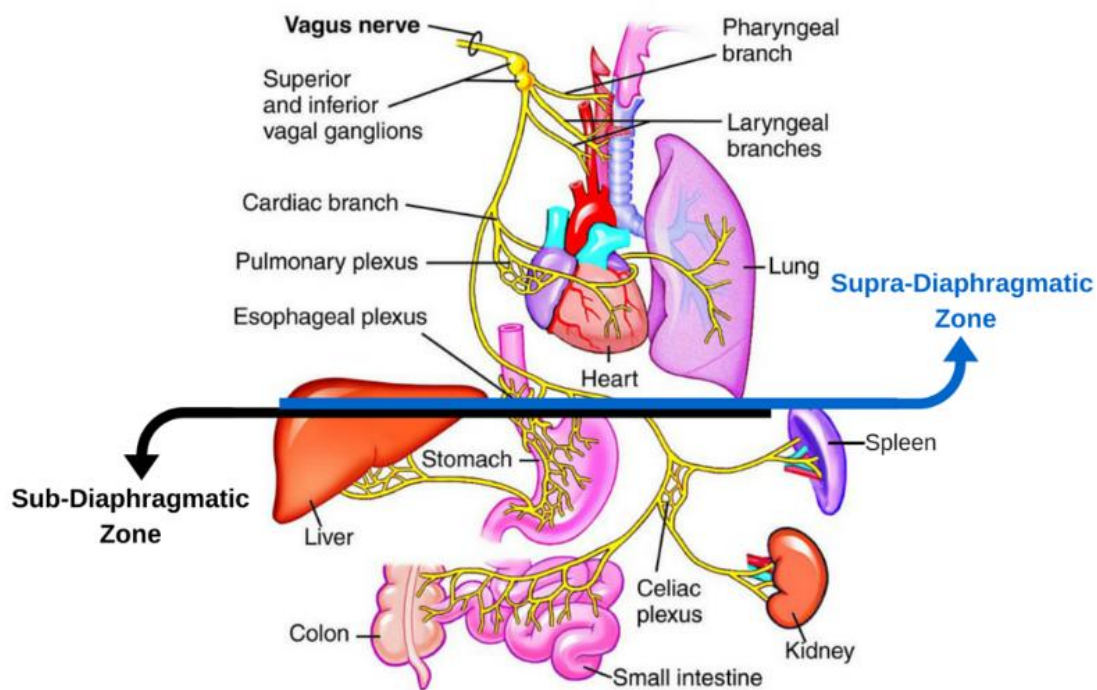
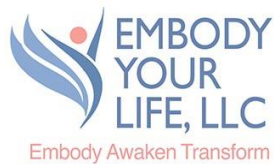


Trauma, the Gunas and the Polyvagal Theory of the Autonomic Nervous System



The Vagus Nerve (Cranial Nerve X) is the link between the brain and the viscera. 80% of Vagus Nerve fibers are afferent, meaning they carry information to the brain.



What is Trauma? Trauma is in the Body, not the Story (or the Event)

"Traumatic symptoms are not caused by the event itself. They arise when residual energy from the experience is not discharged from the body. This energy remains trapped in the nervous system where it can wreak havoc on our bodies and minds." Peter Levine, PhD

"PTSD involves a fundamental dysregulation of arousal modulation at the brain stem level. PTSD patients suffer from baseline autonomic hyper-arousal and lower resting HRV (heart rate variability) compared to controls, suggesting that they have increased sympathetic and decreased parasympathetic tone." Bessel Van Der Kolk, MD, NY Academy of Sciences, 2006

The Threat Response Cycle

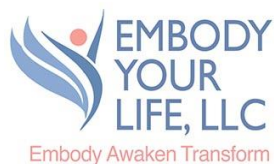
The threat response cycle is a predictable sequence designed for survival that happens automatically and without conscious awareness. This serves to mobilize us to survive quickly without the slower processes of cognition

- Startle – becoming alert to novelty in the environment
- Defensive Orienting – search for the source of the threat; if there is no threat, the organism “shakes” out the energy of alertness and returns to “business-as-usual”
- Fight/Flight – active mobilization of defensive responses to increase chances of survival
- Freeze – tonic immobility if fight or flight are not successful; designed to “feign death” so predator will lose interest or to provide analgesic effect so death is less painful (meant to be time-limited and not chronic)
- Completion of Defensive Action – leads to discharge of survival energies so organism can return to life
- Return to Baseline & Exploratory Orienting – the animal or person begins to explore the environment again without fear; in humans this is a state of calm alertness

Mobility (fight/flight) & immobility (freeze)

This state of immobility or “freeze” holds the key to understanding acute vs. chronic stress. Once aroused, our survival responses of fight or flight need to come to successful completion for our nervous system to come back to a state of rest and equilibrium. When unable to complete these responses, our nervous system’s default is to freeze.

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The frozen, immobilized state may look calm on the outside, but internally the state might contain the intense metabolic energy of fight and flight. The unused fight/flight energy is often just below conscious awareness, creating stress symptoms, which develop when we cannot complete the process of moving through the immobility response and discharging these powerful survival energies.

Since these instinctual energies are generated in the most primitive part of our brain, symptoms of stress tend to be related to the functions regulated by that part of our brain: breathing, heart rate and blood pressure, appetite and digestion, sex and sleep. These symptoms seem to be our bodies' way of binding or containing these intense survival energies until they can be resolved. They show up as stiffness, tightness and tension in the body, and high anxiety or irritability in the mind. Or conversely, they may show up as depression, disembodiment, disconnection, spaciness, low muscle tone, and loose fascia and joints that don't bind our tissues together.

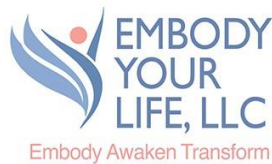
Completing Incomplete Responses

There is little to be gained in re-stressing our nervous systems by re-living a stressful event, or by working with cathartic emotional or highly cognitive methods. These approaches work with the higher brain centers, not the primitive brain centers which mediate survival energies.

The somatic awareness that yoga encourages, provides an avenue for resolving and discharging unresolved survival energies, thereby healing the symptoms of stress. *If our bodies know how to heal, then why haven't we done so?* Just as we have a primitive part of our brain that governs survival responses, we also have higher brain functions of emotional and cognitive responses, which often interfere with this "body wisdom."

To work directly with the inherent wisdom of the body, somatic awareness (or mindfulness of body sensations) largely bypasses the cognitive brain centers by utilizing the "language" of the primitive brain: sensation. By working with a person in a state of resourced, pleasant body sensations and gradually working with the edge of the nervous system activation, the inherent body wisdom takes over. This gradual working of the edges of the nervous system activation gently allows for the discharge and completion of the instinctual survival energies, resulting in a restored sense of settling and wellbeing.

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Trauma, in summary, is caused by an individual's perception of threat or sudden breach of personal boundaries, and their organism's ability to respond, that leads to:

- ↳ **thwarted or incomplete** survival/defensive/protective responses of
 - ↳ *fight/flight*
 - ↳ *freeze/tonic immobility*
 - ↳ **un-discharged freeze** due to coupling of fear and immobility response fuels symptoms
- ↳ **Trauma** is an injury to the autonomic nervous system's ability to flow; it impairs a person's ability to remain present in the here-and-now
 - The ANS attempts to complete the responses, hijacking metabolic energy from the present moment

Healing through Embodiment

"If past experience is embodied in current physiological states and action tendencies and the trauma is reenacted in breath, gestures, sensory perceptions, movement, emotion and thought, therapy may be most effective if it facilitates self-awareness and self-regulation.

***Interoceptive, body-oriented therapies** can directly confront a core clinical issue in PTSD..."*

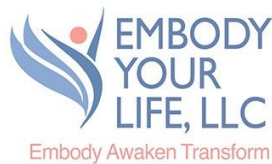
Bessel van der Kolk, MD

- ✧ Healing must **engage the biologically based systems** of the body necessary for regulation and healing
- ✧ Healing must provide a **reparative experience of the regulation of intense traumatic arousal** and affect and facilitate state change
- ✧ The goal is to **expand the person's capacity** to stay present in the here-and-now and re-engage fully in life

WHAT IS EMBODIMENT

- ❑ The sense of one's own body in time and space, as represented in one's brain through interoceptive, proprioceptive and kinesthetic perception, is intimately related to one's sense of self and the base for individual psychological identity
- ❑ Embodiment allows for processing of experience without getting "stuck"; this is mediated by the ability to tolerate sensations and emotions
 - ✓ Experts suggest that body-awareness therapies work by restoring optimal function to this network by way of the interoceptive (insula/anterior cingulate) and premotor cortices.

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DEFINING INTEROCEPTION, PROPRIOCEPTION AND KINESTHESIS

- **Interoception** - You can think of interoceptive awareness, as it's also called, as mindfulness in the body. It is the sensitivity to stimuli originating inside of the body. It pertains to the ability to inhabit the body and be present with bodily sensation as it fluctuates from one moment to the next.
 - Interoception is the name given to the perception of information coming to the brain from the viscera as well as afferents from skin and fascia
- **Proprioception:** The unconscious perception of spatial orientation arising from stimuli within the body itself.
- **Kinesthetic perception** relates to learning through feeling such as a sense of body position, muscle movement and weight as felt through nerve endings.

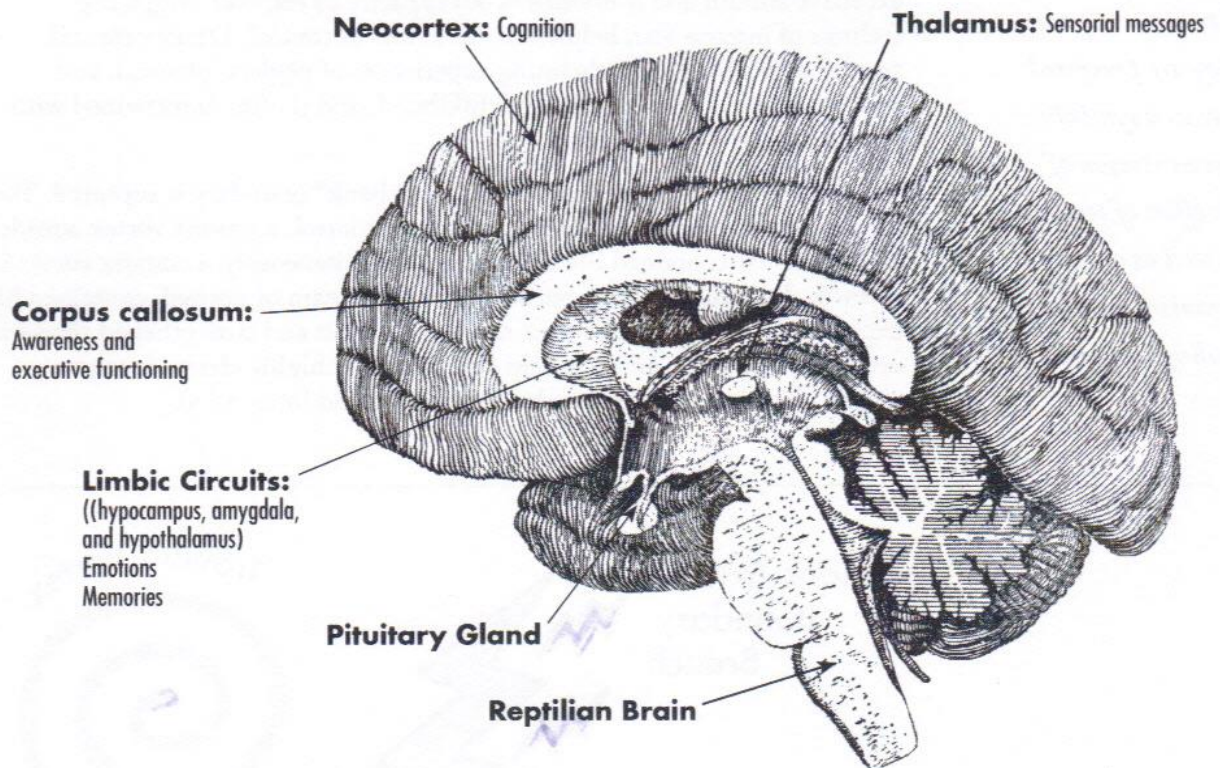
THE PROMISE OF YOGA

- ❑ Leaders in the field of yoga therapy are affirming the role yoga plays on balancing the autonomic nervous system and that yoga asanas are not the only path when it comes to yoga therapy
- ❑ The stress response increases SNS activity, reduces PPNS activity and reduces GABA levels. Yoga practice increases GABA levels, increases activation of the parasympathetic nervous system and reduces activation of the stress response.
- ❑ An understanding of Porges' PVT suggests that yoga works by activating the vagus nerve, in both its branches.
- ❑ Shifting from narrative or cognitions, to somatic awareness is a cornerstone in somatic psychotherapy and yoga alike.
- ❑ Yoga skills for treating trauma include centering, grounding, mindfulness, curiosity about experiencing the present, empowerment, affect-regulation and befriending the body in trauma informed way (Emerson & Hopper, 2011).
- ❑ People may use yoga or other contemplative practices as a spiritual bypass and do not do the psychological work (Hughes, 2015). Somatic psychotherapy may be the place for individuals to work through the psychological issues to move towards a more embodied spirituality.

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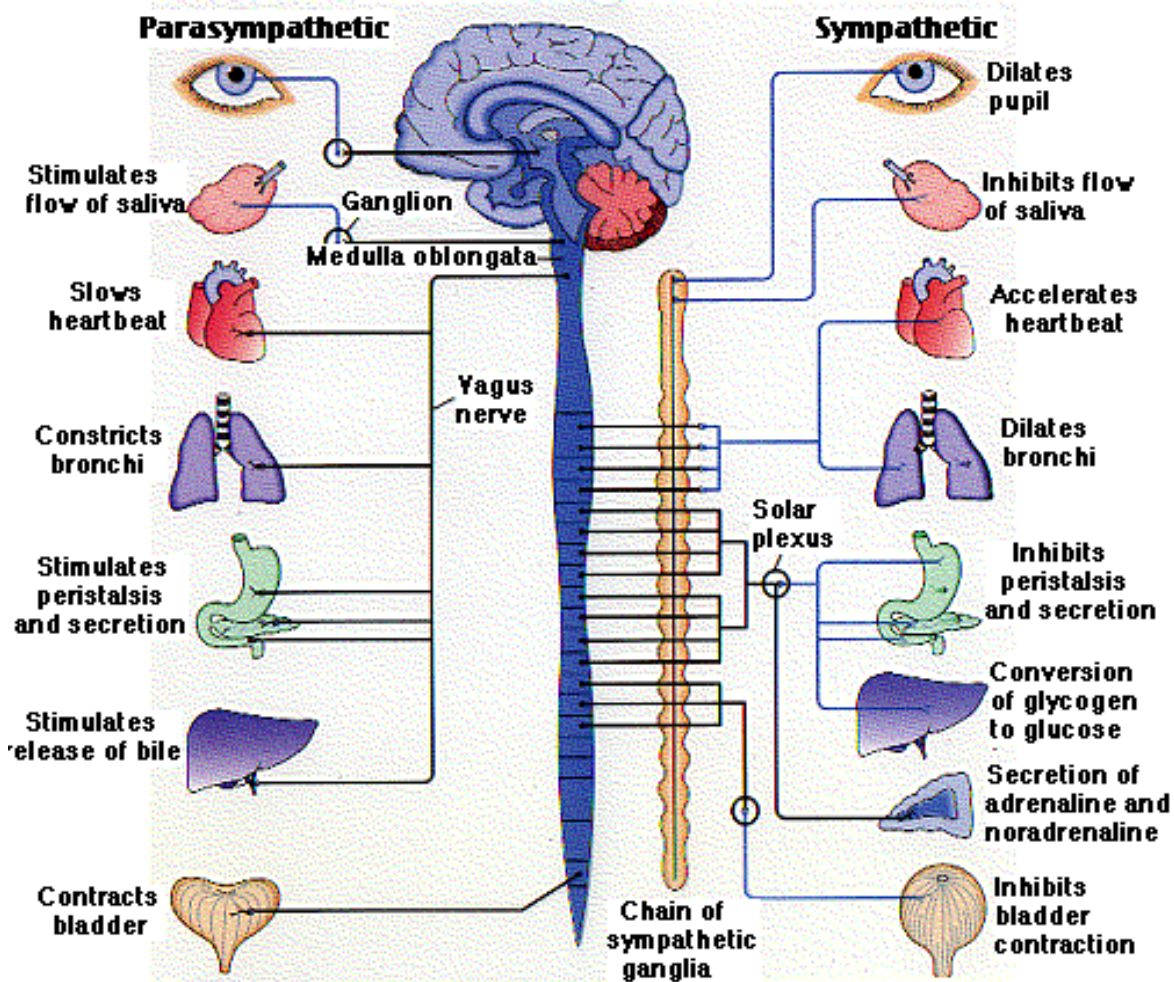
The Triune Brain

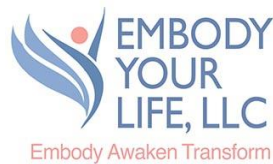
- A. Neo-Cortex
 - a. Governs language, cognition, reasoning, and voluntary movements
 - b. Inhibits and/or regulates other areas of brain activity
 - c. Remembers events chronologically and in sequence
- B. Mammalian Brain or Limbic Circuits
 - a. Governs the expression and mediation of emotions, linked to attachment, instincts and motivational drives
 - b. Contains key receptors of sensations
- C. Reptilian Brain or Brain Stem Governs survival functions - digestion, reproduction, circulation, breathing, and the execution of “fight” or “flight”



The Autonomic Nervous System

The ANS regulates all the basic functions of our bodies, including our visceral system (the internal organs). It operates automatically and is the source of our survival responses. There are two branches of the ANS – the Sympathetic Nervous System (SNS) and the Parasympathetic Nervous System (PPNS). They control opposite physical and emotional reactions depending on the external environment in which we perceive ourselves to be at any given moment. The PPNS helps us rest, unwind, reorganize and regenerate after stress or threat when the SNS arousal has passed. The SNS gets our whole body ready for action during times of stress or threat.





The Polyvagal Theory: A Hierarchical Nervous System

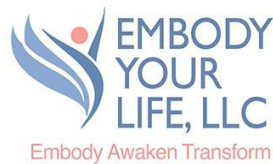
Postulated by Dr. Stephen Porges, the Polyvagal Theory (PVT) emphasizes the neurophysiological and neuroanatomical distinction between **two branches of the vagus** and proposes that each branch supports different adaptive behavioral strategies. The theory articulates **three phylogenetic stages** of the development of the vertebrate autonomic nervous system. Each stage is associated with a distinct autonomic subsystem or circuit that is retained and expressed in mammals. These autonomic subsystems are phylogenetically ordered and behaviorally linked to social communication (e.g., facial expression, vocalization, listening), mobilization (e.g., fight-flight behaviors) and immobilization (e.g., feigning death, vaso-vagal syncope, and behavioral shutdown). The PVT emphasizes that physiological states support different classes of behavior. For example, a physiological state, characterized by a vagal withdrawal, would support the mobilization behaviors of fight and flight. In contrast, a physiological state, characterized by increased vagal influence on the heart, would support spontaneous social engagement behaviors.

Porges stated that the autonomic nervous system responds in a highly sequenced response hierarchy to environmental stimuli, based on a neural process he calls “neuroception” that evaluates risk and modulates vagal output, triggering or inhibiting defense strategies for survival. **Neuroception**, as a process, determines whether specific features in the environment elicit specific physiological states that would support either fight-flight or social engagement behaviors. Neuroception may involve areas of the temporal cortex that decode biological movement and detect the intentionality of social interactions.

Ventral Vagal: The social communication system (i.e., Social Engagement System, see below) is dependent upon the functions of the myelinated vagus, which serves to foster calm behavioral states by inhibiting the sympathetic influences to the heart and dampening the HPA axis (e.g., Bueno et al. 1989). The mobilization system is dependent on the functioning of the sympathetic nervous system.

Dorsal Vagal: The most phylogenetically primitive component, the immobilization system, is dependent on the unmyelinated or “vegetative” vagus, which is shared with most vertebrates. With increased neural complexity due to phylogenetic development, the organism’s behavioral and affective repertoire is enriched. The three circuits can be conceptualized as dynamic, providing adaptive responses to safe, dangerous, or life threatening events and contexts.

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Ventral Vagal Complex (VVC) – signals for motion, emotion and communication to promote bonding and social engagement.

Sympathetic Nervous System (SNS) – signals for mobilization of defensive responses of fight and flight behaviors.

Dorsal Vagal Complex (DVC) – immobilization system for energy conservation and withdrawal; it's a passive survival system.

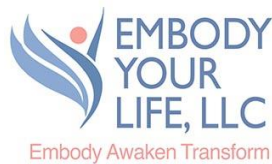
THE POLYVAGAL THEORY

VAGAL FUNCTIONS	SAFETY	DANGER
VENTRAL VAGAL	CONNECTING & BONDING	RELEASE VAGAL BREAK
SYMPATHETIC	PLAY	FIGHT & FLIGHT
DORSAL VAGAL	REST, DIGEST	TONIC IMMOBILITY

THE CORE RESPONSE NETWORK

- When we are working with people in a way that incorporates the body's neurophysiology, we are working with the Core Response Network (CRN), which includes the Autonomic Nervous System (ANS), the Reticular Arousal System (RAS), the Limbic System (LS) and the Emotional Motor System (EMS). These systems organize ***immediate, instinctive response to environmental challenges, prior to extensive cortical processing.***
- ***The influence of conscious conceptual thought processes on the CRN is relatively weak and indirect,*** whereas the influence of those portions of the cortex mediating interoceptive, proprioceptive and kinesthetic awareness is relatively strong and direct. These areas include the **insula and anterior cingulate cortex**, and the sensorimotor and pre-motor cortex, among others.

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The Language of Sensation: Speaking to the Amygdala

- Use sensation-based language; a felt sense is not a mental experience, but a physical one, a bodily awareness of a situation, person or event; broaden awareness of bodily experiences.
- Slow down, expand the experience of sensation
- Be curious (“What would it be like to stay with this sensation and see what happens next?” or “Is there an opposite sensation/image/feeling?”)
- Track sensations by moving attention between the activation and settling (pendulation), allowing the nervous system’s organic intelligence to engage within that cycle and inviting coherence.
- Bring back elements of awareness, mobilizing sensory-motor energy; restoring, developing and organizing both the physiology and affective states.
- Read the impulses and inhibitions; what is the underlying conflict? How does the body want to express it?

Sensation Words

- | | | | |
|---------------|-------------|--------------|---------------|
| • Achy | • Energized | • Loose | • Spacious |
| • Alive | • Expanding | • Moist | • Soft |
| • Bloated | • Faint | • Nauseous | • Spasms |
| • Blocked | • Fluid | • Numb | • Still |
| • Bubbly | • Flushed | • Open | • Suffocating |
| • Burning | • Flutter | • Pounding | • Sweaty |
| • Buzzy | • Frantic | • Paralyzed | • Tender |
| • Chilled | • Frozen | • Pulsing | • Tense |
| • Clammy | • Full | • Quaking | • Throbbing |
| • Cold | • Heavy | • Quivering | • Tight |
| • Congested | • Hot | • Quiet | • Tingling |
| • Constricted | • Icy | • Radiating | • Trembling |
| • Contracted | • Intense | • Rolling | • Twitchy |
| • Cool | • Itchy | • Shaky | • Vibrating |
| • Cozy | • Jittery | • Shivery | • Warm |
| • Damp | • Jumpy | • Shimmering | • Wobbly |
| • Dizzy | • Knotted | • Smooth | |
| • Empty | • Light | • Shudder | |

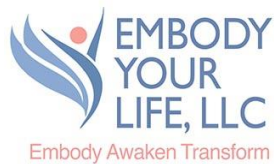
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Defining the Gunas

TAMAS	RAJAS	SATTVA
<ul style="list-style-type: none"> • Immobilizing • Destructive • Negative • Dark 	<ul style="list-style-type: none"> • Mobilizing • Positive • Agitating • Fluctuating 	<ul style="list-style-type: none"> • Balancing • Harmonizing • Clear • Light

GUNAS	ANS FUNCTION	PRESENTATION
SATTVA	VENTRAL VAGAL	FRIENDLY, OPEN, CURIOUS, ENTHUSIASTIC, HEALTHY, BALANCED, ADAPTABLE
RAJAS	SYMPATHETIC	ANXIOUS, NERVOUS, UPTIGHT, TENSE, FRENETIC, DIFFUSED ATTENTION, EMOTIONAL
TAMAS	DORSAL VAGAL	LOW ENERGY, LOW MUSCLE TONE, FLOPPY, UNCOORDINATED, SPACEY, NEGATIVE, APATHETIC

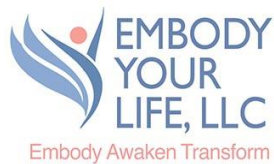
- ✚ A Sattvic/Ventral Vagal dominant nature shows a spiritual disposition with few psychological issues, adaptable, flexible, calm, friendly, easy-going – yogic practices should move us further toward this state, which is the realm of sages and saints.



- ✚ Most of us fall in the Rajasic/Sympathetically dominant category in this outgoing, active culture that overvalues doing vs. being/resting/relaxing; generally anxious, nervous, overactive, distractible, easily irritated; increasing the sattvic nature of rajas will be important, and sattvic tamas for stabilizing the body and the mind
- ✚ Tamasic/Dorsal Vagal dominant people have a danger of severe psychological disturbances, often characterized by denial and resistance to change; this is the realm of addictions and self- or other-destructive behaviors; introducing some sattvic rajas will help move things along

THE ROLE OF THE TEACHER

- ✚ Maintain their own self-regulation and presence in order to provide containment to keep the student(s) within *their* window of tolerance
- ✚ Assess moment-to-moment shifts in nervous system and titrate pace of movement through poses to a manageable range of arousal
- ✚ Work with dominant phase by “prescribing” the right practices for personal sadhana – asana, pranayama, mantra – to support movement from tamas to rajas to sattva, from depression to activation to balance
- ✚ Attune emotionally to evaluate students’ situation clearly and support healing



GENERAL RECOMMENDATIONS

Rajasic/Sympathetic Dominance

Begin active, slow down
movements, invite awareness of
moving in synchrony with breath.
Gradually lengthen the exhales
and introduce more restful poses
Emphasize twists/forward bends

Tamasic/Dorsal Vagal Dominance

“Titrate” entry into more
vigorous, energizing poses
Deepen inhales to window of
tolerance (“taking in life”)
Move from supine to standing and
balancing poses + gentle
backbends

INCREASE RAJAS TO BREAK UP TAMAS: PURIFICATION PHASE (THE SUN)

Goal: Increase light of self-awareness; release deep seated patterns of attachment, stagnation and depression (Yamas & Niyamas)

Attitude: Abhyasa – continuity of practice; support motivation by highlighting mastery of the foundational aspects of yoga

Strategies: Increase activity to break up inertia (Asana, Pranayama); use mainly Brahmana (Energizing) practices that emphasize dynamic movement coordinated with the breath

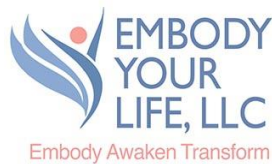
Asana Categories: Extensions, Laterals, Backbends, Twists

Bandhas: Uddiyana, generate awareness at the navel, activate 3rd chakra, build Buttha Agni, the fire of transformation

Pranayama: Ujjai, Increase Inhales and introduce holds after inhale, create heat/“Tejas” with Bhastrika/Kapalabhati

Meditation: Awareness/Concentration Navel Center, Mantra “Ram”, Maha Mrityunjaya Mantra

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Chakras: Root/Muladhara, Sacral/Svadhishthana, Navel/Manipura

Vayus: Inhale Pran to Navel, Exhale Apan to Navel = Samana, also Udana (force of enthusiasm)

Koshas: Annamaya (physical body), Manomaya (mind), Pranamaya (energy body)

CALM RAJAS TO INCREASE SATTVA: CULTIVATING MENTAL STABILITY (THE MOON)

Goal: Move from ego-centered, self-motivated action to selfless action

Strategy: Reduce activity and move inward (Pratyahara – sense withdrawal; Dharana – concentration of Prana); utilize slower movement and longer holds in the poses to increase mental stability and soften effort

Asana Categories: Extensions, Forward Bends, Twists, Inversions, Sama Shiti (stillness) with increased periods of Smarana (remembrance, self-reflection)

Bhandas: Mulabhandha & uddyana to ground and center

Pranayama: Ujjai, focus on throat, to stabilize mind; slower and longer exhales; nadi shodhana/alternate nostril breathing; brahmari (“bee” breath) is cooling in nature

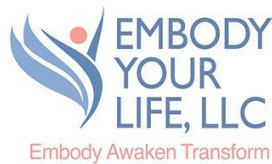
Meditation: Awareness at the heart, with mantra “So Hum” (I am that, I aspire to the spiritual), or Ham Sa (Universal and Individual are One)

Chakras: Navel/Manipura, Heart/Anahata

Vayus: Pran/Heart area to restore vitality, Samana to digest impressions

Koshas: Vijnanamaya (Budhi, higher intellect, intuition, wisdom)

Vichara: a self-inquiry practice to become clear about patterns driving behavior and whether they emanate from lower mind or the higher mind that leads to Purusha; increase discernment and choose wisely



PERFECTING SATTVA PHASE: AWAKENING & ENLIGHTENMENT (THE FIRE)

Goal: Cultivate authentic joy, inner peace; ultimately, transcend the Gunas, from duality to non-duality

Strategies: Move from self-less service to increased meditation/mantra japa (Samyamas: Dharana, Dhyana, Samadhi)

Asana: Less emphasis on asana over time; mainly Langhana (Reducing) or Samana (Equilizing) practices that engage parasympathetic response and tone the digestive and circulatory system for optimal health and wellness

Pranayama: Internalizing practices, such as alternate nostril breathing; increase in kumbaka/breath retentions; pure breathing (circular, no vrittis); Brahmari with Yoni Mudra (Sanmuki Mudra)

Bhandas: Tetra Bhandas, hold energy/Prana in the body

Chakras: Heart/Anahata, Throat/Vishuddhi, Third Eye/Ajna ...
Crown/Sarashara

Vayus: Vyana, distributes prana and integrates all vayus

Koshas: Anandamaya Kosha (the bliss sheath) and beyond

Bhakti yoga: or devotional yoga

Laya yoga: dissolving the chakras

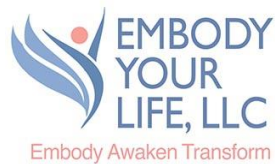
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