

Pain from a Polyvagal Perspective: How the Autonomic Nervous System Supports or Dampens Pain

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1

Premise

- Chronic pain is part of a coordinated defense response to threat.
- Chronic pain is dependent on being in a physiological state that supports defense.
- Calm the body and pain dissipates.

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2

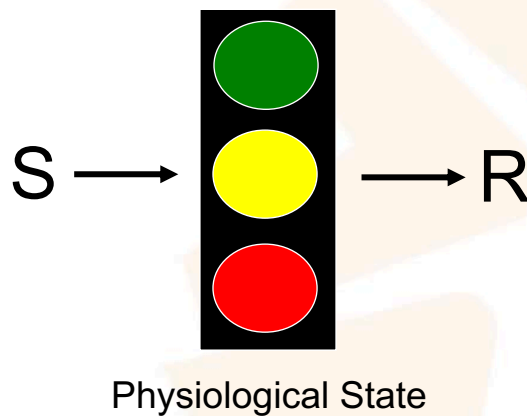
Polyvagal Theory

- Physiological state is an intervening variable, biasing reactions to cues of safety and threat while supporting or dampening chronic pain.

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3

Physiological (Autonomic) State An Intervening Variable Influencing Feelings of Pain

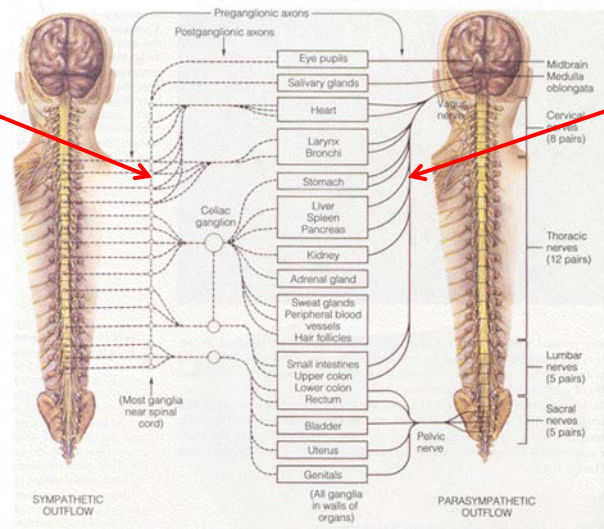


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4

The Autonomic Nervous System: A Paired Antagonism Perspective

Sympathetic
Nervous System



Vagus
(Parasympathetic
Nervous System)

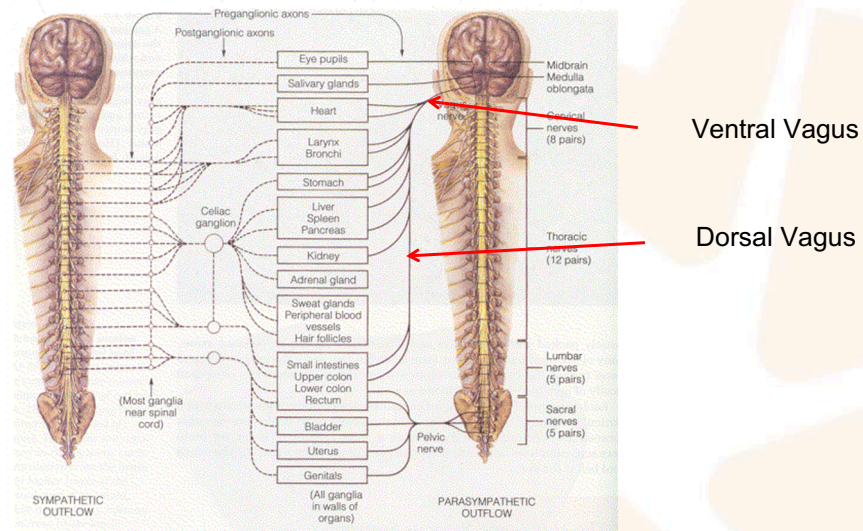
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Polyvagal Theory

- Evolution provides an organizing principle to understand neural regulation of the human autonomic nervous system as an enabler of social behavior and down-regulator of chronic pain.

6

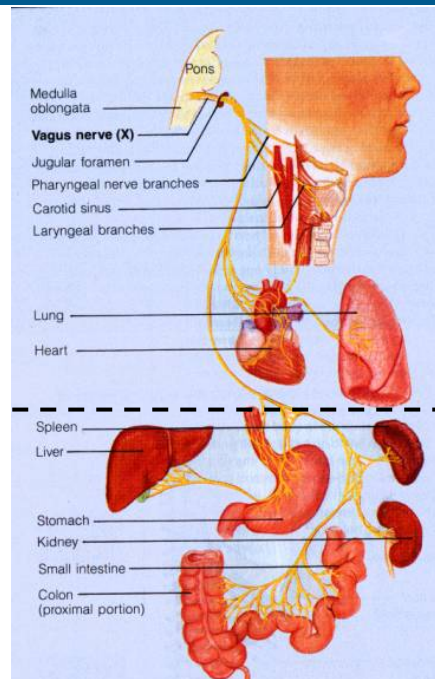
The Autonomic Nervous System: A Paired Antagonism Perspective



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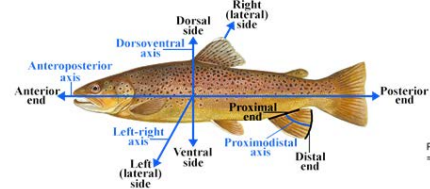
Ventral Vagus
(organs above diaphragm)

Dorsal Vagus
(organ below diaphragm)

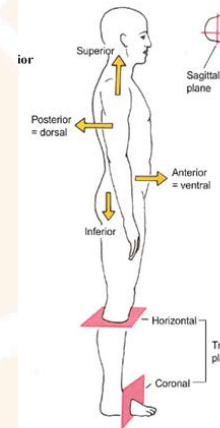


8

Dorsal and Ventral

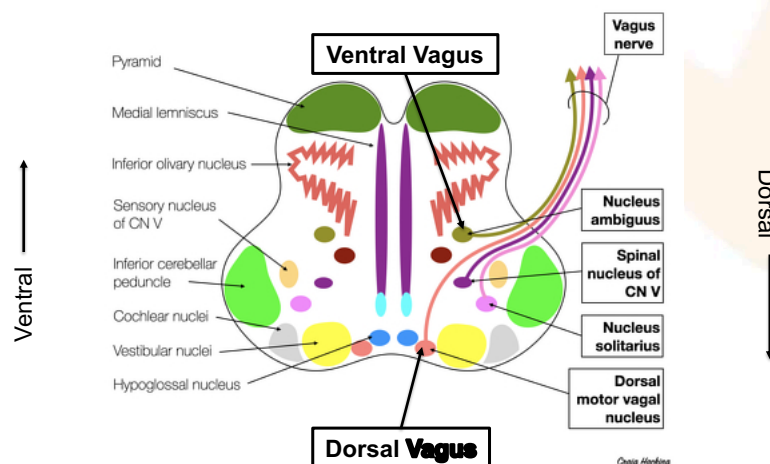


Dorsal = towards the back
Ventral = towards the front



9

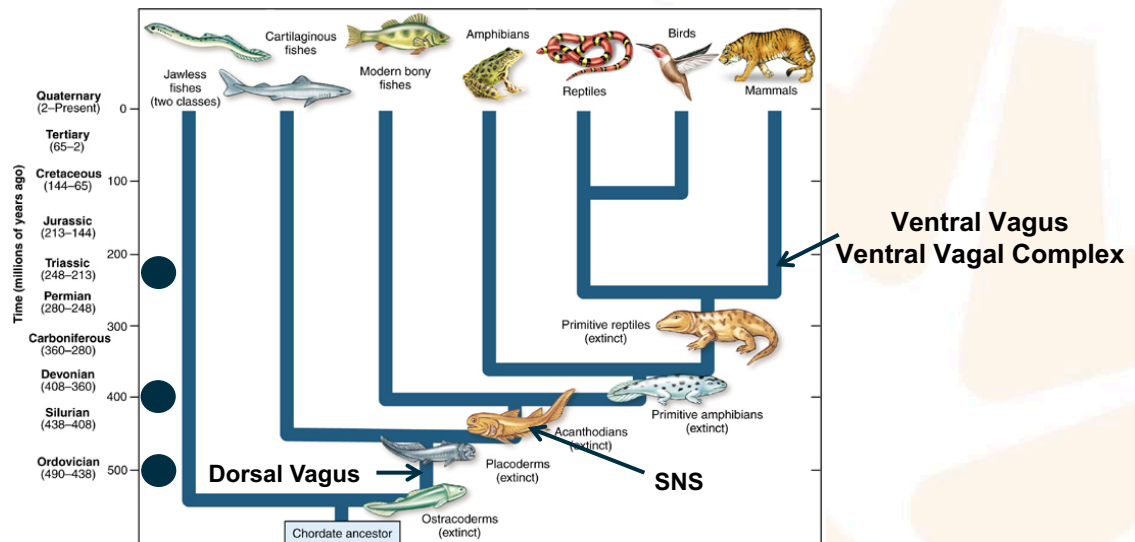
Brainstem Origin of the Vagus



Craig Harkley
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Radiopaedia.org

10

Evolutionary Journey to Sociality



11

Polyvagal Theory

- Three neural circuits form a phylogenetically-ordered response hierarchy that regulate behavioral and physiological adaptation to safe, dangerous, and life-threatening environments.

12

Threat Triggers Dissolution: Evolution in Reverse

Structure	Function	VVC	SNS	DVC
Head	Communication	+		
Limbs	Mobilization		+	
Viscera	Immobilization			+

VVC = Ventral Vagus Complex
DVC – Dorsal Vagus Complex

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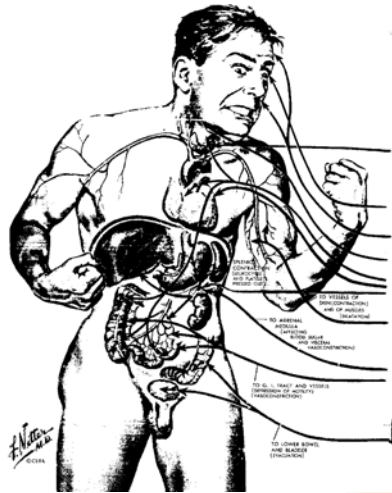
13

Dorsal Vagal Defense Immobilization with Fear



14

Sympathetic Nervous System Defense Mobilization with Fear



15

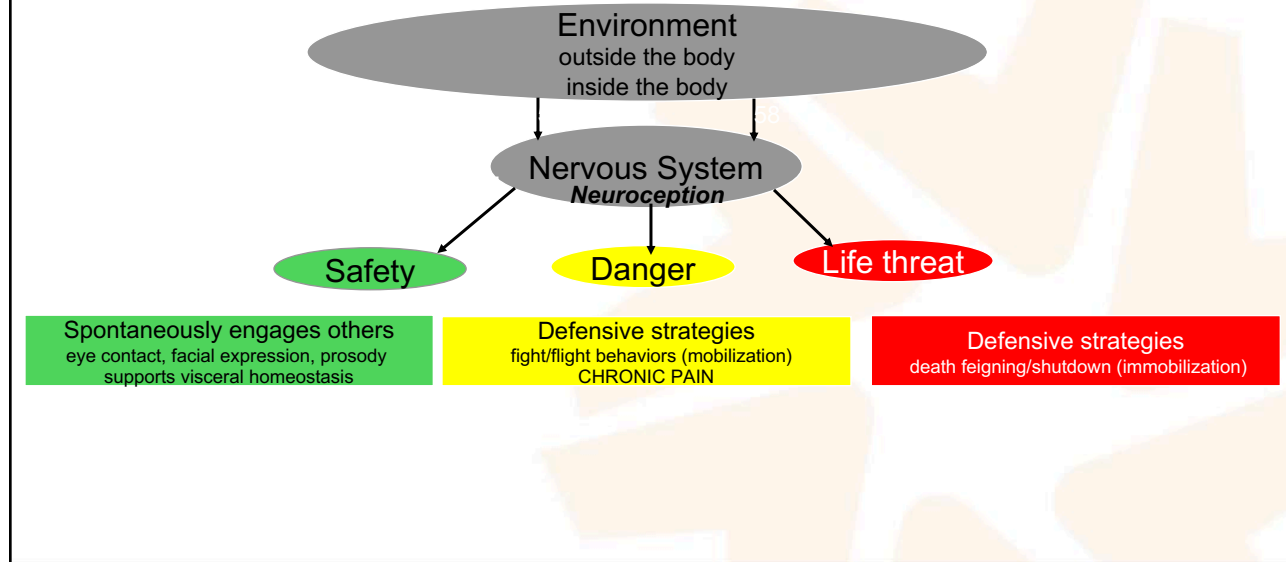
Ventral Vagal Social Engagement System

Sociality and Accessibility



16

The Quest for Safety: Emergent Properties of Physiological State



17

Polyvagal Theory

- “Neuroception” of danger or safety or life threat trigger these adaptive neural circuits that influence the experience of pain.

18

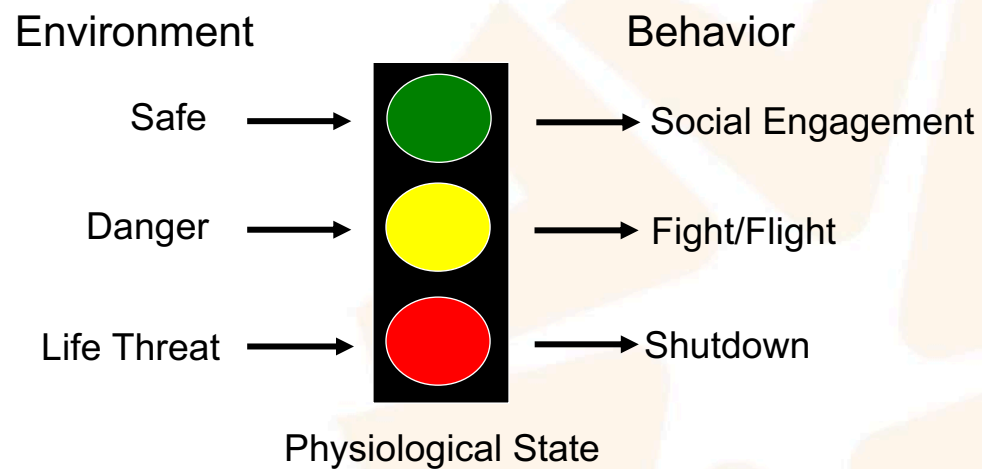
Neuroception

- The neural evaluation of risk without conscious awareness.
- A reflexive mechanism capable of instantaneously shifting physiological state.
 - Reactions to threat cues are processed via neural circuits shared with our phylogenetic vertebrate ancestors.
 - **Reactions to safety cues are uniquely mammalian.**

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19

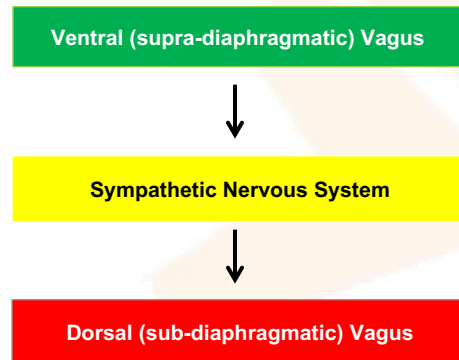
Neuroception



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20

Hierarchical Model of Autonomic State Dissolution (Evolution in Reverse)



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21

Neuroception Our Personal TSA Agent



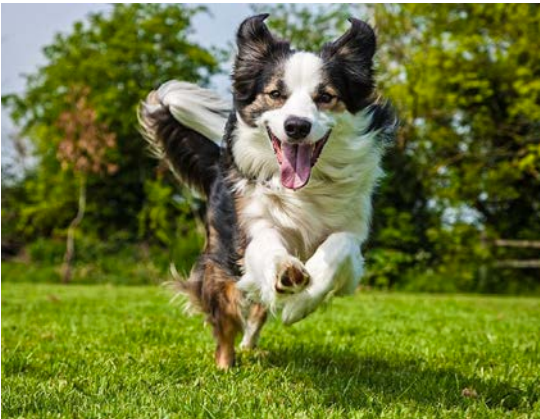
22

Neuroception of Threat Autonomic State Supports Aggression



23

Neuroception of Safety Accessibility and Social Engagement



24

Neuroception of Safety Accessibility and Social Engagement



25

Social Engagement or Threat



26

Social Engagement or Threat



27

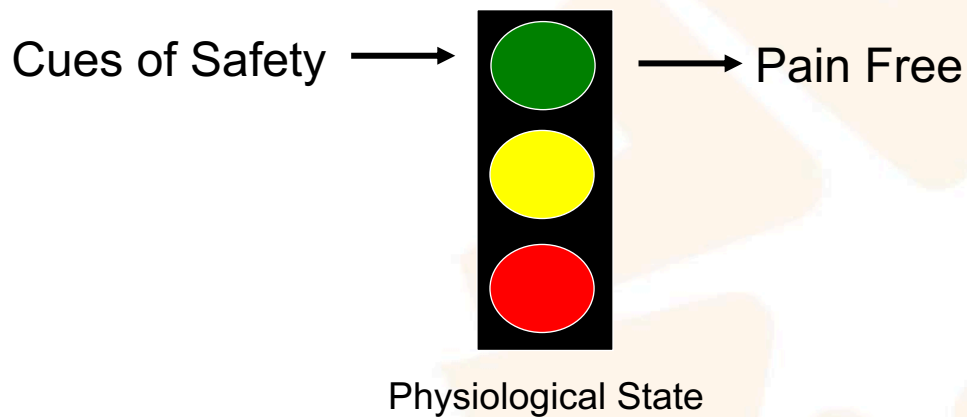
Social Engagement or Threat



28

Physiological State

An Intervening Variable Capable of Dampening Pain

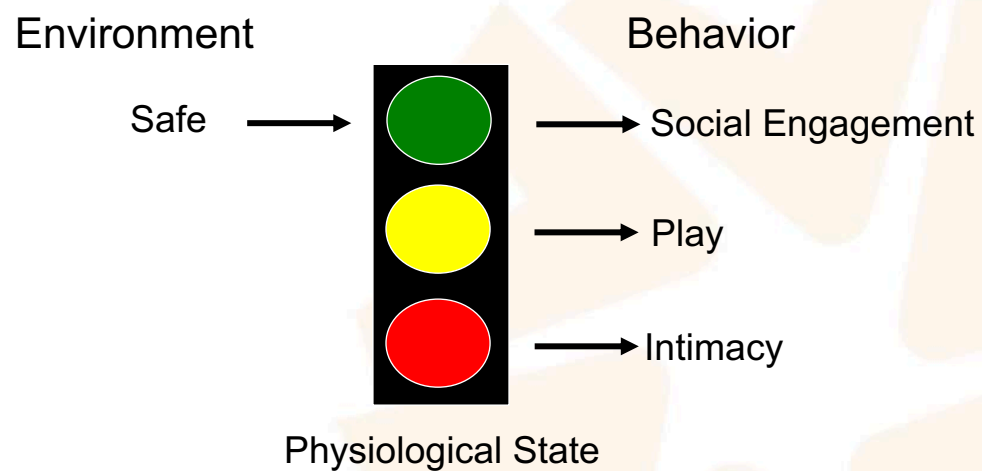


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29

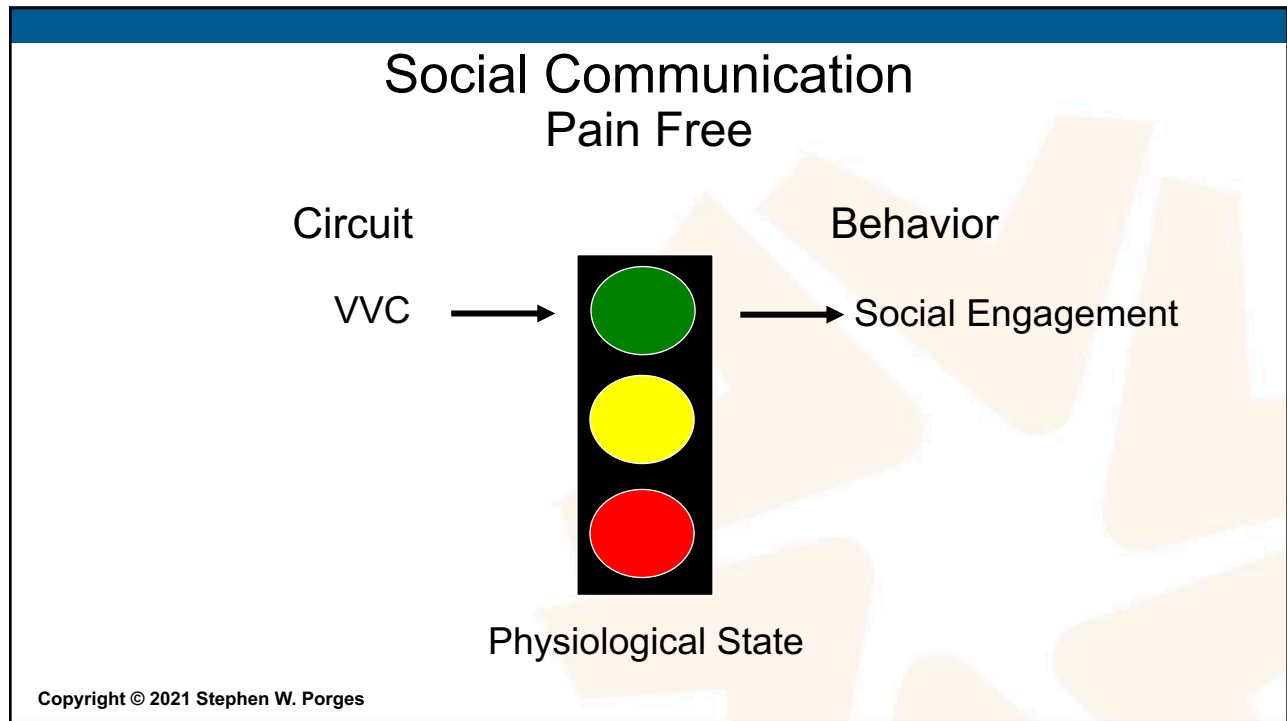
Neuroception

Feeling Safe Dampens Chronic Pain

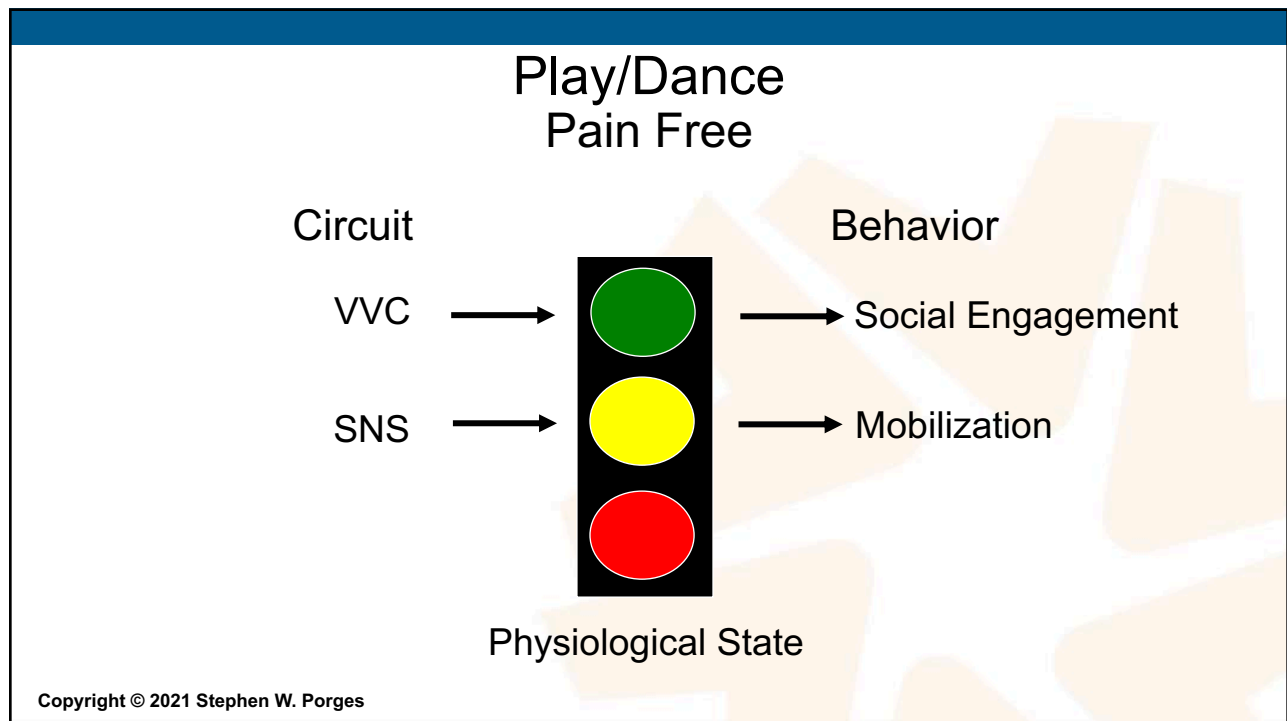


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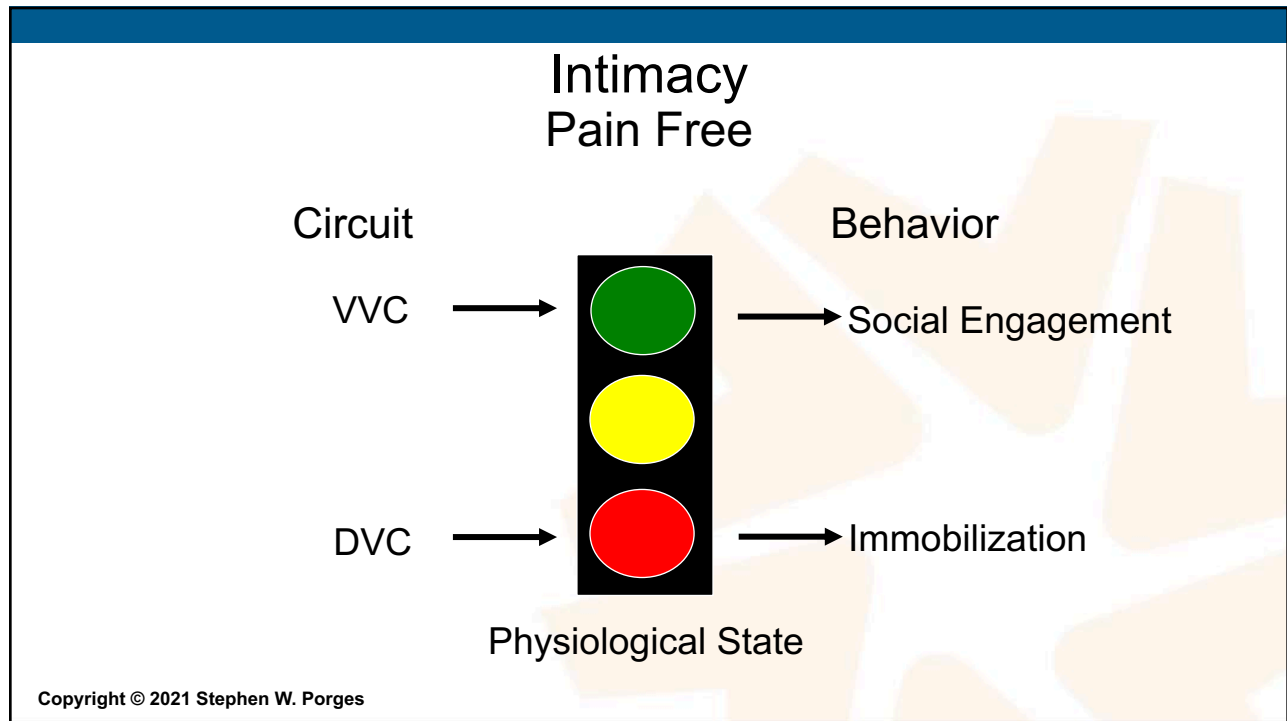
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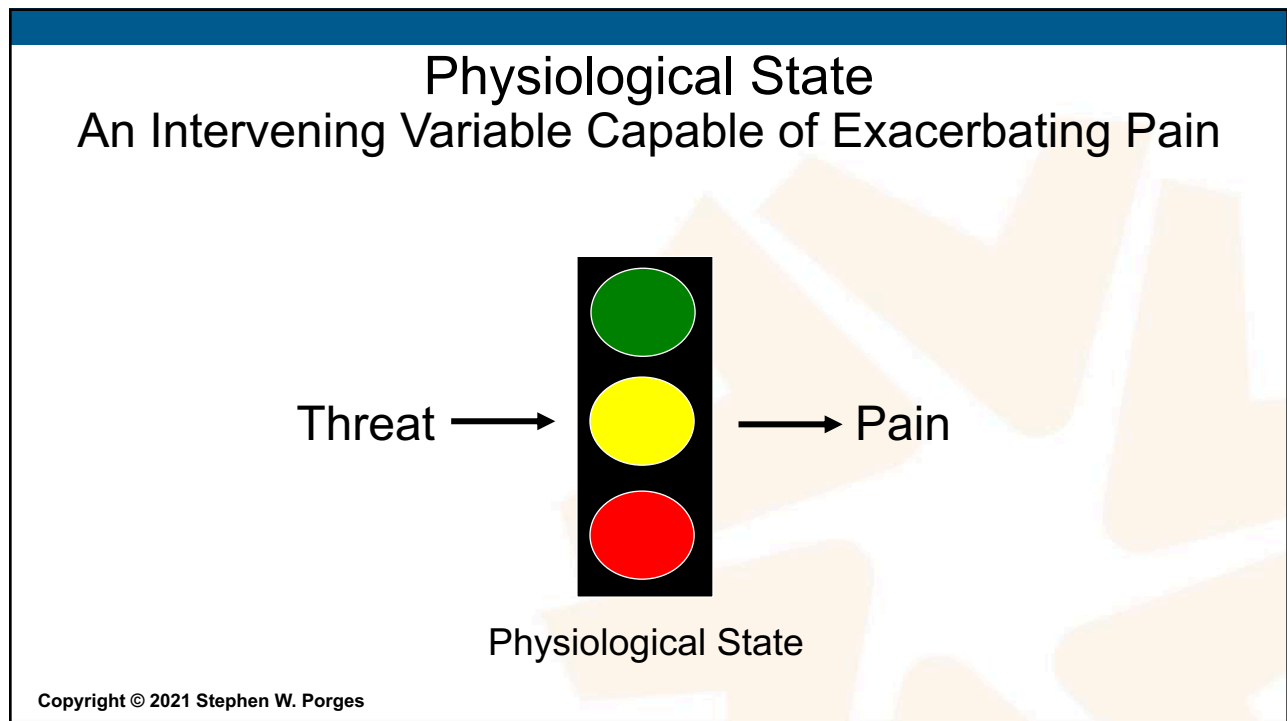
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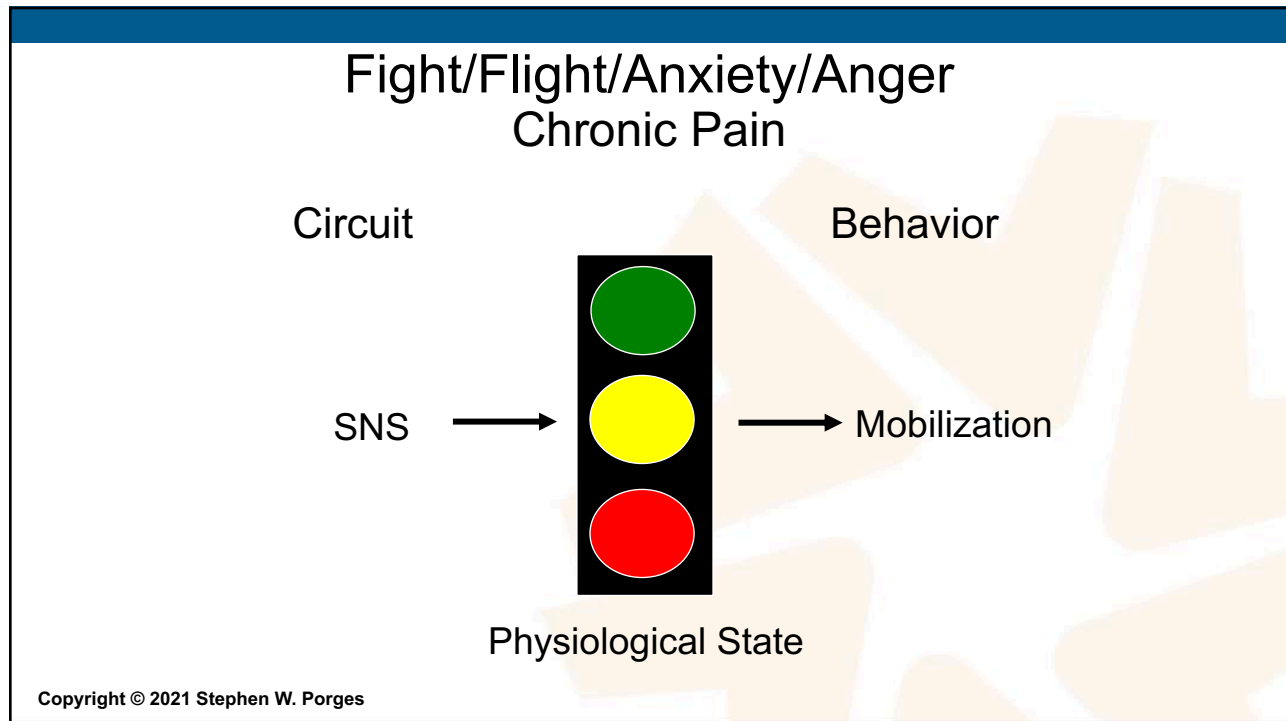
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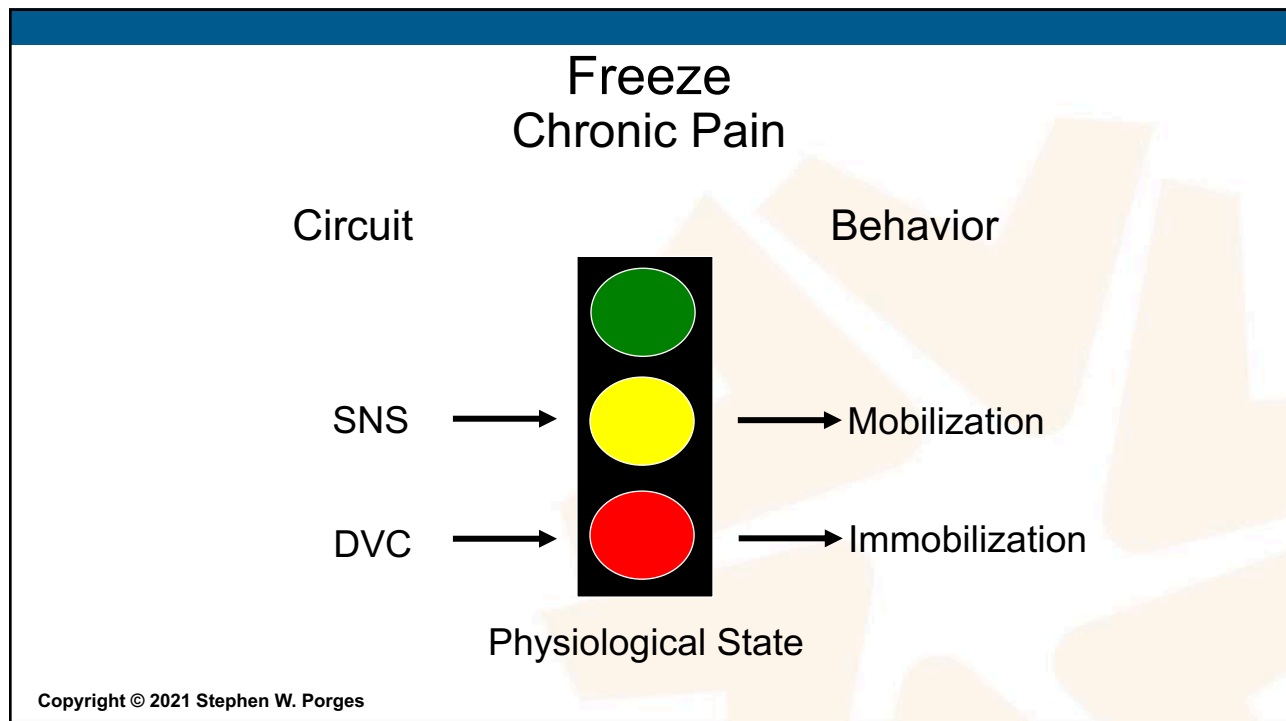
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34



35



36

Neuroception of Safety Starting the Journey to Pain Free

- Decodes and interprets the assumed intention of movements and sounds of inanimate and living objects.
 - Threat => hypervigilant and irritable
 - Safety => calm and accessible
- Familiar individuals and individuals with appropriately prosodic voices and warm, expressive faces frequently initiate calmness and positive social interactions that promote a sense of safety that down regulates defense and dampens chronic pain.

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37

Treatment of Chronic Pain Through the Lens of the Polyvagal

- Cues of safety move the nervous system out of a state of threat supported by sympathetic dominance into a calm ventral vagal state enabling co-regulation and feelings of safety that dampen chronic pain.

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38