

## Commentary on Babette Rothschild's new book and chart

By John Chitty

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I was asked by Nancy Eichhorn, PhD, to elaborate on comments she heard me make during the December 2017 APPPAH Congress in San Diego. I gave a presentation entitled "Polyvagal Theory: An Overview" in which I briefly explained the main concepts of Stephen Porges' work and discussed its importance especially in the context of pre- and perinatal psychology. I used Babette Rothschild's chart (*The Body Remembers, Volume Two, Chapter 2, inserted after page 38*) to illustrate how I think the full value of Porges' discovery has not yet been fully realized.

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Porges, Stephen. *The Pocket Guide to Polyvagal Theory: The Transformative Power of Feeling Safe*. Norton, 2017. This recent effort by Porges is an easier read than his first explication of Polyvagal Theory (2011), which was highly scientific in tone.

The chart is available as a laminated card or wall chart from [www.norton.com](http://www.norton.com), or phone 800-233-4830 and ask for ISBN 978-0-393-71281-0 for the poster). Highly recommended!

I am a big fan of Rothschild. Her earlier book (2000) elevated awareness of the autonomic nervous system (ANS), the substrate of all health, in the psychotherapy world, and taught us to look for and precisely recognize ANS signals in order to appropriately support recovery from trauma. Her new book adds excellent additional detail, including a "six-categories-of-ANS" poster that can now be viewed on the wall of our classroom at CSES. The bulk of the book is about therapy insights, which I found to be excellent; my concerns were just in a few pages of her Chapter Two.

The problem for me starts with Rothschild's description of Polyvagal Theory (PVT), which occupies two pages in the chapter. She summarizes PVT as being the discovery of the "ventral vagus" function as distinct from the previously-known "dorsal vagus" function, which is the foundation of the parasympathetic branch of the autonomic nervous system. Both down-regulate the heart, but in different ways. She states that calm states arise from the ventral branch, and that collapse states arise from the dorsal branch. This is not all wrong, but for a person of Rothschild's immense professional stature, I was really hoping for more.

As a side note, in Rothschild's five paragraphs, there are two trivial errors: (1) the adjectives "ventral" and "dorsal" refer to the positions of vagal nuclei in the brainstem, not the body generally, and (2) "ventral vagal" is not exactly synonymous with "parasympathetic calm."

More importantly for me, Rothschild does not convey the real significance of the Polyvagal Theory. She provides substantial commentary to say that she is not "picking sides" in the "debate;" however, I think she should articulate the two sides accurately, whether she is taking a side or not. One side is the familiar dualistic ANS model, and the other side is the new PVT model; the former is well-known, but the latter is not represented well. She makes the point that a synthesis of the two would be good, and I agree, but she does not venture far into that territory in this book.

This writing is to represent my perspective. I have been exploring and testing PVT for 17 years and found it to be repeatedly confirmed, and I like to take any opportunities that arise to explain it.

### **About Polyvagal Theory**

Polyvagal Theory overturns the conventional understanding of the ANS that we all learned in school under the rubric "flight/fight versus rest/rebuild." I think PVT is a true paradigm-buster, with enormous implications for health care in general and child care in particular. Instead of a two-fold, reciprocal system (sympathetic for excitation and parasympathetic for soothing), Porges describes a three-part system that is partly sequential, based on phylogeny (the evolutionary history of various functions, such as heart regulation). With PVT, we finally have a comprehensive hard science explanation for many behavioral effects.

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Here's a quick description of phylogeny, which is essential to understand PVT (and absent entirely from Rothschild's new book). In vertebrates, the evolution of involuntary heart regulation shows three clear stages, spanning about 400 million years.

The initial burst comes from chromatin tissue, preceding what we normally think of as autonomic, so we are not counting that as a stage. Very ancient vertebrates (such

as lampreys) gain the first stage, a way to slow down the heart; this is primarily the dorsal motor nucleus of the vagus nerve, plus eventually the sacral plexus, and their parasympathetic functions.

Move forward a hundred million years or so and later vertebrates (such as bony fish) gain additional equipment to stimulate the heart with greater precision and force; this is the sympathetic ANS.



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Then much later, with mammals and especially with primates, a third calming function appears, which we will call social engagement. Mammals and primates, quite new on the evolutionary scene, have an essential need for extended protection so that their much more sophisticated cortex has time to develop. In the case of humans, this means decades, until the brain areas for risk assessment have time to mature around age 22-25. This is too important to be left to chance, so the new protective function must be hard-wired, or involuntary. In her wisdom, Mother Nature added an ANS patch for this bonding purpose.

The evolution of mechanisms for excitation and calming cycles can be drawn as a sine wave with well-established upper and lower

limits, the “window of tolerance” (Rothschild, page 46, referencing Levine, Ogden and others) or “window of presence” (Anna Chitty and Ray Castellino, personal communications, 2017). The up- and down-regulating capabilities appeared in sequence: first up, then down, then a better up, then a better down. ANS configurations above the basic wave are hyper-states, and below the wave are hypo-states. Hyper-states precede hypo-states, and hypo-states are well-known to be more dangerous and intractable, as the PVT predicts.

Under stress, we try our most modern strategy first (social engagement). If that does not work or has not worked in the past, we try our more primitive strategy,

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(parasympathetic). If parasympathetic does not work, such as in shock states or severe depression, we are in great danger. The stress responses are played in a sequence. As John Hughlings Jackson (father of neurological science) taught, the newer strategies operate on the older. This makes social engagement the probable winning card for any game.

In the case of newborns, successful social engagement is mission-critical for lifelong ANS resilience. If the social function is defeated (such as by separation, anesthesia or betrayal), babies will not spend long in the next option (sympathetic) because they have neither muscles nor autonomy for effective flight/flight. There may be some angry crying, but it is not usually sustainable. The baby then defaults to the lowest rung on the ANS ladder, the parasympathetic stress responses. Osteopathic medicine reassures us that "the health is never lost," but the full range of ANS functionality may be obscured until supportive resources can be supplied.

The PVT model makes sense of a host of readily observable phenomena including: why safety is of supreme importance in therapy; why betrayal has such a huge impact; the extreme difficulty of depression; and so on. The sequential aspect also allows us to de-pathologize sympathetic stress responses, which have gotten a bad rap for a long time. The goal of therapy is to restore full range of motion in the whole ANS, not to get the client out of sympathetic states, as I was taught.

## **About "Ventral Vagus"**

The next point to clarify is about the "ventral vagus." The vagus nerve (Cranial Nerve X) has four nuclei. In the early 1990s, Porges noted that one of the four, closer to the front in position, did not meet the normal criteria for definition as a parasympathetic nerve. It is myelinated for faster signaling and separated in evolutionary appearance by hundreds of millions of years. Also, it is not primarily targeting smooth muscle such as the viscera, and it has a significantly different function. It is lumped in with the rest of the vagus just because they arise in the same place and both have a soothing effect. They were named with the one label long ago, but really the new branch should have a different name altogether, in my opinion. In any case, "ventral vagus" is not synonymous with "social engagement system" or "parasympathetic."

Rothschild labels her poster's PNS II column "Ventral Vagus," a partially incorrect title that is likely to confuse. The correct phrasing for an anatomical reference for social engagement is more aligned with the "corticobulbar tract," or the "social engagement autonomic nerve complex," or something similar. This terminology references the entire group of involuntary mechanisms necessary for social function including: cranial nerves V (trigeminal), VII (facial), IX (glossopharyngeal), and XI (accessory), in addition to CN X, the vagus. Using "ventral vagus" as an umbrella term for "social engagement nervous system" ignores the contributions of the other cranial



## Rothschild's Chart from Chapter 2, page 38.

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	Yellow	Green	Blue	Orange	Red	Purple
<b>AUTONOMIC NERVOUS SYSTEM: PRECISION REGULATION</b>						
<b>** WHAT TO LOOK FOR **</b>						
	LETHARGIC <i>Parasympathetic (PNS)</i>	CALM <i>Parasympathetic (PNS)</i> <i>Ventral Vagus</i>	ACTIVE/ALERT <i>Sympathetic (ANS)</i>	TIGHT/RIGHT <i>Sympathetic (ANS)</i>	HYPER-FREEZE <i>Sympathetic (ANS)</i>	HYPO-FREEZE <i>Parasympathetic (PNS)</i> <i>Dorsal Vagus Collapse</i>
PRIMARY STATE	Apathy, Depression	Safe, Clear Thinking, Social Engagement	Alert, Ready to Act	React to Danger	Await Opportunity to Escape	Prepare for Death
AROUSAL	Too Low	Low	Moderate	High	Extreme Overload	Excessive Overwhelm Induces Hypoarousal
MUSCLES	Slack	Relaxed/toned	Toned	Tense	Rigid (deer in the headlights)	Flaccid
RESPIRATION	Shallow	Easy, often into belly	Increasing rate	Fast, often in upper chest	Hyperventilation	Hypo-ventilation
HEART RATE	Slow	Resting	Quicker or more forceful	Quick and/or forceful	Tachycardia (very fast)	Bradycardia (very slow)
BLOOD PRESSURE	Likely low	Normal	On the rise	Elevated	Significantly high	Significantly low
PUPILS, EYES, EYE LIDS	Pupils smaller, lids may be heavy	Pupils smaller, eyes moist, eye lids relaxed	Pupils widening, eyes less moist, eye lids toned	Pupils very dilated, eyes dry, eye lids tensed/raised	Pupils very small or dilated, eyes very dry, lids very tense	Lids drooping, eyes closed or open and fixed
SKIN TONE	Variable	Rose hue, despite skin color (blood flows to skin)	Less rose hue, despite skin color (blood flows to skin)	Pale hue, despite skin color (blood flow to muscles)	May be pale and/or flushed	Waxen/gray pale
HUMIDITY	Skin Dry	Dry	Increased sweat	Increased sweat, may be cold	Cold sweat	Cold sweat
MOUTH	Variable	Moist	Less moist	Dry	Dry	Dry
HANDS & FEET (TEMPERATURE)	May be warm or cool	Warm	Cool	Cold	Extremes of cold & hot	Cold
ORAL/FACIAL EXPRESSION (SMILES)	Variable	Content	Alert	Wary	Excessive frown & bleaker	Stumped
CONTACT WITH SELF & OTHERS	Withdrawn	Clear, pleasant, easy, social, relaxed	Alert, aware, direct, socially confident	Wary, flat	Stare, may be dissociation	May be immobilized to feel nothing, inexpressible
HEEDING VOICES	May or may not be accessible	Heard, accessible	Should be accessible	May or may not be accessible	Likely inaccessible	Inaccessible
INTERVENTION	Activate, Deeply increase Energy	Continue Therapy Direction	Continue Therapy Direction	Put on Brakes	Stand on Brakes	Medical Emergency/ CALL PARAMEDICS

© 2000, 2014, 2016 Babette Rothschild Sources: Multiple medical & physiology texts; P. Levine, 2010; S. Porges, 2011

[To see Rothschild's actual poster/chart that John is writing about, please click here to access Chapter 2 from the book and scroll to page 38.](#)

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nerves in the complex. Porges used V and VII, not X in his original test of his theory, The Listening Project at the University of Maryland (Now available as Safe and Sound at <http://integratedlistening.com/ssp-safe-sound-protocol/>.)

### Differentiate Normal Functions from Stress Responses

As a final point, Porges illuminated the difference between "normal functions" and "stress responses." This is not the main theme of his work, it is a beneficial side effect. We have labored under an error of trying to make sense of the ANS without this

critical distinction. It is incorrect to say "fight/flight versus rest/rebuild" because the former is a stress response and the latter is a normal function. The parasympathetic is about baseline metabolism and resting states such as sleep. The sympathetic is about mobilization and active states such as daytime alertness. The social engagement branch of the ANS is initially about maternal bonding and later social communication of all kinds. Note again, the function of the third is quite different from the function of the first, so they should not be conflated as both "parasympathetic," as Rothschild and many others seem to do, just because they

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both down-regulate the heart. To differentiate “normal functions” from “stress responses” is liberating for therapists. Categorization becomes simpler. Rothschild keeps them mixed together; her poster’s green and blue columns (PNS II and SNS I) are mainly normal functions, and her yellow, orange, red and magenta columns (PNS I, SNS II, SNS III and PNS III) are mainly stress responses. The troublesome-for-me row in the chart is the “Emotions” line, which contains both normal and stress responses intermingled in the PNS II and SNS I columns. Meanwhile the rest of the chart has great info, highly recommended for all healthcare and childcare workers.

However, there are some important involuntary phenomena, both normal and stress-related, that do not appear at all on Rothschild’s poster, which makes the chart incomplete for me. Does the client make eye contact? Is the client’s verbal expression clear? What happens for the client in intimacy? What tribal behaviors does the client exhibit?

In addition, Rothschild’s poster omits social engagement strategies in her “Recommended Intervention” row. SNS II says “Put on Brakes”, SNS III says “Slam on Brakes” and PNS II says “Medical Emergency– Call Paramedics.” A PVT-informed list would add something about progressively increasing the client’s felt-sense of safety through effective social contact. One of the most dramatic recoveries from severe depression that I ever witnessed happened when the client’s sister and best friend both had babies on

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the same weekend, and she spent an entire week just holding newborns. Her social engagement system had so much stimulation that her depression just lifted on its own.

As a last comment on the poster, I am allergic to the word “Impossible” (found in SNS III and PNS III columns on the “Integration” row) when discussing client’s capacity to recover. The Osteopathic first principle, “The Health is Never Lost” means never give up all hope. I think it is the practitioner’s obligation to hold the high ground of optimism, so I would prefer language with some upside in this situation.

I also felt an impulse for chart-making, and with Porges’ support I also created a poster (2013) (*see image on page 49*). This poster was on display at the APPPAH conference, and I am happy to send it to readers who may be interested. I depict three ANS branches in two groups (normal function

and stress responses) instead of Rothschild's six categories, so I think there is common ground schematically, as my 3x2 and her 6 do end up at the same numeric value.

I am eager to receive feedback on any of this, just email me (info@energyschool.com) to start the conversation!

**John Chitty** (b. 1949) operates Colorado School of Energy Studies in Boulder, CO (established 1992, www.EnergySchool.com) with his wife and partner since 1972, Anna Chitty. He is a registered psychotherapist, Polarity Therapist, and Biodynamic Craniosacral Therapist. His work has attempted to create bridges between touch

therapy and psychotherapy, hopefully informing each of the value of the other. He served on Peter Levine's Board of Directors in 1999-2000. He met Stephen Porges in 2002, and to this day Porges kindly and generously continues to review his materials for accuracy.

He is author of *Dancing with Yin and Yang* (2013) and *Working with Babies* (2016) and a poster explaining the Polyvagal Theory, *Triune Autonomic Nervous System*. Chapter 6 of *Dancing with Yin and Yang* describes the autonomic understanding more fully than can be done here, and Chapter 9 has many methods for restoring full range of motion in the ANS. His presentations on Polyvagal Theory and related topics can be viewed in electronic forums such as YouTube and Vimeo.

## Phylogeny of Heart Regulation in Vertebrates

Stephen Porges, *The Polyvagal Theory: Phylogenetic Substrates of a Social Nervous System*, Int'l Journal of Psychophysiology 42 (2001) 123-146, 2000.

Key: Arrows indicate the presence of heart regulating functions. **↑** means faster heart rate and **↓** means slower heart rate. Colors indicate which autonomic branch is deployed:  
**RED** means Parasympathetic, **GOLD** means Sympathetic, **BLUE** means Social

DEFINITION OF PHYLOGENY (American Heritage Dictionary) <i>1. The evolutionary development and history of a species or higher taxonomic grouping of organisms.</i>	MECHANISMS OF HEART REGULATION				
	Chromatin Tissue (CHR*)	Dorsal Motor Nucleus of CN X (DMX)	Sympathetic Nervous System	Adrenal Medulla (Produces Catecholemines)	Nucleus Ambiguus (Ventral motor nucleus of CN X)
Cyclostomes- Jawless fish (Lampreys)	↑				
Elasmobranchs- Cartilaginous fish (Sharks)	↑	↓			
Teleosts (Bony fish)	↑	↓	↑		
Amphibians	↑	↓	↑		
Reptiles	↑	↓	↑	↑	
Mammals	↑	↓	↑	↑	↓

\* CHR- Chromatin: Non-neural tissue that stimulates the heart by releasing noradrenic amines directly into blood in the heart.



Note that the Dorsal Motor Nucleus and Ventral Vagus are both slowing the heart, making them easily confused, but they are actually quite distinct, anatomically and phylogenically!

Slide by John Chitty, www.energyschool.com, from Chapter Six in "Dancing with Yin and Yang" (CSES, 2013)