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Polyvagal Theory, The Triune Autonomic Nervous System and Therapeutic Applications

By John Chitty, RPP, RCST

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The "Polyvagal Theory" is a new understanding of the autonomic nervous system (ANS), arising from the research and writings of Stephen Porges, PhD (www.psych.uic.edu/faculty/porges). It uses solid scientific method to significantly change the previous commonly-accepted view of the ANS, with huge implications for trauma therapies.

The ANS is the neuro-endocrine-immune structure that enables survival. Traditionally it has been described as having two branches, parasympathetic (rest/rebuild) and sympathetic (fight/flight). Parasympathetic takes care of essential background operations such as heart/lungs and digestion, while sympathetic provides stress-response and procreation strategies and functions.

Polyvagal Theory, named for the anatomical basis of Porges' discoveries, changes the picture. Now the ANS has three branches, not two, and they are sequential, not reciprocal. Actually, "Polyvagal" is a misnomer and not a fully accurate representation of the new concept, because the vagus nerve is only one component of the newly-defined third branch. Therefore, in this summary the phrase "Triune Autonomic" will be used when referring to the new understanding.

SUMMARY OF THE THEORY

The Triune Autonomic view is based on phylogeny, the study of the evolution of living organisms. For example, all animals have some strategy for acquiring food, absorbing nutrients and expelling cell waste. Very primitive simple animals are stationary feeders in a liquid

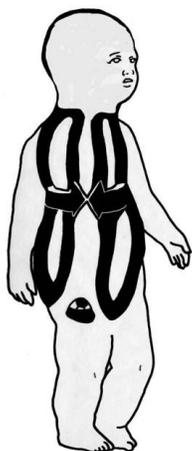
environment, later animals have developed ways to move about to find food, and modern animals have developed capabilities for using tools, social organization, and long-term planning, etc. Throughout the evolutionary chain, survival is the supreme criterion: characteristics that enhance survival are perpetuated in subsequent form and function.

In the ANS, the parasympathetic system is the oldest, reflecting the survival needs of a primitive passive feeder. It delivers nutrient-rich, oxygenated blood to the system, particularly the brain, and its components regulate heart, lungs and viscera. At a parasympathetic level, stress responses are primarily limited to adjusting the metabolic rate within a fairly narrow range and "death feigning" survival tactics.

The sympathetic nervous system is a later development, adding mobility, mobilization and a wider range of possible survival responses. Newer animals gained more survival options in essential proactive, feeding and protective behaviors. Limbs for movement and increased sensory awareness developed, and muscular/structural tissues became more sophisticated. The sympathetic system acts as a controller on the primitive parasympathetic to give a wider range of metabolic responses, shifting resources to muscular, visceral or other systems as needed in response to survival challenges.

Porges has shown clear evidence of a third, more modern branch of the ANS, with a survival value specific to more sophisticated animals especially primates. "Social nervous system" is the proposed term for this third branch of the

Polyvagal Theory continued...



From a hand position lightly touching the vagus nerve in the neck, the parasympathetic can be visualized as a unit of function involving the entire torso and its cardio-respiratory and digestive contents. Patterns may be observed and a three-step process for the whole system may be supported. (Drawing by Renee Peterson, adapted from Keleman, Emotional Anatomy, page 33)

ANS. As brain complexity increases, it takes much longer for newborns to become self-sufficient. In humans, many years are necessary before their enhanced survival capabilities are fully operational. Therefore, structures evolved to secure dependent care for this extended time. Certain emotional affects, specifically the love feelings of mother/baby, are prominent in this survival mechanism. The social nervous system exists as a controller over the sympathetic nervous system to enable moderation of more crude "fight/flight" responses to accommodate this dependency.

The anatomy of the social nervous system consists of tools that help bond a newborn to the mother. These include voice, hearing, visual contact and facial expression, which are each capable of triggering neurotransmitters inducing pleasurable sensations in the caregiver. These are "hard-wired," precognitive functions that exist in newborns, having a compelling power to engender emotional bonding and biochemical events which we interpret as love, thereby securing protective care during the vulnerable period. Healthy babies exhibit these instantly at delivery. However, they experience unsuccessful deployment of these strategies (i.e. betrayal by or alienation from the caregiver) as immediately life-threatening, and justifiably so.

Drawing on the "Theory of Dissolution" (J.H. Jackson, ca. 1890), Porges also shows that under stress, the human system tries its newest, most sophisticated and efficient equipment first. If that doesn't work, older strategies are attempted, and if they don't work, the oldest resources are employed. Therefore under stress, the human first uses its social/relational tactics, then fight/flight, then immobility, as survival strategies. Each of these stages has characteristic indicators. Also, it is clear that with trauma, the capacity for using the newer strategies can be eroded with older strategies becoming the habitual basis for response.

APPLICATIONS IN TOUCH THERAPY

Touch therapists have attempted to affect the ANS for many years, often with great success and also often with frustration. Particularly in working with trauma-symptom clients, touch has proven helpful but inconsistent and in some cases problematic.

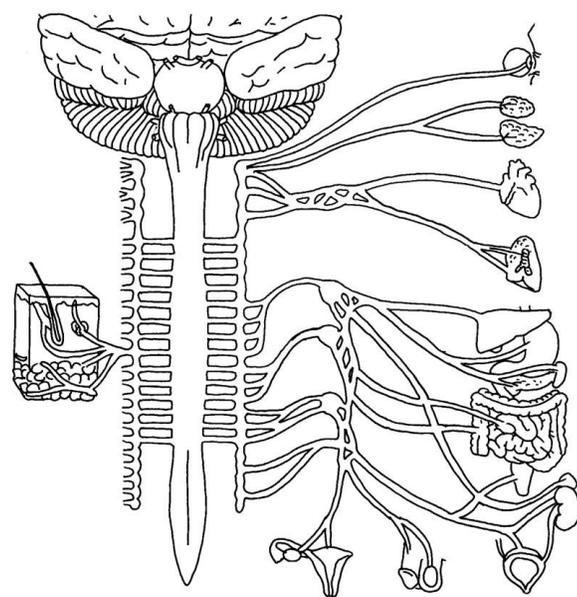
With the "Triune Nervous System" research, new possibilities emerge. Porges describes the use of "portals," or anatomical components of the ANS which can be physically stimulated to induce fulfillment of the impulses of a particular layer. For example, Porges found that stimulating nerves of the social nervous system through muscular activation created profound improvement in

relational behaviors of autistic patients.

Using this portal concept, a practitioner can hypothetically support optimum functioning of the ANS through contact/stimulation with appropriate anatomical locations. This is the same principle exhibited in Randolph Stone's Polarity Therapy, but with 3 layers instead of two, and less need to identify which layer to work with (as a domino effect is produced because the layers are sequentially interdependent).

The portal for the parasympathetic nervous system, based on anatomy, is the vagus nerve and the torso of the body as a single unit of function. For the sympathetic nervous system, the muscles of the limbs and the sympathetic chain along the spine are highlighted. For the social nervous system, cranial nerves V, VII, IX, X and XI, identifiable as a group in the embryological "pharyngeal arches" structure, can be used. Experimentation with these portals has given promising results.

The method for using these portals would vary with different modalities. In Polarity Therapy, an energetic intention and polarized contacts could be employed. In Craniosacral Therapy, the "state of balance" concepts are useful. In massage, manual contact with the relevant areas might be used. In any case, accurate visualizing of the anatomy seems important. While it is beyond the scope of



Lightly touching the side of the neck, the sympathetic system may be viewed as a double strand of beadlike nodes just lateral to the spinal bodies terminating together in a single bead anterior to the coccyx. Viewed as one unit of function, the whole sympathetic system may reveal a pattern and allow a three-stage process. (Drawing by Renee Peterson adapted from Clayman, The Human Body, p. 74)



Polyvagal Theory continued...

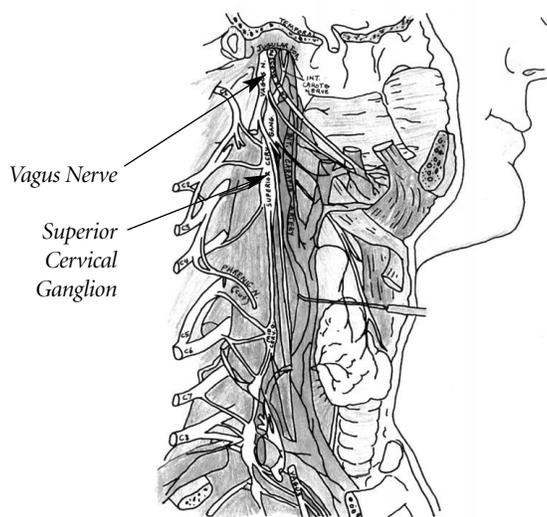


The social branch of the autonomic nervous system may be visualized as a branching of nerves supplying the throat and face. This "pharyngeal arch" structure arises very early embryologically (4th-5th weeks). More specific views are possible within the middle ear and also tracing the corticobulbar tract. Viewing this anatomy may provide access to patterns and the three-stage process. (Drawing by Renee Peterson adapted from Larsen, Human Embryology, page 362)

this article to discuss experimental protocols in great detail, practitioners might explore for themselves using these anatomical structures as a basis.

Getting clients to participate in ANS stimulation has also been helpful in early experimentation. For the parasympathetic, the client might employ conscious attention to the breath and movement of the belly. For sympathetic, the client might engage the muscles of the arms and legs, then relax and track subsequent sensation. For the social, the client might recall a favorite person or pet and use imagination to induce the warm feelings of smiling recognition (CNs V and VII).

Therapeutic intervention in the Triune ANS might also involve remote manipulation of the amygdala via palpation or client participation. The amygdala is a bilateral area of the anterior temporal lobe (one inch inside the temples, posterior to the eye orbit of the frontal bone, medial to the greater wing of the sphenoid, and just anterior to the dorsal horn of the lateral ventricle) that sorts experience to identify threat, based on earlier experience. This is a critical survival factor, enabling instant response to danger, but in trauma it is problematic because the person may respond inappropriately. For example, a person who has been severely betrayed as a child may interpret intimacy as dangerous, though in fact the later experience poses no real threat.



The neck area is a central viewpoint for triune autonomic anatomy, containing the vagus (major path of the parasympathetic), superior cervical ganglion (major superior ganglion of the sympathetic) and cranial nerves IX, X and XI (important parts of the social). Accessing each layer is more a matter of perception than any shift in hand position.

(Drawing by Renee Peterson, adapted from Netter, Atlas of Human Anatomy, plate 124)

Contact with the amygdala, through remote palpation (and state of balance processes) or client participation, seems very promising. One approach has been proposed by Neil Slade based on the neurobiological research of T. Lingo (see www.neilslade.com). This exercise, in which the client uses self awareness to imaginably nudge the amygdala forward, has shown good results in initial experimentation and is recommended on that basis. Clients exhibit a new ability to operate at a social nervous system level, beyond habitual sympathetic (fight/flight) or parasympathetic (immobility) stress-response patterns, and generally display a happier, more optimistic demeanor.

APPLICATIONS IN PSYCHOTHERAPY

The Triune ANS offers a revolution in psychotherapy, because the supreme importance of maternal bonding and intimacy is formalized and grounded in anatomy and phylogeny. Porges' work combines naturally with Peter Levine's trauma resolution methods for excellent effects. The three branches of the ANS are readily visible in clients, once the practitioner knows what to look for. Identifying the currently active layer, the practitioner can guide the client in fulfilling the impulses of that layer, and support the client naturally moving through the three-part sequence. The therapeutic goal is to restore capacity to function at all three layers, but the third, the social nervous system, is probably the key because it is the most sophisticated tool in the stress-response arsenal.

Preliminary experimentation in awareness processing, such as Levine's trauma resolution, Gendlin's Focusing, Perls' Gestalt Therapy and hypnotherapy have been very promising, and practitioners are encouraged to experiment with their methods using the new awareness.

The emerging field of pre and peri-natal psychology (Castellino, Emerson) is a rich field for application of the Triune NS understanding. Among other benefits, a formal basis becomes available for emphasis on maternal bonding (skin-to-skin contact for at least 20 minutes immediately following delivery), minimizing use of contact-numbing anesthesia, and termination of practices that are clearly traumatic to the ANS such as circumcision. Prior to Porges' work, modern anti-bonding hospital practices often felt wrong to lay people and some primary care professionals, but lacked sufficient identification of the specific damage. Now, it can be clearly stated that such practices defeat the baby's best stress response resource and force devolution to a sympathetic (hyper) or parasympathetic (hypo) strategy, imprinting the amygdala to expect betrayal in intimacy situations, a potentially devastating event for the ANS and quality of life.



Polyvagal Theory continued...

APPLICATIONS IN GROUPS

Understanding group dynamics partly derives from understanding individual psychology, based on the principle that what happens individually is the substrate foundation for what happens socially. Because groups are by definition a social environment, automatically invoking social nervous system phenomena, the implications of Porges' work are profound for group dynamics.

In a group setting, the collective relational experience of the individuals is being expressed. Some participants have the social nervous system layer operational, some have experienced defeat on that level and habitually respond in sympathetic ways and, in severe trauma cases, some are limited to parasympathetic responses.

When a group attempts to accomplish a task together, especially in a difficult or seemingly threatening context, the three layers of autonomic function will become visible. Initially, relational strategies will be exhibited (except under severe conditions), these will be successful or gradually yield to sympathetic (fight/flight) tactics, and ultimately to isolation and immobility within individuals and the group. For individuals in the group, theoretically there will be a bell curve effect in which some people exhibit behaviors in advance of, or trailing the critical mass majority of the group. For example, as a group shifts from relational to fight/flight behaviors, some will already be showing immobility while others will be continuing social engagement.

Groups can be facilitated to "evolve" back up the triune autonomic chain, using awareness and careful management. The key is to gently re-establish the foundation (parasympathetic) and subsequent (sympathetic) layers, by acknowledgement of their presence and fulfillment of their inherent impulses. The social nervous system function can then be supported and enhanced, leading to increased trust, communication and functionality within the group.

Similarly, groups can be managed to maintain functionality in the collective social nervous system layer by carefully noting when individuals, or the group as a whole, start to slip down to a sympathetic or parasympathetic basis. For optimum functionality, the critical mass majority can be maintained at the social autonomic level. Similarly, group participation can be therapeutic for individuals by "pulling" them up to functioning at a social level, though their individual systems may be habitually more inclined to sympathetic or parasympathetic levels. ☾



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- Babette Rothschild - trauma work expert and author of 'The Body Remembers'
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- Michael Kern - course director of the Craniosacral Therapy Educational Trust and author of 'Wisdom In The Body, The Craniosacral Approach to Essential Health'
- John Wilks - chairman of the Craniosacral Therapy Association U.K.

Cost £135 if booked before 31st March 2003,
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