SOMATIC PERSPECTIVES ON PSYCHOTHERAPY

November 2011: Stephen W. Porges

Stephen W. Porges, Ph.D., is a professor of psychiatry and the director of the Brain-Body Center at the University of Illinois at Chicago. He is a former president of the Society for Psychological Research and also the Federation of Behavioral, Psychological, and Cognitive Sciences. He is a former recipient of a National Institute of Mental Health Research Scientist Development Award. He has published more than 200 peer-reviewed scientific papers across several disciplines including anesthesiology, critical care medicine, ergonomics, exercise physiology, gerontology, neurology, obstetrics, pediatrics, psychiatry, psychology, space medicine, and substance abuse. His research has been cited in several thousand peer-reviewed articles and has been continuously funded by the National Institutes of Health since 1975. In 1994 he proposed the Polyvagal Theory, a theory that links the evolution of the vertebrate autonomic nervous system to the emergence of social behavior. The Polyvagal Theory provides a theoretical perspective to study and to treat stress and trauma.

The following is a slightly edited transcript of the original audio, which is part of the Somatic Perspectives series (www.SomaticPerspectives.com). Please note that this conversation was meant to be a spontaneous exchange, not a written piece. For better or worse, the transcript retains the spontaneous quality of the conversation.

Serge Prengel: This is a conversation with Stephen Porges. Hi, Stephen.

Stephen Porges: Hi, Serge.

Serge Prengel: Based on your writings, it appears that you have paid a lot of attention to the nervous system?

Stephen Porges: Yes, my research has focused on how neural regulation of physiological state influences behavior and how these mechanisms are related to how we interact socially. In fact, even when I was young I was curious about how we regulate our behavioral state in the presence of others. Although the question originated in my youth, it has been only during the past decade or two that I realized that this ability was a core issue in many aspects of mental health and had a great impact on quality of life.

Serge Prengel: So it's not just an individual pursuit of understanding how to regulate yourself.

Stephen Porges: Well, it actually may have started out as a personal pursuit and then somehow it blended into my research question and co-opted my research skills. My research started off addressing a more esoteric question related to the parameters of physiological reactions that would enable efficient information processing. Then as I was developing my research skills, I started to think about underlying physiological processes and not just physiological indicators or correlates of efficient cognitive processes. I started to ask questions about bodily feelings and emotions. Gradually, I started to ask questions about regulating bodily feelings and emotions in the presence of others and started to investigate the interesting dialectic between how the nervous system mediates our visceral feelings and how these feelings are easily mediated by social interactions.

Serge Prengel: How does our nervous system interplay with our visceral feelings?

Stephen Porges: Although the important role that the nervous system plays in regulating our visceral state and thus our feelings is a relevant question for people interested in body psychotherapy, it is not even acknowledged in many of the models, theories, and therapies emphasized in clinical psychology and psychiatry. Clinical psychology and psychiatry primarily use top-down models that focus on emotions and affective processes as being central phenomena and minimize the role of the body in the experience. For example, consistent with these models, even anxiety may be a "brain" process without a visceral manifestation. Fortunately, there are clinicians, including many body psychotherapists, who have an appreciation of the importance of the bidirectional communication between the brain and the body. For example, sensory information travels from the body to the brain and influences how we respond to the world. And brain processes can influence our viscera via the cognitive and affective processes related to our perspective of the world and our reactions to various features of the environment. This bidirectional and interactive notion of how our nervous system regulates our viscera in a complex social environment, although intuitive, is neglected or minimized by much of clinical medicine including psychiatry.

Serge Prengel: Feelings don't happen by themselves in some kind of isolated sphere, but there is a bi-directionality between our bodily feelings and cognitive thoughts.

Stephen Porges: Absolutely. The strategy of subjugating feelings and the preeminence of cognitive processes follow a long tradition in Western culture of emphasizing thought at the expense of feelings. For example, we can go back to Descartes and discuss how his philosophy structured mind-body dualism. Descartes states in French, "Je pense, donc je suis", and of course your French is much better than mine but is, "I think, therefore I am." He does not use the phrase, "Je me sense, donc je suis." I apologize for poor pronunciation. However, if Descartes used the reflexive form of the verb "to feel," he would have been emphasizing how the body is feeling, the visceral feelings that parallel and contribute to our emotions and not how it feels to touch an object. Unfortunately the personal experience of feelings within the body was not part of the equation for Descartes. But imagine how our treatment of people would have evolved, if that's what Descartes had really said. Where would we be today, in terms of developmental trajectory of what it is to be a human? Instead, based on Descartes, our culturally philosophy has adopted the premise that to be a good human, we have to depress or reject or subjugate visceral feelings to enable our good brain, our smart brain, to express its potential. Physical and mental illness may be a consequence of an adherence to Descartes' dictum. Thus, not respecting the body's own responses and filtering visceral feelings, over time may contribute to illness by dampening the bi-directional neural feedback between brain and body.

Serge Prengel: It might be helpful to our listeners, to discuss how we experience visceral feelings and they connect to our cognitions and what may happen if there are problems in either expressing visceral feelings or if there is a disconnect between our cognitions and the rest of the body.

Stephen Porges: Well, it's really quite interesting. I am actually writing about this now. I have been working on the impact of safety on the access of various attributes of our nervous system. Understanding the prerequisites for feeling safe is a critical issue in the modern world. Our culture takes a paradoxical perspective in defining safety. We focus on words and cognitive representations and minimize bodily responses and feelings to define safety. As professionals

and academics we think that we can use our cognitive skills to define safety. Yet being "safe" is really the body's response to the environment.

Basically, educational and socialization processes are working very hard to dismiss the body's responses to environmental features. If we observe children in a classroom, we note a variety of behavioral features that illustrate that some children are safe and can sit comfortably in the same environment that triggers in other children the hypervigilant behaviors characterizing a lack safety. Moreover, the children who are chronically monitoring the classroom for danger cues are the same children who have difficulties in learning, while those with the features of feeling safe can attend to the teacher and learn efficiently. Unfortunately, the traditional classroom model for education assumes that if some children can perform well in a classroom, every child should. Thus, our society treats the behaviors of individuals, who are behaviorally or viscerally reactive to slight changes in stimulation, as bad. Society assumes that these children should be able to voluntarily turn these behaviors off.

Rather than investigating and understanding that there is a neural substrate underlying the observed range of individual differences, we basically convey to these children that the behaviors are bad even if the behaviors are involuntary. Alternatively, the educational process could celebrate some of the unique sensitivities that people have. However, this seldom occurs and leads into the world trauma treatment in which many of our colleagues work.

In the world of trauma, people's bodies respond. In some cases, the behavioral pattern and neural regulation changes dramatically following trauma. These changes can be so great that the behavioral features may appear to represent a totally different person, who no longer can relate to others or interact in the same world. Since the behaviors of the traumatized individual do not conform to the expectations of typical social interactions, the traumatized individual often feels that they are inadequate or can do things correctly. These feelings of inadequacy may be driven by societal expectations and even through the evaluative feedback during clinical sessions. For example, therapeutic strategies may provide a continuous dialog of evaluation, often emphasizing deficiencies in a hope of triggering voluntary control of more prosocial behaviors. However, the continuous evaluation of their behavior may push the client further and further into defensive strategies.

Serge Prengel: I want to slow it down a little bit, because there's so much information in what you are saying. For instance, children are exposed in school to a pre-imposed model that's almost a mechanical model of functioning. Children are treated like machines. If one machine functions a certain way, then similar machines are expected to have the same behavior regardless of any individual differences in physiological arousal or threshold to be reactive to environmental stimulation.

Stephen Porges: Yes. In another way, even to re-emphasize what you very succinctly described, we treat children in school as if they are learning machines and the success of school is really defined by what information we are able to program into that machine. We don't respect the fact that perhaps the skill set of learning how to regulate your visceral state are not part of the curriculum. Thus, opportunities to exercise neural systems to improve neural regulation of physiological state, which in turn would support a more efficient expression of social behaviors, are not available or are minimized in the prevalent educational models.

These points become obvious when studying challenged individuals, like autistic children. Interestingly, with autistic children, the basic treatment model is a special education model. This model builds on learning theory and uses reinforcement and repetition in the establishment of

skills. Unfortunately, the "learning model" does not incorporate an important feature of autism, which is shared with other clinical disorders, the inability to regulate visceral state in the presence of others. In contrast, the prevalent treatment models force the individual to regulate in a context that may make learning inefficient.

Serge Prengel: Yes. Sensitive and effective therapists are very careful to realize that clients cannot change unless they're in a regulated state. Unfortunately, treatment models often impose a less sensitive model on children and try to force feed them when they haven't learned the basic of regulation.

Stephen Porges: In addition, the child's nervous system might not be sufficiently developed to regulate in a complex setting. So rather than incorporating an understanding of how the nervous system regulates behavioral state, we try to use laws of learning by ramping up the motivation through punishment or reward to change behavior when perhaps the neural mechanisms are not sufficiently developed or atypical. Thus, these strategies are, at best, inefficient.

I like to illustrate this with a metaphor that I use in my talks. In my talks I often discuss underlying visceral state as coloring our reaction to the world. I put a slide up of a traffic light with green, yellow and red lights. Each light represents different physiological states. The green light represents a physiological state associated with safety. The yellow light represents a physiological state associated with danger. The red light represents a physiological state associated with life threat. To the left of the traffic light signal an "S" for the environmental stimulus. To the right of the traffic light I put an "R" for the individual's response to the stimulus. Thus, the response to a common stimulus is qualified by the physiological state. The same stimulus in the environment might produce qualitatively different responses based on the physiological state of the individual at the time the stimulus is presented.

Serge Prengel: Yes. So as you describe this interaction between cognitive processes, reactions and the ability to regulate our emotions and our reaction to fear, it feels that you're giving a great example of what you said earlier about how that's a different conception of what it's like to be human.

Stephen Porges: Yes. Basically I am questioning the goals of our institutions. Are the goals of our institutions to educate people with more information or are our goals to make people be able to reciprocally interact and to regulate each other to feel good. This goes back to Descartes's dictum, which has led us down a track of more thinking, expansive cognitive skills, and cognitively defined "smarter people." However, despite this enhanced level of smartness, we have become literally ignorant about what our bodies really need to feel good.

Serge Prengel: Maybe we should talk about what our bodies need to feel good. Maybe we can talk a little more about that the mechanisms of how visceral reactions work, how the defining features of the neural circuits connecting the viscera and the nervous system. This is important, because often people discuss being in their body and there is an almost a mystical or metaphysical quality to the body versus thought. And as I think you described the process itself, there is a sense of that bottom-up quality.

Stephen Porges: I like to say that a goal of society is to be able to immobilize without fear. This statement might initially sound strange. However, when you think about it, isn't immobilization without fear really a goal of therapy? You don't want your clients to remain "tightly wrapped," anxious and defensive. You want your clients to be able to sit quietly, to be embraced without fear, and to be hugged and to hug others, to conform physically when embraced, and to be

reciprocal in their relationships. If a client is tightly wrapped with a tense muscles and a highly activated sympathetic nervous system state, the client is conveying this state of defensiveness to others. A state characterized by tense muscles and sympathetic excitation is an adaptive state that prepares an individual to move or fight. This state unambiguously conveys to others that it is not "safe" to be in close proximity with this person.

This may be a good time to emphasize some of the neural circuits that regulate the autonomic nervous system. The first point is related to the information flowing from our body to the brain. The autonomic nervous system is extraordinarily important in conveying information about our viscera to our brain. The vagus, the largest nerve in the autonomic nervous system and the major nerve of the parasympathetic nervous system, is primarily a sensory nerve with about 80% of its fibers beings sensory. The vagus is continuously conveying a tremendous amount of information about the status of peripheral organs to specific nuclei in the brainstem. The sensory information from the visceral does not share the same specificity as tactile stimulation other sensory information going up the spinal cords. Visceral feelings are generally diffuse, so the actual labeling becomes difficult and the diffuse feelings often "color" our perceptions and reactions to social interactions.

The second point is related to the motor control of the autonomic nervous system. In fact, the traditional definition of the autonomic nervous system focused solely on the motor components, the neural pathways in the periphery to the target organs, and the target organs in the viscera. Important characteristics of the vagus have been neglected by this focus on the motor portion of the vagus without examining the brainstem areas in which the vagal pathways originate. Specifically, the fact that the vagus has two functionally distinct branches with different functions is often neglected.

Most individuals are taught that the autonomic nervous system has two components, a sympathetic nervous system associated with fight-flight behavior and a parasympathetic nervous system, which is primarily associated with a cranial nerve known as the vagus, associated with growth, health and restoration. This presentation of the autonomic nervous system suggests that the sympathetic and parasympathetic components are antagonistic. While casting the autonomic nervous system as reflecting paired antagonism is at times useful, it is not completely accurate. Thus, although we often use the construct of autonomic balance, the autonomic nervous system seldom functions as a balance system and is more likely to react to challenges in the environment in a hierarchical manner.

It is the contradiction between conceptualizing the components of the autonomic nervous system either as a "balance" or "hierarchical" system that served to motivate me to develop the polyvagal theory. In the traditional view of the autonomic nervous system, the sympathetic nervous system is involved in fight and flight responses, while the parasympathetic nervous system is involved in health, growth, and restoration. However, the polyvagal theory actually describes two defensive systems. In addition to the defensive system of fight-flight, which everyone is familiar with, that requires sympathetic and adrenal responses, the theory identifies a second defensive system. The second system is linked not to mobilized fight-flight behaviors, but to immobilization, shutting down, fainting, and dissociating. This second defense system is a life threat system that is frequently observed in small rodents such as mice.

When a cat picks up the mouse, the mouse immobilizes and looks dead. This is not a voluntary behavior. The mouse is not deciding to play dead. Rather, the life threat features of the cat trigger an ancient neural circuit that is frequently used by reptiles as a defense system. However, since reptiles' small brains do not need much oxygen, they can immobilize and even hold their

breath for long periods. However, this is not an option for mammals, which need massive amounts of oxygen to support their larger brains. This shutdown immobilization response is mediated by vagal mechanisms. In fact, fainting is called a vaso-vagal syncope, which acknowledges the potent disruptive effect of the vagus on our normal cardiovascular function.

Thus, we have a vagal response pattern that is not consistent with health, growth, and restoration metaphor that has been associated with the vagus and the parasympathetic nervous system for decades. The vagal defense system has literally been written out of the literature on the autonomic nervous system. Without a "vagal defense system," autonomic function fits nicely into a simple paired antagonism model in which the sympathetic component supports fight-flight behaviors and is competing with the parasympathetic component that supports health, growth, and restoration.

The inclusion of the vagal defense system challenges this simple model of autonomic balance and forces us to reconceptualize the adaptive reactions of the autonomic nervous system as reflecting the three hierarchical components. The functional hierarchy mirrors the phylogeny of these autonomic components in vertebrates. The oldest vagal system is mediated by an unmyelinated vagus that originates in the dorsal motor nucleus of the vagus. This system is shared with virtually all vertebrates. In mammals this system when triggered as a defense system inhibits breathing, slows heart rate, and promotes defecation. However, in safe contexts, this system supports the subdiaphragmatic organs to promote health, growth, and restoration. The sympathetic nervous system when triggered as a defense system functionally inhibits the old vagus and stops digestion and diverts energy resources from visceral support, such as digestion, to mobilization. The phylogenetically most recent autonomic system is unique to mammals and represents a myelinated vagus, which originates in a brainstem structure that is linked to the muscles of the face and head. Now we understand that when people smile, when they are happy, and when their voice has prosodic features reflected in variations in vocal intonation like a mother's lullaby, they are able to focus, to hear and to understand vocal communication. Functionally, the myelinated vagus is calming us, efficiently processing our cardiovascular and metabolic needs, and actively inhibiting the high states of arousal associated with the sympathetic nervous system. .

Serge Prengel: So the vagus or the two parts of the vagus nerve are in fact, on the one hand, the most ancient and also the most recent parts of our evolution.

Stephen Porges: Yes. The two components of our vagus are mirroring the extreme features of vertebrate evolution of the autonomic nervous system.

Serge Prengel: And the fight-flight is in between.

Stephen Porges: Yes with the sympathetic nervous system supporting fight-flight behaviors. I have developed a simple narrative to describe the unique autonomic and behavioral features of mammals. As mammals evolved, their survival was dependent on satisfying a need to interact for nursing and for other forms of social interactions and group behaviors linked to obtaining food, reproducing, playing, and supporting general safety needs. The new mammalian vagus was able to turn off defensive systems. However, to balance the needs of social interaction with the needs for safety, it is necessary to know when to turn the defenses off and when to turn the defenses back on. In our society this is a major issue. When do we turn off our defenses? When are we safe to be in the arms of another? When are we safe to go to work? When are we safe to go to sleep? Clients often have issues about not feeling safe with others. They have difficulties turning off their defense systems. They can't be hugged. They have sleeping disorders. They have gut disorders. All these symptoms are features of the autonomic nervous system that can only occur

when the newer myelinated vagal system isn't appropriately regulating the sympathetic and unmyelinated vagal components of the autonomic nervous system.

Serge Prengel: So to effectively use our evolutionary heritage, our newest vagal circuit needs to effectively regulate the older circuits.

Stephen Porges: Right. I'm starting to link vulnerabilities of humans, in terms of their health and mental, physical and mental health, to specific neural structures that define the differences between reptiles and mammals. During this transition a mylenated vagus evolved and the defense strategies became more focused on fight-behaviors and the immobilization defense system was minimized. It was minimized because immobilization is potentially lethal to mammals, who have a very high oxygen need. Our common ancestor with more modern reptiles, such as snakes or lizards, was a reptile similar to tortoise. The primary defensive system of the large tortoise is immobilization.

When we inquire about the experiences of traumatized individuals, we learn that many of them have experienced a profound and unexpected immobilization. By explaining the vagal defense system and how the unmyelinated vagus supports an ancient defense system to life threat, we can be very helpful in demystifying the responses that traumatized individuals experience. Providing information that life threat has triggered a very ancient response circuit that may reorganize how the autonomic nervous system regulates physiological state may help the client understand the changes in their day-to-day functioning.

Serge Prengel: Yes. So we are really talking about the fact that, in a way, the stronger the stress, the more we tend to regress to a very archaic form of survival.

Stephen Porges: Yes. Our physical context interacts with our physiological state to determine the options we have to deal with stressors and challenges. We will flee or fight, if we have an opportunity to escape or to defend ourselves. To support these adaptive mobilization strategies we stimulate our sympathetic nervous system. But if we are locked in a room or being held down, we have very few options. Under these difficult and extremely dangerous and often life threatening conditions, we might reflexively faint or immobilize in terror and slip into a dissociative state. These defensive behaviors are dependent on a phylogenetically older circuit.

As an example, on a CNN news segment a video illustrated a plane that was having great difficulty in landing. The wings were unstable and tipping up and down. Although the situation looked precarious, the plane landed safely. After the plane landed, a reporter went to interview the passengers. I am sure that the reporter expected the passengers to say that the experience was very scary and that they were ready to jump out of their skin. The reporter asked a woman how she felt during the landing. Her response was "Feel? I passed out." Obviously not everyone passed out on the flight. Some passengers did have an experience of terror and felt like jumping out of their skin. For the woman who passed out, her nervous system interpreted an inability to fight or to flee as a life threat and shut her down. Her response was neurophysiologically similar to the experience of the mouse in the jaws of a cat. It is obvious that there is an adaptive function to a fear induced immobilization response in which the individual is no longer conscious or in the "here and now." Although the trigger for fainting is associated with mild hypoxia due to massive drop in blood pressure, the defense response strategy has adaptive features by raising pain thresholds so that if you are going to be injured you will not feel the pain.

Serge Prengel: Yes.

Stephen Porges: And, if you survive, hopefully you'll be fine or at least you will be alive. The real issue related to understanding the "shutdown" response as an adaptive defense reaction is to respect the responses that our body may automatically employ to protect us from pain and to save our lives and not to be angry at our bodies.

Serge Prengel: Yes. So again we are coming back to, in a way, what it's like to be human and to have that embodied experience.

Stephen Porges: Right. The embodied experience is critical to humans, because being interactive with others is critical for human survival. Throughout the entire human lifespan, humans are dependent on others. Starting with birth, infants require nursing and caregiving. As we mature, the interactions shift from safety and food to facilitating our physiological state, which we experience as emotional and behavioral regulation through our social interactions with friends and loved ones. The main point is that humans require interactions with others to develop and to optimize their potential. Several biological disciplines discuss similar processes within the construct of "symbiotic regulation." I think we are now in a good position to use this construct from a biobehavioral perspective to explain several aspects of how human social interactions facilitate neurobiological processes. Through expanding this construct we can see how we reciprocally are sending cues to each other's nervous systems. Social interactions are characterized by continuously transmitting cues of safety or danger and whether it is safe to be held in the arms of another or to retreat and protect ourselves. I have used the term Neuroception to explain this dynamic and interactive process. .

Serge Prengel: You have paid attention to that in terms of the mechanism of in which we have evolved love and attachment.

Stephen Porges: Yes. HIV patients provide an interesting example to elaborate on this point. In studying HIV patients, I have learned that often their caregivers feel unloved and frequently get angry attending to the needs of the infected individual. Parents of autistic children often report the same feelings and experiences. In both examples, although they often report feeling unloved, what they really are expressing is that the HIV infected individual or the autistic child is not contingently responding to with appropriate facial expressivity, eye gaze, and intonation in their voices. In both cases, the individual being cared for is behaving in a machine-like manner and the caregivers feel disengaged and emotionally disconnected. Functionally, their physiological responses betray them and they feel insulted. Thus, an important aspect of therapy is to deal not solely with the patient, but to also include the social context in which patient lives with a focus on the parent-child or caregiver-client dyad. This will insure that the parents or the caregivers will learn to understand their own responses as a natural physiological response. Unfortunately, caregivers and parents often attribute motivation to the disengaging behavior. This creates problems. Similar to the frequent responses of teachers in schools, who become angry and aggressive when students disengage by turning away, parents and caregivers often justify their angry and abusiveness to the challenged child or individual.

Serge Prengel: Yes. Can we override our reflexive reactions?

Stephen Porges: We can attempt to override these reactions. However, this is very hard to do. In some of the workshops that I have conducted, I have tried a simple experiential to illustrate this point. I call the experiential the reluctant therapist. In the reluctant therapist, I create triads in which workshop participants rotate through three roles: therapist, client, and observer. In the experiential, the therapist is instructed to gaze avert and turn away while the client is talking. The interesting point of the experiential is that the individual in the client role frequently gets very

angry at the therapist. This occurs even though the client knew that the therapist was role playing and instructed to turn away and disengage. In the experiential, the observer is uninvolved and has the responsibility to be objective and to report how the behavioral cues trigger massive behavioral and state shifts. When the participants rotate through the three roles, the reactions are reliably replicated. It's really quite amazing how easily our body changes state when someone disengages or engages with us.

Serge Prengel: Yes. That's the powerful part. Even knowing it, even in a role-play situation, social engagement has such a hold on us that we really cannot easily disengage from it.

Stephen Porges: Yes. It is quite amazing. In therapeutic settings, clinicians may deal with couples with different "engagement" resources. For example, if one member of the couple has a trauma history that may be manifested in state regulation issues and accompanied with gaze-averting and turning away from the other during confrontations or even during more positive social interactions. What is the partner's response to this? Often their response is simply to get angry.

Serge Prengel: Yes. So as I am listening to you, there is something that feels very nice about deconstructing the mechanisms of what happens in an interaction and the importance of helping others not take these things personally, helping them to diminish the attribution of blame, helping them reduce the layers of interpretation that are a block to people functioning effectively with others.

Stephen Porges: Yes. I totally agree. I think we live in a world that attempts to attribute motivation to every behavior and to place an evaluative dimension of good or bad on the behavior. I use the term "moral veneer" as the feature in our society that pushes us to evaluate behavior as good or bad and not to see the adaptive function of the behavior as regulating physiological and behavioral state. Rather our culture imposes an interpretation of the behavior as being motivated and either good or bad.

When I talk to clinicians, I used to use an example of an instance when a boss or chairman didn't look at the clinician. I wanted to elicit a visceral feeling of being marginalized. I had expected interpretations ranging from the boss didn't like them or that they were not important enough for the boss to attend to them. I noticed that many in audience had blank faces and could not relate to what I was describing. Then I realized that most clinicians don't work for anyone. They don't work for anyone because these disengagement behaviors, which they often interpret as evaluative, did not make them feel good. However, my life has been in the academic world, a social environment in which administrators and many colleagues tend not to have good social skills. However, the point I am trying to make is that most of the behaviors that we label as social skills are not learned. Rather, most of these behaviors appear to be more an emergent property of our biological state than our "skills" in learning.

There are people who make good eye contact, are curious of the other, and have a broad range of facial expressivity. These people are also reciprocal in their social interactions. To maintain this reciprocity, they are literally throwing obvious and often subtle cues at each other. These cues have the potential to make the other person feel safe. When the cues are effective, the other person returns the cues through facial expressions and vocalizations. The face appears more alive, more expressive, the intonation of the voice becomes more prosodic, and the physical distance between the two people if often reduced as the physical space starts to approximate the reduced psychological distance. I am sure that you have observed this within your clinical practices.

Serge Prengel: We do when we are in the middle of clinical practice. We really pay attention to it and we are very aware of it, but of course as we react as human beings. We have just as much difficulty as everybody else paying attention to it.

Stephen Porges: Yes. My personal test of these qualities has occurred as a father and a mentor for my students. How do we react to our children or students when they start throwing cues at you? I learned that have to step back and think about their physiological state. What if they haven't eaten? What if they haven't slept? What if they have all these other things going on?" If events and contexts compromise their ability to recruit the neural circuit that supports safety and social interactions, the interaction is going to be very challenging. So the ability to be engaging, expressive and understanding is going to be limited. We can generalize to our entire culture and identify features that would interfere with access to the neural circuit supporting social engagement. Remember that our culture is not structured to promote personal safety. It is a culture that unambiguously states that we can't work hard enough, be successful enough, you can't accumulate enough, and everything is vulnerable. So the culture is really telling us that we live in a dangerous place and during dangerous times. I always wonder what would humanity be like if we were more respectful of humanity's need for safety.

Serge Prengel: Yes. So you're saying is that, one is that question of what if we actually were paying attention to safety, as opposed to accumulating, also judgment, in terms of being evaluated in terms of accumulation but also what you are saying is that the way up, the shift out, is not so much an intellectual shift or an emotional shift about simply paying attention to safety but is changing into a different system, voluntarily fostering the ability to shift into the social engagement system.

Stephen Porges: Yes. Well, again, if we are smart and this is where science can be helpful, we can start learning what are the features in the environment that functionally trigger our nervous system into fight-flight or allow us to move into a state of safety and recruit the social engagement system and what are the features in the environment trigger a behavioral shutdown, immobilization with fear, and states of dissociation. Often background noises can trigger a physiological state of mobilization and disrupt social interactions and feelings of safety. I have noticed that several clinical offices are in buildings with disruptive sounds including the low frequency sounds of ventilation systems and the mechanicals of large buildings. These sounds can interfere with the client's ability to progress.

Serge Prengel: I mean, if you are in New York City.

Stephen Porges: Right. You might have heard on this phone call sounds of a train, it was the elevated train or "L" as we call it in Chicago. The train was producing physical cues to our nervous system to be basically vigilant and to anticipate potential danger. Often we are not aware of the how our nervous system is bombarded with cues to be defensive. A neurobiologically "informed" design of an environment for humans would make sure that we lived, worked, and played in environments without these features. Removing these forms of stimulation reduce the demands on our nervous system to be hypervigilant for predator or for danger. With these forms of stimulation removed we could more easily functionally relax, engage, and get all the benefits of a social interaction.

Serge Prengel: Yes. Removing, paying attention to all of these things that put us in a hypervigilant mode.

Stephen Porges: Yes. Safe environments are important for everything we do and especially for therapies. I started to think about mindfulness meditation and realized that even mindfulness meditation exercises need to be conducted in a safe environment. It becomes obvious when you ask questions about how breathing and attention are influenced by background sounds and how easily we can become distracted and hypervigilant. I also realized that recruiting the defensive systems associated with sympathetic nervous system activation was incompatible with mindfulness. Perhaps, a simple way of understanding this point is to realize mindfulness requires a state that is non-judgmental. However, this would be incompatible with states of defense in which evaluation is critical for survival. We can map this onto the polyvagal theory, evaluation is really the same thing as saying, we are in a dangerous environment and thus we need to sacrifice social engagement behaviors to insure that we are hypervigilant and poised for fight and flight behaviors.

Serge Prengel: Scanning the environment for danger. Paying attention to where to run.

Stephen Porges: Yes. When we encourage our children to study and to attend to computer monitors, we are basically recruiting a hypervigilant state that is slightly modified to provide a state of focused sustained attention. However, this is not a state that supports health, growth, and restoration nor does it support the social engagement behaviors necessary for successful social interactions.

Serge Prengel: Yes. So we are coming back to that sense of safety for the kids but for the grown up, for everybody as you mentioned, the sense that it doesn't make sense to really think about mindfulness or pursue mindfulness per se without really actually paying attention to how we tend to be reacting to a lack of safety so the awareness of what it is that makes us feel unsafe, the awareness of facing it, dealing with it, is really a prerequisite for finding mindfulness.

Stephen Porges: Right. And the flipside is to understand the prerequisite features that enable us to feel safe and to turn off defensiveness. This leads to the exciting future of clinical treatments. If we were more understanding of the features in the environment that are capable of the turning off the defensive systems, then clinical practices or clinical treatments would be more efficient. If the environment we lived in had the triggers for defense removed and replaced with features that trigger safety, then life would be healthier and of a higher quality. Several features could relatively easily be improved in our work and living environments. These would include reducing low frequency noises in the environment, reducing the unpredictability of environment, and simply being in proximity to people with whom you feel safe.

Serge Prengel: So, in a way, evolving toward treating underlying causes, as opposed to treating symptoms.

Stephen Porges: Yes. We have different neural circuits that evolved with different but still profoundly important adaptive functions. As these neurophysiological systems evolved they provided neural platforms for emergent behaviors with each behavior having an adaptive function. Thus, I do not like to conceptualize behaviors as good or bad, but view each behavior as sitting on a neural platform that represents the organism attempt to adaptively survive. However, although this model enables behaviors to be conceptualized as adaptive, some behaviors interfere with appropriate social behavior and social interactions. Thus, a goal of therapy would be to enable clients to regulate their visceral state and to engage and to enjoy the interactions with others. These social behaviors require that newest neural circuit regulating the autonomic nervous system. The neural circuit is unique to mammals and is only available when we feel safe. It is this system that not only facilitates social interaction and enables social interaction to foster

growth, health and restoration, but it also has the capacity to down-regulate our reactions and the neural circuits that evolved for defense.

Serge Prengel: So we no longer are talking in terms of traditional pathologies but we are talking about things that have, in a way, are good reactions to possibly bad perceptions or basically regulating the way we function.

Stephen Porges: Yes. I tend not to use the word, perception, because that involves a degree of awareness and cognition. We respond to features in our environment with physiological shifts that are outside the realm of awareness. I call this process Neuroception to emphasize that the process is on a neural basis. Our body functions very much like a polygraph. Our body is continuously responding to people and places. We need to learn more about how to read our body's responses. We have to know that when we feel uncomfortable, there's a reason our body is feeling uncomfortable and we need to adapt and adjust to that.

Serge Prengel: Except… To play devil's advocate, I would argue with the sense of reading the information because there, again, would be a cognitive process.

Stephen Porges: You are absolutely right. It's a conundrum, isn't it?

Serge Prengel: Yes. It's hard to talk about processes without having these images.

Stephen Porges: Yes. I think we can wiggle out of this problem by merely saying that we need to respect our body's reactions and rather than continuingly try to develop the skill set that rejects whatever our body is telling us. When we respect our body's reactions, we can use our awareness and our voluntary behavior to navigate into places where we would feel more comfortable. With this new understanding we can create a partnership between our respect for bodily feelings with our stewardship of the body via cognitive functions.

Serge Prengel: Yes. I mean, that language for me, as I hear you, evokes a visual, gentle ways of, as opposed to jagged movement.

Stephen Porges: Yes. When are young, we could deal with noisy places like bars or crowded rooms. But as we mature we have difficulties understanding voices and relating to people when we are in noisy and crowded places. In a sense our nervous system functionally starts to fail us. We want to escape from these uncomfortable environments. Many people have similar experiences. However, many people who have these experiences do not, in a sense, respect the uncomfortable bodily reactions until it's too late and they can no longer control their behavior.

Serge Prengel: Yes. So, in a way, a lot of our pathologies come from too great an ability to override those signals.

Stephen Porges: Yes. We get the signals, but we do not respect them. I think this strategy of denying our bodily reactions has much to with our culture. This point is related to my introductory comment on Descartes, which emphasized a subjugation of bodily feelings to cognitive functions. Our culture's interdependence on religious views has contributed to dispelling the importance of bodily feelings. Specifically bodily feelings were conceptualized as being associated with animals, while cognitions were an attribution more closely linked to spirit.

Serge Prengel: Yes. So we get to that sense of conceiving who we are from a bottom-up perspective.

Stephen Porges: Yes. But it is really both a bottom-up and a top-down model. We want to maintain the bidirectionality of mind/brain and the body/viscera connection, because our brain is regulating our viscera and the viscera is continuously providing information to the brain. Simple movements, such as shifts in posture, result in changes in the signals our brain receive. When we lean forward or backward we change our blood pressure and send different information to the baroreceptors, receptors that monitor blood pressure and communicate with areas in the brain. When we lean back, we tend to become more relaxed and less aware of our environment. If we move to an upright position, we trigger a change in blood pressure that makes us feel more alert and focused. Thus, these simple behavioral manipulations which trigger blood pressure receptors can functionally change our interactions with the world.

In our basement, we have a chair that reclines and takes all the pressure off the lumbar region. When I in this chair I don't want to get out of it. I feel totally relaxed and I don't want to do any work or think. I just want to be there. But when I go up to my office and sit in my desk, I am in the upright posture. My motivations and outlook change. When sitting at my desk I start to see work as interesting and enjoyable. It is as if the shift in posture results in two different interactions with the environment. It is as if the psychological experiences reflect two different personalities: one lethargic and the other engaged and enthusiastic. So something as simple as a slight shift in posture can by triggering neurophysiological circuits change how we react to the world, how we organize thoughts, and how we motivate ourselves.

Serge Prengel: Yes. And what's interesting here is that this is caused by a shift in posture, which may also cause a shift in the dyad between say, me and the environment.

Stephen Porges: Actually, you are onto something and another way of viewing it is, you shifting from being focused on regulating the smooth muscles of our viscera in the relaxed state to recruiting striated muscles of our trunk and limbs in a more alert state. This occurs because sitting upright requires an increase in muscle tone. To accomplish this task you need to recruit different neural circuits than when you are reclining and the tone of your striated muscles are relaxed. In the recline position, you become literally a smooth muscle organism, which has an agenda to conserve resources. But, when you are in the upright posture, your skeletal muscles are required to maintain muscle tone and you can now become an interactive, engaging organism.

Serge Prengel: So in a philosophical way, you think of the individual, the self as a process and under certain circumstances, the process becomes oriented toward maintaining smooth muscles and fostering a state of relaxation.

Stephen Porges: Yes. When you experience a relaxed immobilized state, specific physiological processes may occur that would support health, growth and restoration. This is a very important and useful state, although it does not support social interactions or expansive thinking.

Serge Prengel: Yes. So we're, in a way, just talking about the way in which we can be employ different neural circuits that enable us to react to and adapt to the dynamic changes in the environment. Go ahead.

Stephen Porges: If we conceptualize different neural platforms that support different domains of behavior, we can start to interpret the behaviors and the limitations of behaviors within different neural platforms as emergent behaviors. So when I am reclining, it's not that my lack of social behavior is maladaptive, but it would be viewed as being maladaptive if I had a group of friends over for the evening. So the context is really defining what is appropriately adaptive. But the

behaviors are emergent properties of the neural platform and the adaptive characteristics are dependent on the appropriateness of these behaviors within a specific context. Conceptualizing behavior in these terms may change our understanding of behavioral pathologies. We might end up interpreting a behavioral pathology as a behavior which might have been adaptive in one setting that is now being elicited in a setting where it is maladaptive. For example, trauma victims, who maybe dissociating or shutting down, may be expressing a reaction that would be adaptive during the traumatic event, but is maladaptive in a social setting.

Serge Prengel: Yes. So a sense you are changing the definition of pathology to whether or not a behavior is adaptive in the current context..

Stephen Porges: Yes. I totally agree with that and I think once we do that, behavior is neither good nor bad. It is just behavior that doesn't fit the context. This will enable us to take away some of the moral labels that have affected people who have difficulties regulating state to access the neural platforms that would support more appropriate behaviors. .

Serge Prengel: Yes. And it's in a context of, definitely very, very important, very powerful in taking away that stigma, taking away the judgment, taking away the moral context and judgment evaluation in a way that puts us in a mode of danger.

Stephen Porges: Defense.

Serge Prengel: Defense. And yes and in contrast. Sorry, go ahead

Stephen Porges: I was going to say, you are really getting the core of the theory and how the theory can be distilled into very simple constructs related to our quest for safety. If we are not safe we are chronically in a state of evaluation and defensiveness. However, if we can engage the circuits that support social engagement, we can regulate the neural platform that enables social engagement behaviors to spontaneously emerge. From a Polyvagal perspective, this is the objective of therapy.

Serge Prengel: And in contrast, this is a view that is about, just understanding that these are processes that have a certain, apparent flow, and re-directing, learning, just in a way working with that potential that we have to learn and adapt.

Stephen Porges: Well, you brought up another important point, which I should discuss before we close. That is, even though we have those three circuits to regulate state, we can modify the two defensive circuits through the use of this newer mammalian, social engagement system that is available when we are safe. Thus, once we can easily engage the social engagement system, we are free to mobilize without being in fight or flight. Rather than fight or flight, we can move and play. Although fight/flight and play behaviors both require mobilization, play turns off defensiveness by maintaining face to face social referencing. Play uses the social engagement system to signal that the intentionality of the movements is not dangerous or hurtful. You can see this when dogs play. They chase each other and may mildly bite the other, and then they make face to face contact and role reverse. If we watch people when they play sports, if they hit someone while playing they will diffuse the aggressive reaction by making good eye contact and social communication. However, if they hit someone accidentally and walk away with defusing the valence of the action, a fight might occur. Similarly, the immobilization circuit may also be co-opted by the social engagement circuit during loving behavior that may initially start with face to face interactions that are followed by an immobilized state without fear. Over time we become able to immobilize in the arms of another. I keep emphasizing the important role of

immobilization without fear, because for mammals, immobilization is potentially lethal. So mammals are always moving, unless they can feel safe with another.

Serge Prengel: Are we talking about the good immobilization?

Stephen Porges: Yes. The "good" immobilization response, immobilization without fear, requires the co-opting of the neural pathways involved in "immobilization with fear" with neuropeptides, such as oxytocin. Functionally oxytocin has receptors in the brainstem dorsal motor nucleus of the vagus that regulates the phylogenetically older unmyelinated vagus. This system of immobilization without fear enables women to give birth without fainting or dying. The same "good" immobilization system enables people to cuddle and hug without problems and enables women to breast-feed without having to move. Thus phylogenetically older structures, which initially evolved for defense, have been co-opted for play behaviors and for reproductive and sexual behaviors.

Serge Prengel: Great. So that's a nice way, that's a context in which we have, in that large context, what we do in therapy is in a way part of that, is continuing that ability to adapt to structures.

Stephen Porges: Yes, to enable clients to experience greater flexibility in the world by having access to neural circuits that can efficiently dampen defense in appropriate settings and to utilize the phylogenetically older defense circuits for very positive outcomes.

Serge Prengel: Yes. Thanks, Steve.

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