



Stephen W. Porges

Stephen W. Porges, PhD is Professor of Psychiatry and BioEngineering and Director of the Brain-Body Center at the University of Illinois at Chicago. His work on the autonomic nervous system has led to a new understanding of mechanisms involved in behavioral regulation and social engagement behaviors. He is developing new biobehavioral assessment tools to monitor individual differences in physiological regulation of behavioral state. His research has led to an innovative intervention, The Listening Project, designed to exercise the neural regulation of middle ear structures to reduce auditory hypersensitivities and to improve the ability to listen and to attend to human speech. Dr. Porges speaks throughout the world about his Polyvagal Theory and its applications to typical and clinical populations.

The GAINS Anniversary Interviews: Stephen W. Porges

Interviewed by Lauren Culp

Lauren: What do you see happening and changing in the field of trauma treatment in the next five years?

Stephen: Trauma creates problems for traditional therapeutic models. Traditional therapeutic models assume that most psychiatric disorders have a common neurobiological substrate linked to mechanisms mediating increased stress, fight/flight behavior, and sympathetic activation. All these constructs are related to states of hyperarousal that result in atypical behavioral regulation. However, clinicians realize after evaluating trauma victims that the neurobiological expression of their trauma is not always along a continuum of a highly mobilized defensiveness that we categorize as fight or flight reactions, but often it is expressed along a continuum of immobilization. These clients are experiencing not a hyperarousal with increased mobilization behaviors, but something more like a total behavioral shutdown coupled with subjective experiences of despair and even features of dissociation that may reflect a motivation to disappear.

These behavioral and psychological symptoms have not fit well with classical models of defense, stress, and even clinical diagnoses of anxiety and depression. This lack of fit for the trauma victim with current diagnostic and theoretical perspectives created an opportunity for the concepts that I had been developing with the Polyvagal Theory. As I developed the theory, I was trying to explain another basic defensive system used by mammals under extreme situations of life threat—a system of shutting down and immobilization. By not moving, the mammal would not be detected by predator and, as a byproduct of this strategy, consciousness might be lost or for humans states of dissociation may occur. This

defensive system would foster safe outcomes for many different mammals.

I had not thought of this defense strategy as a trauma reaction. I thought of it as a regression to a more primitive adaptive response that mammals shared with reptiles—and reptiles use this all the time. But as I started to talk about this model and this theory, it was the trauma community that really got very interested in this component of the Polyvagal Theory. If there is one group of professionals who *get it* and see the clinical application of the theory, it is the group of clinicians that treat trauma. For the trauma community, the Polyvagal Theory provides an understanding of the symptoms that are presented by trauma victims.

I have had interesting dialogues with clinicians and also victims of severe trauma. These discussions informed my research and I learned that victims of severe trauma often experience states that can't be explained using other models. Many victims of trauma have actually felt as if they were victims of the therapeutic models! Their personal experiences informed me and I learned that the symptoms that they experienced did not make sense to them within the clinical treatment models they were exposed to. Many felt like they were crazy and could not understand their feelings and the psychological consequences of their trauma. Based on what I have learned from both clinicians and individuals who have suffered severe trauma, I have started to insert in my talks and workshops statements about trauma victims learning to celebrate the success of their bodies in navigating and negotiating extraordinary dangerous situations, like life threat. Basically, respecting how their body and their nervous system put them in a state in which they could survive.

Now, although their reaction to life threat may have put them in a state that enabled them to survive, it also created a problem. The problem is that the state that saved them is a state from which they may not easily recover the flexibility and especially the ability to socially interact that they had before the trauma. Once we understand that the state that saved us is also a state that is currently limiting our ability to be social and feel good, we can still *celebrate* our body's successes.

So when I talk with clinicians, I typically ask them, "What would happen if you told your clients (as opposed to demanding that their clients be more social, more interactive), 'Let's take a few moments now and celebrate what your body did.'" After making these statements in talks, I started getting emails back from clinicians about how demystifying reactions to trauma was in itself healing. They were telling me that some of their clients were actually recovering, or at least improving in terms of their symptomology, once they lost a sense of fear of what their body was doing when they couldn't understand it. So, to make this statement simpler, I see the world of trauma moving away from trying to categorize all adaptive defense behaviors as if they were fight or flight and moving toward respecting the primitive defense systems that are extraordinarily successful in removing us from injury and pain, so we are in a sense not feeling it at that moment. The real question about therapy is how do you move someone out of that state and move them more into a state in which they can interact with people and feel safer.

Lauren: A close family member experienced a trauma of home invasion when he was asleep and had PTSD. In addition to exploring the

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cognitive understanding of the experience with professionals, I used my experience as a massage therapist to use touch as a way to ground the person. What are your thoughts on the use of therapeutic touch?

Stephen: In general when people have experienced trauma, they may not easily be receptive to other people, or easily receptive to being touched. As a clinician you have to be very sensitive to the client's vulnerabilities and find the window of opportunity to engage. Also, you have to be very sensitive to the client's reaction to your engagement behaviors. I am trying to get therapists to pick up the cues when the person loses their resilience, to literally

learn to back off rather than go in and push the person to an extreme, which used to be part of therapeutic models.

Lauren: That is very interesting. I hear you saying that it is important to stay very present with the cues of a patient who has experienced a form of trauma and to respect that individual's unique experience. As a clinician I also try to find the strength-based areas where people have found their own tools to help themselves reorganize their experiences.

Stephen: With trauma, it's not the event; it's the response to the event that is critical. I have a little phrase to remind that "Everyone's hell is their own." To me this means that my judgments of the traumatic event are irrelevant to the client and it is the client's response that determines the trajectory of outcome. Therefore, situations that we may be thinking are relatively benign, an individual's nervous system could respond to it as if it were a life or death situation. And of course when you have a home invasion, people might say, "Well, you are alive and you are not injured, so what are you concerned about?" In making that statement, they are not sensitive to the victim's whole body response to the violation. The

critical point is that we must respect the fact that our nervous system sometimes does what we want it to do, based upon voluntary behavior, and sometimes may functionally betray us while attempting to save us.

I will give you my own personal experience of this type of body betrayal. A few years ago, I had to have a MRI for a medical evaluation. I was really interested in getting the fMRI evaluation, since many of my colleagues use MRI to do functional imaging and I wanted to understand the procedures. I thought this would be an interesting thing to do. However, as I was moved into the magnet past my eyes, I started to react with a major claustrophobic response. I said, "Wait a minute, can I have a glass of water?" I had the glass of water. Then, I went back in up to about the same point. And then I said, "I'm out of here!"

The point is that I did not know that my body would react to the immobilization necessary for going into an MRI with, functionally, a panic attack. Now, knowing this, whenever I have to get an image, I have to be heavily sedated. I will not open my eyes within the magnet, for 45 minutes or so, because any of those visual cues will trigger responses. Even if we think we are healthy and insightful, we don't know how we are going to respond to certain situations.

Another similar example occurred when I was getting an infusion for a heart check-up several years ago. The infusion catheter started to slip out, so I told the technician and he moved the infusion catheter around to make sure it was appropriately inserted. However, when he moved the catheter, it triggered afferent pathways associated with blood pressure regulation and I passed out. Their interpretation was that I was afraid. It had absolutely nothing to do with fear. It had to do with the fact that they triggered certain sensory receptors. Similar to the symptoms of trauma victims, the medical world interprets behavioral consequences with a psychological interpretation whether or not the behaviors, such as fainting, are physiological reflexes.

It is important not to think of everything as being driven by our body and influencing our brain and consciousness through a bottom-up model. We also have access to top-down circuits that enable us to use our cognitive functions to restructure and help us function even though we may have experienced certain traumas or disruptions in our normal developmental trajectory.

I have a metaphor that I use called the "big brain" metaphor to explain how we can use top-down models. As a species, we are fortunate that we do have big brains—we can use them to take in information and literally become our own parents, rather than keep expanding on early childhood deficits and treating early disruptions and trauma as deterministic influences leading to failure. Having a good brain—having a big brain—we can now start talking about top-down mechanisms. Earlier, I was talking about bottom-up mechanisms in which our body is literally subjugating our brain.

Our brain can reorganize how our body feels. We can reinterpret, see things in a different way, we can shift our disappointment and our anger to an understanding that the people who may have failed us were merely trying to adapt under very difficult circumstances themselves. Many people can never let go of the past and often attribute many of their current problems to their early experiences with poor parenting. They forget that their parents were children who may have experienced poor parenting, might have been exposed to life threat, and most likely were relatively immature or insecure when they were born. Often the individuals who are basically blaming their parents forget that they themselves are parents as well. They are now creating a trans-generational pathology, in which their parenting is also compromised. Having a "big brain" allows us to have an understanding that many of the features that may have been hurtful in the past may have been stimulated by some innocent adaptive behavior.

I will give you some simple examples. We are

all extremely sensitive to this: if we are engaged in a conversation and then the person just walks away without terminating the social interaction. When this happens, our body cries out to tell us that something is wrong. This is a situation that we can't tolerate – it's a violation of our expectancy of a social interaction.

Most people don't say, "Wow, this is pretty peculiar. Why should I be so upset?" Even sophisticated scientists and clinician won't explain the behavior by considering that the person may have some autistic spectrum features. Rather they assume motivation to the insensitive behavior of the person walking away. For example, we might think that the person who walked away doesn't like us, that the person doesn't value us, or that we are not important enough. We start confabulating, building a plausible model attributing a motivation to the behavior. We never step back and say—maybe this person is trying to adapt in a very complex social environment and doesn't have the resources.

I consider this an extremely important issue that we have both bottom-up and top-down strategies. We have bottom up strategies in which our body subjugates our brain and conveys feelings associated with adjustments to stress and danger that impact on our ability to perceive the world. But we also have top-down strategies in which we can put ourselves in safe environments, then we can start to use our knowledge base and try to deconstruct and demystify things that may have been hurtful to us.

Lauren: In my clinical practice, I work with adult

children of spectrum adults, from ADD to Asperger's, who with that new insight can create a shift in their current experience and understanding.

Stephen: Yes! In telling the story of our own past, we are not the child anymore. We are the adult. It is a very interesting and rewarding approach. This is critical for people of my generation whose parents experienced world wars, the depression, and things we don't even think about in our culture today. We say, "Well, these people survived it." Of course, we should have been more understanding that a sense of security was not conveyed with their survival.



Lauren: You mentioned the autistic spectrum, I am wondering about your work in schools and in the field of autism.

Stephen: I was involved in designing the building for a school for autism that is run by the Easter Seals Foundation in Chicago. The school had to have certain features. One important feature was that it should be quiet. We worked on reducing sound and also providing lots of light that was not glaring or distracting. The windows are five feet off the ground and do not provide stimulation that is distracting. The lights are indirect lights; they are not glaring down. The rooms have very good sound attenuation—they absorb the sound.

We did this because many individuals with autism have lower thresholds to noise, sound, and light. They are hypersensitive to sound. They may even have a dampened pupillary reflex—the eyes may be more dilated. Basically, most children with autism spectrum disorders are in a physiological state of mobilization. When in this state, the pupils will be more dilated and the middle ear muscles will not be working as well. When the pupils are dilated, there is a hypersensitivity to light. When the middle ear muscles are not working well, there

is a hypersensitivity to sound. We brought these ideas into the design.

Next, we tried to change the culture of the school. This is a real interesting issue. In the educational model, autism is being treated in the school system by special education professionals, with a variety of other supportive disciplines such as speech and language therapy, educational therapy, occupational therapy, and physical therapy, but basically it is a special education model. But special education strategies were not designed for autism. They were designed for individuals experiencing learning delays who didn't have hypersensitivities and who didn't have state regulation issues. The imposition of those special education models on a population that is basically behaviorally reactive creates a major problem.

The Listening Project, which I developed for autism treatment, is something we are now trying to bring into the classroom, using the dyad of the teacher and the student as if it was the student and the parent. We are trying to evaluate how calming the student down will improve interaction with the teacher. There are two things that we are working on in terms of our research model in the school. One is the improvement of behavioral state regulation through improved neurophysiologic regulation. We are using both the Listening Project and we have a protocol that we haven't started yet to implement biofeedback procedures to improve heart rate regulation. The focus is: if you can make the children calmer, you literally change the dynamics of the educational environment.

The second part is assisting with auditory hypersensitivities, which is the focus of The Listening Project. At least 60% of individuals with autism have auditory hypersensitivities. If you ask parents of autistic children and adults if their children have auditory hypersensitivities, even if from the parent perspective they don't have it now, they will say that their child used to have it. They often say something like "We taught them not to put

their fingers in their ears." The parents have trained away the behavior which was the window to an adaptive response. Although children with auditory sensitivities were making an adaptive adjustment to the loud stimulation by putting their fingers in their ears, the behavior was disruptive to the parents and the teachers. The parents and the teachers felt that the fingers in the ears behavior was demonstratively signaling to the teacher or parent that these children did not want to listen to them and were not considering that the sounds were overwhelming the children, because the sounds were not overwhelming to the parents and teachers. So it's again this whole issue of respecting the physiological state of the other and respecting the sensory world of the other person that appears to be limited in the medical and educational communities. When you change the culture to respect the individual differences in how the nervous system responds, you start to change developmental trajectories; and that is what we are working on.

The real issue for communities is that schools, in a way, warehouse challenged children. Even though an enormous amount of money is spent by school districts for the treatment and the education for children with autism, the progress or the trajectories for most children is not sufficient to integrate them into society. It doesn't mean that some autistic children don't go on to college or aren't doing well, but in general, the educational experience for autistic children is stressing for them and for their families and educators. I want to create an environment where science not only informs practice, but practice informs science.

In the study of autism, we have academicians, scientists, and clinicians with interesting theoretical models of what autism is. However, these professionals are less sensitive to the fact that various symptoms are disrupting the lives of the individuals. An example, of course, is auditory hypersensitivities. It is disruptive to the life of many of these families, yet this is not a domain that scientists investigating autism

want to study. They don't want to study it and funding agencies don't want to fund research in this area, because it is not specific to autism. They are looking for the neurobiological signature or the genetic signature of autism, and they won't find it because of the heterogeneity of the behavioral and neurophysiological features.

Auditory hypersensitivities have also been found in people who have been traumatized. There may be a common core of clinical problems in several psychiatric disorders, because a retraction of the neuroregulation of the social engagement system occurs when the physiological state is in a defensive mode. A retraction of the social engagement system will result in auditory hypersensitivities as well as the flat facial affect found in many clinical disorders.

Another problem with autism research is that virtually all of the research is done in a laboratory setting. Where is the diagnosis being made? The diagnosis of autism is occurring in the clinic. A clinical environment triggers defensive behaviors, which will result in limiting the functional range of behavior. In the clinic or the laboratory, you don't know whether the differences between autistic and nonautistic individuals are due to the defensive reactions to the environment or truly a characteristic of the individual. Your example is a perfect example of clinicians seeing certain features. The best way to understand autistic behavior is to see the child in a familiar environment. So the notion that I had was not to conduct research in the lab, but to do it in a school. By creating a laboratory in the school where the child is familiar with the context, the tremendous uncertainty of the child coming to a new environment to be tested is reduced.

We see wonderful things happen during The Listening Project. For many children by the

time they finish the intervention, they spontaneously embrace the staff and give them hugs and want to come back. The laboratory setting within the school for autism is supportive, friendly, and calming; it is not stressing to them. Juxtapose the laboratory within a school with placing a child with autism in an MRI within a hospital setting. I have always wondered which autistic individuals could go into an MRI because many of them have auditory hypersensitivities, and of course would not like being constrained. What might the fMRI research telling us, if you get someone with that diagnosis to get into that MRI machine?



Lauren: One of my teenage patients used to spin when he was little and now flaps/flicks his hands when he is stressed. What do you think about that?

Stephen: Does he rock? Does he like to swing? Swinging in a head-to-toe direction stimulates the vagal receptors involved in blood pressure regulation and helps organize the whole vagal system. It is extremely calming and it might

reduce flapping. When a child does hand movements he is basically expressing a mobilization reaction within a social context. He is not running away. He is just flapping his hands. Often parents get upset when a child flaps and they try to extinguish the behavior. So instead of flapping, the child might pace. One child that I knew wore out the carpet in his bedroom, because his mother did not want him to flap. I view flapping as an adaptive mobilization behavior within a social context. Rather than be fully out of control, you just are flapping your hand.

One of the simplest techniques to help calm and help self-regulate is swinging. This might

include swinging on a porch swing or a glider rocking chair. Everyone used to have them as part of a social engagement strategy. They are not very popular any more, but they were there for a reason. They were, in a sense, behavioral modifications of a physiological state, or bio-behavioral interventions. The swings were calming. Swings may help an autistic child to self-regulate. Rocking on an exercise ball may provide an efficient method of stimulating the sacral afferents of the parasympathetic nervous system. These afferents transmit information to the brainstem and increase parasympathetic tone. Thus, rocking on an exercise ball may provide an alternative portal to stimulate central regulation of the vagus.

Lauren: In general, where have we been in the last five years and where do you see us going in the next five years with Interpersonal Neurobiology—the brain, mind, and relationships?

Stephen: The first point is that it is extremely important for scientists who study the nervous system to be informed by the clinical community. There are major gaps between laboratory scientists and clinical practitioners. Research models or neuro-models of various disorders often miss some of the major features seen in the clinical world. This gap between research and the clinic even expands into the realm of clinical research, which may be conducted by licensed practitioners, who are basically called scientists within medical schools and academic departments. However, often the clinical features observed within the laboratory are different than what is seen within the clinic. From a personal perspective, I have always found talking to clinicians a way of informing me of what are the *real* problems, as opposed to scientific research being a platform to pontificate—a way of viewing the world.

Where are things going in the next five years?

I am going to tell you something that you might not expect to hear. I think we have been living in a world that has become both brain-centric and now is becoming gene-centric in our desire to try to understand mental health problems and to optimize the human experience. I think in focusing on brain structures and brain functions in the way that has been done, we miss one of the major points that clinicians are extraordinarily aware of, and that is: the importance of bodily feelings and how they kind of regulate or subjugate our ability to access higher brain processes, including the higher psychological processes involved in thinking, loving, and socially interacting. As we become victim to this, the products of the technologies of genetics and brain imaging, we have minimized the important realm of sickness behavior that permeates through the whole body, and we become focused on areas of the brain that are not firing or on specific genetic polymorphisms.

If we think in terms of symptomology, whether we are talking about psychiatric symptoms, behavioral problems, or even just physical health symptoms, most of the symptoms are actually in the periphery. The nervous system is not solely a brain independent of the body, but a brain–body nervous system. The future of interpersonal neurobiology is in understanding that our nervous system expands through out our entire body and is functionally responding to the interactions with other human beings as well. So a good future of IPNB would be a greater understanding of how social interactions and social support, whether from a therapist, from a family member, or from a friend, can facilitate physical and mental health—a true interactive, interpersonal model of neurobiology.

Lauren: You've shared so much for us to chew on. Thanks for taking this time with us.