Stephen Porges tells Denise Winn how he discovered a bodily defence system even older than fight or flight and what this explains about post-traumatic stress.

The significance of stillness

WINN: Professor Porges, you first formulated polyvagal theory in 1994 and, as you say at the beginning of your latest book, The Pocket Guide to Polyvagal Theory, its major impact has been to provide “plausible neurophysiological explanations for several of the experiences described by individuals who have experienced trauma”. In the guide, you show how, from a polyvagal perspective, not feeling safe is the core behavioural feature that leads to mental and physical illness. The human givens approach holds that when essential emotional needs are not sufficiently well met, or when the innate resources we have to help us meet them are damaged or misused, that is when mental ill health occurs – and security is certainly one of our essential emotional needs. So I’m really interested to hear more about your findings in this respect, and about the related role of what you term social engagement. But let’s begin at the beginning, which was that, in graduate school, you were attracted to a new interdisciplinary area called psychophysiology. What is that?

PORGES: Psychophysiology was a new discipline that focused on how physiological processes were related to psychological experiences. Basically it provides a science to infer mental processes through the monitoring of physiological variables. I thought it was an extremely interesting discipline with exciting applications. It fit my personal interests. At that time I was in my early 20s and I was curious about what we could learn about a person by monitoring physiology without requiring them to make verbal or written responses. I realised that what people say or write frequently represented a confabulated narrative that was generated to fit specific needs. There was a disconnect between intentions and what was actually being said.

WINN: When you say “to fit specific needs”, what do you mean?

PORGES: Their sense of self and who they were. Let me give you an example. Let’s say a person was brought up with certain very strong religious beliefs and they don’t think it is appropriate to make negative statements about another person, regardless of what they might feel. They would have facial expressions and vocal intonations that didn’t match the intentions of the words they were speaking. To me, the idea of being able to monitor heart rate, pulse, and skin conductance was really thrilling and exciting as a way of seeing what was going on beneath the skin.

WINN: And did that set you off on the road to developing polyvagal theory?

PORGES: Well, not immediately. In the late 1960s and early 1970s I first conceptualised how to quantify heart rate variability, and how it changed during psychological and physical challenges. In fact, I was the first scientist to quantify heart rate variability, which is the variation in the time between heartbeats. The heart doesn’t beat with a constant rhythm; embedded in the beat-to-beat heart rate pattern are modulated rhythms that are due to neural influences. In my early research I documented that individuals with greater variations in the time between heart beats appeared to have a greater capacity to pay attention, had faster reaction times, and were more resilient. These observations led me into studying the neurophysiology of heart rate variability, and started me on an intellectual journey that resulted in polyvagal theory.

WINN: Before we go further into that, can we just say a bit more about the vagus, which you describe as the major nerve of the parasympathetic nervous system, functionally connecting our brains to our bodies.

PORGES: The vagus, first of all, is a cranial nerve and, as you say, it is the major component of the parasympathetic nervous system. We have a sympathetic nervous system that, in general, supports mobilisation and energetic activities, including pumping blood. Most people conceptualise the sympathetic nervous system as a fight-and-flight system. However, although it supports the fight-and-flight responses, it has other more prosocial functions and supports energetic activities. Without a well-functioning sympathetic nervous system, we would be lethargic. Our exuberance and upbeat movements and feelings are dependent on the sympathetic nervous system as an energy source, whereas, in general, the parasympathetic nervous system is about repose and support of health, growth and restoration.

WINN: And, prior to polyvagal theory, it wasn’t recognised that the parasympathetic nervous system had two vagal branches.

PORGES: That’s right – or, more accurately, that it had two functional pathways that originated in different areas of the brainstem, which served as the origin of motor fibres that travelled down the vagal nerve to visceral organs. The traditional
view of the autonomic nervous system put the emphasis on the antagonistic influence of the motor pathways of the sympathetic and parasympathetic nervous systems regulating internal organs. The bi-directionality of the system was minimised, especially the bi-directionality of vagal pathways between the visceral organs in the body and the brainstem areas in which the motor pathways originated and the sensory pathways terminated. In fact, about 80 per cent of vagal fibres are sensory fibres, informing brain structures of the status of visceral organs. This provides a plausible explanation of how gut problems influence how you feel and how the rate your heart is beating at can influence how you perceive the world.

In the early 1900s, physiologists had already identified fibres in the vagus that were cardio-inhibitory and could slow the heart when stimulated. My aim was to develop a better measure to quantify that. After almost two decades, in 1985, I received a patent for procedures to dynamically monitor vagal influences on the heart. The methodology was embodied in a device that I called the ‘vagal tone monitor’ and I started to apply the technology in clinical settings, with patients with various mental and physical health diagnoses and challenges.

WINN: We have long been familiar with the fight-or-flight explanation for emotional arousal, which is all about activating the sympathetic nervous system and readying us for action when we are under threat. But your work on the vagus identified another even older defence system, connected with the parasympathetic nervous system – more usually, as you say, associated with repose. This second defence system is about immobilisation, shut down and dissociation from a threatening event. I believe you came to these understandings through your research on pre-term babies.

PORGES: Yes. In the early 1990s I was conducting research with pre-term infants. At that time the literature informally described vagal pathways and the entire parasympathetic nervous system as a health, growth, and restoration system. There was no qualification that a part of the parasympathetic nervous system, a vagal circuit, could be recruited as a defence system in response to cues of threat to life. It was as if this fact about the vagus was expunged from the common understanding of the parasympathetic nervous system. It wasn’t that people didn’t know that the heart rate could slow to extremes that could result in brain damage and death; they just couldn’t conceptualise the neural mechanisms that mediated it. Without an appreciation of a vagal mechanism that could be lethal, the vagus could be described as a wonderful health-providing resource, and the sympathetic nervous system became synonymous with stress and became the mortal enemy.

WINN: So the vagus was seen as all good, despite clear evidence to the contrary. It was a neonatologist that alerted you to the contradiction, wasn’t it?

PORGES: Yes. It occurred during a period of my research when I was working with high-risk preterm babies. I had already developed the measure for cardiac vagal tone. I wanted to apply it to identify clinical risk and to use it in assessments to provide helpful feedback to clinicians. My work was based on the assumption that, if a pre-term infant had more vagal regulation of the heart, the infant would be more resilient, more likely to survive, and have a positive outcome; conversely, if the infant was very premature, the vagal system wouldn’t be working sufficiently and the infant would be at greater risk.

In 1992, I wrote a paper, published in a major paediatrics journal, in which I described the important protective value of cardiac vagal tone, which could be monitored in the preterm infant by quantifying the respiratory component of heart-rate variability. After its publication, I received a letter from a neonatologist who said that, in medical school, he had learned that bradycardia (slow heart rate) could kill you and that bradycardia was caused by the vagus. What stuck in my mind was that he wrote, “Perhaps too much of a good thing is bad?”

Intellectually that didn’t make any sense to me. I thought about what I had learned over the years from my research and what I had observed in the laboratory and clinic. There was something protective about the respiratory rhythm in the beat-to-beat heart rate variability and, when that respiratory rhythm wasn’t observable, the infant was vulnerable to bradycardia and could die. But how could I reconcile that the vagus was responsible for both lethal bradycardia and protective heart rate variability? I called this contradiction the vagal paradox.

WINN: Is this what led you to discoveries about the unmyelinated and myelinated vagal pathways?

PORGES: Yes. I often say that the whole unfolding of what became polyvagal theory was right in front of my eyes in the neonatal intensive care unit, where the observant scientist can actually see the vagal system develop.

My research showed me that humans and other mammals have both unmyelinated and myelinated vagal pathways. Myelin is an insulating layer around the nerve that facilitates faster and more efficient neural transmission. These two vagal pathways originate in two different areas of the brainstem. An extremely pre-term infant born at less than 30 weeks’ gestational age doesn’t have a myelinated vagus. The process of myelination of vagal motor fibres, the vagal fibres with a respiratory rhythm, only begin to develop at 30 to 32 weeks of gestation. Through scientific publications describing vagal fibres in preterm infants who had died, I was able to find studies that provided sufficient information for me to generate...
a hypothetical developmental curve of the myelination of the vagal motor fibres going to the heart, and map what I had observed in my research onto that curve.

It was an ‘aha!’ moment for me, because I could monitor the shift in the neural regulation of the heart that was now paralleling the vulnerabilities experienced by the high-risk infant. The major vulnerabilities of a pre-term baby are apnoea (cessation of breathing) and bradycardia, during which heart rate slows to a degree that the brain is not receiving sufficient oxygenated blood. If we transpose these developmental observations into an evolutionary context, we can interpret the preterm’s reactions of apnoea and bradycardia from a reptilian perspective. For example, reptiles, which have only unmyelinated vagal motor fibres, hold their breath (they can survive several hours without breathing) and slow their heart rate to appear to be inanimate. It is a primary defence strategy for them and it serves reptiles well, since they have small brains and are not as oxygen dependent as mammals. Mammals with their large brains require a continuous source of oxygen.

WINN: In effect, you recognised that babies born before 32 weeks have an autonomic nervous system with features more akin to that of a reptile than a mammal.

PORGES: Primitive extinct reptiles are the ancestors from which both modern reptiles and mammals evolved. Through these common ancestors, we evolved with a functional common core in our brainstem, which changes during embryological development, as the brainstem structures and emerging cranial nerves change and shift in function. In mammals, the primary role of the unmyelinated vagal fibres is now to regulate organs below the diaphragm. The myelinated vagus, which only mammals have, is the primary regulator of organs above the diaphragm. So bradycardia and apnoea are due to an ancient defence system that is still available in the pre-term baby and then, as we get older, becomes less accessible, although some unmyelinated fibres remain connected to the heart’s pacemaker.

WINN: Does the mammalian nervous system, or the myelinated vagus, ever develop in severely pre-term babies?

PORGES: The environment in which pre-term babies survive is not as supportive as the intrauterine environment, in terms of that type of development. Once the preterm infant leaves the womb, it is bombarded with challenges from all the senses and its nervous system is reacting and defending. At times these reactions may occur merely to being touched. When the system is protected in utero, it doesn’t have those challenges but, when the baby leaves the womb, the body has to react with what tools it has, which are the defence reactions similar to a reptile.

WINN: Let me make sure I have this clear. All this development happens in utero and, by the time the baby is born, if it is full term, the mammalian system is functioning? But not so for the pre-term baby?

PORGES: Yes. It is during the last five to eight weeks of gestation that the mammalian myelinated vagus comes online and the origin of these myelinated fibres migrates from one area of the brainstem to another, with the functions of the two vagal pathways becoming distinct.

WINN: So does that mean that those pre-term babies, if they survive, are more at risk of using that older defence system if under any kind of severe stress?

PORGES: The answer is a qualified yes, but there are other features associated with this disruption in maturation of the myelinated vagus. A major landmark of health in pre-term infants is the proper coordination in sucking, swallowing, and breathing, which involves the use of the cranial nerves controlling the striated muscles of the face and head. In the brainstem, structures regulating the cranial nerves that control these muscles communicate with the brainstem structure regulating the activity of the myelinated vagus. This provides the mechanisms for social behaviours such as facial expressions and vocalisations, as well as ingesting food, to regulate physiological state.

In our biological quest for safety, we have an implicit biological imperative to connect and co-regulate our physiological state with another. Even how we look at each other is critical in this capacity to connect. For the pre-term infant, these systems are challenged and poorly coordinated. In the time since I have been lecturing to groups involved in treating survivors of trauma, I’ve learned much more from parents about the outcomes of children born severely pre-term. Whenever I asked about cognitive ability, usually their child would be doing well. But when I asked, “How is your child in social interactions and relationships?”, they would say, “Clueless.” Now I only ask about relationships.
WINN: Very interesting! Because when we talk about the potential developmental risks for children that were born pre-term, we don’t tend to think of that one.

PORGEs: No, we don’t. Advances in medical treatment have reduced risks for mental retardation and motor development. It appears that the major issue is about co-regulation, which occurs naturally with most infants who are born full term. When a mother calms her baby with cooing and smiles and loving gestures, the baby relaxes, and that in turn calms the mother—co-regulation. Neurophysiologically, co-regulation is primarily about reciprocal facial expressions, gestures, and vocalisations between mother and infant via the striated muscles of the face and head. The pre-term baby doesn’t have the neural resources for behaviours that would enable co-regulation. Those systems are blunted. But I’m an optimist. I believe that these systems can still be recruited and remapped or retrained.

WINN: From what I understand of polyvagal theory, we don’t make conscious decisions about which defence system to use, when under threat. Interestingly, you give the example of people highly fearful of public speaking feeling terrified that they are about to pass out. People having panic attacks often fear the same. From a fight-or-flight response perspective, fainting wouldn’t make sense, as blood pressure increases rather than falls. But are people who respond in that way actually going into this earlier defence mode instead?

PORGEs: I think you are asking how the circuits are triggered. Let’s look at the sequence of how the autonomic nervous system evolved in vertebrates. Ancient vertebrates started with a very simple autonomic nervous system and the first neural component was the unmyelinated vagus. When it was functioning, it helped support physiological homeoestasis, but it could also react in defence. And when it reacted in defence, the animal defecated, stopped breathing, and reduced its metabolic output. Through evolutionary processes, some vertebrates developed a spinal sympathetic nervous system that fostered rapid movement. As evolution progressed, mammals evolved with a vagal circuit that was linked in brainstem structures to the neural regulation of muscles of face and head, forming an integrated social engagement system. Although I understood this sequence of evolutionary changes in the autonomic nervous system, I was missing a concept that explained how the different circuits could be triggered or buffered.

To answer this question, I first had to conceptualise what I knew about the autonomic nervous system into an evolutionary order or hierarchy. The hierarchy provided a rule determining the order in which the circuits could be recruited; newer circuits inhibit older circuits. This doctrine was based on the work of John Hughlings Jackson, an important English neurologist of the late 1800s. Jackson described how damage to parts of the human brain through illness or injury disinhibit older circuits. He used the word dissolution, meaning evolution in reverse, to describe the process. When I read about dissolution, I realised that dissolution was the perfect construct to describe the sequence of autonomic reactions to challenges. When we face severe challenges, we adaptively respond by triggering evolutionarily older systems as we attempt to survive.

WINN: Do you mean when we face severe challenges where we perceive ourselves as unable to escape? In other words, where triggering the fight-or-flight system wouldn’t work?

PORGEs: These responses are reflexive and not planned. In fact, I developed the concept of neuroception to explain how we react without awareness to cues of safety, danger, or life threat—whether accurate or not. Neuroception is distinct from perception, since it occurs reflexively long before we actually perceive and interpret the risk in the environment. You are a therapist?

WINN: Yes.

PORGEs: Actually you don’t even have to be a therapist, just a social human being, to notice what I am going to describe. Imagine you are talking to someone and you accidentally say something that is a trigger to that person and suddenly their face becomes tight, and their hands clench. When these shifts in physiological state occur, their whole perspective of you changes and they may lash out with aggressive words or behaviour. Ever had that happen?

WINN: Yes.

PORGEs: Because from your perspective your intentions were admirable, you don’t understand what is going on, and you feel that you are a victim. But the person who lashed out at you is in a physiological state that shifts their perspective, and they will structure a narrative to justify their behaviour. So there is a shift from a socially connected state to a state that has survival as its only priority. The beauty of being a human or any other social mammal is that, if we reflexively shift into defence, we also have the opportunity to be calmed and soothed as we re-engage our social engagement system with another person. If we are exposed to cues of safety, trust, and love, through social engagement behaviours that may include a soft voice and appropriate gestures, we calm. This state of calmness spontaneously occurs in response to supportive social engage-
ment behaviours and not in response to being lectured.

The link between physiological state and the circuits that produce facial expressions and prosodic vocalisations is unique to mammals. These integrated behavioural features are dependent on a neural circuit that also includes myelinated vagal pathways that calm the heart and down regulate the sympathetic nervous system. As mammals evolved, they maintained neural structures to be defensive, while developing unique neural pathways to down-regulate defence by being comforted by another. Thus, the ability to rapidly move back and forth between social and defensive states is deeply wired into our nervous system. As mammals evolved, they had to be acutely aware of and reactive to cues of danger, but they also had to seek safety and comfort in the presence of others.

This sequence of dissolution, moving from social engagement to defence, and then inhibiting defence through re-engagement works beautifully in most mammals. But what happens when you experience severe trauma or have certain disease states? We lose the accessibility of the facial muscles and the intonation of voice. Now, as the body is stuck in a state of defence, the cues of safety may be distorted and less effective in calming and soothing. Do you remember the singer Johnny Mathis?

WINN: Yes. He had a wonderfully smooth voice.

PORGES: When Johnny Mathis recordings were played, it enabled adolescents to feel safe – basically, for their bodies to feel safe in close proximity to each other. This type of vocal music may communicate cues of safety, via neuroception, that there is no danger and your body doesn’t need to be protected. In other words, Johnny Mathis’s voice enabled couples to feel physically close. When I lecture, I frequently use the metaphor that our nervous system is waiting for Johnny Mathis, because there are certain inflections and intonations of voice that our nervous system is primed to respond to and can’t block. We are wired to respond to prosodic vocalisations. Mothers intuitively know this. Fathers often know how to employ prosodic vocalisations with their dogs, but not so much with their kids. That is because fathers tend to speak in a low pitched, monotonic voice, which functions to create a boundary or constraint for a child, whereas the child’s nervous system just wants to be safe and is waiting for a voice that is composed of frequencies similar to a mother’s lullaby.

Since our nervous system is seeking Johnny Mathis, intonation of voice provides a portal through which we can reach people who have had traumatic experiences.

WINN: And calm them down.

PORGES: But feeling calm is double edged! When a person with a severe trauma history starts to calm down, their body may be triggered to go into defence, if the cues of calmness and immobilisation are associated with a violation of trust and abuse. Functionally, as the body gives up defence, it becomes vulnerable and may trigger an implicit memory associated with an event during which trust had been violated.

WINN: That is what human givens therapists would call pattern matching.

PORGES: So now the body is unable to trust and move out of a state of defence. For some people with a trauma history, giving up defence triggers panic. They don’t know why they are reacting in that way but, as they start to calm down, they may attempt to communicate their feelings, saying, “I’m not feeling good”; “I’ve got a bad feeling in my gut”; “I’m feeling angry”. They are trying to figure it out. But what has actually happened is that their body has gone into a state of vulnerability.

Hypothetically, being calm and trusting another should not create vulnerability. But, for many with trauma histories it does trigger feelings of vulnerability. I have been working on a methodology to shift individuals out of feeling vulnerable in this physiological state. I thought I could do it with computer-altered vocalisations. I developed acoustic stimuli that processed vocals to exaggerate prosody. This worked extremely well with children, and many autistic children became spontaneously engaged, after a few listening sessions; even their facial muscles changed.

WINN: Is this the Listening Project Protocol?

PORGES: Yes, it started out as that. But it is now commercially available and marketed as the Safe and Sound Protocol. Many trauma therapists have started to use it and what I have found out since it was released is that some of their clients were triggered into states of vulnerability and became anxious and mobilised. At a workshop in London last May, I played a computer-altered version of a song sung by Judy Collins. I played only six minutes of the altered music, yet many of the participants had reactions ranging from feelings of slight anxiety to strong feelings of dysregulation. Several needed supportive engagement with others to help them feel comfortable again. This demonstrated to me, as well as the participants, that stimuli as simple as listening to computer-altered music could trigger anxiety and gut pains in some, while others experienced the same stimuli as blissful – or criticised what I had done to the music! Surprisingly, the range of reactions was great.

WINN: That is quite telling.

PORGES: These surprising observations led me to think about the mechanisms that would trigger these diverse reactions. Cues of safety
were no longer functioning as cues of safety, but were transformed into cues that would anticipate being immobilised or restrained and becoming vulnerable. So I started to inquire how stillness was perceived. For instance, did a person perceive a state of stillness as a wonderful moment when time expanded, when they could be at peace within themselves, or did they experience stillness with fear of losing boundary and falling into the void? If you start talking about stillness to people with trauma, you immediately learn that it is frightening to many of them.

Let’s imagine a woman or child living in a climate of domestic abuse – what does their body do? The old understanding of our autonomic nervous system was that we activated the sympathetic nervous system to support fight-and-flight behaviours. But, frequently, clients provide a totally different narrative that focuses on immobilisation, restraint, and dissociation, which functionally enables the individual mentally to be in a safe place. But the narrative could also include passing out, defecating, or urinating in their clothing. When this immobilisation defence circuit is triggered, it doesn’t seem to be easy to regulate back to a calm state or to re-engage with others and co-regulate. After experiencing this type of shutdown defence, how do individuals protect themselves from going into that immobilised state in the future?

WINN: You mean because the extreme defensive reaction has become their default position?

PORGES: Yes. What they frequently do, to stop going into an immobilised state of defence, is to keep mobilised, keep moving. This would follow the evolutionary hierarchy of the autonomic nervous system, with newer circuits inhibiting older circuits. The adaptive strategy would be to maintain muscle tension and appear to be highly anxious and have a very low threshold for reacting with aggressive behaviour. These individuals might be prone to experience panic.

Panic has an adaptive function; it is mobilisation and keeps them from shutting down.

To understand the origin of panic disorders and vulnerability to panic, we need to understand a person’s clinical history, and it is not necessary for the clinical history to include documented emotional trauma through abuse. It could be triggered by memories of a medical procedure that was frightening. It could be related to a history of being restrained when the child was very young. Even if the intentions of the individual doing the restraint were good, the body of a young infant doesn’t discriminate between the intentions to do good or to do harm. As a society, we need to have an appreciation of the body’s reaction to the event or behaviour, independent of the intention or motivation leading up to the behaviour.

WINN: I’d like to come back to what you said earlier about trauma seeming to affect the way people express themselves, through the looks on their faces and their tone of voice. You describe in your book the way that this is often manifested in certain psychiatric disorders, such as schizophrenia. What is happening there, physiologically, to cause the emotional flatness that you often see in schizophrenia, the lack of tonal variation and so on?

PORGES: Let’s throw away diagnoses for a moment. There are certain core features in several diagnostic categories, and these core features can be clustered into the functions disrupted by the loss of neural regulation of the striatal muscles of the face and head. When these functions are lost, it changes the autonomic state, and vagal regulation of the heart is depressed. Such individuals will have flat affect, lack prosodic vocalisations, and have difficulty extracting the human voice in background voices and sounds. They will have an autonomic nervous system that isn’t calm and resilient, but instantaneously reacts to minor events and is literally ready to react and defend. Thus the social engagement system is retracted to facilitate the opportunity to defend. We talk about all these clinical ‘disorders’ but we are actually talking about a physiological state that is easily triggered to become defensive; the neural circuit for co-regulation, connectedness and resilience is turned off.

WINN: So this is what trauma therapists who are working with your ideas are trying to reverse?

PORGES: Yes. First, I think these ideas have been helpful to trauma therapists by reframing
their perspective in interpreting the reactions of their clients: clients’ limited repertoire of expressive behaviours can be categorised not as good or bad but as adaptive reactions of the nervous system that are triggered to protect the individual. When clients start to understand the adaptive nature of their behaviours, their personal narrative changes and much shame and blame is reduced; they can even feel heroic. This new prosocial understanding allows them to start to shift away from being defensive towards the therapist and to expand their world.

**WINN:** You have explained that the neural circuits supporting social behaviour and effective emotional regulation are available only when our nervous system deems the environment to be safe. The social engagement system seems to chime with human givens understandings about the vital need for social connection and for using innate resources to help us achieve it. Could you say a bit more about how social engagement works, from the polyvagal perspective?

**PORGES:** Sure. In part, many human behaviours involved in our interactions are attempts to recruit the social engagement system to down-regulate defensive reactions. We often use facial expressions, voices, listening, and hand gestures to regulate our behavioural state. As a therapist you will see people making various movements – ingesting, sucking, chewing their nails – and these are desperate attempts to utilise the social engagement system to trigger the calming effects of the vagus and our autonomic function.

**WINN:** Could you explain that a bit more?

**PORGES:** We can see this more easily in young infants. When infants are agitated, fussy or crying, how are they calmed? Usually, by feeding. But as they rapidly mature and reach the age of young infants, who is about six months old, with a flat facial expression. The infant’s responses follow a predictable sequence. First the infant will try to engage the mother or experimenter with facial expressions that may be supplemented with arm gestures. As the mother or experimenter goes on maintaining a ‘still face’, the frustrated infant will disengage and look away or else may go into a tantrum.

We forget that adults do this as well. If we have colleagues or bosses or spouses with whom there is a disruption in reciprocal interaction, we lose self-control and react.

Also, as a therapist, you will have clients with various dysfunctions or difficulties, and they often have physical ailments as well, such as irritable bowel, fibromyalgia, hypertension, and hypotension. The apparent ‘comorbidities’ are due to the compromised function of the autonomic nervous system that occurs when the social engagement system is depressed. Functionally, the social engagement system needs to be switched on to support homeostatic functions. Once the social engagement system is down regulated, the autonomic nervous system is vulnerable for defence.

**WINN:** So when the social engagement system isn’t working, the whole body is thrown out of kilter?

**PORGES:** Yes. Without an adequately functioning social engagement system, the autonomic nervous system is incapable of supporting processes associated with health, growth, and restoration.

**WINN:** That is really significant. You say play is important as a means of helping us learn to down-regulate stress responses and feel safe with others.

**PORGES:** Yes, play with others involves social interaction. Play allows us to mobilise, using the sympathetic nervous system along with the social engagement system. The social engagement system down-regulates the sympathetic excitation to ensure that we don’t move into fight or flight. We take our cues from the playful expressions and actions of those we are engaging with.

**WINN:** So we know that we are safe and it is not about aggression.

**PORGES:** Yes. We also have intimacy. When we are not face to face with individuals whom we trust, we can use gesture and voice as portals to the social engagement system. This coupling between the social engagement system and our evolutionary oldest component of the autonomic nervous system, the unmyelinated vagal circuit that enables reptiles to feign death, enables us to experience stillness as a positive state and to remain calm in the arms of another without triggering immobilisation in defence. In these blendings of physiological states, we see the function of the social engagement system in coordinating or choreographing the entire autonomic nervous system. With an adequately functioning social engagement system, we can recruit all the attributes of the autonomic nervous system, and this optimises health as well as social behaviour.

**WINN:** For those who have suffered significant trauma and particularly those who have never felt safe in their lives, you say, “feeling safe is the treatment”. This has been taken on board by a lot of trauma specialists working with people who have often been diagnosed as having complex PTSD and commonly experience dissociation and emotional dysregulation. Is feeling safe really the treatment – or is it the initial first step in treatment?

**PORGES:** This leads to some new concepts. What I have been talking about I call active and
passive pathways. Feeling safe is the passive pathway – it enables physiological state to shift to one that supports more open and trusting behaviours. The active pathway consists of what I call neural exercises – these could, for instance, be reciprocal play or therapeutic interactions. Singing, especially in groups, is a good neural exercise. Neurophysiologically, since singing requires longer exhalations relative to inhalations, the calming impact of the myelinated vagus is potentiated. Singing also activates other aspects of the social engagement system by exercising the neural regulation of the muscles of the face, ear and larynx and pharynx. Yes, safety is the treatment, but it also provides the substrate for other treatments.

WINN: It seems it isn’t just safety within an individual’s personal orbit that concerns you, however. I’m quoting from your book here: “Polyvagal theory challenges the parameters that our educational, legal, political, religious and medical institutions use to define safety. By moving the defining features of ‘safety’ from a structural model of the environment, with fences, metal detectors and surveillance monitoring, to a visceral sensitivity model evaluating shifts in the neural regulation of autonomic state, the theory challenges our societal values regarding how people are treated. The theory forces us to question whether our society provides sufficient and appropriate opportunities to experience safe environments and trusting relationships. Once we recognise that the experiences within our social institutions, such as schools, hospitals and churches, are characterised by chronic evaluations that trigger feelings of danger and threat, we can see that these institutions can be as disruptive to health as political unrest, fiscal crisis and war.”

Indeed, you even mention noticing treatment rooms in clinical settings that have a lot of low-frequency sound from ventilations systems, and this can be enough to disrupt feelings of safety. Do you think there is much we can do about all that?

PORGES: Scholars, educators, and scientists in disparate fields are becoming interested in polyvagal theory because the theory provides an understanding of how our nervous system responds to contextual and even historical challenges. We, as a species, were born without a manual. Polyvagal theory identifies some critical indicators and processes that we need to incorporate into our ‘manual’. But importantly, we don’t need to be safe all the time. We don’t need to have reciprocal co-regulation all the time. But we need to have access to safe environments and relationships.

There are two major points here. First, the removal of threat is not the equivalent of safety. This point is often missed by society. Second, we need to acknowledge that humans are a traumatised species. We should never have the expectation of a blissful life because our bodies also need novelty and challenge. We are wonderfully complex organisms, residing in a complex society. The irony is that those who are provided with the cues of safety and can utilise them are often the ones who become the most bold and creative. It is a paradox. If we have the feeling of being safe with others, we can do things that are extremely challenging. But if we forget the critical role of the antecedent state of safety and assume that we don’t need a safe base from which to deal with challenges, the outcome is often tragic and limiting, with individuals living severely compromised lives.

WINN: I think that fits very well with understandings from developmental psychology about how infants whose emotional and physical needs are met are the ones that feel confident enough to want to explore and learn and take risks. What you have just said sort of answers what I was going to ask you next, about human resilience. Even if our environments are far from ideal, isn’t it true that people are, in the main, able to cope and get by well enough? We do cope with trauma a lot of the time. Would you agree with that?

PORGES: Absolutely. And I think we have to celebrate our resilience and our ability to cope with challenges, because that is how the nervous system grows. Neural exercises are really transitory challenges to this system and how rapidly it can recover.

WINN: Lastly, and I think you have half answered this as well, now – you emphasise that the human organism needs to perceive itself as safe to survive and thrive, which means interacting safely with others. Does this mean you see this as the organism’s goal? One of the most important emotional needs identified in the human givens approach is the need for meaning. Without it there is hopelessness, and the kind of depression that may lead to suicide. Is there a place for sense of meaning and purpose in your understandings about what makes a flourishing human being?

PORGES: Let me put it this way. We have a quest for safety, but it is not our sole goal. Safety is a facilitator of our internalised personal goals. Polyvagal theory is actually moving towards some new ideas. I am working on the notion of purpose – purpose to live or purpose in life. We have learned from those who have experienced and survived severe trauma that the biggest impact of trauma is the loss of purpose in life. The concept of purpose is deeply rooted in our nature, and potentially biological. This process is now a focus as I expand polyvagal theory to further understand the consequences of reactions to life threat and our ability to thrive in spite of trauma-related disruptions.

WINN: Thank you, Professor Porges.