FEELING SAFE or FEELING AFRAID:

A THEORY BASED ON HUMAN EVOLUTION.

The University of Illinois' Dr Stephen Porges is proposing a new way of conceiving the way our brain regulates our ability to feel safe and engage socially with others. He was recently in Sydney presenting at two STARTTS' seminars.

By REBECCA HINCHEY

Shuffling into the counselling space, Fatima's eyes are downcast, her eyelids drooping. Her face gives nothing away, infected as it is with the nothingness that sometimes characterises people who've endured a war zone.

It is session four and still she refuses to meet your gaze. Half the time you wonder if Fatima hears you at all, she seems to almost drift in and out of conscious listening. Will Fatima ever engage?

Reactions to trauma, even severe trauma, have traditionally been linked with the area of our nervous system associated with 'fight or flight' – our sympathetic nervous system.

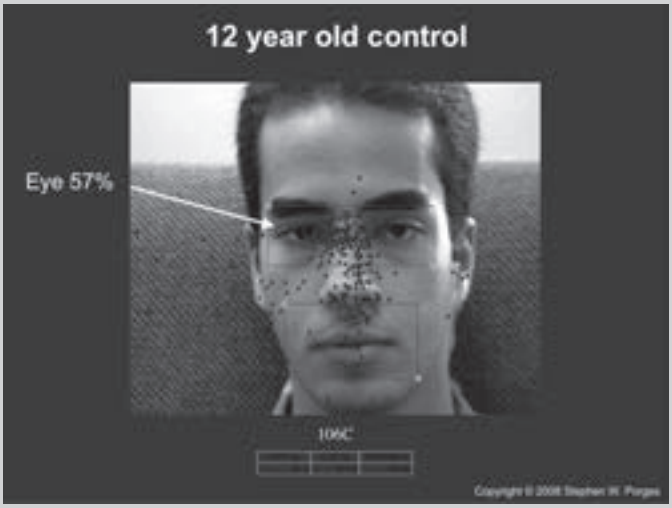
Yet work by Dr Porges, Director of the university's Brain-Body Centre, suggests a separate area of our brain may be responsible for the way we respond to the most extreme forms of danger associated with threats to our existence.

A CHALLENGE TO TRADITIONAL TWO-PART NERVOUS SYSTEM RESPONSES

According to Dr Porges, Fatima's flat affect and distorted hearing are related to difficulties that occur when a very primitive part of our brain reacts to threats to our life.

According to Dr Porges, once this circuit in our brain is triggered, the ability both to detect safety and to be comforted by other people no longer works as it should.

This area of the brain, known as the brain-stem, regulates cranial nerves that connect the brain with both our face and our body. The



vagus, a cranial nerve, is critically important during risks to our life.

The vagus forms part of our autonomic nervous system – the part which is responsible for our involuntary reactions such as heart beat, sweating and breathing. Traditionally this has been divided into two parts, the sympathetic and parasympathetic nervous systems thought about in terms of balance.

Balance theories posit a sympathetic nervous system – the mobilisation or 'flight or flight' system - weighed against a parasympathetic system – the one which calms us down, where we behave 'normally'. The Polyvagal Theory is by contrast a hierarchical one.

Dr Porges' Polyvagal Theory suggests that the way the autonomic nervous system reacts is hierarchical. The hierarchy follows the evolution of our autonomic nervous system. Basically, it identifies three autonomic reactions which help us perceive safe, dangerous or life threatening environments and then react appropriately to them.

REACTIONS TO SAFETY

The first part is invoked in safe environments and allows us to engage socially with others. In terms of human evolution, it is the youngest. It helps us to distinguish background noise from conversation; it allows us to make eye-contact with others we feel are friendly or harmless and it helps our facial muscles react in the positive ways which facilitate conversation and relationships. This part of the vagus is unique to mammals and is a key component in our socialisation process.

REACTIONS TO DANGER

The second dimension is linked with the 'fight or flight' response. It occurs when the social engagement described above does not succeed. This region helps us react to potentially dangerous situations. It allows us to mobilise, to be ready for action. This area of the vagus is turned on when our palms are sweating and our heart is beating faster because we are entering a room full or people we don't know or we suspect we are being followed in the street.

The third and least discussed area is associated with reactions to life threats. These reactions are mediated by a very ancient part of our nervous system. It is the 'freeze' response usually related to a near death experience. The freezing coupled with this response is different to the freeze sometimes associated with a pre fight or flight reaction. It is actually a response that looks more like a 'shutdown'. In the freeze or more appropriately named immobilisation response our blood pressure drops, our heart rate slows, facial expressions disappear, our pain thresholds are heightened and we may faint, defecate or dissociate. It is this response which sees mice feign dead when confronted with a cat. The response is not deliberate, but a programmed reaction developed over millions of years.

This section of the vagus is evolutionarily the eldest and is an area which we share with other vertebrate animals such as reptiles.

The three parts respectively can be termed immobilisation, mobilisation and social communication.

WHO SAYS IT'S SAFE?

Responsibility for our reactions to our environment is only half the of the vagus equation. This tube-like collection of neurons provides us with information about hazards in our environment. It lets us know whether it's safe to proceed and engage, or whether we need to protect ourselves against danger or life threat. It will then match our autonomic state to the environment.

Without our conscious awareness the vagus is constantly scanning our surrounds. Safe, dangerous or deadly? Safe, dangerous or deadly? Safe, dangerous or deadly?

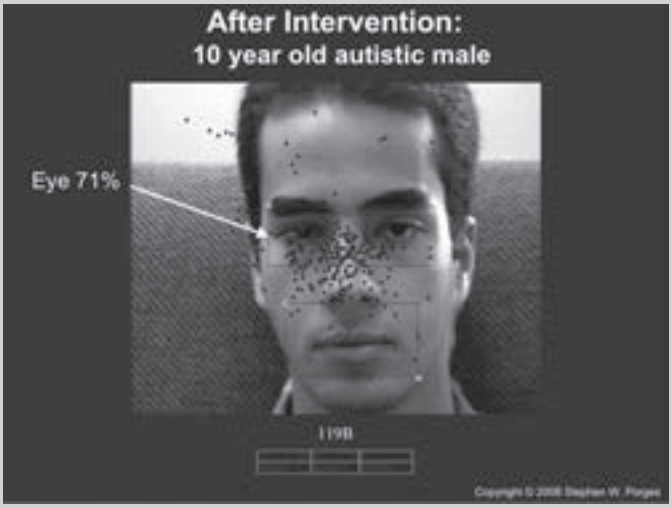
Dr Porges terms this vigilance 'neuroception'.

WHY IT'S SAFE FOR ME BUT NOT FOR YOU

According to his theory, a faulty neuroception will interfere with our ability to feel safe in an otherwise secure environment. Conversely, it may react as if we are in safe surrounds when really they are very dangerous. A defective neuroception will therefore also inhibit our ability to react appropriately to the environment.

Fatima may not have any cognitive reason to be frightened, yet her neural pathways are telling her that it's extremely dangerous, and they are recruiting that part of the vagus involved in physiological responses to risk to life.

His research suggests people with a range of psychological disorders, from autism to anxiety to bipolar, are suffering from defective vagus systems which are unable to detect safe environments.



Some disorders associated with a faulty neuroception are connected with autonomic states that promote fight or flight which aren't compatible with social engagement or communication.

However, Post Traumatic Stress and other disorders associated with trauma reactions may be unique in recruiting the oldest vagal circuit that reptiles use to immobilise as a defence strategy.

To understand how Fatima's vagus is betraying her is to understand how it works in a hierarchical progression, based on its evolution.

The newest part of our system, the one which allow mammals to socially engage, can only work when we are able to inhibit the reactions from the older parts of the vagus system, the mobilisation and immobilisation parts.

To build relations with others, we need to turn off those defensive functions of our vagus – the 'fight or flight' and the freeze.

Yet for some people like Fatima, that seems impossible.

IMPLICATIONS FOR TREATMENT

So how can the Polyvagal theory be used to help people with autism or post traumatic stress disorder or other faulty vagus-related conditions?

Put simply, early activity suggests the key is the relationships between the parts of our brain responsible for controlling our facial and listening muscles, our heart beat and our breathing and the physiological reactions they produce.

The third or social communication section of our vagus system directs our facial and middle ear muscles. For example there are neural mechanisms in our vagus which allow background noises to become weak so that even when we're at a loud party, we're able to distinguish the voice of the person we're speaking with.

It also commands our heart rate and bronchial system.

When that part of the vagus is switched off or blocked, then people like Fatima are unable to discriminate between voices and background sounds or are easily startled by sudden or loud noises, among other social difficulties.

Early research by Dr Porges' team among people with social communication problems is using computer altered acoustics to activate the ear muscles linked to the third, social communication vagus. If the theory is correct then this should also stimulate other social behaviours.

PRELIMINARY RESULTS LOOK GOOD

For now for therapists, it means paying attention to the environment, especially acoustically. Speaking softly or removing your client to a quiet space is likely to be helpful. Listening to music, playing an instrument and singing are all strategies which Polyvagal Theory might suggest.

In the future, it could possibly open a branch of vagus-inspired therapies related to exercising the neurons involved in positive communication and relationship building.■