Rethinking Trauma

How Neuroscience Can Give Us a Clearer Picture of Trauma Treatment

the Main Session with

Ruth Lanius, MD, PhD and Ruth Buczynski, PhD

National Institute for the Clinical Application of Behavioral Medicine

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Rethinking Trauma: Ruth Lanius, MD, PhD

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Rethinking Trauma: Ruth Lanius, MD, PhD

How Neuroscience Can Give Us a Clearer Picture of Trauma Treatment

Dr. Buczynski: Hello everyone and welcome. I'm Dr. Ruth Buczynski, a licensed psychologist in the state of Connecticut and the president of *the National Institute for the Clinical Application of Behavioral Medicine*, and I'm so glad you're here tonight.

I'm going to be talking with one of my very favorite people. In our office, I refer to her as the other Ruth, so they know that I'm not referring to myself!

This is Dr. Ruth Lanius. She is a physician as well as a PhD. She's an associate professor of psychiatry at the University of Western Ontario, in Canada, and she's the co-editor of the *Impact of Early Life Trauma on Health and Disease*, and she has authored over 100 published papers.

Today, we're going to talk about a variety of topics. We're going to talk about a new model of dissociation and what that means for treatment and for the people you work with.

We're going to talk about how neuroscience and psychology can give us a better understanding of trauma and what's going on. We're going to talk particularly about the effects of early life trauma and the effects of PTSD on the brain and development in general.

I'm awfully excited. Let's jump right in, so we don't lose any time. I usually run out of time with many questions I still want to ask because Ruth is really up on so many areas – in fact she's up on everything! So, welcome to the session, Ruth. It's good to talk to you again.

Dr. Lanius: It's great to be back, Ruth.

A Working Definition of Dissociation

Dr. Buczynski: Let's talk about dissociation. There is a wide range of practitioners on this webinar tonight. There are a lot of psychotherapists and psychologists and social workers and marriage and family people, and they of course know exactly what you and I mean when we talk about dissociation. But in addition to that, there are lots of other folks who are also professionals.

They might be school nurses and physical therapists and occupational therapists – a range of people who may not be quite as familiar.

> "Dissociation provides an escape where no actual escape is possible."

For their sake, can we have just a brief description and definition of dissociation, and then I'd like to get into what you're now calling a 4-D model of dissociation. But first, what would you say dissociation is?

Dr. Lanius: Dissociation provides an escape where no actual escape is possible. It provides a mental escape from intense experience, from intense emotions, and from intense memories.

It's a very broad term and can refer to a number of things. For example, it can refer to dissociative flashback – reliving an experience and losing your connection with the present.

> "The 4-D model takes dissociation and understands it as an alteration in consciousness."

It can refer to dissociative amnesia – not remembering, for example, the torture you've experienced.

It can refer to depersonalization or out of body experiences – removing yourself from your body in order to dampen the emotional intensity of certain emotions that you may be experiencing.

Or it may be referring to fragmentation of the self – experiencing your *self* as having *multiple selves*.

It's a definition that can refer to a lot of different experiences.

This leads me into the 4-D model that Paul Frewen and I have been working with. The 4-D model takes dissociation and understands it as an alteration in consciousness. We are co-authoring a book that's being published by Norton later this year on this 4-D model.

Consciousness and the 4-D Model

Dr. Buczynski: Consciousness – let's develop that idea some more.

Dr. Lanius: Consciousness broadly refers to an organism's ability to be aware of itself as well as of the environment.

You can't be conscious unless you're conscious of something. There's always a subject as well as an object.

When we think about dissociation, consciousness can be very affected in a number of ways.

"Each of the four dimensions can be understood as having a non-dissociative problem as well as an alteration in consciousness."

There's a model developed by Zahavi and Thompson that talked about consciousness in terms of four dimensions: consciousness of time, consciousness of thought, consciousness of the body, and consciousness of emotion.

When we think about each of these dimensions, we can see that they're very affected by trauma. What we're proposing is that each of the four dimensions can be understood as having a non-dissociative problem as well as an alteration in consciousness, which would be a dissociative presentation.

Dr. Buczynski: No matter what your profession is, these four dimensions might be one way for you to think about the trauma that your patient is presenting or talking about. I think it would be worthwhile, Ruth, if we talked a little bit about each. Can we start with time?

Dr. Lanius: Absolutely. The dimension of time – I think we understand time to be experienced as a continuous entity moving in a forward direction, and usually there's a seamless connection between the immediate past, present, and immediate future.

"Patients with traumatic experience are often reliving their traumatic experience in the form of reliving dissociative flashbacks."

But as we also know, our patients with traumatic experience often don't have that experience.

They are often reliving their traumatic experience in the form of reliving dissociative flashbacks, which we would term as an alteration in the dimension of time, whereas people who are solely experiencing, for example, reminder distress or intrusive memories, we would say that that's not an alteration in consciousness. That is a non-dissociative change in the time dimension of consciousness.

Dr. Buczynski: Can you give any examples?

Dr. Lanius: Yes. For example, I have a patient who was stabbed in the neck, and he describes to me that what he experiences is the actual blood running down his neck, and he feels like he's right back at the scene of the trauma. That, I think, would be understood as a dissociative flashback.

He loses his sense of the time of the present, and he's transported right to being back in the past –feeling like he's back at the scene of the trauma and re-experiencing his trauma. We would term that as an alteration in consciousness of time.

"The dimension of thought can be likened to a story told in the first person."

Now, another person with less severe PTSD who has been, for example, in a train accident might come to you and say, "Whenever I hear a train, I get anxious – I get a bit distressed, or I may be sitting there on a given day, and I get some memories that come into my head about the train accident. I see trains, but I'm very much aware that I'm in the present and I'm not reliving that memory in any way."

We would term that as a non-change in consciousness – not an alteration in consciousness. Not dissociative.

Dr. Buczynski: Moving on from time, the second one that you mentioned was thought.

Dr. Lanius: Yes, thought. The dimension of thought can be likened to a story told in the first person. When you're telling a story, you usually have a subject, which often refers to perspective. You have an object, which often refers to content, and then you have structure. You have the beginning, middle, and end.

Again, when we think about our traumatized population, that's not often the case. Often, there are disruptions in the thought and in the way the story runs of the trauma.

In terms of perspective, specifically, we would term that a non-dissociative presentation where you don't have alterations in consciousness that would involve negative self-other referential thinking.

We know this from our patients who often say about themselves, "I'm bad, I'm dirty, I'm non-deserving," but they also see the world as a place that will never be the same again – it's changed for the worse.

The key here is that the perspective is in the first person. People own their thoughts – *I'm bad – I'm dirty – I don't deserve.*

But when we move into the dissociative dimension, as we proposed for the dimensional thought, this is where you now have voice hearing.

"When we move into the dissociative dimension, people are no longer the sole orators of their experience, and these different voices can often have different senses of time."

People are no longer the sole orators of their experience, but other voices are being introduced. Now you're moving into a second person perspective. Now you're hearing "You're bad – you're dirty –you don't deserve."

These different voices can also be associated with different phenomenal experience in terms of what goals they may have or how they interpret events – good or bad or

its different effects – positive or negative.

> "If you're trying to function in the aftermath of trauma and you don't have a sense of time, you're constantly thrown back into the past and you don't know where the present is."

These different voices can often have different senses of time**.** In this regard, if this is present, especially with multiple voices, this can lead to the experience of multiple selves, as can be seen in severe dissociative symptomatology.

Again, when we think about an adaptive versus a non-adaptive perspective on dissociation and you're in the midst of trauma and you have to handle extremely overwhelming experience, but also maintain a level of functioning, that phenomenal experience of experiencing multiple selves may be very handy.

However, if you're trying to function in the present as a coherent self, obviously the experience of this type of fragmentation would interfere with functioning. That's important to keep in mind for each dimension.

In going back to the time dimension, I just briefly want to mention the adaptive response to that as well. For example, if you feel like you've lost your sense of time, which can occur in traumatized patients as we've seen with some of the Vietnam veterans who were kept captive in Hanoi for seven years, then losing your sense of time can be very adaptive.

> "Depersonalization can be extremely adaptive."

If you're constantly aware of a sense of time and the fact that you have been there for year after year, that would be extremely devastating to face.

Again**,** if you're trying to function in the aftermath of trauma and you don't have a sense of time, you're constantly thrown back into the past and you don't know where the present is.

If you don't have a sense of time, it can be extremely interruptive to your daily life.

The Role of Embodiment

Dr. Buczynski: What role does embodiment play?

Dr. Lanius: Now we're proposing two dimensions: a non-dissociative dimension of consciousness of the body, which we would refer to as physiological hyper-arousal – physiological distress, and then the

dissociative dimension which would be depersonalization.

Depersonalization can be extremely adaptive. If I can just read a quote from one of my patients, I think it really illustrates how adaptive depersonalization at the time of the trauma can be.

She says, "For me, it was like a physical separation. Here's me up here and here's this shell down here that is being hurt and abused. But I can't feel it. I don't feel it. I'm separate from that person. I'm separate from my body now. My body's being hurt, but I'm not being hurt."

"The non-dissociative dimension of emotion would be general negative effect."

That is what lets you survive – it's *not you*. You're not experiencing the full impact of what is happening. You are experiencing it, but you're not experiencing the full impact.

She does a beautiful job of describing how depersonalization or being out of your body can dampen the emotional aspect of the trauma.

Dr. Buczynski: The value of it.

Dr. Lanius: Absolutely, and of course this can also occur after the traumatic experience when you're having memories of the trauma that are very intense and you have an out of body experience that really helps to decrease the emotional intensity of the memory.

How Dissociation Affects Fight/Flight/Freeze

Dr. Buczynski: How is the fight/flight/freeze response affected?

Dr. Lanius: Fight/flight/freeze is part of the dimension of emotion.

In terms of emotion, we would say that the non-dissociative dimension of emotion would be general negative effect. For example, you are shame – you have become an emotion – fear or sadness. You are feeling permeated with the emotion.

We would term that the general negative effect of non-dissociative response, in terms of the emotion dimension of consciousness.

With the dissociative dimension of emotion – that dimension of

"A model that relates dissociation to animal defensive responses is a good starting point to understand dissociation."

consciousness – we would think about emotional numbing, shut down, freezing, or compartmentalized emotion.

This may be a good time to talk about an animal defense model of dissociation to help us understand the relationship between fight and flight and this emotional shutdown.

I'm going to refer to a figure from a model created by Schauer and Elbert. They came up with a model that relates dissociation to animal defensive responses. We can talk about some things that may be missing from this model, but it is a good starting point to understand dissociation.

"If the animal feels like there's no way out, it often then moves on to feigning death in the hopes that the predator will lose interest . . ."

Whenever an animal is confronted with a predator that is still far away from the animal, it has a quick freeze orienting response. Heart rate during this response goes up, and the animal orients itself to where the predator is and thinks about the best route of escape.

Then, as the predator comes closer to the animal, it wants to flee. Of course, to flee, it needs to run away. This is where you get activation of the sympathetic nervous system. You get blood being pumped to the muscles and to the heart, so the heart can increase in heart rate and blood pressure to have enough blood in the muscles to run away.

"... this is the point where we don't just have sympathetic activation, but we also have the parasympathetic nervous system come online."

However, if the animal's not able to flee and the predator comes closer, then the animal engages in a fighting response. You have further activation of the sympathetic activation. Heart rate goes up further, blood pressure goes up further, and more and more blood is being pumped to the muscles so the animal can really engage in this fighting response.

However, if the animal feels like it's going to lose or there's no way out, it often then moves on to feigning death, in the hopes that the predator will lose interest.

This is the point where we don't just have sympathetic activation, but we also have the parasympathetic nervous system come online.

Often, during this stage of the process, we have dual activation of these two nervous systems. If you look in the cardiology literature, this has also been associated with sudden cardiac death. Now the animal is feigning death in the hope that the predator will lose interest.

However, if this goes on and the predator doesn't lose interest, this is when the animal now begins to shut down more and more. Now we're seeing that the parasympathetic nervous system really comes online.

There's more shutdown, numbing, and analgesia to decrease the experience of pain. Blood pressure and heart rate go down.

What we often hypothesize and see at this point is what we call cortical differentiation – the outer part of the brain, the cortex, becomes disconnected from sensory experience.

"There are implications for not having an integrated sense of time, thought, body, and emotion, to the point where we know our traumatized clients often feel that they have no-self."

You don't feel what's going on. You lose hearing. Often, it is also hypothesized that this response is involved with out-of-body experiences – the experiences of depersonalization or de-realization where everything feels unreal around you.

Here you're disconnecting in order to tolerate immense, immense experience at the expense of being able to feel anything. You no longer can engage in voice production.

What happens during this stage is that you're essentially dead to the world, and it takes quite a while – up to hours – to come out of this state, once a person has gone into it.

Clinical Implications for Treatment and the Recovery Process

Dr. Buczynski: When you use this model to think about working with someone in the recovery process, how do you put it together?

Dr. Lanius: There are clinical implications for each dimension – there are implications for not having an integrated sense of time, thought, body, and emotion, and this has a devastating effect on the sense of self, to the point where we know our traumatized clients often feel that they have no-self.

"When we think about traumatized clients who often have flashbacks , what we're seeing is recall that is not by choice – people are triggered."

Maybe we can start by talking about clinical implications for each dimension, and then how we can tie all those together to move from the experience of having no-self to the experience of having an embodied self with integrated senses of time, thought, body, and emotion that can engage . . .

Dr. Buczynski: That would be a way of talking about our goal for treatment – going from a no-self to an embodied self that's living in the present.

Dr. Lanius: That's right, with an integrated sense of time, thought, body, and emotion – absolutely.

Now, moving back to the dimension of consciousness of time, we've talked about how the dissociative dimension of this, with an altered state of consciousness, involves reliving experiences – feeling like you're back in the past and reliving the entire traumatic experience.

> "The first part of dealing with reliving flashbacks would be to strengthen the self."

What's really helpful in the treatment is to think about Endel Tulving, who was a very well-known memory researcher. He stressed that in order to recall personal episodic memories, personal memories, you have to have a self that is able to engage in this time travel back to the past.

With an individual who doesn't have trauma-related disorders or alterations in consciousness, the implications of this research is that the *I-self* or the ego in somebody who doesn't have trauma-related disorders is located in the present self. You're choosing to recall the past. You're not dragged into the past and reliving it.

What happens in somebody without trauma-related disorders or alterations in consciousness is that the awareness of the present self is maintained, and the representation of the present self outweighs that of the past self. There is a self, and there is a traveler that can go back and recall voluntarily the memories.

> "Once we have accomplished that strengthening of the self, then we often move on to exposure-based treatments."

Now, when we think about traumatized clients who often have flashbacks of reliving experiences, what we're seeing is recall that is not by choice – people are triggered. They're dragged back into reliving the past.

We would hypothesize, according to this 4-D model, that the I or the ego now resides in the past self, that we're dealing with a weakened present self and that the awareness of the present self is reduced – the representation of the past self outweighs that of the present self.

In essence, what we've done is we've lost our traveler. There can be no travel without a traveler, so we've lost that present self. We've lost our traveler – we can't voluntarily go back to recall those memories, but rather the past self is predominant now, and the I-self, or the ego, is located in the past self.

Implications for treatment are two-fold. If this hypothesis is correct, the first part of dealing with reliving flashbacks would be to strengthen the self. A lot of us already do that, especially in the early stages of therapy.

> "Over time, this can create a shared narrative where a person experiences his/her sense of self as a more coherent, integrate sense of self."

We teach people grounding skills – for example, helping them to use the five senses to bring them back to the present.

We teach people to become more aware of their own body, again, as an anchor to learn to be in the present.

We teach emotion regulation skills. What skills can they use? What emotions become too intense?

We teach them distress tolerance skills, and we teach them to use relationships, including, of course, the therapeutic relationship, to strengthen their sense of self.

Once we have accomplished that strengthening of the self, then we often move on to exposure-based treatments that can help to move that timeless traumatic material into memories of the past that are no longer relived, but that can now be remembered.

It's about strengthening the self – helping to create a traveler, as Endel Tulving would say – that can then recall the memories voluntarily.

Dr. Buczynski: In terms of implications for treatments, is there anything else we should talk about?

Dr. Lanius: Do you want to move through each dimension?

Dr. Buczynski: Yes, let's do that.

The Dimension of Thought

Dr. Lanius: For the dimension of thought, if you have a non-dissociative individual, it's about creating a narrative, finding words for one's experience, and helping them to cognitively restructure some of that negative self-referential processing as well as other negative referential processing. With this, we are helping them to see themselves in a better light and to see the world in a better light.

> "When we have a dissociative dimension of thought, working with the adult and child self can be absolutely key to creating self-compassion."

This is done throughout trauma therapy across the world. Of

course, it becomes much more complicated when you now have a dissociative presentation of thought – when you have voice hearing.

This may be one voice or this may be many voices. When people have this experience of having multiple selves, potentially, in the extreme case, the focus now becomes on creating a shared narrative – no loner feeling that you have multiple narratives, but that you now have the experience of having a shared narrative.

This can be done through identifying the strengths of each voice in the present and encouraging awareness and communication among different voices or parts of the self.

Over time, this can create a shared narrative where a person experiences his/her sense of self no longer as fragmented or experiencing more than one self, but as a more coherent, integrate sense of self.

I have a beautiful piece of artwork, where one of my patients depicted his adult self working with his child self – it almost looks like a Madonna. This helped him to create a singular sense of self as well as self-compassion through opening up that communication.

When we have a dissociative dimension of thought, working with the adult and child self can be absolutely key to creating self-compassion.

> "He had a very prominent experience of hearing child voices that would scream inconsolably and would cause significant stress."

Dr. Buczynski: If we have a trauma patient who's not dissociated with that experience of dissociation of thought and multiple voices, we still sometimes work with having an adult working with their past self or their child self.

Is that a similar therapy, just with a non-dissociative person, or are we doing something totally different there?

Dr. Lanius: I'm really glad you brought that up, Ruth, because absolutely, we wouldn't just use that in a dissociative person.

We can use that in a non-dissociative person as well. It becomes more complex in a dissociative person, but even in a non-dissociative person, this can be a key to self-compassion.

The more dissociative somebody becomes, certainly in my experience, the more hesitant they can become in engaging in this type of work.

Often, what I do, to give them a choice, is to have them look in their mind at how far apart and where they want to start with this adult self or this child self. Then over time, as they become more comfortable with this work, slowly, they begin to move these parts closer together.

How to Bring the Adult and Child Self Together

Dr. Buczynski: Can you tell us a little bit about this patient and what exactly you did with him?

Dr. Lanius: This was one thing we did, and he had an incredible symptom of self-hatred.

Dr. Buczynski: He had trauma from an early age?

Dr. Lanius: Absolutely, repeated early life trauma at the hands of his father and an uncle, and was then triggered through a workplace assault which triggered his symptoms of PTSD with severe dissociation.

> "Getting a person comfortable with the starting point of the body scan, helping them be aware that the body holds a tremendous amount of pain, and then titrating the pace of the body scan are all key ideas."

He had a very prominent experience of hearing child voices that would scream inconsolably and would cause significant stress.

To help him to bring in the adult self and to begin to soothe these child voices, we worked with both the adult voice and the child voices.

At first, this was incredibly stressful for him, because he didn't believe the child voices deserved this. We got him to imagine the great distance between the adult and child voice and that helped him to begin to do this work.

Over time, he imagined the two voices coming together and soothing each other much more effectively. This brought online a lot of self-compassion and decreased the self-loathing that he was experiencing.

The Dimension of Embodiment

Dr. Buczynski: Let's move to the next dimension.

Dr. Lanius: That's the dimension of embodiment. In terms of clinical applications, what I have learned in the

last several years is that doing a body scan such as John Kabat-Zinn describes and adapting it to the traumatized client can be extremely informative in what's happening inside the body.

Dr. Buczynski: How do you adapt it?

Dr. Lanius: We adapt it by going at a much slower pace – we get a lot of input from the patient about the speed at which they want to go.

"Doing a body scan and adapting it to the traumatized client can be extremely informative in what's happening inside the body."

A lot of people are familiar, of course, with the typical body scan. If you do a normal body scan with a non-traumatized person, you would start at the toes and move up very rapidly and cover the entire body in one session.

With a traumatized client, and it depends on the client, you may just stay with the foot for quite a period of time until the person becomes more comfortable covering other parts of their body. You may start with the hands if the foot is very triggering.

Getting a person to feel comfortable with the starting point of the body scan, helping them to be aware that the body holds a tremendous amount of pain, and then titrating the pace of the body scan are all key ideas.

Certainly, what I have learned, and what you can see on some of the pictures on the slides, too, is that traumatized clients, especially those with depersonalization — out-of-body experiences and other severe dissociative symptomatology — often experience not just out-of-body experiences, but also that their hands or feet are disconnected from their body.

That can give you a lot of information on how to work with a client.

It's harder to get at that information by just working cognitively. But if you use the body as a kind of bottom-up approach to working in psychotherapy – once the client is willing to engage in such a body scan – then it can give you a wealth of information, and from there, you can work cognitively.

"You can take a bottom-up approach from the body and a top-down, cognitive approach to integrate the difficulties you find through a body scan."

You can take a bottom-up approach from the body and a top-down, cognitive approach to integrate the difficulties you find through a body scan.

The Dimension of Emotion

Dr. Lanius: With the dimension of emotion, we've talked a lot about this shut-down, numbed-out state.

To heal the dimension of consciousness, we help our client awaken from a shut-down state to feel a full range of emotions, including happiness, joy, and triumph.

Again, we have to do this in a very much titrated fashion, depending on our client.

It takes us back to the body scans and to some of the information that (Antonio) Damasio has written a lot about in terms of the body mapping – Bud Craig has written a lot about this, too.

"To heal the dimension of consciousness, we help our client awaken from a shut-down state to feel a full range of emotions, including happiness, joy, and triumph."

This thinking links physical sensations with feeling states and emotions, keeping in mind that each feeling state or emotion has a body map. It has certain, physical sensations associated with it that are different from person to person.

For one person, sadness may be associated with a tight throat or a lump in the throat and a tensing of the neck, whereas others may experience sadness as tightness in the stomach and a feeling of heaviness in the shoulders.

We work with clients to identify what physical sensations are associated with what feeling states and emotions, very slowly and at a rate they can tolerate.

We don't want to flood people with affect. We want to work with them very slowly, so they can tolerate it because a lot of our clients are alexithymic.

"We work with clients to identify what physical sensations are associated with what feeling states and emotions, very slowly and at a rate they can tolerate."

They don't have words for their experiences – they can't put their feelings into words – they don't know what they feel. We have to assess that and really go at a pace that is comfortable for a person.

Dr. Buczynski: For the people who aren't familiar with the term *alexithymia*, could you just give us a description?

Dr. Lanius: Yes, it refers to the inability to put what you are feeling into words. You have difficulty knowing what you are feeling – being out of touch with your feelings. When we think about the experience of a

traumatized individual, this symptom makes a lot of sense.

> "When we think about our patients at the time they were traumatized, emotions were futile."

When we think about our patients at the time they were traumatized, emotions were futile. If they were scared and wanted to run away, that was impossible. If they were sad and they wanted to be consoled, there was no one there to console.

Emotions became futile. They were intense, often unbearable, so people disconnected from them.

They didn't have words for what they were feeling. They no longer knew what they felt. They often felt numbed out and shut down.

In working with this dimension of emotion, the alteration in consciousness and the shut-down, numbed state, we're helping our clients to awaken from this through careful identification of physical sensations and linking them to feeling states and emotions.

> "In working with this dimension of emotion, we're helping our clients to awaken from this through careful identification of physical sensations and linking them to feeling states and emotions."

To do this, we can use drawings. For example, I have a picture of the body, and I have people color in the different physical sensations they feel in associations with feeling states and emotions – that can be extremely helpful.

You can see this on one diagram where I have four drawings of a patient where she identifies that.

How to Bring Drawing into Treatment

Dr. Buczynski: How do you use the drawing in your treatment? When do you introduce it, and what exactly do you do?

Dr. Lanius: When we start to work with feeling states and body scans, I first start with psycho education.

We talk about how each feeling state and emotion is associated with certain physical sensations in the body. Then, we have photocopy outlines of the body.

I say, "If you are interested, you can use these photocopies, or you can draw your own body. I want you to

> "We talk about how each feeling state and emotion is associated with certain physical sensations in the body."

think about what physical association may be associated with sadness, fear, or anger. Start coloring in those bodies."

Over time, as people become more aware of different feeling states, these drawings become more complex.

At first, they may associate sadness with just a feeling of heaviness in their shoulder, but as they become more aware of sensations in their body, they may also notice a heavy chest and a tension in their face.

As these physical maps become more complex, they can identify feeling states and the emotions they relate to much quicker.

A Study of Emotional Numbing Symptoms

Dr. Buczynski: You conducted a study with Frewen and Dozois looking at emotional numbing symptoms as predictors of neural activation. How did you conduct that study? What exactly did you do, and then, what did you find?

Dr. Lanius: In this study, we looked at positive and negative emotions in traumatized individuals, people with PTSD related to childhood trauma. There were standardized emotional scenarios, both positive and negative.

For example, a positive one may have been getting a positive job evaluation, and as we know, traumatized patients often have difficulty experiencing positive emotion – they feel non-deserving of such experiences.

> "We looked at positive and negative emotions in traumatized individuals, people with PTSD related to childhood trauma."

We wanted to examine positive as well as negative experiences.

A negative scenario would have been, for example, to get a negative job evaluation.

We put people in the functional MRI scanner, and they had to imagine themselves in that situation in the first person. We also got ratings of their feeling of being emotionally numb.

We wanted to know how intense that feeling was for them. That allowed us to look at the associations with feelings of numbness and brain activation.

"Clients who have a lot of feelings of numbness have very little awareness of what they feel."

What we found was for both the positive and negative scenarios, the more the feeling of numbness, the less activation they had in the dorsal-medial prefrontal cortex.

This is a key brain region involved in self-reflective awareness, which is the region of knowing and being able to reflect about what you feel.

It's really interesting that clients who have a lot of feelings of numbness have very little awareness of what they feel.

What is also interesting about that finding is that, at the same time, we were studying normal individuals who had not been traumatized. We wanted to see the capacity to be mindful of what is happening in your body and how that would be associated with brain functioning.

"The more mindful people were of what is happening in their bodies, the more brain activation we saw."

What we saw in the healthy individuals was that the more mindful people were of what is happening in their bodies, the more brain activation we saw in the dorsal-medial prefrontal cortex.

Of course, the two-million dollar question is this: as we help somebody move from the state of numbness and emotional shutdown into being aware of their feelings, are we activating the dorsal-medial prefrontal cortex? Of course, my hypothesis would be *yes*.

Dr. Buczynski: How do you use that knowledge when working with your patients – when you are not in your research world, but in your treatment role?

"As we help somebody move from the state of numbness and emotional shutdown into being aware of their feelings, are we activating the dorsal-medial prefrontal cortex?"

Dr. Lanius: What is helpful for trauma-related disorders and is extremely validating is to know that there are changes in how the brain functions.

Psychiatric or mental disorders are invisible injuries. The average person doesn't see them. I think this is also related to the stigma associated with mental illness even though it has significantly improved.

What these brain scans are able to do is to make an invisible injury visible.

It has been tremendously helpful, and certainly some of our patients understand, "Wow, I'm not just making that up," which they have sometimes been told, and that's so unfortunate.

With this information, they're feeling: "Wow, there are actual changes in my brain and things I can do to work on those difficulties." That has been tremendously validating for a lot of people.

Working with Patients to Normalize Experience

Dr. Buczynski: Outside of patients where you actually could show them the scan if you wanted to—for patients that weren't part of the study—do you describe the study and try to help normalize their experience in that way?

Dr. Lanius: I do at times, absolutely. More broadly, we have a research base now showing that trauma symptoms are related to alterations in brain functioning. That, by itself, is incredibly validating for people.

Dr. Buczynski: Do we have any brain scans showing a person before and after treatment?

"We have a research base now showing that trauma symptoms are related to alterations in brain functioning."

Dr. Lanius: There are some studies. We have some preliminary, pilot findings with the use of neural feedback.

Neural feedback is a brain-computer interface that can help us regulate the way the brain functions. It's very similar to biofeedback, which I'm sure that this audience knows.

What's different about neural feedback is that we're not using heartbeat or pulse as a feedback, but instead we're using brain activity for the client.

Dr. Buczynski: How about before and after talking treatment? Has anybody done brain scans with someone who has suffered from a lot of trauma, conducted a long treatment – perhaps with a successful outcome – and looked at their brain afterwards?

"Neural feedback is a brain-computer interface that can help us regulate the way the brain functions."

Dr. Lanius: Absolutely. There are some emerging studies by a Dutch Group, Thomaes and Dorrepaal.

Thomaes is the one who has looked at complex trauma in response to treatment and found some normalization of brain areas that have been involved in PTSD.

Dr. Buczynski: What parts seemed to normalize? Which parts of the brain?

Dr. Lanius: Some parts involved in emotion regulation and memory. The anterior cingulated cortex and hippocampus, as I recall.

Dr. Buczynski: That's very interesting. That would affect the person's ability to learn. That would be profound.

"Knowing that we can bring online brain regions involved with emotional awareness, emotion regulation, and memory is very exciting."

Dr. Lanius: Knowing that we can bring online brain regions involved with emotional awareness, emotion regulation, and memory is very exciting, and that study was done by Thomaes.

Dr. Buczynski: Were there any other studies?

Dr. Lanius: Yes, but this one is especially with people with repeated traumatization.

Dr. Buczynski: Does anybody look at the work that Vincent Felitti did in 1998 with Adverse Childhood Experiences? Do you see this recent work confirming what he found and vice-versa?

Dr. Lanius: Absolutely, and a lot of people are not just looking at the mental health implications of repeated trauma, but also the physical implications of repeated trauma.

It is so important that we look at both of these aspects at the same time. Of course, they interact – mind and body are interconnected, and these two types of problems are very much connected as well.

Dr. Buczynski: I remember at our conference at Hilton Head, one physician who talked about chronic pain said, and I'll paraphrase, "When I'm working with a patient that has multiple body systems in chronic disease, where it is two or more, I think about the likelihood that it's going to have been some trauma."

"Of people are not just looking at the mental health implications of repeated trauma, but also the physical implications of repeated trauma."

Dr. Lanius: That really was shown by Felitti who wasn't a psychiatrist but an internist, and asking people was both very validating and informative for the physician.

Dr. Buczynski: How would you language it?

Dr. Lanius: It depends on what area you work in. Filetti's questionnaire, the Early Adverse Experience Questionnaire, asked about emotional, physical, and sexual trauma.
And it wasn't just that but it asked if you had a caregiver that died when you were young. It asked if you had a family member who had been incarcerated.

All of these types of experiences could and should be a normal part of every medical evaluation. It's important to know about a person's background – it helps you to understand their symptoms in context with their life.

Dr. Buczynski: Would you say that would be true for physical and occupational therapists as well?

Dr. Lanius: To be comprehensive, it's absolutely true. I can give you an example of one of my patients who had broken her ankle and had orthopedic surgery. Then she had to engage in physical therapy.

She was a very traumatized client and for her, being touched was extremely triggering. In addition, she felt like she was non-deserving of going to a physiotherapist.

If the physiotherapist had originally known more about her history, it would have changed the course of treatment.

"It's important to know about a person's background – it helps you to understand their symptoms in context with their life."

Dr. Buczynski: I had a patient once who had severe childhood trauma, and it was of a sexual nature. The patient had to have a colonoscopy. What a severe situation that was. It really requires physicians and nurses to be well-educated and to see themselves as part of a holistic treatment team.

On the other hand, the psychotherapists, psychologists, social workers, and marriage and family people need to understand the effects of trauma on the brain and chronic disease.

We are confirming it more and more, and it's becoming clearer just how broad the effects of trauma can be.

Epigenetics and Trauma

Dr. Buczynski: Last year, we accidentally got into a whole conversation about epigenetics. I was fascinated as we talked about some of the studies that had been done looking at gene expression and trauma. Is there anything to report in that area?

Dr. Lanius: There was a study published a few days ago by Erika Wolf looking at dissociation in PTSD and whether there are particular genes involved in PTSD. There is some preliminary evidence that a gene involved in fear processing is involved with the experience of dissociation.

Dr. Buczynski: Explain what that could mean.

Dr. Lanius: We have to be speculative at this point.

Fear processes may affect what genes can be expressed. We know that intense fear can be associated with dissociation. So that means a relationship between gene expression and certain trauma symptoms.

"Your hardwiring could make you less susceptible to certain traumatic experience."

Dr. Buczynski: You say fear processes can affect what genes are expressed. That makes a lot of sense to me – anyone who understands epigenetics a little bit. Does your genetic hard-wiring affect your experience of fear?

Dr. Lanius: It could, potentially, yes. Your hardwiring could make you less susceptible to certain traumatic experience.

We know that the short versus long serotonin allele plays a role in how you respond to traumatic experience.

To keep looking at these gene environment interactions is one very important part of this puzzle. It's not the whole part, but it is one.

A Safe Attachment Figure and the Management of Fear

Dr. Buczynski: In earlier interviews, we've talked about attachment figures. If you've had a healthy relationship at an early age with an attachment figure, that also is a factor in resilience and better management of fear.

Dr. Lanius: Yes – an attachment figure, especially a safe attachment figure, helps the child to be able to regulate emotions and knows what the child feels.

With an attachment figure, the child is able to learn and feel emotions. They don't have to suppress those emotions. And, of course, the attachment figure teaches the child how to regulate intense emotions.

When the child becomes upset, the attachment figure is there to soothe the emotions, helping the child to regulate intense sadness, feel passion and joy, or regulate anger when the child becomes angry and

"With an attachment figure, the child is able to learn and feel emotions."

goes overboard.

I think it was Alan Shore who said that the attachment figure could be an interpersonal regulator. Yes, an attachment figure can be the key.

"The attachment figure could be an interpersonal regulator."

Dr. Buczynski: That's an interesting point.

I'm so sorry but we are out of time, and we've just scratched the surface. I had so many notes we never got to – there was so much to talk about in the pieces we did get to. I just want to say *thank you*. I admire your work very much and always enjoy spending time and talking with you.

Dr. Lanius: Thanks for having me back, Ruth.

About the speakers . . .

Ruth Lanius, MD, PhD is a Professor of Psychiatry and the director of the PTSD research unit at the University of Western Ontario. She established the Traumatic Stress Service and the Traumatic Stress Service Workplace Program, both specializing in the treatment and research of PTSD and related comorbid disorders. She currently holds the Harris-Woodman Chair in Mind-Body Medicine at the Schulich School of Medicine & Dentistry at the University of Western Ontario. Her research interests focus on studying the neurobiology of PTSD and treatment outcome research, examining various pharmacological and psychotherapeutic methods. She has authored more than 100 published papers and chapters in the field of traumatic stress, regularly lectures on the topic of PTSD nationally and internationally, and has published Healing the Traumatized Self: Consciousness, Neuroscience, Treatment together with Paul Frewen.

Ruth Buczynski, PhD has been combining her commitment to mind/body medicine with a savvy business model since 1989. As the founder and president of the *National Institute for the Clinical Application of Behavioral Medicine*, she's been a leader in bringing innovative training and professional development programs to thousands of health and mental health care practitioners throughout the world.

Ruth has successfully sponsored distance-learning programs, teleseminars, and annual conferences for over 20 years. Now she's expanded into the 'cloud,' where she's developed intelligent and thoughtfully researched webinars that continue to grow exponentially.