



THE SPECTRUM OF HEALTH

— P O D C A S T —

Podcast Session #72

The Power of Having Heart Coherence

With Dr. Rollin McCraty

This episode is full of impactful wisdom and delightful insights into how powerful the heart really is. Rollin McCraty, Ph.D. is Director of Research of the HeartMath Research Center, and joins us to share his psycho-physiology research in heart coherence.

To learn more about Dr. McCraty and his work, simply head to HeartMath.org.

Dr. Christine Schaffner: Hi everyone, welcome to the Spectrum of Health podcast. Today, my guest is Dr. Rollin McCraty. Dr. McCraty is the Director of Research of the HeartMath Research Center at the HeartMath Institute. As a psycho-physiologist, Dr. McCraty's research interests include the physiology of emotion, heart-brain communication and the global interconnectivity between people and the Earth's energetic systems. Findings from this research have been applied to the development of tools and technology to optimize individual and organizational health, performance and quality of life.

00:35 DS: Dr. McCraty has acted as a Principal Investigator in numerous studies examining the effects of emotions on heart-brain interactions and on autonomic, cardiovascular, hormonal, and immune system function, and outcome studies to determine the benefits of positive emotion-focused interventions and heart rhythm coherence feedback in diverse organizational, educational and various clinical populations. He has been featured in a number of documentary films, such as I Am, The Truth, The Joy of Sox Move, The Power of the Heart, Solar Revolution and The Living Matrix, among many others. The website that you can go to to find out more about Dr. McCraty's work is HeartMath.org, and we're going to be talking about moving past stress management, building and sustaining resilience capacity.

01:20 DS: I really enjoyed this conversation and my mind went in so many different places regarding how to bring this work to my patients and to all of you who are listening. I hope that you're inspired as well. Enjoy the podcast.

01:35 DS: Welcome everyone. We have a real treat today with Dr. Rollin McCraty, and we're going to talk about HeartMath and all things heart coherence today. So welcome, Dr. McCraty. It's really an honor to have you on the podcast.

01:47 Dr. Rollin McCraty: Well thanks, Christine, it's really a pleasure and honor to be here.

01:50 DS: A lot of my patients are into HeartMath. They've either heard of it, experienced it, or have an interest or curiosity in it. So, for the person who's new to HeartMath, can you give us an overview of what HeartMath is?

02:05 DM: That's always been a challenging thing for any of us here to do, because we're into so many different aspects, but basically HeartMath, as relevant for our discussion, is a set of tools, techniques, processes, and technologies even that support it, that really help people shift into an optimal state we call heart coherence, which helps get the heart and brain in sync. And that optimal state that these techniques lead you into, there's over 400 independent studies now showing that that is a really good thing to do. It helps the body's natural regenerative processes, balances the hormonal system, quiets the activity in the nervous system, but more importantly, I think it aligns us with who we really are at a much deeper level. I'm seeing we have the science here to support the idea that the heart isn't just a pump, that it's really an access to a deeper part of who we really are, what some people might call their higher self or spirit. Here at HeartMath we just call it our 'larger self' to take any kind of religious or new age context out of it, because we mean this quite literally, and have the science to back up that statement as well. So it really helps people navigate life with more grace and ease.

03:20 DS: Who doesn't need more of that these days? I did a summit last year called The Body Electric, and my whole goal around that was to give people the conversation and the science around seemingly esoteric ideas that people might not understand, where they might think, "Oh, energy medicine" or kind of not understand that this is really rooted in science. I think it's awesome how you intersect science with the spiritual aspects of our own being. The new term might be this idea of coherence, and so can you walk us through what you mean by coherence?

04:00 DM: Sure, that's a great place to start. And in fact, we spent several years with my scientific advisory board, which is a lot of names that people would recognize. I was very fortunate to attract a lot of mentors, back in the '90s. Anyway, "And so what are we going to call this," right? And 'coherence' is what we came up with, and the reason for that is, if we start at the first definition, most dictionaries or probably all of them define coherence usually in the context of somebody, the quality of somebody's speech or writing, you'd say. So hopefully I'm putting my words together in a way here that conveys a coherent meaning. It's a concept that makes sense, it's connected, and if I'd had too much to drink last night and I'm kind of uttering nonsense, I'm 'incoherent.'

04:47 DM: In a way, it has similar meanings and physics, which is how I mean it. So coherence is almost always used in the context of complex systems, and so coherence is a big deal in science these days, in almost any branch of science, whether or not we're talking about the universe, a really big system, which is amazingly coherently organized. You know how the Earth goes around the sun and the moon around it, all of it, it's very coherent.

But it implies there is a coherent system embedded within that--what it means is that all the parts have to be somehow connected and communicating with each other, to be able to coordinate and operate together harmoniously. So it implies some stability in a coherent system that is stable over time, and in a coherent system, it's very energy-efficient. So, we can apply those same concepts and measures of coherence in our body--how well are all the parts working together, the immune system, the hormonal system, nervous system, heart and brain.

05:51 DM: In fact, we were, I think, the first to use it in that context, the words "physiological coherence," though we didn't invent the term. But we can also use coherence in another one of our areas of research, in social sciences--social coherence. How well are the relationships and the harmonious order amongst a team, or a family or a community? I know we won't go into it today, but we also use it in the context of our global coherence work. We founded the Global Coherence. Some of your listeners might know the Global Coherence Initiative, GCI, where we're looking at the coherence between humanity itself, all of us, you can think of us as all little cells in much a bigger organism, and the Earth itself, and how we're actually interconnected with the magnetic rhythms and frequencies, in a very real measurable way with Earth itself. So we look at personal coherence, social coherence and global coherence, and how they all interrelate and are kind of all nested within one another. That was hopefully not too complicated.

06:53 DS: Well said. I loved it. And after the Body Electric Summit and a lot of the research that I've done, I've dumbed it down when I explain it to patients, that health is coherence. I feel that when we are healthy and well, we are coherent. And so I think that was a beautiful explanation, and obviously it

applies outside of our physical body as well. So with your research and with how HeartMath really works, how do we even assess or measure the state of coherence within a physical body?

07:27 DM: Well, as it turns out, it's quite easy to do. And the way we do it is we look at the activity of the heart. And as it turns out, the heart is integrated and involved in multiple systems. A lot of people just think of the heart as this mechanical pump, but we know now it's much more than that. It's a hormonal gland, it secretes hormones, oxytocin, all the catecholamines, dopamine, norepinephrine, all these things are all literally manufactured and secreted by the heart. It's the primary source of rhythm in the body. It really sets the pace even for the brain. So that you could look at that as the conductor of a very complex orchestra of all the different systems that have to work together, the heart really sets that rhythm. And the fact that the heart and brain are so interconnected, in fact, the neural structures between the heart and brain connect the heart and brain more so than any other systems in the body. In fact, while we're on that topic, the heart actually sends more information to the brain than the brain sends to the heart.

08:35 DS: Wow.

08:36 DM: Now that sounds like some new discovery. This has been known since the late 1800s, this is basic anatomy, it's just been forgotten and has had a lot of rediscovery. And the quality of those signals that the heart is sending to the brain profoundly affect brain function, cognitive functions. There are neural pathways from the heart directly to every major brain center, and the quality of these neural signals profoundly affects how well we can

think, our decision-making, our ability to self-regulate, which is so key in today's world, and but also our emotional experience. So hopefully, most of our listeners out there when they fell in love with their spouse or whatever, their significant other, I bet they didn't say 'I love you with all my brain.' There's a reason for that. And we intuitively know this and feel this in the heart for a reason. I'm getting a little bit off track there...

09:30 DS: Oh no. It's all great.

09:31 DM: So as it turns out, the heart rhythm is the most reflective of how we feel. So this is some of our work in the early '90s. We were the first, I think, to ever show that specific emotional states are reflected in the heart, as a pattern in the heart rhythm. They were saying anxiety looks different than anger, but especially when we are feeling things like love, appreciation, kindness, compassion, the list that we associate with the heart naturally anyway. But we can walk out the door in the morning and it's just one of those days, we're actually having one here. Blue skies and the perfect temperature, and just, "Ah God, what a beautiful day." We have that feeling of appreciation or gratitude, even when we don't call it that, that's what we're feeling.

10:18 DM: Our heart rhythm shifts into a very different pattern, and that's a pattern that we now call 'coherence,' which reflects physiological coherence, because we see that nice sine wave, a rhythmic looking pattern...For that pattern to emerge, all of the systems in the body that I was mentioning earlier, especially between the heart and brain, have to be working together harmoniously. And then when we get triggered, and we feel things like anxiety, or impatience, or frustration, especially anger, the heart rhythm then becomes very chaotic-looking and literally shows that all these systems within the body are

out of sync and are using a lot more energy and basically are in a state of disharmony. And we can call that autonomic dysregulation, we can use a lot of terms to describe that, but it's really that what we're seeing reflected in the body really starts up here, in these higher level brain systems, the amygdala and so on, which are really driving the activity in the autonomic system. Now, sorry, I rambled on there.

11:21 DS: I love everything you're sharing, and I think a lot of my patients have a lot of what we would call neurological symptoms. And there's so much conversation right around the gut and the brain. And while that of course is relevant, as you're talking, I'm thinking, "I've got to start with the heart with everyone." And I think that's still underestimated and under-utilized. And so that's a great description of coherence. I love how we're wired that the positive emotions that we all know feel good in the body, or change our state, also have a huge physical and physiological effect, like gratitude. I study science and then I love people who inspire me, like Lynne McTaggart and Joe Dispenza and Tony Robbins. All these people have a lot of gratitude practices in their ways of inspiring people to lead a healthy life, and so it just takes this whole other framework when we look at what gratitude does to not only the heart, but to our physical body.

12:22 DS: So Dr. McCraty, we have this concept of coherence, we know that we want to be in a state of coherence, we know that we can measure coherence and that it translates to health. How does HeartMath interact with someone who's incoherent? A lot of my patients have anxiety, depression, insomnia, and all of these really incoherent emotions and states. How do we start shifting somebody?

12:48 DM: We could talk about this for probably hours. The key here, I think, to start with is self-regulation. If we really look at most health issues, and even our societal problems or the conflicts we have in families and work teams, it ultimately boils down, if you really look under the hood, to failures of our capacity to self-regulate. I don't mean that from a judgmental or blaming perspective, because most people just haven't been taught how. Sometimes we discover it ourselves through the hard knocks of life. But that's really the key to our growth, is our capacity to stay composed when life is tough out there. And this is where the emotions you're talking about are so key, because really we have a greater degree to self-regulate our emotional diet than most people understand, or have been led to believe. And in fact regulating our emotional diet, and this is backed up by many studies as well, is far more important than what we eat, as far as the impact it has. I'm not saying it's not important to have good nutrition and hydration, of course it is. I'm saying we really understood the impact we're having on our body day-to-day.

14:11 DM: When I'm talking about self-regulation, Christine, in this context, I'm really meaning in-the-moment self-regulation. I like traffic jam examples, because they are obviously not just about traffic. If you're driving in your car and the traffic lights are all green, you're hitting them just right and you pull up to where you're going, there's the perfect parking spot right in front of the store...In this situation, it's easy to be in the flow and self-regulated. But what happens when we hit the traffic jam, for most people? We get a little irritated or maybe impatient or frustrated. Some people just flat out lose it. So that's a failure of self-regulation, if we really understood what those emotions are doing to our body. And just under the radar, there we are, saying "Hurry up!" While all of this is going down, we're setting in motion at least 1400 biochemical changes in our body that basically use and deplete energy. Certainly it's

not going to make the traffic move any faster. All we've done is deplete ourselves. So we can say they're literal traffic jams, but then equate that to all the things we go through in a day. For so many people, things like the subtle anxieties and frustrations and impatience have become so familiar to the brain, we don't even recognize them anymore.

15:36 DM: In fact, what becomes familiar is what we experience as comfortable. And the way the brain works, we actually have to keep creating those feelings internally to feel comfortable, as crazy as that sounds, but it's actually the way our bodies work and our brains work. So no wonder we feel so depleted at the end of the day. And then over time, these biochemical changes set up the internal environment for higher inflammation and lowered immunity, which is exactly what you're probably describing. Inflammatory type issues then lead to diabetes and heart disease and metabolic syndrome and the list goes on, all really because of those unmanaged emotions. Does that makes sense?

16:22 DS: Absolutely. Do you think it's just that our society doesn't honor and teach people this, or how do people become so unable to self-regulate? What are some of the factors there?

16:39 DM: A lot of it is we aren't taught about our emotions. There's a suck-it-up mentality. Let's be clear, I'm not talking about suppressing emotions. And by the way, we don't use the term negative and positive here, we call it depleting emotions and renewing emotions...

17:04 DS: I like that.

17:04 DM: Because of the effect they have physiologically, and that's just a scientific fact. So I'm not judging or saying that maybe anger isn't appropriate sometimes. But it still depletes you. Everybody can relate to that. If you've had one of those good old anger blow-ups triggered, we let them have it. It might feel good in the moment, the adrenalin and feeling of, "How powerful am I?" But a few minutes later, there we are drained. So we've all had that experience. HeartMath techniques are really about, how do we become more intelligent about managing our energy, kind of more aware of it. And it really always has to start with self-awareness, and identifying what are we actually feeling? Kind of accepting and getting past the denials, especially in us men.

17:52 DS: But then there are very simple techniques, and we've spent a lot of time with our techniques and testing them over the years to make them really simple, so people can actually use them and get almost immediate benefit out of them. There's about eight core techniques for very different purposes, and most start with what's called heart-focused breathing, and that's where you put your focus and attention in the center of your heart or your chest, not necessarily your physical heart. And pretend you're breathing through the chest area. And you breathe a little slower and deeper rhythm than normal. It's not some big exaggerated thing, but that focus of attention is really important in the heart area. And then in the beginning, you can try breathing in about four or five seconds on the in-breath, four or five seconds on the out-breath, which happens to be the resident frequency. We actually have a resident frequency of the heart, brain, cardiovascular system. So it's a 10-second rhythm, the same as the coherent rhythm. So the heart-focused breathing helps shift the physiology into coherence.

18:54 DS: Everyone has access to their breath. I love that...

19:00 DM: That's why breathing techniques are taught just about everywhere, from learning how to shoot better, to Lamaze, to yoga, because we have conscious access there, though most people don't understand the mechanisms of why they work. So the breathing rhythm, I won't go into all the mechanisms here, but they modulate the rhythm of the heart. So we're starting to shift the rhythm of the heart into that nice coherent wave I'm talking about. And remember all this information going from the heart up to the brain, all the neural pathways. So one of those pathways goes to the amygdala, which it then recognizes in a healthy brain as a familiar state that we associate with safety and comfort, and everything's okay. So that creates a better feeling just when they're doing the breathing, in a healthy brain. But where maladapted, and where anxiety or depression have become the familiar baseline, that can feel uncomfortable at first, because it's an unfamiliar rhythm.

20:03 DM: But then, the next step in most of the techniques usually has to do with activating a feeling of gratitude, or appreciation, or genuine connection with someone, depending upon the technique. But I'll stop there. So now, by doing those in the moment we're starting to get triggered, now we stop the play out of those 1400-plus bio-chemicals that deplete us and we create a very different pattern of hormonal and neuro-chemicals that actually regenerate us. And those signals now go into the brain through a pathway to what's called the thalamus, which synchronizes literally the electrical activity of the entire brain. That coherent rhythm enhances its capacity to create global neural synchronization. So suddenly we can think clearer, make better decisions, are more stable emotionally, reaction times are increased. So that's why athletes and law enforcement love our stuff so much.

21:01 DM: This is an important point, just to ramble on a little bit here, Heart-Math isn't about just the 'bad guy sympathetic nervous system,' because it's not bad--we need a good healthy sympathetic system. And you have to relax, which is how most stress management approaches are structured. There's a lot of times in life we actually need a higher heart rate, in athletics or sports, or even in a meeting, right? It's not about this kind of fluff muffin, meditative state, there are times we really have to be on, but we can be coherent or incoherent at any heart rate. So think of coherent rhythm equals inner composure and better mental acuity.

21:48 DM: So that's something we can learn to shift into, right in the traffic jam, or in the meeting when that person says that thing that you knew they were going to say and there we go, right? So when we're in an incoherent state, and we get triggered, we're feeling frustration or anger, those depleting emotions, that incoherent rhythm also goes to the thalamus, which is responsible, one of its roles is synchronizing bacilli in the brain globally, that desynchronizes brain function. And that's when we typically say or do the stupid thing we later say, "God, that was stupid, I can't believe I said that." Not that you can relate to that, Christine, I'm sure.

22:30 DS: No, not at all. [chuckle] 2020 has not given me any opportunities to experience incoherence at all. [laughter]

22:39 DM: Does that makes sense, though? These are simple tools that you use in the moment to really self-regulate our emotional diet.

22:48 DS: With the patients that I see, there's a complexity, right? We see these complex, multi-systemic pathophysiologies, and what you're explaining is a really simple tool. Yes, it takes discipline and you have to do it. But what I'm hearing is that we are wired and we have tools to really change our state, no matter where we are in our life, which I think is a really empowering way to look at our health and our body.

23:21 DM: I have to be a little bit careful here, because I can sound like a minister or something, but there's so many examples now and case histories in healthcare of people that I've literally gotten out of wheelchairs over time, and these types of things. Because as we learn to self-regulate and shift into more coherence, we're also connecting with the intelligence of the heart, that's the bigger benefit that I haven't really talked about, but if we just keep it at the biochemical hormonal nervous system level...and this happens in ratios, I don't want to make it sound like, "Oh, I learn the technique and suddenly..."

23:57 DS: Sure.

23:58 DM: Because it does take some practice. But with some practice over a few weeks, it becomes the new automatic as well, because we're training the brain and nervous system into that new state as a familiar. But the point I'm wanting to make here is that as we start regulating those anxieties, impatiences, frustrations, dramas, we're stopping the flood of the chemistry and the neural activity that's depleting us and interfering with the body's natural regenerative processes. So we're taking that burden off, that extra load. Right there, that is huge. Even if we could just go to neutral, not even go to maybe appreciation or compassion or kindness, just neutral, that is a huge step for a

lot of people. But then as we learn to go more to the more regenerative emotions as well, then we're now creating the biochemistry of regeneration. So first thing, we have to stop what's draining the system, and then start adding...I use the metaphor, it's a very good one I think, that we have an inner battery. When we sleep, we recharge that inner battery, and that's one of the ways, but also coherence is charging the battery too.

25:15 DM: And that, once people understand that it's really true, we really are energy systems, then this becoming more intelligent about how we choose to use our energy, suddenly we're doing it now because it makes sense to us, not because somebody said we should, a doctor or a guru or something. But because of our own innate intelligence, it just makes sense, I want to use the energy I have in my inner battery more intelligently and be more conscious of how I keep it charged. You mentioned sleep earlier too, and in thousands of people in studies almost in every case sleep has been one of the big improvements after people start using HeartMath. There can be things like apnea and stuff that are more neuro-based of course, but for the majority of people that have sleep problems, it's because a lot went on during the day.

26:10 DM: We get triggered, even if it's unconscious. The top of the food chain of that 1400-plus biochemicals is cortisol, the stress hormone, which is also not a bad guy, we want healthy levels of cortisol, we just don't want to keep shocking the system with it inappropriately and unnecessarily. But the downstream effects of even a short burst of cortisol, because it regulates metabolism, as I'm sure you well know, those effects last for many hours. Cortisol actually modulates at the DNA level to express differently. So, if we had those kind of episodes throughout today, where we're upping the metabolism,

then that carries over into sleep. They've got the racing mind, you can't go to sleep, because the chemistry of the body is ready to go use energy.

27:03 DS: Absolutely, a lot of my patients do struggle with insomnia, and as far as giving them things to down regulate cortisol and to give them the melatonin they should have, HeartMath seems like a really important tool to help with improving quality of sleep. Dr. McCraty, you went into the intelligence of the heart, but before we shift out of this idea of regulation, and regulating emotions in our nervous system, there's a lot of talk in our community around the role of the vagus nerve and how the vagus nerve really is this switch between sympathetic and parasympathetic, and a place where all sorts of things can go awry. Do you have any comments or feedback on HeartMath and the vagus nerve?

27:49 DM: Well, sure. We could do a whole hour on that topic as well. So, to give a little context here, when I've been talking about coherence and incoherence in heart rhythms, that is based on what's called heart rate variability, which I'm sure you're familiar with. And everybody knows what heart rate is, which is simply how many times did the heart beat in 60 seconds, in a minute, that's why we call it beats per minute. But in reality, in a healthy person, in someone who's resilient, the heart rate changes with each and every heartbeat. This is always going on. There's hardly ever two heartbeats where the time between the two would be the same. Even when we're asleep, during quiet times, whatever. And the heart rate variability, there are many factors that go into creating heart rate variability, I won't go into all that here, but one of those is the activity in the vagus nerve.

28:49 DM: So the vagus nerves, of course, are very large nerves, there's thousands of fibers in each of the two vagus nerves. They come down through the front of the body, that's the longest nerve in the body. 90%, or 80% if we want to be conservative, but most suggest 90% of these fibers in the vagus are taking information from the body back to the brain, only 10% are taking information down from the brain to the body. In psychology, the vagus nerve is a very big thing. And the way you measure the activity in the vagus nerve is you look at how much heart rate variability you have. It's the rhythm of the heart. And in fact, when we breathe, what modulates the heart rhythm is that we change the activity patterns going down the vagus to the heart and body.

29:35 DM: Now, by the way, most of those ascending, or afferent as we call them in neuroscience, pathways back to the brain come from the heart and cardiovascular system, by far. So that's why I say the two are mainly connected. So, with vagal activity, which is the parasympathetic side of the nervous system (the vagus is the primary nerve of the parasympathetic nervous system), most people are talking about the 10%, the brain down. And yes, looking at vagal activity is really important, because we know that people who have lower heart rate variability, that's what I would call vagally mediated, it's only one of the things that mediate HRV--a lot of people get confused about that and think it's all about that, it's not, let me be very clear. About 30% of HRV is due to vagal activity. And if that's lower than it should be, I consider that, as do many of my colleagues, a measure of what we call self-regulatory capacity.

30:39 DM: Now, Steve Porges, a friend of mine, coined the term many years ago about the vagus nerve, to really say that it's the primary nerve that underlies what he calls the social engagement system. You could think of the vagus and the activity coming down from that as the brakes. Like if we use a car analogy, you've got to stop at a stop sign or somebody runs out in the road, you put the brakes on, it's what slows and stops. So when we have more vagal activity to the heart, it slows heart rate, as opposed to the accelerator, which would be the sympathetic in our analogy here. So what he means by the social engagement system, just to riff a little bit here, if that's okay, we have this fight-flight thing that got associated with the sympathetic nervous system back in the 1920s, Walter Cannon.

31:27 DM: And I think that's really created a misnomer, like the sympathetic is a bad guy where the only thing we can do is run away or fight. And in fact, in a lot of our training programs, I talk about the modern day evolution of fight or flight. It's a real response, but it's not like a lot of people think. But the whole point of the social engagement system, which is the parasympathetic through the vagus nerves, is that we aren't limited to fight or flight like a lot of people led to believe. We have the capacity to put the brakes on. To wait a minute. We might disagree on something, Christine, but we can put the brakes on and say, "Well, let's at least hear what each other's perspective is," even though I may not agree. I don't have to hit you or run away from you or separate from you. So that's the social engagement system, which is the vagus.

32:24 DM: And so, the way we literally measure the health of that is how much vagally mediated heart rate variability there is. This is throughout the field of psychophysiology. So that's why there's so much importance around

vagal activity, but the thing we have to remember is what's creating that activity in this downward prance of the vagus, is what's going on above it. It's the wire. A very complex wire. Or the highway, right? The freeway with multiple pathways going both ways. But it's really what's happening in our emotions and our amygdala that's driving that activity. So when we get incoherent, which is vagally mediated, a lot of that jerky heart rhythm stuff, it's because the brain centers above it are out of sync. That make sense?

33:11 DS: Yes. And I'm familiar with the work of Dr. Porges as well. I'm glad that it sounds like you guys have had many conversations around this topic.

33:23 DM: A few. Yes. The other thing you asked me--so when we get in a heart-coherent state, we're actually increasing vagal activity. And you actually see that in an increased range of the HRV while we're doing those practices. Now, the other part of that is, because most people are only talking about the vagus to 10%--the 90% is way more important, because now we're shifting the quality, let's use the word quality, of those neural signals coming up the vagus. And that's what will help slow or mediate sympathetic outflow--what's actually coming up.

34:03 DS: When I've talked about it, I've said 80%, so I didn't realize it was 90% that is from the body up to the brain. It sounds like HeartMath has the two aspects, we can influence the top down, and then we can also influence the heart via the vagus to the brain.

34:24 DM: I actually put more emphasis on the bottom up. And of course they're both important, but one of the reasons for that, one of my mentors, this guy named Karl Pribram, you may know the name, a lot of people won't.

A pretty famous guy, and he's considered by many to be the father of modern cognitive neuroscience. A lot of things he did, people aren't aware of because of the way we reference things these days, that only back so many years. But things like executive functions for the frontal cortex, he's the guy who coined the term "executive functions" and he's actually one of the first brain surgeons ever in the world

35:12 DS: Wow.

35:13 DM: He grew up through knowing nothing about the brain to being one of the top experts by far in the world. Anyway, one of his passions was the study of emotions--how is it that we feel and why are they happening, and the motivations they create, and all this. And many of the theories of emotion now are all based on his theories, literally. I'll try and say this as simply as I can. If we look at the amygdalas, that's one of the things that used to drive him crazy--a new book or a paper would come out talking about the amygdalas, the fear center or something, and he would just throw them in the trash can because they had it all wrong. But what the amygdala does is determine what is familiar and not familiar. That's what its role is. So to do that, it has to have a reference that we're comparing the now to. So in fact if we talk about these afferents coming up from the heart, they go directly to the amygdala, and in fact in the core nucleus of the amygdala, the cells are literally synchronized to the heartbeat.

36:25 DS: Oh wow.

36:26 DM: You can watch them fire milliseconds later after every heart beat, boom, boom. So whatever the heart rhythm pattern is, is going directly to the

core of the amygdala. Now, one part of the amygdala is where through these kind of neural patterns, you store what he called "familiar baseline references". I'll give you an example. One of my grandmothers when I was a little kid, in her world, she worried all the time. Worry, worry, worry, anxiety--it drove us crazy, but in her world that was her way of care, that was what she equated with caring. She was caring about us because she was worried about us.

37:04 DM: So that had become her familiar baseline. What the amygdala does is it's always comparing, looking for a match between the familiar and the current input, and a match equals comfort. So this is what we would call these days a maladapted baseline. The person who's always quick to trigger anger or anxiety or these types of things, that's become their baseline. So there is no such thing as sustained change in terms of our behaviors, our emotional experience, without resetting that baseline, those many baselines that we form over a lifetime.

37:43 DM: Now, what Dr. Pribram absolutely proved was that the only way that you can establish or reset a baseline is to change the afferent information coming from the body to the amygdala. You cannot think yourself into a new baseline, at least not directly. You have to change the afferents, the ascending neuro information, especially from the heart. And he actually talked about this in 1970, in very elegant ways. The heart being the primary source of rhythm is what is the primary source of establishing the familiar, which the whole organism then jumps off from.

38:18 DM: So everything we experience and perceive goes through this pattern recognition process at this level. That's why the bottom-up information is

so critical and why, especially in trauma work, the somatic type approaches are becoming so much more popular. Over time we realized that with a lot of the brain focused therapies...You can't think yourself into a new baseline, it's impossible. This was actually proven. This is not some theory.

38:48 DS: Right, right. That's fascinating. Some of my patients have done what we call limbic retraining therapy programs, Dr. Gupta has one, it's typically patients who are highly sensitive. They often are chemically sensitive or mold-sensitive, and the premise of this is how do we kind of rewire their safety mechanism so they're less reactive. The whole goal is for them to not react so strongly to their environment, but I haven't thought about it in this way, that we can really change the amygdala through changing the heart or creating more coherence from the heart.

39:30 DM: Yes, and I'm going to take it one step further. It's the only way you can do it.

39:33 DS: Done, check. [laughter]

39:37 DM: Now, these simple little techniques like heart focused breathing. We think we're changing the brain down and we are, but it's the stuff coming back up directly into the amygdala, we do that enough times, or especially over the first few weeks, you're literally training the amygdala to that rhythm being the new inner reference that it's comparing to. And once that's established as the new reference, that's when this work becomes transformational, because now it becomes the new automatic, you don't have to think about it. And people find themselves becoming more relaxed, kind of casual, kinder,

and just kind of naturally without ever thinking they're trying to do that, because that is the natural association with a coherent rhythm.

40:25 DS: This is awesome info, and a lot of people who are listening out there are probably curious. Do you have experience in your research and studies working with these types of patients, the highly sensitive type?

40:40 DS: Yes, sure.

40:42 DS: What would you say to those patients listening, how long has on average that you see that change taking?

40:50 DM: On average, and there's a lot of variation here, it's after about six weeks of practice that you start seeing changes, which seems like a long time, but that's short if you think of a lifetime of being stuck in an old pattern.

41:01 DM: Yes.

41:04 DM: HeartMath has been used a lot in trauma work. We're actually creating a new certification course in trauma work for people who want to integrate HeartMath approaches in their trauma work. What inspired us to go ahead and do that was work that was being done in Syria with refugees, with Syrian refugees in Lebanon actually. And the fellow who was doing that has spent his life on humanitarian efforts in trauma work, and a lot of these refugees were children. I think he worked with over 800 children in whom their primary symptom of how the stress of all that was playing out was bed wetting. And of course, that's not a good thing if you're in a refugee camp, they don't have washers and dryers and lots of people are crowded into these

tents and things. And he was able to get, I forget the exact number but it was in the high 80% resolution of those symptoms in a very short period.

42:15 DS: Wow.

42:16 DM: Actually he based his program on our program for kindergarten and first grade students at HeartSmarts, it's very simple techniques for these kids, and then he reinforced it by teaching the mothers. So what was powerful about that was not only that it worked in such a high ratio, but how fast it worked. Then he also had a much more complex and in depth program for survivors of trauma, survivors of trauma and torture. And again, very fast resolution, I mean it was weeks, not days like with the children, but still. And anyway, that's why we finally said okay, we've got to get off our behind so to speak and go ahead and get this out to others. So the course we're doing is a great course and I've been watching the episodes. A lot of trauma-informed experts are talking about how they've integrated HeartMath into their work in trauma--Dan Siegel, and a bunch of people like that all show up in our course.

43:19 DS: I will definitely check that out, and I know that for so many people who are listening, we all want more tools, to help people we know. Especially practitioners who treat the patient population I see, they know that trauma is a huge factor in regulation, but wonder how to guide people.

43:36 DS: So in that course, we go into a lot of the things with the over-sensitive and with that we did some studies, you mentioned chemical sensitivity earlier. Many years ago, probably late 90s, we did some research with a clinic

up in Canada, Nova Scotia actually that specializes in patients with environmental sensitivity disorder. And in fact, at that time, it was the only population we'd ever seen that we would say had too much heart rate variability--it's almost always about too low of HRV. However, when you look at the HRV, the actual rhythms and patterns of it, it was not normal. They had a lot of it, it almost looked like an arrhythmia, but it wasn't. I try to informally call this state vagal system chaos. It's rare, but if you do see people with chemical or certain environmental sensitivities, a pretty good ratio of them actually have this nervous system chaos disorder. So, we get hit with the stimulant, the chemical or whatever it is, and that triggers the system. This is a level of failure of physiological self regulation. Ultimately what it is, the system goes into this chaotic state and it's lost the capacity to self-regulate. So a small stimulus creates a very big out-play. And we've now started to see the same pattern.

45:13 DM: Years went by and we do a 24-hour HRV analysis for clinics all over the world, especially functional medicine clinics that we just sort of seem to resonate with. Then we've started to see this same pattern show up now and then in patients coming to the clinic. And not always, but almost always, they're coming because they have anxiety, they never had a night problem with anxiety, and suddenly they're feeling this overwhelming anxiety/panic. They have no idea why, and what we see is that most likely what's going on is they've developed an environmental sensitivity disorder that's triggering the system into this chaotic rhythm, which actually looks almost like extreme anxiety when somebody's having that emotional state. But in this case it's physiological, so you have that rhythm going up to the brain, it cannot bring it back into a normal rhythm to the familiar so that spins up into anxiety and panic, and what they really have is probably a mold allergy or some other type...

46:17 DS: Yes, mold does that.

46:18 DM: Yes, the triggering with the system and they've been exposed to it long enough, it's kind of like the straw that broke the camel's back. And in fact, in the clinic we worked with most, the majority of their patients are farm workers who worked for years and years with chemicals and sprays, and then suddenly the system got overwhelmed to a point that they become hypersensitive to the same thing that they didn't have any problem with for many years. I don't know if that helps you or...

46:48 DS: Yes, that's fascinating. You're speaking in the language that we all are seeing, and it's just great to have this other control. It's really heart-breaking to see these patients where they can't break the cycle or pattern.

47:06 DM: So, being as we're talking about this completely independent of the environmental sensitivity studies--there was a study of anxiety/panic disorder patients and I forget all the reasons why, but they did a 24-hour Holter recordings, GCP recordings, on them for some other reason, I forget what it was now. And a very unexpected finding came out of it. What they found was that in, I think 50...Don't take me to jail if I don't get the numbers exactly right, but it's going to be close to this, about 55% of those patients with anxiety actually had undiagnosed atrial arrhythmia, sudden onset atrial arrhythmias. Fifty-five percent. Treat the arrhythmia, guess what, no more anxiety.

48:05 DM: In fact, if you plot arrhythmias, the heart rhythm pattern looks very close to the heart rhythm of somebody who's actually experiencing anxiety that got triggered, it's actually brain-generated anxiety. In this case, it was the

heart going into these atrial fibrillations, these arrhythmias, sending that pattern to the brain which it interprets as, "I can't bring it back to because it's an arrhythmia." Right? So right back into the feeling of anxiety. So probably half of the patients taking medications for anxiety disorder actually have a heart problem.

48:41 DS: My wheels are turning with all of that, because we look at trauma and emotions of course but we also look at the brain and where the brain is inflamed and where the brain might not be producing neurotransmitters and this and that. But it could be the heart--the heart, it has a huge role when we look at viral infections or even lyme or as you said, or mold. These things can affect the actual physical heart as well as blood flow and circulation. My wheels are turning, thinking about this in so many different ways. That's fascinating.

49:18 DM: Keep in mind, the heart has its own intrinsic nervous system...

49:21 DS: Right.

49:22 DM: That is a very complex neural system. In fact its nickname from, not from me, but from the neuro-cardiology community of the Heart Brain, it's not a metaphor. They mean this literally. So there's a very complex neural structure in the heart itself where all these heart/brain communications originate from. So, there's neural structures there too that can be affected...That's a whole other topic.

49:45 DS: I know, I could stay here all day, Rollin. Just one quick logistical question as we wrap up. How long do people have to practice HeartMath per day?

50:00 DM: Okay, there's two answers to that. One is I would actually recommend that they get one of our HR heart rhythm feedback devices which actually feeds back your heart rhythm in real time and tells you how coherent it is as they practice some of the skills and techniques. I would recommend practicing, practice shifting into coherence and practice staying there for longer periods for say maybe five minutes twice a day, first thing in the morning, because you're really stabilizing the nervous system before you go out in the world, go about your day, and then at night before you go to bed. So you stabilize the system before going to sleep. Now, what you're doing there is you're training the nervous system in the brain into the new familiar I've been talking about.

50:51 DM: Okay. That's one part. Part two is you start practicing remembering to use the techniques that you've learned in the moment during the day. Now for some people that I've heard, "It's all I did all day long." Because they're getting triggered so much, that's great. You know other people, it may be not so often, you know. So that's why there's a variation on that. But those two things in combination, the training of the nervous system through the feedback, and then remembering to practice, that's the hardest part for people. As soon as we get triggered and all that cortical stuff gets inhibited, we forget we even learned a skill, let alone remember to use it. So we have to do reminders, and that's where having someone like you or a health coach or somebody that helps hold us accountable is really helpful.

51:39 DS: Awesome. Well Dr. McCraty, I could literally talk to you all day. I really appreciate all that you shared with your expertise and all the research that you've done. And if people want to find out more about the course you just mentioned, or how to get a device or any of that good stuff, where should people go?

51:55 DM: HeartMath.org.

51:57 DS: Easy, and I've definitely referenced your website a lot in some of the talks that I've done. You guys do such a great job of laying all the information out there and you all are busy. You'll never get bored right?

52:10 DS: We have lots of books that are very inexpensive ways, if you wanted to get a coach or a mentor to help guide you through the process, or directories that you can find in your area, there's 10,000 certified HeartMath trainers out there around the world now. Many thousands of healthcare professionals have gone through our Healthcare Professional Certification, a lot of those are probably listed in the directory as well. And if you're into the science, I would recommend a book called "Science of the Heart" Volume Two. I go into the studies on intuition and global coherence. It's a science book but it's pretty easy to read. Then if you really want to learn more about the techniques and those types of things, our latest book I would recommend would be "Heart Intelligence".

52:57 DS: Awesome.

52:58 DM: That would be a good choice.

53:00 DS: We'll put that all in the show notes. I can't thank you enough for your time and your expertise in sharing this knowledge today. And you all have created quite the movement, so thank you. The world really needs this right now, so thank you for what you're sharing and putting out into the world.

53:13 DM: Thank you for helping share this with your audience, Christine.

53:17 DS: Thank you.

53:17 DM: Alright, have a great day.