Using Heart Energy to Build Resilience

Guest: Dr. Rollin McCraty

Niki Gratrix Hi, everyone! Welcome Today, we're in for a real treat. I have the great privilege of introducing Dr. Rollin McCraty. Dr. McCraty is director of research at the Institute of HeartMath. He is also a professor at Florida Atlantic University.

And he's an expert in research and development systems engineering and instrumentation design. He's undergone advanced training in electrical systems engineering at NASA Space Center. He has a bachelor's degree in technology, a master's in radiational physics and a PhD in health services.

Dr. McCraty and his research team regularly participate in collaborative studies with other U.S. and international institutions. And his research has been published in journals that include the *American Journal of Cardiology*, the *Journal of the American College of Cardiology*, *Stress Medicine*, *Biological Psychology*, and many more. He's been interviewed in leading news publications, national TV shows, and appeared in numerous documentaries.

So, Dr. McCraty, we're thrilled to have you on this summit! And a warm welcome to you!

Dr. Rollin McCraty Well, thank you! It's a pleasure to be here, Niki!

Niki Gratrix So I'm really, I'm truly excited to interview you today because your research is good. It's profound. And it has huge implications and is highly relevant for our audience. So what I wanted to do is just start. We've had a theme on this summit around this model of stress and fatigue based around the more classical understanding of psychoneuroimmunology. So we're talking about exposures to stresses that become hard-wired in the brain and have this cascade effect downwards to chronic stress in the nervous system affecting the endocrine and then the immune system. And that can lead to serious mitochondrial malfunction in the more serious cases of chronic fatigue, for example. So it's a top-down model. And it's mainly in the biochemical paradigm.

So what I would like to invite you to do is share your research on the heart. And how that's going to slightly explode that model?

Dr. Rollin McCraty Well, okay, I'd be happy to do that. You are right in a way. I wouldn't say we're going to explode the top-down model because it is an important part of the puzzle. But it's only part of the puzzle that I think you're alluding to, Niki because we'll call it the bottom-up processes are quite powerful and in many cases are what's missing from a lot of approaches to really being able to better self-regulate our energy and these types of things.

Niki Gratrix So, in particular, let's just talk about examples of the heart affecting and communicating upwards to the brain.

Dr. Rollin McCraty Okay. For the listeners, our very basic introduction to this I think it's important to understand first that the heart and brain are more interconnected and communicate more so than any other two systems in the human body. And there are four primary ways that the heart communicates information to the brain and body. It's not just the brain.

One of those that we will talk a little bit about is neurologically, through the nervous system. In fact, what I'm about to tell you will be surprising to a lot of people. But it's actually been known since the late 1800s. It's a basic anatomical fact. And that is that the heart sends far more information to the brain than the brain sends to the heart.

In fact, if we look at the vagus nerves, which is a primary nerve pathways—there's two vagus nerves, of course—they're very large nerves, thousands of fibers in each one, and 90 percent of those neural fibers are carrying information from the body to the brain. And the majority of those are quite literally coming from the heart and cardiovascular system. So for maybe the last quite a few years since the brain dominant paradigm shift, it's really been focused on the 10 percent, which is the top-down part. So we'll talk more about that in a moment. But that's one of the primary ways the heart and brain communicate.

And biochemically is another. In fact, the heart was reclassified in the mid-1980s to be part of the hormonal system when it was discovered that the heart secretes hormones. And there's been quite a number of those that have been identified now. The first one to be identified is now called atrial peptide. It's been called different things over the years.

And that tends to be nicknamed the balance hormone because it has a balancing effect on the vascular system. There are receptors in the brain for it and so on. In fact, when we have high atrial peptide, it blocks the stress response at the level of the adrenal glands. We don't secrete as much cortisol and stuff. And there's a whole lot more.

But the most recent one, I think the funniest one that's really appropriate is oxytocin. In fact, the heart produces as much oxytocin as the brain. And for those that aren't familiar with oxytocin, I think most of you are these days, but the media love to call it the love hormone or the bonding hormone because it's the hormone that even small releases off have long-lasting effects on our relationships. So it's pretty appropriate. Well, I don't know if you're married or not. But you probably didn't tell your significant other that, "I love you" with all your head, hopefully, Niki, right?

Niki Gratrix No.

Dr. Rollin McCraty So you follow what I mean there.

Niki Gratrix Yes.

Dr. Rollin McCraty Then also energetically is another way that the heart communicates not only with the brain, but the whole body. And this we'll talk about I suspect in this interview. The field of the heart, actually the magnetic field, literally reaches out. It affects others and our environment. And if we have time, we'll even get into how it even connects us with the greater earth field itself. And then the fourth way is biophysically, which we won't go into a lot of detail there.

Niki Gratrix I think what I find really interesting is the way that how the heart specifically seems to lock into parts of the brain like the amygdala and the thalamus. It's that neurologically, as well as electrically?

Dr. Rollin McCraty Oh, it's definitely neurologically. Well, and then it's electrically. It goes along with the neurologically. Technically the term is called afferent. But it's sending neural pathways from the heart through both of the parasympathetic system, which is the vagus nerves and through your spinal column through the sympathetic chains, both a number of neuropathways flowing up from the heart to the brain, primarily the vagus nerves.

Yet, it's been observed. Since by late 1960s, 1970s, a lot of research was done in the field of psychophysiology, which is my field, that showed that not only was the heart sending all this information to the brain, but that the quality, we'll call it, of these signals, the pattern to these signals has profound effects on brain function, on mental functions. Now, it's actually in the older writings from back then, they're literally saying that the heart is acting as though it has a mind of its own. So it made its own decisions. In other words, the heart can override the signals coming down from the brain.

And that's really important for our own survival that it can do that because sometimes if we got really angry at somebody and we keep driving the heart to go faster and faster, if something a little more intelligent didn't finally come in and say, "No, hold the phone here," you'd drive yourself into an arrhythmia and die. So it's a good thing there is this local intelligence within the heart.

So back then what they didn't know was that within the heart, the human heart, it's now nicknamed the heart brain. And this is information. This isn't me. This is from the field that's called neurocardiology. So we now know that the human heart has what's called the intrinsic cardiac nervous system. That's the technical name.

But it's basically the brain and the heart. And that's not a metaphor. That term was coined because all these neural systems in the heart really qualified to be a functional brain. I won't go into all the anatomical details. But it's a very complex interconnected neural system. And it's all the same functions and features you would expect in a brain. Neuroplasticity, short-term memory, long-term memory, neurogenesis, and so on all exist in the heart.

But these signals that are sent upstairs, they are directional pathways through all of the major brain centers and some very strong and direct ones. They first come up to the medulla, which is the brain stem area. And then there's direct and very strong neural pathways to the two centers you've just mentioned, Niki, the thalamus and the amygdalas. And those have really important roles.

Now, before I explain that. The terms was given back in the early 1970s to describe the effects that the signals from the heart were having on our brain functions, mental functions, they called them two terms, either cortical inhibition or cortical facilitation. So I'm sure we'll get to, as well. But this is part of the story here.

A healthy person, our heart rate changes with each and every heartbeat. And that's called heart rate variability. And we can go into the importance of that a bit more later.

But with a healthy person, even when we're asleep, people are sitting still listening to this now, they're heart rate is constantly varying.

And the way I'd like to suggest we think about this is the analogy of Morse code. So most people know that in the time between things, and Morse code being code information, and it can be quite complex information, depending upon the nature of a message. Well, think of that as the strategy that the nervous system—really the whole nervous system—uses to encode information. It all has to do with the time between things. Even within between neurons, it's the information is all encoded in the time between the neural spikes.

So the heart is doing the same thing, just on a much more global scale because that information through the magnetic field and all these other neural pathways literally affects every cell in our body. So it can act as a synchronizing signal, if you will, the master information distributor, if I can put it that way.

So when we have disordered patterns in the heart rhythm, and that's what we naturally are creating when we feel things like irritation or frustration, impatience, especially anger or anxiety and these types of emotional states, that creates a very disordered looking heart-rhythm pattern.

And it's really quite simple at the end of the day the way this all works. But it took a lot of researchers a lot of years to sort it all and really get it all verified. But the story's pretty clear. So when you have these disordered or what we call incoherent heart rhythm patterns, that disordered message, that signal is going directly to the thalamus, which is the great core of our brain. And then the brain is organized in layers around that. We only have one thalamus. It's the very center of the core of the brain.

And one of its roles is to synchronize the electrical activity of all the neurons in our brain, including the cortex and the frontal cortex and where these more executive functions exist and so on. So when we're in that incoherent state, it basically, these erratic signals interfere with the thalamus' ability to synchronize the activity of the entire brain. And that was what they labeled cortical inhibition.

Now, that's actually really easy to measure in things like reaction times, coordination, visual field tests, things like that. That's been done in labs all over the world since the 70s. Now, on the other hand, what we've found is that when we're in a positive state, we're appreciating, "What a beautiful day it is" or those feelings of connection with other people—love, compassion, kindness, the heart naturally goes into a much more ordered or what we call coherent rhythm. That's where a picture's worth a thousand words, like a rolling hills pattern versus the squiggly, jerky pattern.

And the term that was given back to that pattern, all the way back in the 70s, was the one I mentioned earlier cortical facilitation. The brain works better because it facilitates the thalamus' ability to synchronize electrical activity. So even though the easiest ways to measure this is things like reaction times and coordination, the part of the brain that's most profoundly affected is the frontal and prefrontal cortex.

And the skills that that gives us are what [inaudible] called executive functions. He coined that term. But it's basically foresight. The ability to understand and know how our actions and our now affect the future, so planning, goal setting, discrimination, and

appropriate behavior, probably not a good idea to hit the boss if we want to keep our job, abstract thinking, all these types of things.

So those are pretty refined abilities. And it's pretty easy to understand that the neural machinery, if you will, that underlies those capacities, when they're out of sync, those are the ones that are taken offline most profoundly.

And you've probably never done this, Niki. But a lot of people either know people that have, maybe is that we're in a conversation with a friend or spouse, colleague, whatever, if you have teenagers, you can probably relate, they say or do something that just frankly gets us a little angry and upset. And in about a minute later or 30 seconds later, we're saying to ourselves, "Oh, my God! I can't believe I just said that or did that." You blurt out the thing. Can you relate at all?

Niki Gratrix No, never!

Dr. Rollin McCraty No, I would never think you had ever done that. But then I would usually ask the question, "Well, how many of you have done that with the same person around the very same issue more than once?" That usually gets a laugh because, of course, we've all done that.

But what I've just explained was the physiology of it. This is really fast-acting stuff. So when we feel that anger or that frustration, it literally inhibits our brain. So we blurt out the thing that ends up causing a lot more stress, a lot more energy drained, especially in the context of fatigue. And we've activated all of the stress hormones and all that autonomically mediated stuff.

So if we're able to get into a coherent state, we actually facilitate all those same functions above and beyond our normal walking around state. So suddenly, we have more options. We have what seems like more inner time and our inner world to have that choice point between the beginning of the reaction and the blurt out. Like an inner prompter can come in and say, "Wait a minute, that's probably not going to be a good idea if I say that in this situation."

Niki Gratrix So it's really profound just listening to you because it just shows how much, even how smart we are is led by the heart and whether we're in that coherent state or not. And something I've heard you mention before is about this idea that the brain may be more of a recording system of actually what's going on being led by the heart. So rather than originating in the brain, it's the heart that takes the lead. And then you talked about the brain is eavesdropping on what the heart's doing and then imprint it.

Dr. Rollin McCraty Well, exactly. Now, this is not saying heart over brain, by the way. I'm mostly just saying that for reference here. I'm glad I've got a brain. I want it to work really well because the brain does what it does. And it just so happens that also bringing the heart into the equation, the brain can really be the big winner here and come out and be a lot smarter.

Now, what you're talking about now, Niki, so the other pathway we mentioned earlier is a direct neuro connections once these neural signals come up from the heart to the medulla as we talked about the thalamus. But there's also direct neural pathways to the amygdala or amygdalas, as we should say.

In fact, the core nucleus, the centers of the amygdala are literally synchronized to the heartbeat. So every time the heart beats, the cells in the core, the amygdalas, fire in unison with it. So whatever these patterns, arrhythmic patterns are—that Morse code information—is clearly getting to the amygdala. And it's monitoring those signals.

Now, I'm going to make a long story short here. But basically, what we're starting to see now and understand is that the amygdalas, as you just indicated, are interpreting the signals from the heart and other parts of the body, but primarily the heart. Now, interestingly, in our face we have 47 muscles that we have unconscious control off. We smile or we frown. There's also neural systems that feed information back to the brain that reflect the patterns of our facial expressions. And they connect the end to the amygdala exactly the same place that the imprints from the heart do.

So in reality, the imprints from the body—face and heart, especially, but other systems—breathing rates and hormonal rhythms—and all this creates this backdrop that the amygdala is basically eavesdropping on or monitoring that has a great large role in creating our emotional experience, how we actually feel. So this is a major part of what I was talking about by bottom-up. So it's very hard sometimes to do willpower to regulate ourselves, our emotions, and so on.

Most people have had the experience of a New Year's resolution. You know how long they normally last, right? Usually, not very long. As soon as we forget about them, we're back into our old habit patterns. Now, the reason that this happens is the way this tends to work or does work—so you've got the amygdala—it's the associated neural circuitry. It's not just the amygdala. But we'll focus on it because it's the center of this.

So when we have these inputs to the amygdala long enough where we hang out in a certain state that creates what's called a familiar baseline reference pattern. So the way the brain works is it's always analyzing patterns and information. And it works on comparing things. So the brain is comparing the now—current inputs—to the familiar baseline that we've established. And it looks for the match or mismatch. And when there's a big mismatch, it gets our attention.

A common example is we don't typically feel our heart rate or our heart beating until the heart rate gets really high or really low. It gets out of the range of the familiar. And then that gets our attention because it's a big mismatch. Now, this same thing works for creating emotions, this same idea. It's a complex thing. But I'm trying to make it simple. Well, here's a key understanding, Niki, is that what becomes the familiar baseline is what we experience from an emotional perspective as comfortable. Okay.

So you might know children that everywhere they go, they create chaos. All right. Or you might know some adults like that. But usually when you find out that whatever their environment's been, that they're in a chaotic environment, be it with their peers or whatever, that's become their baseline. So they have to be acting out and doing this stuff to feel comfortable.

Or people, let's say that are anxious all the time or worried or tend to get frustrated quick, that's become their familiar. And that's where they're comfortable.

Niki Gratrix And so, for example, if somebody had a lot of trauma and stress for a period, then that's, obviously, the heart is registering that. And then if over time, the

amygdala can record that and do a reset so that that becomes the baseline, is it the amygdala, which is resetting the baseline in response?

Dr. Rollin McCraty Yeah. Absolutely. Absolutely.

Niki Gratrix Oh, got it.

Dr. Rollin McCraty So a baseline can get established. In the more typical way is through just repeated patterns. Like, "I worry a lot because I'm not caring if I'm not worrying." How ridiculous is that? But a lot of people feel that. That's their inner experience. Or it can happen through a traumatic event, especially if it has a strong emotion associated with it. So that can quickly create a baseline. We have many different types of baselines.

But this is an adaptive system, which is good and bad. So, for example, a common example, we'll pick PTSD. For somebody that's in law enforcement that's really in an inner city thing or what we see a lot of what's going on in law enforcement these days, but our military, where you really are in an environment that your life is at risk where you really have to be hypervigilant and really alert and all this stuff that you have to be so that your system adapts. And that becomes your new baseline. It's adaptive, but it's predictive.

But now, what happens when you go home or you're in an environment where you don't need that? But they're really, that's their baseline. So that to be comfortable, they're in that hypervigilant state. So it's maladaptive in that case.

Niki Gratrix That's so interesting.

Dr. Rollin McCraty Does that make sense?

Niki Gratrix Yeah, it's fascinating. And it's so applicable to what we see that happens in many chronic fatigue patients, as well, which we'll expand on a bit later.

Dr. Rollin McCraty Well, exactly because if you're in that hyper state, even though it feels normal and comfortable, you start losing awareness because of the familiarity of what it's doing to our body. And it's basically, you're using energy. So at the end of the day, this is really all about energy management.

So there is no such thing from my perspective, Niki, as a sustained change or behavioral change, especially without shifting that baseline. And as it turns out that being in a coherent state is one of the most rapid ways to do that. And there are other processes that are also very helpful. So I'm a big fan of a lot of different techniques that help, in my way of thinking, that give people a jump-start like jumper cables on a battery that jump-start a car when the battery's low. Its energy's low. Those are very helpful.

But if you don't give people their own set of tools and techniques to start better self-regulating their own energy and becoming more intelligent about our own energy expenditures, the battery just runs down again. And you're just constant having to get the jump-start rather than coming up with ways to recharge our own inner battery. As we call it.

Niki Gratrix And reset. Yes.

Dr. Rollin McCraty And resetting is an important part of that. Absolutely.

Niki Gratrix So can I ask you, too… I'd like you to expand about heart rate variability. And what you've talked about is a mathematical relationship between emotions and the heart. And one of the best ways of measuring the heart and the health of the heart and your emotions, as well, is this heart rate variability. Do you want to expand a bit more about that?

Dr. Rollin McCraty Oh, happy to. And this is upside down from what doctors were taught not that many years ago. I'd say 20 years ago now. And that is that in a healthy resilient person, our heart rate changes a beat in every heartbeat. And that's what's called heart rate variability. Of course, heart rate is just how many times does the heart beat in a minute. But in reality, the heart rate is changing with each and every beat. And that's what's called heart rate variability.

Now, as it turns out, we have more of this natural intrinsic variability when we're young. And it gets less and less as we age. In fact, it's such a strong relationship to aging, that we can measure a person's HRV—how much of it they have—and tell within about 2 years, how old they are if they're on a healthy aging trajectory.

Now, if we've had a lot of trauma and we have a lot of stress in our life, we're using more energy than we're recovering—again, it's all about energy—that's reflected in lower HRV, much lower than it should be for our age. Now, that's really important because low HRV, again for our age—I'm going to quit saying that, but always know that I'm talking about age-related HRV—is a stronger predictor of future health problems. In fact, it's correlated with what's called all-cause mortality.

So if our variability's low, that's a better predictor of future health problems and death from any cause, than all of the standard things people keep hearing about like high blood pressure and cholesterol and smoking and all that stuff. So it's a really important inner fundamental rhythm.

In fact, there's many of us in the research side of this consider the measurement of the amount of HRV we have as a measure of resilience—our resilience. So within resilience, that concept, which is really our energy—how much energy we have in our inner battery—that's primarily regulated, if you will, over longer time periods by our own ability to self-regulate—to be in control of our emotions.

And that's so important because if we look at the hierarchy of what goes on in our body, it's the emotions that run the show and what drives the hormonal system and the activity in our nervous system and so on. So if we're in these incoherent states a lot, which translate basically to impatience and frustration and these kinds of feelings, we're constantly draining our inner battery until that becomes our new baseline and we've depleted our self to where it's harder to recover from.

Niki Gratrix And that's amazing. Just to back up what you're saying there, I saw Dr. Dean Ornish, the great pioneer in lifestyle medicine for the treatment of patients with heart disease. I saw him speak at the Personalized and Lifestyle Institute consortium recently. And, of course, he's talking about his research.

And he covered, obviously, exercise and diet and the low-fat diet and so on. But he initially made the point that it was whether a person felt loved or not or whether they felt isolated or not, that that factor was more important than the others. So it's so important. It's amazing that that turns out to be more important than everything else is…Wow!

Dr. Rollin McCraty Right. Right. So I'm just maybe hopefully here helping add some of the physiological reasons for that because when we are more loving and feeling more loved and connected, that is what drives, if you will, the systems in our inner body. And when they're more coherent—coherent just means they're more aligned. They're more resonant. They're more calmer. Our inner systems are cooperating with each other instead of fighting each other. So that adds energy to our inner battery instead of depleting it.

Niki Gratrix Can I just quickly ask? Is it HRV wouldn't be affected by things like chemicals, exposure to chemicals or a gluten sensitivity?

Dr. Rollin McCraty Sure. Sure, it can be. Of course.

Niki Gratrix Okay.

Dr. Rollin McCraty Yeah. So HRV is a great major of overall system function. So there's two different levels. There's how much of it we have. And then there's, which is really amazing, so there's the how much, which is predictive of future health, our resilience, self-regulatory capacity, these things. But then if we take a deeper look at HRV, there's independent of how much of it we have, the patterns that are constantly changing and going on reflect our current state.

Okay. So when we're frustrated, like I mentioned earlier, it becomes a very jerky looking pattern. When we're in that loving state, like Dr. Ornish is talking about, it becomes very coherent. And that's literally reflecting how synchronized the activity in our nervous system and brain is. Okay. So there's two levels here.

So anything that depletes our energy like exposure to a toxin, especially over time, is reflected in lowered HRV or a more chaotic HRV pattern. And so, in fact, we've actually done research in populations with chemical sensitivities and these types of things. Now, that's a whole other story. We probably don't want to get into here. But HRV is a wonderful measure of these types of things, both on the current level, short term level of what our current state is and the long term health effects.

Niki Gratrix Wow. So when we start to consider about getting into some ways that we can improve our HRV, it's not just that we would want to be using some of the machinery that you've created—which we'll talk about in a second—to help balance emotions, but it's also things like we would need to address if somebody is exposed to chemicals and has gluten sensitivity, those things, obviously, should be assessed and removed from the environment so that it's another factor to consider.

Dr. Rollin McCraty Oh, absolutely. I think a really great metaphor here again I've been using is to think of we all have a certain amount of energy we wake up with. This is a metaphor, sort of, that is literal, as well, is that we have an inner battery. And that's what resilience is. How much charge do we have in our inner battery?

Especially if somebody who's depleted their inner battery, it really gets down to what are we doing that drains energy versus what are we doing to add energy to that inner battery. So both are really important. Of course, you have to have the right diet and the right food substances because that's part of what the cells do, right? The mitochondria make food into electrons. It's energy. But we also have energy in different domains like a mental type of energy. That's a very real and measurable thing, our emotional energy. These are all real things. And they all have different qualities.

Niki Gratrix So that's actually what you've just done there, it's really beautiful actually because it's brought together just about everything on this whole summit. So we've now brought together all the other speakers, the ones when we're talking about gluten sensitivities why we're doing that. Why we've talked about chemical sensitivity? All these different aspects of diet.

And then we're covering all the emotional aspects because certainly within fatigue, as well, adverse childhood events—emotional trauma in childhood is highly correlated with onset of chronic fatigue in later life. And there's also, it's the adverse childhood events, they're saying now 67 percent of adults are affected by this. So it's one of a range. But it's a very important one. So this aspect of actually changing out and getting to a coherent state and helping to clear the emotional traumas also are a really important factor.

Dr. Rollin McCraty Yeah, I'm glad you said that. Can I add a little bit here?

Niki Gratrix Go!

Dr. Rollin McCraty All right. So we do a lot of HRV analysis. We do it for clinics all around the world, actually, a formal clinical HRV assessment that doctors do. And then we send them back a report. And we started, I think, I'm going back a few years here observing through our conversations with the physicians we work with, that later in life when we get into our 40s and 50s, that a particular type of the heart's rhythm—when we make an HRV, it's complex and it's all these different internal rhythms—but a particular rhythm called the VLF rhythm tended to be low in people with early childhood trauma or adversity.

And I ended up talking to one of my colleagues or friends that does a lot of HRV research at Emory University, who we'll have a conversation, he said exactly the same thing. "We've been seeing early childhood trauma reflected in low VLF HRVs later in life." And this was a mystery at first. We were, "What the heck is going on?!"

Well, what we now know is that this particular part of HRV is highly correlated with, if you will, or associated with when we have high inflammation, inflammatory processes. And it's a type of systemic inflammation that's not always obvious.

So this all came full circle—to make a long story very short here—with the work that has been done with epigenetics, especially out of UCLA that is now pretty convincingly shown that both loneliness, which you also mentioned earlier, and early childhood adversity lead to epigenetic changes in early childhood that down-regulate immunity and up-regulate the processes that create inflammation.

Now, when we're young, we're still, physiologically speaking, pretty resilient. So it takes time for those processes to finally wear down the inner battery I was talking about. So

later in life we're seeing that now reflected in depleted batteries, basically. That's reflected in low HRV.

Niki Gratrix Wow! So I ask the question. I was going to ask about the link between inflammation, as well. Fantastically interesting. Okay. Because that links it all together in how they found inflammation in the brain, inflammation in the digestive system, and so on, and chronic fatigue, and stress-related conditions. So fantastically interesting.

Dr. Rollin McCraty And we see low HRV in chronic fatigue, as well, of course.

Niki Gratrix Yes. Yes. Of course. And one of the issues that we've got this standard, the conventional treatment approach, which is things like cognitive behavioral therapy that's recommended for stress.

Dr. Rollin McCraty Top-down process, yes.

Niki Gratrix Yes. And words—using words—rather than how effective is thinking a word versus these other techniques. And perhaps, that's where we can talk a bit about some of the…Yeah.

Dr. Rollin McCraty Well, from my observations from doing research for many years—and I'm not down on cognitive approaches, don't get me wrong here—but frankly, they just don't work very well in a lot of populations. And so it's really hard for the mind to manage itself—the mind to manage the mind.

Whereas, if we go back to what I was explaining earlier that for a large degree, I think a lot of the cognitive models have it upside down. And there is neural circuitry that this is based on. The idea is that information comes into the brain from the external world. And what we see here is mental and so on. It comes to the thalamus. It goes up to the cortex where we become consciously aware of it.

And then and only then, it goes down to the amygdala and subcortical areas where we determine emotional content and all this kind of stuff. So the idea is change our thinking, we change the signals going to the subcortical of the emotional centers. And we change our emotions and reverse our behavior.

Well, that's true. But it's missing a really big part of the story. So now, if we bring in Dr. Pribram's whole model of emotion, that he introduced many years ago—which makes a lot more sense, at least to me anyway—is that in reality that there's neural circuitry right between the thalamus and the amygdala.

So emotional experience occurs long before the information even gets to the cortex. So in reality, emotions are much faster than thoughts. And in most of our life experience, we've already had the unconscious emotional perception. And then that's biasing the cortex that's trying to justify what we already felt. Okay.

Now, if we bring in the pattern recognition model I was talking about earlier, really what the higher cortex stuff is doing is monitoring the degree of match and mismatch and labeling the feeling. So I'm saying a lot here. And it's probably too fast and complex for a lot of listeners to follow. And I apologize for that.

But the main point here is is that if we can shift the rhythms of the heart, which we can do through what we call heart focus breathing exercises and other self-regulation techniques or even movements and things like that, we're shifting that afferent input to the brain, which is going directly to the amygdala that's a bottom-up process that shifts the emotions and all these same processes.

So it's a much easier thing to do. And now, we're also starting to shift that baseline, whereas through the top-down processes, none of that's really going on. It's just mind on mind. So it really targets shifting the emotions. And now, this is really easy to see if you use one of the devices called an emWave or Inner Balance, one of our devices or anybody's HRV monitors, you can think yourself blue, not much happens to our body, to our physiology.

But as soon as you feel something positive or negative, that's when big changes happen in our hormones, in our heart rhythms, to our blood pressure, and so on. Okay, I hope that that was somewhat coherent the way I explained that.

Niki Gratrix Yeah, I followed it really well. But I think that was a great explanation. It's exactly explaining why the aim is to change feelings and not just thinking. And it's incredibly difficult to get any kind of consistent change just you trying to change thinking, which is I think most people would have experienced and know that, as well. So that's fantastic. And thank you so much for explaining it so well.

So how about we talk more about your research and the effect of this? Maybe talk a bit more about the electromagnetic field and how far it spreads out away from the body and how we basically are affected by other people?

Because of our electromagnetic field, we all affect each other and affect the relationships and so forth?

Dr. Rollin McCraty Sure. Sure. So let's start with some basics here. When you go to the doctor's office, if that ever happens, they put electrodes across your chest to measure your electrocardiogram. Or if you're ever a research subject, they stick the electrodes on your brain to measure your brain waves. What those electrodes are measuring is a flow of current.

So we know from basic high school physics, that whenever you have a flow of current, of electricity, you create a magnetic field. So the doctors measure energetics every day without knowing it. So that every time that the heart beats, it produces by far the largest magnetic field produced in the human body.

Now, this is a literal magnetic field. I'm not talking about an aura or something here. I'm not saying they don't exist. But I can't measure an aura in my lab. I can measure magnetic fields quite reliably. In fact, it's exactly the same kind of magnetic field that your cell phone produces to send signals to the cell tower and back or any kind of communications equipment as far as that goes.

So the magnetic and electric fields are two different things. We call it electromagnetism because one field can make the other, not interchangeable, but one can make the other. So any time there is a flow of current, you make a magnetic field. Now, magnetic fields,

especially lower frequency ones, penetrate things. That's why cell phones work inside of buildings where electric fields are pretty easy to shield.

So the magnetic fields of the heart radiate external to the body. And we measure that field with a device called magnetometers. And the sensitivity of today's magnetometers, you can measure the heart field about 3 feet away from the body. Using the same piece of equipment at the same settings, you can measure a brain wave about an inch away outside of the body.

So that gives you the difference in the magnitude of the fields we're talking about here, an inch versus 3 feet. Now, that doesn't mean the field doesn't go farther. Of course, it does. That's the sensitivity of the instrumentation to detect it in a noisy world right now.

So what we've also found is when we measure these fields that they act as carriers of information and, especially, our emotional information. As I reflected—I don't know if I said this earlier—but our emotions are reflected in the rhythms of the heart. Anxiety, that's different from frustration, which it's very different than love or compassion and so on. So we can do, it's called spectral analysis of these fields, magnetic fields, and pretty much tell with about 75 percent accuracy somebody's emotional state.

So think of it the same way you would a cell phone. You create what's called a carrier wave. That's the magnetic field, which carries information. Now, in the case of a cell phone, it's the picture or the text, the voice, whatever we're choosing to encode that rides on that field. So it turns out the heart's doing the same place or our physiological system's doing the same thing. And it's just the heart's the big carrier wave.

So the next step on once we get figured that all out and got on the that, this is going back quite a few years in our research path, but let's just say, "Okay, we know we're radiating this stuff. Do we check it from other people?" And as it turns out, our nervous systems are exquisitely tuned in to biologically-generated fields, not so much other manmade stuff, but the things that it's a very narrow window.

So we're exquisitely tuned into these heart-generated magnetic fields of other people as our animals. So we can quite literally measure an energetic communication going on—I call it an energetic dance—between people when they're in conversation or just hanging out or whatever.

And we've got some great examples of this, especially fun to do it with animals. So we've got fun little examples of dogs and horses. And their HRV, their heart rhythms, quickly respond to the emotional state of humans, for example. So it's really neat to see that going on. And then other experiments have been done that shows dyslexia, this physiological linkage or communication channel that's going on.

So this is a communication that's occurring at the energetic level. And it's completely independent of things like body language and voice tone, which, of course, carry emotions in those things. But even when people are isolated from that…

Let me ask you, Niki. You've probably had the experience. You go to a friend's house or even a place of business. And you walk in and you can just feel that something's amiss before any of those other queues occur. And a common thing is you could cut the tension with a knife. Right?

Niki Gratrix Yes, I find that I can particularly notice it like bad energy at airports. That's one of the worst ones. Yeah.

Dr. Rollin McCraty Yeah. So there's this energetic sensitivity. Now, on the other hand, it could feel really good to be around certain people or in certain homes and things, right?

Niki Gratrix Mmm hmm.

Dr. Rollin McCraty So we're able to actually measure this now, which is really neat.

Niki Gratrix That's profound. It's so profound because the implications are…It's that statement that Tony Robbins says about who you hang out with is who you become. And that has deeper meaning in the context of your research.

Dr. Rollin McCraty Sure. And we've also shown…Well, actually I've never studied. It was independent of us, but based on our later findings, really nice, well-done, well-controlled study, took groups of 40 people. And they had them in groups of 4 around the table. And they were monitoring all their physiological signals and all that. And basically, 3 of the people were trained and used the emWave devices—which is a way of training yourself how to be more coherent—for 2 weeks. So they're not big experts, long-haul experts or anything. And then the fourth person in that group was naïve. They didn't know what the experiment was really about.

So the 3 people were signaled at random times. It was a very well done protocol. I won't go into all the details. But long story short, when those people shifted into a coherent state, it had a measurable impact on the other person who had no idea of what was being studied. So in other words, when we're coherent or incoherent as far as that goes, we're creating a field environment that literally affects those around us.

Niki Gratrix So this is why not only is that really important when we consider the kind of clinician-patient relationship, just so that this is the healing impact that a clinician can have just because of their state with patients, which is really important, but also very important for I found with fatigue patients if they're being at home and perhaps being around people that are—I've been using these words—like energy vampires. And it's possible these people really do exist now because…

Dr. Rollin McCraty Oh, yeah. Oh, yeah.

Niki Gratrix Totally. Right. And this is so important because it can be a factor of why someone's not recovering. And they can do everything else brilliantly. It could be doing diet. It could be working so hard and changing their state. But then they constantly go sometimes, unfortunately, back home. And now they've got this home environment where they've got some very unhealthy relationships going on because someone's constantly in a lower state. And it's really important. Sometimes it can be the factor they need to address to recover.

Dr. Rollin McCraty Absolutely. These energetic field environments, is what they are, can be very important. Now, at the same time, yes, you're right. But there are things that we can do. And it takes some practice to be able to maintain our own coherence even in the presence of other incoherent energetics.

Now, of course, if somebody's in a really toxic environment or relationship, there's only so much you can do there. But there are things we can do to really help protect ourselves and really to maintain our own composure and our own energetic coherence, which can go a long ways.

Niki Gratrix So wonderful. That's also connecting with what we'll be talking a lot more with some other people on the summit, as well, about dealing with it emotionally and psychologically. So here we have the science behind it, as well as actually explaining it from an electromagnetic perspective, which is amazing.

So also, do you want to just share that we have these fields around us and now the amazing and fascinating research that I absolutely love that you're doing in terms of how we're being affected by the electromagnetic rays on the earth and beyond that?

And this is such an ignored area I think because we think we almost exist in a vacuum that's unaffected by where we live. That we're on this spaceship earth and that we have a sun that's shining every day and we don't consider these factors. And yet, they have a profound impact on health. You've got the floor.

Dr. Rollin McCraty Oh, okay. Well, I have to be really brief here because to really dive into that is a whole interview in itself to be honest. But basically, it's called the Global Coherence Initiative—for anybody that's interested—which has a lot of components. One is to help educate people about the earth scale environments and what they can do to maintain their composure.

And that's really what a lot of the HeartMath techniques are all about is to be able to maintain our own self-regulation and our both personal and energetic composure, if you will. So what we're doing in the Global Coherence Initiative, on the science side is we're installing a global network of ultra-sensitive magnetometers around the earth that are designed to measure what I call the resonant frequencies in the earth's magnetic fields.

Now, it's really interesting. I wish we didn't have to do this ourselves. But there are other magnetometers, of course, NOAA and different places out there. But they don't measure the resident frequencies. They measure the strength of the field and the noise or ripple on the field level.

But as it turns out—I'm going to have to make this long story very brief—there are 2 primary magnetic fields of interest. But there's more than this that's generated by the earth. So we know we have the geomagnetic field, which is the thing our compasses tune in to, which is absolutely critical for life on Earth. Without that magnetic field, there would be no life as we know it on Earth. Earth would be pretty Mars-like very quickly. But in that field, it extends many hundreds of thousands of miles out into space.

But think of what are called field lines. And if you remember back to high school or junior high or whenever it was, you got to dump iron filings on a glass plate and put a magnet under it. I think a lot of people had that experience. And you see all the iron filings magically line up. And these little lines are drawn. Those are called flux lines.

And as it turns out, whether they're real or not, they are real, and if you think of the Earth's magnetic field lines as guitar strings, when you pluck a string it vibrates. And that's exactly what's happening with the Earth's field lines. And what's plucking the

Earth's lines are what's called the solar wind. So they're always there. And they're always vibrating.

And as it turns out, one of the primary resonant frequencies of those is exactly the same frequencies—0.1 hertz—of a coherent heart rhythm in a human being. It's exactly the same. So they all overlap. There's many of them. And it depends upon this solar wind pressure and so on. They all overlap the cardiovascular system and the rhythms in our autonomic nervous system, exactly the same frequencies.

Now, we have another magnetic system. And that's the thing called the ionosphere, which surrounds the planet. A big soap bubble, if you will. And the bottom of the ionosphere is like a mirror. It's reflective of low-frequency magnetic waves. So the magnetic waves that get created in this cavity between the Earth and ionosphere, they're called Schumann resonances. And there's 8 of them.

And the first one is 7.8 hertz, which is the same as the alpha rhythm in our brains. As it turns out all 8 of these rhythms overlap brainwaves. So I'm trying to make a long story, short here. Basically, the Earth is singing away 24/7 at the same rhythms as our heart and brains operate at.

Niki Gratrix So that's fascinating. And, yeah, it's too much obviously to go into this. But the implications being things like—does this work?—it would be things like so the electrosmog that we might have that might block those frequencies and even things like earthing technologies is that maybe will link into circadian rhythms. Is that the explanation about why those things are important?

Dr. Rollin McCraty Not so much. Not so much. No, I'm familiar with all those things. They're important. In fact, one of our big supporters, unfortunately he just passed away last year, was Dr. Franz Halberg, he was on, in fact, our board for the Global Coherence Initiative. And a lot of people may not know that name.

But you mentioned circadian rhythms. So Dr. Halberg coined the term circadian rhythm in 1948. So he was a great supporter and one of our collaborators. So these are important things. But it's not exactly quite the parallel as is grounding and so on.

Niki Gratrix Okay. But is there ways that people can enhance like Schumann resonance? Don't you have these post-electromagnetic frequencies?

Dr. Rollin McCraty: Well, maybe. I don't know. I think a more important thing that we're always looking at is basically what I was talking about earlier, Niki, about how the heart's field carries information. And we have this communication going on between us like at the living room level. Really, we're saying or suggesting that the same thing's going on at the global level. That we all couple to the Earth's magnetic field, which creates a global information field.

We're doing a bunch of studies right now that clearly show that these resonance frequencies affect us in actually more profound ways that we ever thought we would see. It seems like every week, one of our collaborators or some of our own data's are, "Wow! We just did not expect this to be so so profound."

But the data's showing that we're profoundly interconnected at a much deeper level with each other and the Earth than what we even expected to see. We expected to find some things, obviously, or we wouldn't do all this. I know we're running out of time here. So what I would like to encourage your listeners to do is to be more, say mindful or heartful of, "What am I feeding the field at each moment?"

That's probably too much to ask, but at least each day try and remember, put up a sticker on your mirror or something. "What am I feeding the field?" How much am I feeding the global field environment is really being kind to my coworkers and others and compassionate and the loving and all the stuff we're talking about that feeds the field a more coherent frequencies.

Because if that's all living systems on the planet—if we're right about this— versus how much am I feeding the field with my impatience and frustrations because I didn't get my to-do lists done fast enough and so on.

Niki Gratrix And if people want to know more about that specifically, you have a website for the Global Coherence Initiative?

Dr. Rollin McCraty Yeah. Well, you can access it through the HeartMath Institute website. It's a little bit easier to remember, so just HeartMath.org is a great website. There are hundreds of research papers there that you can download for free, as well, and lots of books and technical access to the technology that allows people to train at home how to become more coherent.

And just one of the things I'd like to really just remind everybody. Hopefully, I've been talking about it or it's come through today. Is this is really learning how to self-regulate, but from a deeper inner reference point that's more connected with through our heart our deeper self of who we really are, our soul, spirit, and nature.

We didn't get into that. We have a lot of research suggesting that the heart really is connected to that deeper part of our self. And that the great religions and philosophers have been right all along.

Niki Gratrix Well, we've got 5 minutes left. I will just briefly ask you a tiny bit more about that.

Dr. Rollin McCraty Okay.

Niki Gratrix Yeah, if you're okay with that?

Dr. Rollin McCraty Sure.

Niki Gratrix Because I think it can be so important this idea that if somebody, they have a health crisis, for example. And in terms of so that the resilience gets through something like that, the idea that there in truth, there is a deeper spiritual part that may be an expanded consciousness outside the normal human consciousness, that we can, when we get into a coherent state through the heart that we can connect with that. And that this would give us guidance or just the ability to keep going through very difficult times. And you've got a little bit of a research you've done on this, too, that could potentially back that?

Dr. McCraty Quite a bit of research on that actually. The original studies were called the Electrophysiology of Intuition. And if we really only have 5 minutes, I can't go into detail. But these are very vigorous laboratory-based studies. And what we've basically shown is that the heart…Well, I call it intuition. So for me, the flow of information…I'm going to tell you what the research shows, rather than describing the research to save time here.

But it basically suggests that intuition is really the flow of information. And it depends on what word people are comfortable with—their spirit, soul, higher self, higher capacities, larger self, whatever. But that is a real part of our undivided wholeness. And that it exists in another dimension. And that's what we really mean by heart intelligence is accessing that dimension of our deeper selves, which is who we really are. And that that literally communicates with the energetic heart and then the physical heart.

So what the experiment show is that the heart responds first to these intuitive signals and these experimental paradigms. Then the heart literally sends a measurably different signal, neurological signal, to the brain. And you see the brain response. And then the body responds.

Now, the research also shows is that when we're able to get into a more coherent state, which is largely done by being more appreciative, loving, compassionate, that that quiets the noise and couples this to a deeper…We have a deeper connection to that internal signal from our higher self measurably. So we have more access to that intuitive guidance.

And now this is a whole other interview probably by itself to really get into the types of intuition because there's really 3 primary types. And it gets confusing if we don't really spell it all out. So we call this a nonlocal intuition from a scientific term. But this is the type of intuition that you can explain through implicit processes and energetic sensitivities and so on that really does come from that deeper part of our self.

And that's really when I said earlier, this is really about learning to self-regulate from a deeper inner reference point. That's what I'm talking about because for most people it doesn't work to be more in charge of ourselves, if you will. It's really about alignment with the deeper part of who we really are.

And to do that, the fastest way to do it is to learn how to self-regulate the emotions because it's the language of intuition and to be able to bring this into our moment-to-moment guidance, we really do have to quiet the mental chatter, if you will, and the emotional turbulence to be able to hear the deeper voice within.

Niki Gratrix Fantastic. And people can find out much more about you, everything you do, that you've got some amazing interviews and research published on HeartMath.org. And I encourage everybody to go to that website to have a look at Dr. McCraty's work, which is absolutely fantastic.
So thank you so much for your time today. It's been such a great pleasure to have you on the summit. It's one of the best that we've had and very important. And I hope our audience is going to appreciate everything you shared with us today. So I just want to thank you so much!

Dr. Rollin McCraty Well, it's my pleasure! And I feel honored to be able to share some of our work with yourself and your listeners!