

DR. DANIEL J. SIEGEL



A DAVID VAN NUYS INTERVIEW

“We can promote compassion, integration, and kindness.” So says my guest, Dr. Dan Siegel, discussing his latest book *Mindsight* and the organization he has founded, The Mindsight Institute. Daniel J. Siegel, MD, received his medical degree from Harvard University and completed his post-graduate medical education at UCLA with training in pediatrics and child, adolescent, and adult psychiatry. He served as the National Institute of Mental Health Research Fellow at UCLA studying family interactions with an emphasis on how attachment experiences influence emotions, behavior, autobiographical memory and narrative.

Dr. Siegel is currently a clinical professor of psychiatry at the UCLA School of Medicine where he is also on the faculty of the Center for Culture, Brain, and Development and the Co-Director of the Mindful Awareness Research Center at UCLA. An award-winning educator, he is a Distinguished Fellow of the American Psychiatric Association and recipient of several other honorary fellowships. Dr. Siegel is also the Executive Director of the Mindsight Institute, an educational organization that focuses on how the development of mindsight in individuals, families and communities can be enhanced by examining the interface of human relationships and basic biological processes. His psychotherapy practice includes children, adolescents, adults, couples, and families.

Dr. Siegel has published extensively for the professional audience. He is the co-editor of a handbook of psychiatry and the author of numerous articles, chapters, and the internationally acclaimed text, *The Developing Mind: Toward a Neurobiology of Interpersonal Experience*. This book introduces the ideas of interpersonal neurobiology and has been of interest to and utilized by a number of organizations, including the U.S. Department of Justice, The Vatican’s Pontifical Council for the Family, Microsoft and Google, early intervention programs and a range of clinical and research departments worldwide. He has been invited to lecture for the King of Thailand, Pope John Paul II, and His Holiness the Dalai Lama.

Dr. Siegel serves as the Founding Editor for the Norton Professional Series on Interpersonal Neurobiology, which also includes more than 20 textbooks. His book with Mary Hartzell, *Parenting from the Inside Out: How a Deeper Self-Understanding Can Help You Raise Children Who Thrive*, expresses the application of this newly emerging view of the mind, the brain, and human relationships. His professional book, *The Mindful Brain: Reflection and Attunement in the Cultivation of Well-Being*, explores the nature of mindful awareness as a process that harnesses the social circuitry of the brain as it promotes mental, physical, and relational health. His book *Mindsight: The New Science of Personal Transformation* offers the general reader an in-depth exploration of the power of the mind to integrate the brain and promote well-being. His latest professional text, *The Mindful Therapist*, explores the application of these ideas for the clinician’s own development of mindsight and neural integration.

Dr. Dave: *I am really happy to have this opportunity to meet with you and to discuss your work. As I was reading your latest book, Mindsight, I appreciated reading about some of your personal struggles as a young medical student at Harvard. You actually dropped out of medical school for a time because of what you felt was missing in the curriculum at that time. Tell us a bit about what led to that disaffection and what you did during those intervening years before returning to Harvard Med.*

Dr. Siegel: Well, I had been a biochemistry major in college and also very interested in other things, like people, basically. And I had worked on a suicide prevention service and was on a dance team, and things like that. I thought medical school would be a great opportunity to blend the real passion I had about people with my background in science. And the science was very useful, of course, for learning the technical aspects of medicine, but when I was a young student in my first and second year, unfortunately I

encountered [some] professors who had this really unfortunate trait, in which they treated people as if they were bags of chemicals rather than having a center of subjective mental life—a core aspect of the essence of their humanity. Instead they were treated just like they were a bunch of enzymes in need of surgery or medical prescriptions or whatever.

I was very young when I started school and I think my youth, and also my idealism, just made it so I tried my best to do what I thought you were supposed to do, which

is to learn from your teachers. But the more and more I learned from these particular people who didn't see the mind—a word I coined as *mindsight*—they seemed to lack this thing called mindsight; to see the mind. I got very depressed and disillusioned with the whole experience and ultimately came to the Dean of Students after one particularly horrendous interaction with a supervisor during a final physical examination review. It's a long story, but the bottom line was how very painful it was to see the way he treated the patient; not in a very kind or empathic way. So I went to the Dean of Students and I just basically said, "I can't go on anymore. I'm dropping out." While in my mind I was dropping out, she insisted that I just take a leave of absence, which I thought would be a leave forever.

I ended up spending a little under a year actually. I loved dancing in college, so I thought of becoming a dancer and a choreographer. I pursued that for a while and then when I decided that wasn't going to be my calling for all sorts of reasons I travelled across Canada to become a salmon fisherman, and that didn't exactly work out for all sorts of reasons too. I came back and worked in Los Angeles as a sound technician for a film crew who were filming the performing arts at Royce Hall, UCLA. During that time I had surgery, and John Lennon was unfortunately assassinated. I woke up out of the anesthesia and heard this news report that Lennon was killed and I couldn't believe it. In my mind, it was like, "why in the world would a person kill John Lennon?" And it kind of opened my mind to other things that had been cooking during that time off of travel and dance and stuff: what is the mind? What is in the mind of this murderer that would get him to take such an incredibly benign and contributing member of our society and kill him intentionally?

So that really opened up my own awareness of the idea that you could try to figure out what was going on in people's minds and try to help those minds get better. And through a series of different things I ultimately decided to go back to school because it was actually faster for me to become a psychiatrist than to become a psychologist because I was halfway done with medical school. So I went back to Harvard armed with this year off and the conviction

that the mind was real. I could then use mindsight in my own inner world to—this is back in 1981—say, "Look, some people don't see the mind. They are my anti-role models, and if they're my professors, I have to not be like that."

And then I saw with my medical patients, when I saw their minds, when I could really relate to their feelings and ask them what they're thinking, what they remembered, what had meaning for them, the stories that emerged and the feelings that accompanied them seemed to help them get better.

Ironically, I finished medical school, went into pediatrics, went into psychiatry, went into child psychiatry, went into research psychiatry, become a scientist studying narratives and emotion regulation and ultimately I started teaching about that kind of stuff and coming up with new ideas about it. But years later, it was maybe 25 years after the day I decided to drop out of school, in the very room that I decided, a place called the Ether Dome—I was back there giving a lecture, invited to give the opening keynote address to Harvard on the importance of stories and emotion in the development of health.

What a triumph!

It was unbelievable. My son was there. It was just incredible.

To come full circle like that must have been so gratifying?

It was.

Now mindsight is a new term that you introduced into our therapeutic vocabulary. What do you mean by mindsight?

Well, originally the word mindsight back in 1980-81 was just a little private term I made up, describing how you see the mind. And then as I went through my training at medical school, it helped me remain sane, basically. And then when I became a psychiatry trainee I saw that there's something very special about knowing how we as clinicians see the inner, subjective world of another person, the mental life of another person, to see inside. But when we teach them—our

clients, our patients—how to develop the skill of seeing the mind, perceiving the mental world, they can then start to work with that inner life in a very different way. So mind-sight, then, became more than just insight into yourself or empathy for another person. Those are very, very important, but it became also, how do you shape your own internal world, or help another person shape their internal world toward health? So now mind-sight is a term that means how you perceive the inner world and then move that world towards something I call integration, which we can talk about. Integration is basically a process where you link different elements to one another, and in the world I work in we consider integration as health. So mindsight allows you not only to see the inner world of yourself or others, it helps move that world in yourself or others toward wellbeing because it promotes integration.

Mindsight sounds a lot like mindfulness. Is there a difference?

Yes. The two words that people always ask me about—and it's a very important question—one is *mindfulness* and the other is something called *mentalization*. I'll start with the mentalization part.

Mentalization is a term [coined by] Peter Fonagy and Mary Target and Howard and Miriam Steele; these are fabulous researchers in London. In the '90s and in the last decade, the 2000s, they studied the way parents see the inner mental life of a child. And when parents reflect on that inner life for themselves—something called reflective function for their child—they're basically using mentalization; they're seeing things in mental terms.

So mindsight of course embraces those fantastic studies on mentalization and sees that seeing the mind is at the core of something called "secure attachment." It's really good for developing resilience and thriving, really. Mindsight overlaps with that, but it's not the same—I'll explore that in a moment. Mindfulness, the next word,

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is something that's been around for thousands of years. It's been in the East, in the West, also used in contemporary practices, in religion, in contemplative traditions. So in Buddhism, for example, and Hinduism, and the Islamic faith, and Judaism, and Christianity, in Lakota tradition, in all sorts of traditions, there's an effort to encourage members of that culture to focus on the present moment, to not be swept up by judgments and expectations, and to then use this ability to focus your mind, your attention, on the present moment sensory experience so that you're not suffering. So it allows you to distinguish, for example, between self-created suffering and inevitable pain in life. So suffering might be seen as coming from saying, "Oh! I shouldn't have hit my knee! I shouldn't have hit my knee! What a clumsy guy I am. I'm so clumsy! Look how I've done that to myself. Oh, I'm so bad! I'm so bad." All that negative talk would create suffering, when instead I've just bumped my knee.

Mindfulness, just as a little example there, has you pay attention to the present moment, as Jon Kabat-Zinn has beautifully described it: in a purposeful way without being swept up by judgments. Other people describe it as imbued with a feeling of kindness, an attitude of compassion toward the self and others. And that's mindfulness.

Now mindsight, this term I made up before I even knew there was a term called mindfulness, embraces all those fantastic practices of mindfulness, but it's not the same, because mindsight is the way we monitor energy and information flow in our relationships. So like we are sharing right now between you and I, the way we're shar-

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ing with people who might listen to this interview—that's a relationship, the sharing of energy and information flow. Then there's the embodied part. There's the mechanism of energy and information flow that extends from your toes to your nose. It's basically a neural mechanism and you can learn to become sensitive so you perceive or monitor this flow. And then basically whether the flow is happening in your body—the embodied brain, I call it—or in your relationships (the sharing is the relationships and the mechanism is the embodied part), you can then use the focus on energy and information flow to move that flow towards integration. This is something that's not talked about in the mindfulness world, it's not talked about in mentalization. You can look at mindsight this way: if you took a triangle and said there's relationships—one point of the triangle; there's the brain—the second point; and there's an emergent property that we call the mind—the third point on the triangle.. Basically what we are saying is that mindsight is the ability to perceive energy and information flow in your subjective mental life, in the sharing of relationships, in the mechanism of the body, and then move that flow toward integration. And so that's how mindsight is distinct from mindfulness, which it embraces, and mentalization, which it also embraces but it takes it into the realm of health and integration in body and in relationships.

I was interested to read that you called together a conference of peers, and that you experienced some frustration looking for a definition of "mind" because nobody had a good one, and you ended coming up with your own, which you've alluded to here, and I'll quote: "The human mind is a relational and embodied process that regulates the flow of energy and information." One of the things I especially appreciated is your emphasis on the whole body, that the mind is not just in the brain that's in the skull, but that the brain is in some sense

distributed throughout the body.

Exactly. So here's what happened. The thing that I brought together was actually a think tank of forty scientists, and it was at UCLA back in 1992, the beginning of the decade of the brain. Our task was to just ask the question, "What is the connection between the brain and the mind?" These were anthropologists, sociologists, linguistics people, these were people from neuroscience, one neurosurgeon was in the room, psychology, all sorts of groups were there—forty people from over a dozen different disciplines of science. We could all agree on what the word brain meant. No one knows exactly how the brain works, but we knew it was composed of basic cells distributed throughout the whole body, but many of them in a spider web-like set of connections in the skull itself. We were learning lots of new, exciting things back then in the beginning of the decade of the brain because technology had allowed us to look beneath the previously opaque skull and see what the functioning of this stuff was, looking at the skull part of the brain. I use the word brain to mean the embodied nervous system, but brain is a lot easier to say.

So here we were, ready to turn to the mind, and these scientists could not find any common ground on what to say about what that word meant! And this was really, really frustrating, and the group was basically going to implode and disappear. So I took myself for a walk, as the person who invited everyone into the group, and the next time when the group got together I offered a definition, the one you quoted. Basically that one part of the mind—not the whole mind (because of course the mind is consciousness and subjective experience and beauty and love and poetry and everything is a part of mental life like that)—can be defined as the way energy and information flow is regulated. So we say it's a relational and an embodied process that regulates the flow of energy and information. Now

when you say it like that you need to understand that at that moment, saying it to this group, every single one of the 40 scientists said, “Yes, this is a place we can begin our discussion. This fits with everything I do.” Anthropologists would say, “Yes, I study the way energy and information flow is shared in relationships across generations. That’s what culture is! So that’s fine with me.” A neuroscientist said, “Yeah, I put a person in a scanner, I have energy flow (let’s say from a picture) and the moment it has meaning (information) I see what parts of the brain are activated. I’m looking for energy and information flow in the brain itself. And that’s fine with me.” So the group with 100% consensus went on to meet for four and a half years.

Oh, that’s great!

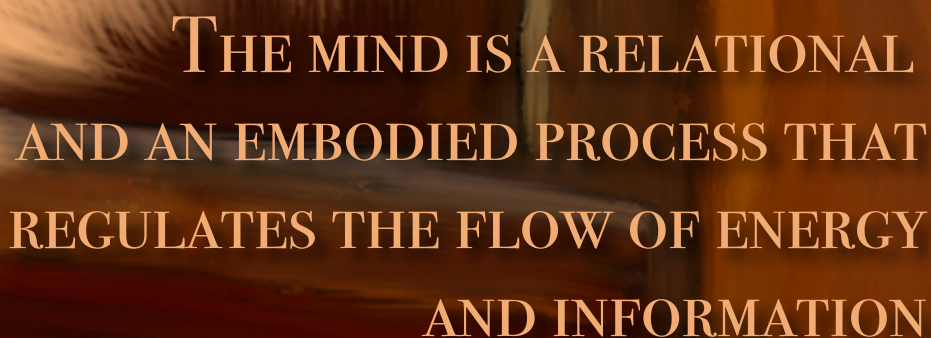
Yeah. Four and a half years, and you know the exciting thing was we could go deeply with that working definition. Now, just so we’re on the same page about this, what this means is that the process says that the mind—this core aspect of the mind—is a verb, it’s not a noun, and from a scientific point of view we use the concept of an emergent property. The emergent property is something you see by elements of a system interacting with each other, give rise to a process called an emergent property, and that’s what I’m suggesting the mind is and the group found that very useful.

I’ve asked psychotherapists from every discipline of psychotherapy you can imagine—social work, nursing, psychology, psychiatry, all of us in mental health, “How many of you have ever had even one lecture, besides the one I gave, that defined the mind?” 2–5% say yes. It’s always the same; way over 95% say, “I’ve never been given even one lecture that defines the mind.”

So what people have told me, and I don’t know if it’s true, but they say, “Look, you’re proposing a revolution in the field of mental health.” And I say, “I don’t think it’s

a revolution, I just think it’s a natural evolution—that we’ve had a field of mental health that didn’t define the mental, and now it’s natural to just define it together. A working definition.” When you say it’s relational and embodied, it honors the power of relationships, and of course that makes people nervous because then they don’t own their mind. Of course anyone in a relationship knows you don’t, it’s dependent on everyone else in the relationship. And then the embodied part means every psychotherapist needs to know about the nervous system, brain science and biology, which of course makes them nervous, but that’s what it means to be a professional. We need to know about relationships and the embodied brain also.

When you say it’s a regulatory process—here’s the exciting thing—it means you have to monitor something, like when you’re watching where you’re driving a car, and modify that thing. And so the thing is energy and information flow, energy being the capacity to do stuff is how a physicist defines it. Information is a swirl of energy that has symbolic meaning, like these words we’re using with each other, and so when you realize that, you have to monitor and modify energy and information flow in your relationships and in your body, and then we put in the thing which we can talk about



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next if you want, Dave, that we’re talking about integration. We don’t just say, “Hey, regulate yourself.” We’re actually saying we can define mental health, or any other kind of health probably but let’s just stick with mental health—mental health is integration, and integration is the linkage of differentiated parts. Amazingly, when you’re not integrated you go to chaos or rigidity.

Now when I first came across this and looked for the science, it blew my mind. I went to a mathematics book because I could find no science that said why chaos and rigidity would be the patterns I was seeing in my patients in psychotherapy. So I found this book on the mathematics of complex systems that said when a system is not linking differentiated parts and maximizing complexity (like a choir singing harmony), when they're not in this harmonious flow, this flexible adaptive, they go to either chaos or rigidity. I opened up the *Diagnostic and Statistical Manual of Mental Disorders* to any page and every single symptom of every syndrome in that book (which has no conceptual framework), was an example of chaos, rigidity, or both, and I thought, "Oh, my God! This is a book designed not to have a framework," but now it can finally have a framework that not just

of where we're at in this field, this mindsight approach.

You spell out functional areas of integration, so can you take us through the highlights of integration?

Well, what happened to me back in the '90s, when all this was emerging in my own explorations, was first of all an importance to stay really close to science. So everything I'm saying has a scientific foundation that comes from many different disciplines in science. You won't see it written anywhere in one place, but the process is to look for the common principles across separate disciplines, and that's something Wilson calls *consilience*.

The first thing to say is that these ideas are built from science and then they're applied in everyday life in parenting and in psychotherapy and in schools, in educational settings, so that there is a practical benefit to these scientific and conceptual ideas.

People would ask me for a practical guide, and I would say, "Look, this approach, which I call interpersonal neural biology, is about health, but it is a form of therapy. It informs therapy, sure, but it's really a way of bringing together all the different disciplines of science and now contemplative practice, religion, art, music, dance—all these different ways of exploring the truth of being human and being alive. They're all welcome into this conversation. When they said "get practical," then I had to really try to formulate what I was doing in my private therapy suite. When I started teaching students the more organized approach to it—these domains you're talking about—I started teaching students and they started applying, for example, in integrating consciousness. So you say, "What's that?" Well that's finding ways to differentiate awareness from that which you are aware of and then linking those. "What other kind of integration?" Well, there's something called bilateral integration: the difference between the left hemisphere and the right. There's a beautiful book called *The Master and his Emissary* by Iain McGilchrist that explores these differences between left and right. What we've been doing is exploring how you integrate. To honor the differences, promote the differences, then cultivate connection. Here's

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says impaired integration leads to any of the psychiatric syndromes; now we know it's being supported by new data coming out by all sorts of people, to show that developmental trauma or schizophrenia or autism or bipolar disorder shows evidence of impaired neural integration, where the parts of the brain that link differentiated parts aren't working well together. You can also show that integration can be promoted through psychotherapy—and it works. People go from chaos or rigidity into more harmonious states of being, which we call wellbeing. So the framework has embedded in it a definition of health, a pathway to understand how integration is health, impairments lead to chaos or rigidity, and a plan for what you can do about it. So that's kind

the thing: integration is not the same as blending. It's not like a smoothie, it's more like a fruit salad; you maintain your individual identities so that the whole is greater than the sum of the parts.

So that's the key of integration. There's bilateral integration, then there's vertical integration that is honoring these deep, deep processes in the body itself: the muscles, the intestines, the heart, the brainstem, the subcortical areas also like the limbic area—and how you bring those up into cortically-mediated forms of awareness. Then there's memory integration where you literally see how different elements of synaptic shadows from past experiences are embedded in forms of memories, called implicit memory, and you can literally pull them together; take the differentiated elements and link them together in something called explicit memory. You can see how trauma is, in large part, an impediment to memory integration.

If you have an integrated memory, then the next form of integration is narrative integration. We are narrative creatures and you need to have a way where you find meaning by connecting the past, present, and future. Now this connection of past, present, and future is really the fundamental core of narrative. Narrative integration allows you to become not just a passive historian of what's happened to you, but actually the active constructor of your own life story. You can be your own novelist.

Then there's state integration, which is the brains' capability of being in different states. Like one state in me wants to be in solitude because I love just getting into the present moment and going inward. Another part of me loves to be social. Well, with one body, how do I take these two states and give them both what they need? So that's just a simple example. State integration is honoring differences, promoting linkages; not becoming the same. I don't say, "Oh, I've gotta choose one or the other!" No. I hold onto the opposites within awareness and I intentionally find harmony by bringing them together.

That sounds very Jungian in a way—holding of the opposites is an essential Jungian concept.

Well, it's so beautiful when I hear that because what we're looking for is consilience. The sages and wise elders, all of whose shoulders we stand upon, if this works then this framework should meet the criteria for Jungian analysis, and psychoanalysis from a Freudian point of view, cognitive behavior work, EMDR work, narrative therapy, work therapy, group therapy; it should fit with contemplative practice. It turns out—it does!

I can't tell you how exciting it is. I'm often asked to give addresses to each of these groups, including the religious groups, and what people find is that it's consilient with their approach. So what I say is that interpersonal neural biology, this mindset approach, is really a place for all of us to come together and collaborate, to try to bring more kindness into the world.

The next kind of integration, *interpersonal integration*, is all about that. How do you honour differences and promote linkages?—which is basically kindness. Integration is kindness.

I have really been sensing this coming together. That some kind of "coming together" has been happening and we can all get under the same tent. It really does build on a lot of threads of thought, and approaches that I have been articulating; ideas like mindfulness, the various functions of the brain, gaining a better understanding of the brain and so on, and the role of memory—all of that. It's beautiful. One of the things I love about your book, too, is that you ground many of these ideas in case histories. Early in the book you relate a case history of Barbara, who suffered from headaches. Perhaps you could take us through that, because it effectively sets up many of the theoretical points that you make.

Sure. Barbara suffered from a car accident, and unfortunately she had terrible damage to the part of her brain just behind the forehead, in the arc of the steering wheel because she unfortunately didn't wear her safety belt. What happened in taking care of her family was the family was falling apart after this brain damage. Her neurosurgeon lent me her scans and I took her scans to the library and I looked up the parts of the brain

that had been damaged and pursued a scientific review of what we knew at that time (it was a long, long time ago) from the science of the brain that could help us understand what areas were damaged and what the science would tell us about what those areas were responsible for. So ultimately a list of nine functions that emerged from this area behind the forehead came out, and I could help the family, the children and her husband, understand why Barbara was not Barbara anymore. Even though she looked similar, because she had plastic surgery, the brain surgery had removed all sorts of things. She got better from a physical point of view, but not from a mental point of view. This area of the brain is one of the most integrative regions; that is, it's part of the cortex that links the cortex to areas below it: the limbic area, the brain stem, the body proper. It even makes maps of the firing of other nervous systems, called empathy, and these are mindsight maps of the self. I call them *me-maps*, or mindsight maps of someone else are called a *you-map*, and even a mindsight map that makes an internal representation of a sense of "we", I call those mindsight *we-maps*. Barbara didn't have any of those maps anymore. The whole family collapsed.

These maps we make in our cortical regions, these pre-frontal areas, are necessary for us to have social and emotional intelligence. They're necessary for other people to feel felt by us. All these ways that Barbara used to be, unfortunately, sadly, she could no longer create because those areas of her brain, the integrative areas, couldn't pull all that stuff together. So the family was able to go through a grieving process when they could understand the truth. That insight, about the importance of knowing about integration in the brain and its role in creating wellbeing in our families, really started me on a journey to honor relationships—I was being trained as a relationship scientist—and to also look at narrative, because we make meaning out of these experiences. And this is what the kids and husband had to do to make meaning out of their loss.

So I wanted to put together some kind of view that tied relationships, narrative, psychotherapy, the brain, and integration, all into one perspective. Barbara... while her situation was so painful, the family

did recover in a very deep and powerful way and could do the necessary healing. The lessons learned were profoundly important for understanding the importance of integration in our relational and mental and neural health.

Thanks for taking us through that. We now know that there is this reciprocal integration between the brain and our thoughts, that the brain shapes our thoughts but our thoughts can also shape our brain. So what do you see as the deeper implications of this neuro-plasticity?

Oh, it's huge, Dave! I mean, here's the power of it. The simplistic model that was running around a while ago was that the brain runs the show. Like they'll say, "The mind is just the activity of the brain, or the side effect of brain activity or whatever." But what we now know is that the brain is constantly changing. Your mind, your mental life, the process that regulates the flow of energy and information in your relationships and your body, including the stuff up in your skull, the way you focus energy and information flow, which is basically how you pay attention, drives your pattern of thinking; you can alter how you feel and it specifically activates the firing of certain circuits of neurons. When you make your neurons fire by the energy of your mind and the focus of that flow, you can actually get the brain to change not only its firing in the moment, but you can rewire it so that it changes its synaptic connections. You can grow new neurons, you can alter the myelin sheath that's laid down connecting neurons in a circuit so that the effect of flow is 3000 times more potent! And now we're learning—not only synapse formation, neuron formation from new neurons from stem cells in the brain, myelin formation—about the cutting edge area of epigenesis. You can actually change the regulation of gene expression, and molecules called epigenetic molecules. The preliminary data is coming in that, for example, if you use mindfulness meditation, which is using the focus of your attention in a very specific way to pay attention to present moment experience and letting go of judgments, when you're taught how to do that you can actually reduce the destruction of the part of the chromosome called telom-



MIRROR NEURONS CONSTANTLY SCAN THE MOVEMENTS OF OTHER BEINGS, LIVING CREATURES, AND TRY TO DETECT PREDICTABLE PATTERNS

eres. When the telomere destruction is reduced, you actually, conceptually, theoretically, are extending your life span—we have these ends of chromosomes, and when you use them all up your body is ready to die—if you can slow down that telomere turnover by increasing something called telomerase through mindfulness meditation.

We now know the focus of your mind—that's all mindfulness meditation is, focusing your mind in particular ways; it's very powerful—can change not only the connections in the brain, but even epigenetic control of gene expression. So we're at this incredibly exciting time to empower ourselves to develop our mind with mental training to promote wellbeing; in body, in relationships, in mental life, in ways we could only dream of before; and now we have the mechanisms that are just being illuminated to support these important steps toward health.

Now another factor, mirror neurons, plays a key role in the interpersonal aspect of your interpersonal neural biology. Take us through the role of mirror neurons in empathy and emotional contagion.

Well, like anything in science you can say “up” and a bunch of people would say, “No,

it's down.” We need to just start by saying that mirror neurons are extremely exciting. I think they are an incredible discovery by some researchers in Italy, Rizzolatti and Gallese and others. They were discovered and proven to be in human beings by Marco Iacoboni and Itzhak Fried here at UCLA, through neurosurgery they were doing. There are a lot of contributors to this field, but you need to know, some scientists don't believe they exist. I happen to believe in them because I've read the research and I really think it's fantastic. Basically what this is, and there's a long history to it but I'll just cut to the chase, are neurons that constantly scan the movements of other beings, living creatures, and try to detect predictable patterns. When these mirror neurons detect a predictable pattern, they have a process called the sensory implication of motor action, and what that means is that, Dave, if I see you moving your hand toward a glass of water and lifting the glass toward your mouth, I'm going to start predicting that you're going to drink water. Now my mirror neurons predicting your actions work with an area called the superior temporal cortex to create a map of your intentional state. So the first step that these mirror neurons do is that they are looking for predictable

sequences. The next thing they do is they make a neural map of another being's intention, which is a mental state. So now I've mapped out your intention, and then I can do two things with that mapping of your intention.

The first thing I do is I drive that information down into my subcortical areas; these are all cortical regions—superior temporal cortex... mirror neurons are in the parietal area and the anterior area, as well as the cortical lobe as well as other areas besides these frontal and parietal regions—and I drive it down into my limbic area, and probably downward to my brain stem, and make my body resonate with you. So I might start feeling thirsty, for example. We call this “internal simulation”.

The second thing I'm doing is getting ready for behavioral imitation; that is, my hand may try to find a glass, or it may even happen automatically, and I find a glass and I start drinking when you're drinking. Just like when someone yawns and you yawn, or someone crosses their legs and you cross your legs. These are behavioral imitations, and there's also internal simulation. So the mirror neurons allow for behavioral imitation, and through the insula they go downwards—the sub-cortical area is rising back up through the insula to the prefrontal areas, especially the right anterior insula...a twig of it goes over to the right anterior cingulate—I just call this whole set of prefrontal areas the *resonance circuits*. So you can resonate with another person. I can resonate with you and I'll feel thirsty. Or if you're in pain, I could feel your pain. Or if you're joyful, I could feel joyful.

This is the modern conceptualization of the neurobiology of empathy and compassion; that we move from internal simulation, then, in these middle pre-frontal areas, that that patient Barbara unfortunately had severely damaged, and not only map out our internal sub-cortical state in something called *interoception*, but then you take interoception in these middle pre-frontal areas and you make a map of what's going on in your own mental life. Like, “Oh, I'm feeling sad,” and then you take it a next step over in an adjacent area of the middle pre-frontal region and you say, “I wonder if Dave is sad?” And so we draw on interoceptive ability—the ability to perceive inward—and we

then imagine what we ourselves are feeling with insight, and then we project really that insight into ourselves onto what we imagine is going on in someone else, which we can call empathy. That's kind of the pathway, and this is how mirror neurons fit into the whole exciting discovery about the nature of our relationships with each other.

Is there any final thought that you'd like to leave us with?

I think if we do this together, then the sky's the limit on what we can achieve. I know the world's in a very painful place for lots and lots of people all around the planet, but people can now, with all this new scientific understanding and this framework for understanding what wellbeing is, be empowered to promote integration and promote compassion and kindness. This is something we can do. We can help affect global change issues, which is an area I work in. We can work with people in communities that are really struggling to bring this kind of resilience from the inside out. And doing this together, I think we can do incredible things. So, I want to welcome everyone into the mindsight community and I look forward to meeting people in person.

Dr. Dan Siegel, thanks for being my guest today.

Dave, thank you. It's really been a pleasure; a great interview. Thank you.

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