The Embodied Interpersonal Neurobiologist

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In the quiet of our therapy offices or classrooms or businesses, how do we nudge society toward a more awake and compassionate state? How do we become subterranean leaders of a revolution of awareness? Gandhi said, "You must be the change you want to see in the world." Because these words have been so often repeated, they may lose their impact, but they apply in a particular way to our determination to embed Interpersonal Neurobiology (IPNB) in all we do. Putting in the consistent effort first to internalize the specifics of the principles (thus creating a solid differentiated body of knowledge), and then to integrate (link or weave together) these principles with our prior knowings can lead to us becoming *embodied* interpersonal neurobiologists. Without such dedication and persistence, there is a significant danger that we are just in possession of floating bits of knowledge that don't impact the way we relate with ourselves and others. Mindfulness research shows that at the beginning of practice, new meditators enter a state of consciousness, but then leave it more or less quickly after practice. With long repetition, neural nets build, and the state of mindfulness becomes the trait of ongoing mindful awareness. That's what we're after – the trait of being interpersonal neurobiologists.

The article that follows is the story of how one agency approached this challenge. Portions of it appeared in the September/October 2008 *Psychotherapy Networker*.

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The young man sat scrunched into the corner of the couch, rapidly telling his therapist about how he had briefly shaken his young daughter who couldn't be consoled as she was crying with a stomachache. His little girl was unhurt, but this father was clearly horrified and mystified by his behavior, burdened by debilitating shame. His eyes darted from place to place, as though searching for bits of lint on the floor. Should he move out? His therapist made a bid for connection with him, her heart warmed by empathy for his suffering, her words soft, but eye contact remained sparse, and his ragged breathing showed he was too anxious to sense her presence. Briefly brushing against his history, she unsurprisingly found it was peppered with angry outbursts - both physical and verbal - from parents who had a marked intolerance for any expression of discomfort: suck it up and go on, delivered in slaps and snarling tones. Then she softly said, "Let me tell you something about your brain and a different way we might understand why you shook your daughter." Perhaps it was the unexpectedness of the brain coming into the room, perhaps it was the hope that there might be an explanation other than that he is a monster - whatever the case, the spell of disconnection broke as his eyes fully met hers for the first time.

She held up her hand, folding the thumb against the palm to show him roughly where his limbic system lives. Noticing that the hand in his lap was paralleling her movements, she felt a little leap of joy that they were now much more fully engaged. She talked with him about how implicit memories are encoded from the earliest days of life. That they include patterns of behavior (like acting out under stress), sensations (like the building frustration in his body), and mental models about the way we expect the world of relationships to work (shut up, suck it up). Then she folded her fingers over the nestled limbic thumb to show him how the middle prefrontal cortex (from the first knuckle down to the tips of the fingernails) is designed to calm the body and the emotions, to slow us down enough to allow us to choose not to shake a crying child, even if we feel an impulse to do that. But if no one cared when we were in pain or fear as a child, she told him, these calming circuits between the limbic system and middle prefrontal were never solidly established, so now, with his precious child, he found himself occasionally at the mercy of these old encoded patterns. Continuing to hold his eyes, mindful of how his own fingers had folded over his thumb, she said, "The best news is that together we can make these circuits solid so your limbic system

won't easily run away with you again." His relaxation was visible, and warm connection flowed easily between them. Of great importance for the effectiveness of therapy, the yoke of shame lifted enough for him to be fully available for the next steps toward the neural integration that would build his much-desired capacity for empathy in stressful times and flexible decisions as a parent.

How do we get to the point that the brain flows easily within the relationship? In 2003, a colleague and I first heard Daniel J. Siegel (whose hand model of the brain we now use every day) speak at the annual UCLA Attachment Conference. As he talked, our necks prickled with the excitement of realizing he was putting scientific legs under what we were intuitively doing in our work, mainly with trauma survivors of all ages. Now, five years into the endeavor of integrating his seminal ideas into therapeutic practice, we realize that before we had only a rough and fuzzy sense of how to move through the underbrush of childhood pain and fear. It wasn't that our empathy-rich methods didn't work, that people didn't recover, but that the roadmap to steady our own steps as therapists and give therapy sturdier underpinnings was still missing.

As Dan talked that day, my mind began seeing clumps of dissociated neural nets that lay like buried bombs in the amygdala, waiting for experience to trip the wire. I could feel the ragged ends of middle prefrontal connections that couldn't quite hold in stressful times. With these fragmented conditions in the right hemisphere, it made sense that no clear story could find its way across the corpus callosum to the left hemisphere where a person could make verbal and stabilizing sense of his or her history. My mind expanded as he talked about how the brain isn't confined within the skull, but instead participates in a constant flow of energy and information from brain to brain, as we become woven together in the constant re-creation of each other's inner world. I literally could feel how my being is spread among all the people with whom I have any emotionally significant contact. Perspective-shifting stuff. A visceral sense of this interconnectedness gives new meaning to the importance of minding our own internal house as therapists, teachers, parents, or public servants.

At that time, I had the privilege of supervising a group of marriage and family therapist interns at Center for Hope and Healing (CHH) in Irvine, California, and was eager to bring these concepts to them. What happened next was instructive. For the next two years, we played with various aspects of what I had learned, but we did it in a piecemeal way - spending a little time with implicit memory, pondering the scientific explanation of how trauma creates dissociated neural nets, playing with the hand model. While we found it had some benefit for ourselves and our clients, I didn't sense we were developing the clarity and solidity that would make it central to our way of working. It gradually occurred to me that we lacked a center, a principle to which we could tie these fascinating bits of information, but I wasn't clear about how to solve the problem.

At about that time, Dan Siegel conducted his first immersion workshop, an experience both terrifying and wonderful. We were to read his book, *The Developing Mind* (1999), closely enough to be able to teach it to Dan, and we were not to know which section we would teach until a very short time before the two-day intensive. I feel certain you can imagine the focus and emotional intensity engendered by us not wanting to look like fools in front of him. Armed with pencil, highlighter, flashcards, and determination, I did the necessary thing - I actually learned the nuts and bolts of Interpersonal Neurobiology - the details of brain structure and flow, the neurobiological correlates of attachment patterns, the means by which we shape each other's minds. On the last day of the training, a group of us suggested to Dan that we needed a way to make these ideas more public, so

we founded this organization, GAINS, as an educational nonprofit. I became the editor of the Quarterly, and, therefore, responsible for the soundness of the neurobiology of the numerous articles. Again, a very focusing activity. Between these two experiences, I finally was creating the well-formed and more comprehensive neural nets, a differentiated body of knowledge, if you will, that could be robust enough to link successfully with the rest of CHH's well-defined paradigm of trauma treatment. Why did this give us greater odds of successfully integrating the ideas?

One of the core principles of IPNB is that our brains, as self-organizing dynamical systems following the laws of complexity theory, develop via a process of differentiated circuits linking together (the definition of integration) to create a more complex system (Siegel, 1999). In this case, complex doesn't mean more complicated, but more stable, more comprehensive. This principle also applies to groups of brains. Our left hemispheres just heard that series of words, which may or may not make sense immediately, depending on our familiarity with the concepts of integration and complexity. Now, let's apply them. We might notice that when two people are well-differentiated, meaning they experience a solid sense of self as a result of a mostly coherent inner world, they have a good chance of linking together in a relationship that is grounded in warmth and secure attachment (a more complex, stable system). Neighborhoods and nations, products of human minds in relationship, operate according to the same principles. With these more concrete examples, the concepts are no longer prisoners of our left hemispheres, and may begin to take on life, a sign that they are gaining more integration with our other neural circuits.

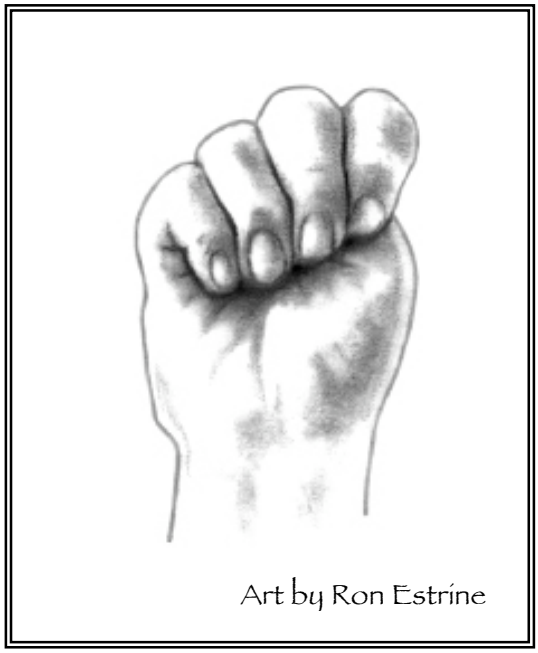
With this thought, the concepts are becoming an integrated lived reality, another stream of information woven into my more usual ways of perceiving, another story I tell myself about what it is to be human.

Bringing it closer to home, right into our bodies, we might begin to notice when we experience more or less integrated states. On a peaceful spring morning with the birds singing, I feel a quiet sense of alertness and ease that I begin to recognize as one signal that my brain is more integrated and my mind more coherent. Then, I hear from my best friend that she has been fired from a job she loves. The unexpected jolt, coupled with the way my mirror neurons pick up her agitation, brings a sense of disruption and disorganization internally. Feeling fear, I recognize that my amygdala is activated and not well regulated by my middle prefrontal circuits - they are not integrated at the moment. With this thought, the concepts are becoming an integrated lived reality, another stream of information woven into my more usual ways of perceiving, another story I tell myself about what it is to be human.

So the initial lesson I learned is that for any of us to truly live this stuff, we first have to make it our own in some kind of comprehensive way that includes repetition and frequent application. A weekend seminar or single reading of a book won't do the trick. Our left hemispheres need to grasp certain principles, while our right hemispheres look for ways to walk with the information. During my period of cramming, I drew pictures, talked incessantly with my family about their brains, and in general made it as much part of daily life as food and sleep. Apart from all the ways it gave my family permission to gently make fun of me, it helped the new information integrate. In short, the constant question, "How does this apply to me and my world?" can be a best friend as we study in this deeper way.

Having understood the need for my supervision group to develop a differentiated body of knowledge, we began to study together in earnest. We first ingested and then digested an adequate awareness of brain structure and flow. These building blocks gave us a solid reference point. Then we considered how our attachment relationships with our parents in the first two years of life combine with genetics to literally create the

brain structure that underlies our way of relating. We began to see the stop sign erected by dismissing parents on the corpus callosum of their avoidantly attaching children's brains. In these circumstances, the parental brain wires the child's developing brain to not listen to the right hemisphere call for attachment, to not be connected to the body, but instead to keep awareness safely - and lifelessly - in the left hemisphere. We could feel the seething jungle in the right hemispheres of preoccupied mothers and their ambivalently attached children. Without sufficient connections to the integrating/regulating circuits of the prefrontal cortex and the making sense functions of the left hemisphere, parent and child are at the mercy of their shared limbic upset. With great sadness, we could sense the knots of dissociated limbic pain that lie at the core of disorganized attachment, as the unresolved terror of the parent flows endlessly to his or her helpless and disrupted child.


Art by Ron Estrine

We became increasingly aware of how our inner response, particularly as experienced in our bodies, could speak to us of the attachment experience of our clients more powerfully than their words. This deepening of our countertransference awareness was giving us greater attunement both with ourselves and with our clients, as well as a tangible expansion of empathy (feeling with) and insight (understanding of), what Dan Siegel calls "mindsight" (2006). Most wonderfully, our former fuzzy sense that empathic relationships heal was being enriched and sharpened by our clear-sighted understanding of how to be with our clients in ways that would promote the precise pattern of integration that had been blocked by potentially ruinous early attachment experiences. This increase in vision had a noticeable impact on the confidence of our newest interns, and the old-timers reported feeling more settled internally. This felt knowledge was bringing all of us greater regulation. For our clients, this meant we were becoming more wise, stable, and secure holders of their inner worlds.

As our confidence and fluency with this new way of experiencing developed in tandem with our efforts at creating user-friendly language for the science, we began sharing this information about the brain and relationships with our clients. When offered at the right empathic moment (timing is crucial if we want these ideas to take root), almost every person - including teens and children - immediately began developing a more hopeful story about their upset and their lives. An eight-year old boy with an ambivalent attachment was struggling with bursts of anger at school. His therapist taught him about his amygdala and prefrontal cortex, and about the pathway from one hemisphere to the other. Very quickly, he learned to talk to his brain in a kind inner voice (perhaps patterned on his therapist's voice) when he felt the upset building in his body. By cultivating what we might call his caring observer (integrating some prefrontal circuits and shifting some energy to the left hemisphere), his limbic impulsivity gained a calming ally. He learned about the portable brain he always carried in his hand (Siegel & Hartzell, 2003), and just opening and closing his fingers around his thumb helped him get the visceral feel of those calming circuits "hugging" his limbic system. Of course, all this progress rested on the foundation of the empathic and compassionate relationship with his therapist, an empathy now deepened into mindsight by his therapist's greater capacity to see and accurately hold the mind of her small client because she was holding her own mind more clearly.

Degan, a fifty-year-old computer programmer who had ploughed through five marriages, had come in six months earlier reporting that all his wives divorced him because he was "cold." He had no

idea what they meant, but needed to find out before marrying a sixth time. In my usual fashion, I encouraged him to take me by the hand into his history - a trip he was ill-equipped to make because there were almost no significant landmarks. His mother was "nice," his father "hardworking," his brother "OK." The poverty of words was underscored by the arid feeling in the room - both hallmarks of avoidant attachment. At this point in my learning, I understood that part of the problem was that Degan was locked out of his right hemisphere, home of the integrated map of his body. Without being in touch with his bodily sensations, he had no idea how he felt about anything. So we tried a number of approaches that might foster connection to himself and to me. We tried to go more deeply into his history, but there were no living memories. I encouraged him to try sandplay - a powerful instigator of right brain processing, but he could only choose objects with his left hemisphere, lifeless things that reminded him of certain events, past and present. We spent time doing exercises to help him sense areas of tension in his body, but he grew bored and restless when he could feel nothing. When we tried doing some mindful awareness practices, designed to help him get in touch with his senses, he became irritated.

I was growing concerned that he would leave therapy before we had made any kind of living connection, so I decided to take the plunge and talk with him about his brain. Using the model in my office, I showed him how our parents initially wire patterns of connection into our brains, joining the limbic system to the cortex and the right hemisphere to the left. We talked about how his emotionally cold parents had unintentionally wired in separation between his hemispheres, leaving him without a neural clue about his feelings. I noticed that the intensity in the room increased as soon as I began to talk. After awhile, he said, "This is great! Before now, I knew more about my car's engine than I do about my own brain - which seems ridiculous!" Better yet, the very act of understanding this together gave us a warm connection for the first time in all the months of trying. I believe that his lively curiosity about his brain, my eagerness to share, and the relatively innocuous subject matter may have forged the first links between hemispheres.

Curious about how he was experiencing our contact, I spontaneously asked him how he was feeling, and he said, "I feel like I could hug you!" So, we spent time meticulously noticing the sensations that underlay that surge, reinforcing the nascent links between hemispheres. Brain talk quickly became the connective tissue for our interactions. Once he understood where his brain wiring was underdeveloped, he became eager to do whatever it took to build better neural connections. For him, it was an engineering project, but underneath that, as happy co-conspirators, we were covertly repairing the broken attachment circuits that kept him separate from everyone. Two for the price of one. Three, if we include the way this kind of response reinforced my growing conviction that brain awareness could be a powerful tool at several levels. Still, I left that session wondering if our success was primarily due to him being a computer programmer inclined toward an interest in science. More to be learned.

A few days later, reflecting on the overall process, I began noticing how calming my new awareness of the brain could be for me. Curiosity about what was happening both in my brain and in the relationship between brains when I was with others yielded the sensation of a *small but caring distance* between my observing mind and my sensations, feelings, and thoughts. This was clearly not a disconnection, but more like one part of my brain being able to hold another part in kindness. When a client angrily challenged me, instead of just reacting internally, I *watched* my autonomic

nervous system getting heated by my natural limbic reaction to the intensity. Internally, I said, "Heated, heated, heated." This capacity to observe and name gave my brain room to recover balance so that it was easier to remain in a calm, compassionate state internally. Research tells us that just naming our emotions accurately causes a balancing shift toward the left hemisphere (Hariri, Bookheimer, & Maziotta, 2000), and I suspect that is what happened for me.

At some point, I realized I was watching me watching my brain. As a long-time meditator, I recognized a subtle but important difference between mindfulness based on awareness of the breath, for example, and mindfulness that included awareness of the brain. Both are important and have a place personally and in therapy. However, many trauma survivors struggle with traditional mindfulness because going toward their inner worlds initially draws them toward the abuse rather than calmness. I began to suspect that something about the concreteness and left-brain fascination of thinking about brain processes could give clients the ability to maintain the same small but caring distance I had experienced, as well as activate and then integrate circuits in both hemispheres.

That same week, one of our interns shared about a long-time client whose many years of childhood trauma left a paper-thin barrier between adult functioning and childhood terror. That day, he noticed that the young woman came into session in a familiar hypervigilant state that signaled trouble for their therapeutic endeavor. They often had to tiptoe around the memories lest she slip so deeply into the pain that the connection between them was lost. Even working with her bodily sensations by themselves and cultivating her known sources of self-soothing had produced modest results. In response to this concern, the therapist said his mind suggested pictures of the fragmentation in his client's brain as a series of neural knots, disconnected from each other and from the modulating circuits in her brain that had a chance of slowing her terror. The image was persistent, so, emboldened by some previous success, he decided to take the risk of describing what he was seeing in his mind. She was instantly more alert. This response to the brain coming into the room was becoming familiar, and appeared to contain some mixture of curiosity and hope. She wanted details, and as he gave them, she said, "I always feel like my father's a monster right in the room with me when I remember. But as you say this, I can see all that's left is a bunch of neurons firing, making my nervous system upset."

The calming effect was obvious because she began to breathe more deeply without any conscious effort, and her hands grew calm in her lap. She decided to approach the memory that was upsetting her. Even though the feelings were intense, she was much better able to stay in connection with her own adult self and with her therapist from start to finish. While therapy with this kind of trauma is long, slow, and often difficult, she has commented that awareness of her brain has been most helpful. She once said, "It's like we're holding my brain in our four hands right here in the space between us." He reported that their eyes met deeply, and hers held a new twinkle. With her and with others, I have noticed that something about having the brain right there generates more laughter and more ease - both certainly signs of increasing mental health. My initial experience of being soothed by observing my own brain - a sign of several circuits in the brain coming together - was proving to be true for therapist and client alike.

About the time I was gaining confidence in my ability to communicate effectively about the brain and observing the consistent power this had for my clients, I tried sharing something about the limbic

system with a young man who struggled with bouts of extreme rage that he often turned against himself. Before the first sentence was out of my mouth, he shouted, "Stop!" startling himself as well as me. He said that it felt almost physically painful, like prolonged contact of ice on skin, when I started talking about the brain. His mention of coldness reminded me that when he did work with sandplay, he always chose objects like foil, ice, and metal tubes to embody the feeling of his psychotic parent. I asked him how the space between us felt. He said, "Mechanical, machine-like, dead, cold. I hate it." So we put the brain away. I had this same experience with two other clients in ensuing months - both of whom had at least one psychotic parent and that same fascination with cold, metallic objects. While the brain was not overtly present, my own awareness of neural processes continued to help me be clearer, and therefore more confident, with these three people who suffered so terribly from the way these very injured parents had wired in the initial disorganized and terrifying attachment.

As therapists, we are always at risk for being pulled into our clients' worlds, particularly when faced with massive disorganization, bottomless despair, or strong dependency needs. We might either drown in their feelings so that we are no longer a calm, steady presence, or respond in ways that replicate earlier painful interactions for them - push them away, get irritated. I was becoming so aware that being settled in clarity about brain processes gave me a vantage point slightly away from the emotional fray. With these three people, for example, I had often felt the visceral pull of their earliest attachment wounds - a combination of terror, disorganization, and giving up. Their helplessness would sometimes become mine, agitating my body and mind. Those were not helpful sessions. Now, just picturing each of them caught in their limbic system's tangle calmed me because I knew where they were. As our brains joined, I knew that my calmness and understanding were the very states that would rewire their brains. It was as though they had one piece of the neural equation, the limbic system, and I had the other - the regulatory circuits. Together, we made a whole brain in that moment, while, at the same time, the underdeveloped circuits in their brains were lighting up with new connections in tandem with mine. A few months later, the young man who had shouted "Stop!" said, "You seem different. I keep having the picture that your backbone is stronger. Is that crazy?" I asked him how that felt for him, especially in his body. He said, "It makes me feel relaxed, like you know something I don't know that's really good for me." I grinned, and silently held his brain in my mind.

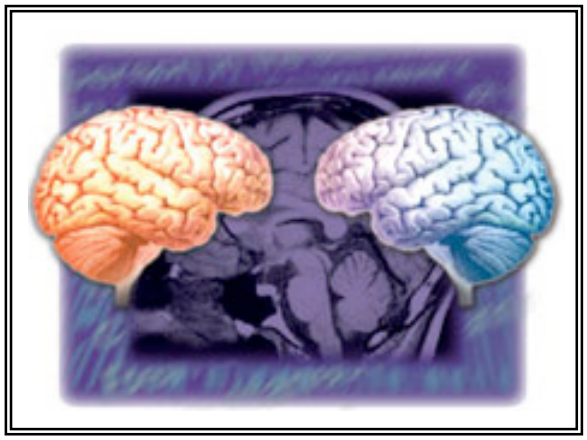
Whether we are dealing with attachment struggles, trauma, brain injury, or the early severe wounds that yield Axis II diagnoses, the ability to picture where integration is blocked and what can foster links between dissociated areas forms a secure foundation for how we are present with our clients.

The underlying principle of each of these stories is a living picture of fostering neural integration. Continuing his post-*Developing Mind* quest to further refine the picture of the neural substrates of mental health and well-being, Dan Siegel describes nine domains of neural integration in his 2006 article in the *Psychiatric Annals*. Whether we are dealing with attachment struggles, trauma, brain injury, or the early severe wounds that yield Axis II diagnoses, the ability to picture where integration is blocked and what can foster links between dissociated areas forms a secure foundation for how we are present with our clients. Again, we don't hold this as left hemisphere-only knowledge. That, in itself, would represent a break in integration in us. Instead, we dwell with the ideas until they become images of flow and broken flow that are experienced viscerally as well as understood conceptually.

For the sake of solidifying the foundation, let's review some of the domains of integration, seeing how each one flows into the next. Let's also keep in mind that the overall goal of fostering neural integration is to increase well-being and resilience, as well as to develop the capacity for

compassionate and fulfilling relationships - perhaps a fair definition of mental health.

Integration of consciousness (Siegel, 2006, 2007) - the capacity to attend mindfully to thoughts, feelings, and bodily sensations - is a good place to begin as this core process supports healing by linking therapist and client to self and to one another, and helps clients find calm ground on which they can stand consistently. If even a small part of our mind can notice what is unfolding in our experience, instead of being engulfed by it, we are encouraging the parts of our prefrontal cortex that can soothe and regulate the limbic system to become more active.



We begin this process with our clients through our own calm, mindful awareness of them, delivered by both nonverbal (most important) and verbal means. Through the lovely contagion of mirror neurons and resonance circuits, clients may soon pick up the flavor and rhythm, gradually embedding the capacity to be mindful of their own experience. A mid-thirties man came to my office carrying his anger like a Boy Scout badge signifying his worthiness to trade stocks in the fiercely competitive economic scene of his daily dealings. I noticed his clenching fists, rapid breathing, and unquiet eyes, and consciously filled the space between us with acknowledgement of his inner agitation, holding it in calmness. Gradually, it was as though his body and breath began noticing me, allowing his fists to relax some, his eyes to stay with mine, and his breath to slow. Between our two brains, we had achieved some initial integration of consciousness. This awareness that minds (and, therefore, brains) don't stay put in a single skull is powerful for therapy. Because of the social nature of our brains, our neurobiology is profoundly interpersonal. We began to talk about the benefits of noticing inner states, of allowing one part of the brain to calm another. We experimented with the effect on him of first noticing and then naming his bodily sensations and feelings. On this foundation of kind observation by both of us, we were then able to move into the broader therapeutic process of dealing with his anger-generating abusive childhood. It goes without saying that in whatever ways we cultivate the integration of our own consciousness and our own capacity for mindful, compassionate presence, we are also building the essential bedrock on which our clients' foundations can develop.

The essence of the next domain, *vertical integration* (Siegel, 2006, 2007), may be best experienced by sensing what happens between a parent and child in the largely right-hemisphere dance of secure attachment. The parents' easy flow of empathy, coupled with repair when empathy fails, wires the bodily and emotional experience of trust into their infants' *limbic system*, simultaneously soothing their *bodies*. At the same time, implicit mental models of the goodness of relationships become deeply embedded. At about twelve months, based on increasing neural maturity, the child's *prefrontal cortex* is ready to begin integrating with the limbic and body, with these next steps patterned by the parents' well-integrated brains. This linkage among body, limbic, and cortical regions is what we mean by vertical integration. In our daily life, when we are with people who are securely attached, we will often feel the ease in relationship that comes from this smooth flow.

This was not the childhood experience of our young stockbroker. The stress of the daily verbal abuse he experienced left knots of dissociated neural nets in his limbic system and a frequently agitated body, while parental disregard for his pain impeded connection between his limbic and prefrontal cortex. The result for his adult life included lots of anger disrupting his relationships. Almost all of our clients have some vertical dis-integration or they probably wouldn't be uncomfortable enough to come see us in the first place. Unfortunately, our culture also supports this

disconnection from body and emotion, and these ways of knowing.

Because lack of empathy and understanding are the central obstacles to forging these regulating neural connections, three experiences can be helpful. First, the compassionate presence of our mindsight, as we feel and understand our clients' vertical disruption by paying attention to our bodily response to them. Second, provision of support and assistance with regulation during their inner journey to touch painful and frightening dissociated neural nets. Third, empathically sensitive talk about what is happening in their brains so they can hold a clear and encouraging picture in their minds. Taken together, these three can clear the debris so the path is open for the natural integrative process to resume. Allan Schore (2007), proponent of the centrality of right hemisphere processes to recovery, stresses that healing these early implicit wounds is based in the moment-to-moment attunement we have with our clients, much of which takes place below the level of conscious awareness. Inescapably, we must attend to our own vertical integration so our brains can ignite this capacity in others.

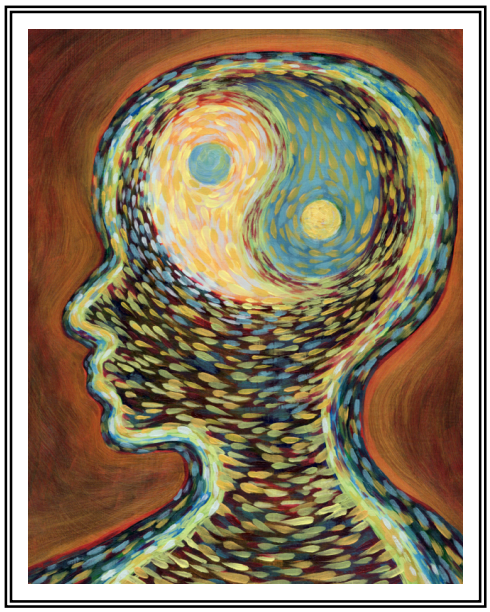
So far, we have mostly been attending to right brain processes, but as we now carry our visceral awareness across the corpus callosum, we are entering the domain of *bilateral* or *horizontal integration* (Siegel, 2006, 2007). Brain researchers, notably Hariri, Bookheimer, & Mazziotta in 2000, found that being able to accurately label emotions in words (an activity that integrates right and left hemispheres) calms limbic upset. *Accurately* - emotionally rather than historically - is the key word. The left hemisphere has a built-in drive to tell stories that make sense of what is happening on the right. If the information coming from the right is blocked (as it often is for avoidantly attached people), or chaotic (as it often is for those with ambivalent or disorganized attachments), the left-hemisphere story may either be without life or chaotic to the point that the story has no coherence. In both cases, the regulatory benefit of the narrative is lost. In fact, sometimes such a story can actually cement in the limbic upset. Our stockbroker told himself his anger was useful because the aggression drove him to make speedy trades. We could call this a *cohesive narrative*, meaning that it captures and reinforces one aspect of a partial narrative. His story kept his anger alive, while ignoring the disastrous effect it was having on all his relationships. One of the most enjoyable parts of therapy, if we are aware of it, is noticing that as dissociated neural nets holding painful memories are integrating on the right, patches of *coherent narrative* are sprouting on the left.

The difference between cohesive and coherent narratives is that the latter is able to embrace some aspect of a person's story with both calmness and emotional connection—an inherently regulating ability. During therapy, our stockbroker dropped the cohesive narrative about the usefulness of his anger, and added two narrative strands quickly: one about his father's verbal abuse, and one about how his brain encoded it. These emotionally accurate stories encouraged him to process the feelings of fear and shame beneath the anger, and led to more detailed stories embracing both his history and his brain. In this way, we may often find ourselves oscillating back and forth between providing support for the unfolding process of *memory integration*, at the visceral level, and *narrative integration* (Siegel 2006, 2007), which culminates in a verbal story. Over time, as the tapestry of memory and story fills in, the vast panorama of personal and intergenerational history unfolds to be understood and held in one compassionate embrace by both client and therapist. That is a rich and lovely day.

All of these steps toward wholeness transpire in the lap of *interpersonal integration* (Siegel, 2006, 2007), this state of often unspoken joining and resonance which forges links between regions that have been neurally discrete. We have found that incorporating the narrative strand about brain, mind, and relationships transforms empathy into mindsight for both therapist and client. This addition of insight seems to deepen and strengthen the interpersonal bond in surprising ways, as though additional fibers are being added to this sometimes narrow cord. Near the end of our time together, the man who was no longer a stockbroker

because it didn't match his temperament, said this: "You know, I turned a corner when you said that I had missing links in my brain that could be repaired. It was like we became partners in a different way because I didn't feel so hopeless anymore."

I can't stress strongly enough that learning and sharing about the brain, the mind, and the power of relationships aren't simply cognitive insights and interventions, at least not at our clinic. All the meta-analyses of what makes therapy effective indicate that empathic connection is the most significant and robust variable. Neurobiologically speaking, that makes sense because our brains are continually shaping one another's neural landscape - for better or worse. Marco Iacoboni's (Carr, Iacoboni, Dubeau, Mazlotta, & Lenzi, 2003; Iacoboni, 2008) discovery of mirror neurons in human beings tells a rich tale of human interconnectedness at a level we never dreamed before. Building on this, Dan Siegel (2007) talks about the complex resonance circuits, rooted in, but not limited to mirror neurons, circuits that embed the being of one person within another. We literally do not live only within our own skulls. So when we share from the perspective of understanding the brain, we aren't handing a bit of knowledge to our clients, but deepening the alliance by standing together to hold their brains and minds, and by our mutual understanding of this fundamental aspect of the human story.



Working with a client who was hated by her mother (the worst injury) and locked in a tiny closet under the stairs for a period of time every day (a source of terror), we found that regular conversation about how her brain was impacted by both traumas helped her interlace her terrible narrative with calm and compassionate understanding. Even in the most difficult work with painful memories, she said, "All the time I was sobbing and you were comforting me, some small part of my brain was aware of what was happening, that these memories were linking up with the present me. *I knew right where I was*." This last statement illuminates the heart of the healing process. Instead of being submerged in the memories as though they were happening right now, recall became a conscious act of healing.

So here we all are - the third generation of brain-aware professionals. First came the neuroscientists, generating gigabytes of data about the architecture and flow of the brain. Next, the great synthesizers, turning all this data into comprehensive theories of brain, mind, and relationships—Dan Siegel, Allan Schore, and others. And now us - in-the-trenches clinicians, educators, makers of public policy, healthcare professionals of every stripe, and interested others, striving to internalize and then richly apply these principles that point the way toward the possibility of becoming more kind, resilient human beings. In this way, we can be leaders of that quiet revolution, gradually remaking the way we human beings see and understand each other and ourselves, assisting in the creation of a more awake and compassionate world.

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Leaders Mind Their Brains

Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology*, review in advance posted online July 23, 2008, retrieved September 30, 2008.

Davidovitz, R., Mikulincer, M., Shaver, P. R., Izsak, R., & Popper, M. (2007). Leaders as attachment figures: Leaders' attachment orientations predict leadership-related mental representations and followers' performance and mental health. *Journal of Personality and Social Psychology, 93(4),* 632 – 650.

de Bono, E. (1985). *Six thinking hats.* Boston: Little, Brown.

Limb, C. J., & Braun, A. R. (2008). Neural substrates of spontaneous musical performance: An fMRI study of jazz improvisation. *PLoS ONE 3(2)*: e1679 doi:10.1371/journal.pone.0001679.

Pearce-McCall, D. (2007). Our organizations, ourselves: Mindsight at work. *GAINS Quarterly: Connections and Reflections, Autumn edition,* 12 – 17.

Popper, M., & Mayseless, O. (2003). Back to basics: Applying a parenting perspective to transformational leadership. *The Leadership Quarterly, 14,* 41 – 65.

Siegel, D. J. (1999). *The developing mind: Toward a neurobiology of interpersonal experience*. New York: Guilford Press.

Siegel, D. J. (2006). An interpersonal neurobiology approach to psychotherapy: Awareness, mirror neurons, and neural plasticity in the development of well-being. *Psychiatric Annals, 36(4)*, 248-256.

Siegel, D. J. (2007). *The mindful brain: Reflection and attunement in the cultivation of well-being.* New York: W. W. Norton.

The Embodied Interpersonal Neurobiologist

Badenoch, B. (September/October 2008). Brain to brain. *Psychotherapy Networker,* 34-37, 56.

Carr, L., Iacoboni, M., Dubeau, M., Mazzlotta, J., & Lenzi, G. (2003). Neural mechanisms of empathy in humans: A relay from neural systems for imitation to limbic areas. *Proceedings of the National Academy of Sciences of the United States of America, 100,* 5497-5502.

Hariri, A. R., Bookheimer, S. Y., & Maziotta, J. C. (2000). Modulating emotional responses; Effects of a neocortical network on the limbic system. *Neuroreport, 11*(1), 43-48.

Iacoboni, M. (2008). *Mirroring people: The new science of how we connect with others.* New York: Farrar, Straus & Giroux.

Schore, A. N. (2007). *The science of the art of psychotherapy*. Paper presented at conference of the same name. Skirball Cultural Center, Los Angeles, CA.

Siegel, D. J. (1999). *The developing mind: How relationship and the brain interact to shape who we are*. New York: Guilford.

Siegel, D. J. (2006). An interpersonal neurobiology approach to psychotherapy: Awareness, mirror neurons, and neural plasticity in the development of well-being. *Psychiatric Annals, 36*(4), 247-258.

Siegel, D. J. (2007). *The mindful brain: Reflection and attunement in the cultivation of well-being.* New York: W. W. Norton.

An Elf in Therapy

BBC World News (August 10, 2005). Retrieved on December 12, 2007 from http://news.bbc.co.uk/1/hi/technology/4137782.stm.

Block, J. (2007). Pathological computer game use. *Psychiatric Times, 24*(3). Retrieved on April 10, 2008 from http://www.ajp.psychiatryonline.org/cgi/content/full/165/3/306.

Badenoch, B. (2008). *Being a brain-wise therapist: A practical guide to interpersonal neurobiology*. New York: W. W. Norton.

Clark, N., & Scott, S. (in press). *Game addiction: Through the eyes of the players*. Jefferson, NC: McFarland Books.

Doidge, N. (2007). *The brain that changes itself: Stories of personal triumph from the frontiers of brain science*. New York: Penguin Books.