

FAMILY LAW AND THE NEUROSCIENCE OF ATTACHMENT, PART II

Daniel Siegel and Jennifer McIntosh

Daniel Siegel is renowned for his ability to translate neuroscience for professions working outside the arena of science. Here, Siegel discusses advances in interpersonal neurobiology, specifically considering applications for family law. Siegel is a clinical professor of psychiatry and co-director of the Mindful Awareness Research Center at UCLA and director of the Mindsight Institute. He is the author of numerous articles, chapters, and books, including the internationally acclaimed professional texts, *The Developing Mind: Toward a Neurobiology of Interpersonal Experience* and *The Mindful Brain: Reflection and Attunement in the Cultivation of Well-Being*.

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ON ATTACHMENT, NEURAL INTEGRATION, AND MEANINGS FOR FAMILY LAW

McIntosh: Professor Siegel, you are highly regarded internationally for your ability to translate neuroscience data into meaningful information across many fields. One of the tasks of this Special Edition of the Family Court Review is to translate the neuroscience of attachment theory for family law professionals working in the arena of divorce and family separation.

Siegel: That is basically what my job has become, to bridge the fields of clinical practice, education, and research by being a translator across multiple disciplines.

McIntosh: Your theory of the developing mind is one in which attachment shapes brain functioning, and the mind's potentials. We have also heard Allan Schore on this topic in this Special Issue (Part I, this issue). Let's unpack your take on these issues.

Siegel: When I wrote *The Developing Mind*, I was trying to make a vocabulary and a set of concepts that were discipline neutral. The proposal in that book is that neural integration is at the heart of health and the heart of secure attachments, and that impaired integration results in psychological rigidity, chaos or both. I call this model interpersonal neurobiology. In that, I conceive of a triangle of human experience that involves mind, brain and relationships. Relationships are the way we share energy and information; the brain is a term for the extended nervous system that is the mechanism of the flow of energy and information in the body; the mind is the mechanism of regulation, which entails two things: monitoring and modifying energy and information flow.

We know from studies of neuroplasticity, that energy and information flow by way of attention: where you are focusing attention stimulates the firing of certain neurons. And when neurons fire, they increase their synaptic connectivity to one another. I suppose one of the cornerstones of my thinking is this: relational experience drives neural firing, and neural firing drives neural wiring.

McIntosh: Where are the interfaces of that work for our understanding of divorce, parental conflict and their sequelae?

Siegel: Sure, what has this got to do with divorce and conflict? When you think about high-conflict divorce, it is all about energy and information flow patterns. Mindsight, which is the ability to see, feel and think about the internal world, is often low. In high-conflict divorce, the circuits that embed mindsight will not be stimulated, and they will not grow. There have not been comprehensive brain studies on children who have grown up with long standing divorce conflict between their parents: we just do not have that data yet. But knowing what we do know about the centrality of the attachment relationship to human brain development, we can think consiliently, linking findings from across

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disciplines, and know the probability of impairment to neural integration from particular patterns of relationship and associated neural firing over time.

McIntosh: So, back to translation for the non-psychologists reading this. Would you explain concepts such as neural firing and neural wiring, and synaptic connectivity, and why understanding this matters?

Siegel: The nervous system is composed of neurons and supportive cells. The neurons are the important elements that connect to one another through a juncture called the synapse. You have a hundred billion neurons in the skull part of the nervous system, and you have an average of 10,000 synaptic linkages to other neurons per average neuron. So that means you have trillions of connections in the brain. It is understandable that a lot of people get very nervous when they think about the nervous system! But think about this whole conglomeration of cells as a system: this system has separate and differentiated parts and those differentiated parts become linked together. The brain has separate areas that specialize in different functions, like left versus right hemisphere, or brain stem versus limbic area versus cortex. When you take these differentiated or specialized areas and link them, that is called integration. What I am proposing is that attachment relationships are secure to the extent that they promote neural integration across the nervous system. That is the bottom line. That matters.

Research shows that a child will have different attachment models to different people. In the child, there is a state of brain firing that is anticipating certain learned patterns of communication, because an energy and information flow has formed through unique interactions with the mother that are distinct from the father (or other parent). The brain is perfectly capable of having different models of attachment, and the research bears that out, that you can have an attachment which is secure with Parent A, and insecure in various ways with Parent B. We've therefore learned that attachment status is not genetically determined. Attachment security is one of the very few aspects of human characteristics that essentially has no genetic influence. This is a very important finding.

McIntosh: What this means is that attachment styles are not simply inherited. Attachment security depends on patterns of interaction with each parent.

Siegel: Exactly. So that is important for people like lawyers and judges to know, that we are talking about experientially based development. From the neuroscience research, we understand more that attachment experiences shape the way neurons are connecting up to each other in the early years of life, from birth on. The down side of that of course is that the first laying down of structures of what is called self-regulation happens in the first 18 to 24 months of life and is heavily influenced by what goes on with attachment at that time.

McIntosh: Alan Sroufe (this issue) talks about the first 12 to 24 months of life being a co-regulated state, where the primary function of the attachment relationship is to co-regulate the infant toward a capacity to self-regulate. What we see is that capacity growing in year 2, year 3, and more established but not "done" at year four by any means.

Siegel: I love what Alan Sroufe says, and I believe in it totally. The thing to be careful about with the word "self" in self-regulation is that we are always co-regulating. We are not hermits. In other words, you want to have a child who is able to have more autonomous self-regulation that does not depend totally on another person, but self-regulation always continues to be influenced by an inter-personal context.

McIntosh: There is a whole ecology of regulation within a family unit, and we know well that parent conflict before, during and after separation, can be a massively dysregulating influence for children, short or long term.

FUNCTIONS OF A WELL-INTEGRATED BRAIN

Siegel: Yes. This is important for understanding what high-conflict divorce does to that ecology, and the neuro-developmental risks that brings. Let me explain that. From our current pool of science, I and many others are confident that secure attachment promotes a more integrated brain. A well-integrated brain yields affect regulation that is well-balanced, emotional and social intelligence that is well-honed, a capacity to see the mind of oneself and others, and a well-developed potential for insight and empathy.

There are at least eight integrative functions that emerge from attachment experience, expressed through an area of the brain just behind the forehead called the pre-frontal cortex. Here are the functions that attachment determines:

1. Balancing your body: the regulation of the heart and being in tune with your own bodily experiences, your own body's regulation.
2. Attuning to others: where you are open and receptive to how they are, and do not just push them away, but can focus on and receive another's internal world.
3. Balancing your emotions: so that emotions have enough vitality so that life is rich and full, but not too much energy and arousal, so the life becomes chaotic or too depleted, so life is rigid and depressed. Optimal harmonious flow, that is, emotional balance.
4. The emotional ability to extinguish fear inside of yourself: this part of the brain is very important for that; kids who are securely attached learn how to do that within themselves.
5. The ability to have response flexibility: to pause before you act, the ability to stop an impulse before it turns into an action.
6. Insight into oneself and the ability to relate the present to the past, and to be the author of your own story into the future.
7. Empathy: the ability to put yourself in another's point of view and say, I wonder what this experience was like for them; empathy is the cognitive frame of being able to imagine being in another person's skin.
8. Morality: the capacity to think of the larger social good and act on that sense even when alone; some recent studies have come out in New York by Miriam and Howard Steele looking at the development of morality and its positive relationship with secure attachment.

McIntosh: To be clear, insecurity in attachment does not mean you do not have those functions, it just means they look different.

Siegel: Right. They are blunted, or some do not work as well. The simplest thing to say is your affect regulation is not so good for number three. In some people, they cannot really see from another person's point of view, that is number seven, the empathy point of view. And of course, with the trauma of disorganized attachment, you get all sorts of things going badly wrong, including dissociation.

HIGH-CONFLICT DIVORCE AND NEURAL DISINTEGRATION

McIntosh: Divorce practitioners may not well understand the implications of attachment disorganization, although it is my guess that disorganized children are over-represented in the family court population. Of more concern, some decisions may inadvertently add to the risk of disorganization.

Siegel: I agree. With disorganized attachments, the child has been confronted with situations of being fearful or terrified of an attachment figure, the person on whom they are dependent. In this situation, the brain has two simultaneously activated circuits that are incompatible. One is the circuit of "I am in a terrified state, I'd better go to my caregiver who will protect me and soothe me." That is fine. The problem is, the other circuit says, "I am in a terrified state, and I need to get away from the source of the terror, which is the caregiver!" As Erik Hesse says, it is fear without a solution. So, it is understandable that over time, this creates a pattern in which that child has no clear attachment strategies to call upon, and as Hesse says, their attachment strategies collapse. This is a collapse in attentional organization and hence, disorganized attachment.

McIntosh: How does interpersonal neurobiology help us understand the consequences for children caught up in complex divorces?

Siegel: High-conflict interactions between parents, and this includes non-verbal conflict, affect two very different but equally important processes. One is the way the brain responds to direct experience. So, in other words, if I had parents yelling at each other in an impending separation, that yelling may

terrify me. The direct experience would be like this in brain terms: I would have activation in the limbic part of my brain, in the amygdala, which generates the state of fear. Below the limbic area, where my amygdala is, rests my brain stem, which has nuclei that are responsible for the fight/flight/freeze response. If I have repeated experiences of fear, let's say my father's screaming at the top of his lungs at my mother and maybe hurting her, that fear state can be coupled with the fight/flight/freeze response. If I am very young, I feel helpless. This will engage my freeze state, which has a certain neural firing profile to it.

If this happens without repair, even once, but especially if it happens repeatedly without repair, my brain will register this experience as a template of sorts (repair meaning my attachment figure comes to me, helps me understand what happened, helps soothe me, and helps bring me out of that terrified state). The experience of fear with no repair will sensitize my fear circuits and my freeze response circuits, and I'll be more prone in the future to interpreting events as terrifying when they are not and going into a fear-freeze mode. That is a direct effect.

An indirect or an adaptation effect is that because my stress and fear state is overwhelming to me, I adapt by avoiding awareness of other people's emotions. I isolate myself, even from my own emotions, and I become what you might call a distant child. So, those two impacts of difficult experiences, direct activation of the brain encoded in memory and the adaptation of the brain to the direct effects can then shape how my personality develops. And you may think that is my temperament, but it is not. It is the impact of suboptimal attachments, by way of the direct effect of those experiences and the adaptations to those experiences.

McIntosh: Some may think that indirect adaptations are beyond the family law system's duty or scope of influence. Why is this a serious thing and how much attention should we give it?

Siegel: This is a very serious thing. Those adaptive (indirect) ways of responding then produce their own microclimate in which this child will continue to grow. The mind, in many ways, is riding along brain firing patterns, and living in a high-conflict divorce can set up self-reinforcing conditions. Let's just say I am a preschooler and my parents have a high-conflict divorce. My terrifying father, let's just say, puts me in freeze mode and I totally disconnect from my feelings in that state, and then I am afraid my mother is going to badmouth my father because she does that all the time, so I am going to shut off from her too, because I do not know how I am going to hear that from her and then have to go back and live with my father 50% of the time. So my brain is in torment without relief. And the best thing I can do is not look inward. The inner world is a Pandora's box for me; if I go there, I cannot even articulate how confusing it is. And so, I just live outside of my own skin. I have to just do, do, do, do, do. So instead of being a human being, I've become a "human doing."

McIntosh: It suggests that children cannot afford for family courts to believe that they neither can nor should influence the child's attachment microclimate, as you put it.

Siegel: Right. We want to promote repair when it is needed, and ultimately better neural integration in the child. What that means is that when all is settled and done with the matter, we have a child who is able to look inward and look outward, and not just have one way of looking. The child is able to feel their body and the child is able to have emotions that are rich and fulfilling rather than confusing and terrifying. When we say integration is impaired, that child is prone to rigidity, shutting down, or chaos, explosions of feelings. This is an unsettled child, one who needs to do, do, do.

RESONANCE CIRCUITS AND THE PROBLEM OF PARENTS' INTENTIONS

McIntosh: You have said in your writing that children soak up not just direct behavior, but the intentions of others. That is interesting when we consider how much covert hostility some of these children are exposed to.

Siegel: We know for sure that our brains are hardwired to connect to one another. I am also of the view that the brain is hardwired to soak in the intentions of others.

McIntosh: That makes sense when you think in evolutionary terms about survival and the importance of being able to determine the intent of another to better predict their actions.

Siegel: Yes, for the survival of the species, it is everything! To put it very simply, there is a set of circuits I call the resonance circuits. These consist of the prefrontal areas as well as a set of “mirror neurons” that help us process social communication. These mirror neurons probably should have been called sponge neurons, because you soak up like a sponge the intention of another person. So, in other words, there are neural circuits that help us map out the mind and intention of another person and ultimately enable us to resonate with the other, so that two people become a “we.” This resonance is essential for healthy attachment. This is how the baby “feels felt” by the caregiver. These resonance circuits also enable us to perceive the intentional state of another and link not only our internal states, but our behaviors as well. The important thing is this: if a parent has the intention to harm another parent, even if they do not actually do anything, kids are going to pick that up. They will literally soak that intention in. To have one parent have a negative intention towards another is toxic. It is that simple. It is toxic. Negative intentions by one parent to another have a negative impact on the developing child.

McIntosh: Is it important to reduce the child's exposure to that kind of climate? Do we prioritize a child maintaining relationships with these two parents if it means more exposure to that dynamic?

Siegel: My clinical statements are probably obvious, but I'll just say them. Anything you can do to reduce the hostility and contempt and the disrespectful attitudes as well as verbal statements and hostile behavior is crucial. Parents should deeply learn that they actually lose themselves by maintaining resentment. As they say, forgiveness is a way of accepting that there is no hope for having a different past. And so parents can learn that victory really comes by letting go. Often parents need help to achieve that that.

McIntosh: Particularly the court population. It is the top 10% of the conflict spectrum.

Siegel: Yes, I have them in my clinical practice too. What I found incredibly helpful in that work is the notion that when children can make sense of what's going on with them, it makes all the difference in the world. By age 5 or 6, they can have an advocate, or a court-appointed advocate who can teach them what it is like to have two parents who hate each other, and have an environment in which these negative intentions of their parents can be articulated and spoken about. Even though you're not changing the parents, at least that ability to make sense of the nonsensical world of parental hostility should be a requirement. Clinically, I use the words “making sense.” Literally, the child has to feel the sensation of the conflict and articulate it, using drawing, play, or the words of storytelling with a neutral person. The child needs to have a place where they make sense of what's going on. Making sense is a profoundly integrative process in the brain and in our relationships. Making sense mends the mind.

McIntosh: There is still mixed understanding of what we ask the child to bear in a high-conflict dynamic, shuttling between two war zones without adequate support.

Siegel: I guess I would think in terms of mindsight. I would have the court have an advocate who sits down with the high-conflict pair. If it were me, I would literally take out a piece of paper, and draw the mind and the brain and the relationship triangle. And I would say to parents who can't leave the conflict behind, “You need to understand that the kind of communication you have, both verbally and non-verbally, is going to shape your child's brain here and here,” and you point to that area of the brain. “If you're in a state of fury and anger at your child's other parent, you're going to be negatively impacting your child's brain development. You are role-modeling a nonintegrated state for your child. Look at this triangle and know that what you are holding on to in your own hostility actually has a negative impact on the brain of your child. It is toxic for the growing brain.” For some reason, that hits people hard. It is physical. You can prove it. You can see it. I do not know why brain talk does this, but discussions about the brain make people get more serious about getting better, and preventing unnecessary damage. And often this motivates the beginning of change.

McIntosh: Perhaps brain science also helps the family law field stay focused on making protective developmental decisions.

Siegel: That's right!

FACILITATING ATTACHMENT: WHAT DOES IT TAKE?

McIntosh: What kind of parenting environment would be pathogenic for a child to be trying to move a lot between the parents? What's the right environment for that?

Siegel: It is a great question. From just the theoretical base, I am not sure I can come up with a blanket statement. In individual cases, people are portrayed in such unbelievably inaccurate ways by the other, so I would be hesitant to make some kind of blanket statement. I have seen one parent describe another as being a monster, but once I get to know the "monster," that parent is not a monster at all. How would you know? Every case has to be considered individually.

McIntosh: I am guessing you would not advocate for a presumption of a certain kind of parenting arrangement for most children after their parents separate?

Siegel: No. That really does not make a lot of developmental sense. There are real differences in parents' and in children's ability to adapt.

McIntosh: What about infants and pre-verbal children and the context for developing attachment in a divorce situation?

Siegel: With a child living in a large orphanage with impersonal care, there is some reason to believe that after four years of no attachment at all, as may occur, a window may have been largely shut for the capacity for intimate relationships later in life. But in divorce, you're talking about a child who has had an attachment with at least somebody. Could they develop an attachment with another person? Absolutely yes!

McIntosh: Does the infant need to have frequent or equal contact with both parents for two attachments to flourish?

Siegel: In intact families, you do not see that. The young child spends most of the time with one caregiver, usually with the mother. So, why would the divorce situation require something different? Attachment requires an attunement where the child feels felt by the caregiver, even if it is once a week. That is more important than just disorienting a very young child by frequent shifts in their location.

McIntosh: To get around the disruption of frequent shifts, some judges have ordered that an infant under the age of three live up to one month with one parent, and one month with another. What might be the developmental sequelae of that kind of arrangement?

Siegel: Massive! Massive separation distress! If the child is attached to the person they are going to, they have still lost the parent they are coming from, so either way, it is just a huge loss! If I were in that situation, as painful as it may be, I would ask that the child stay with the mother or one of us until the child was older and could handle that, maybe 3 years old, and definitely not in the first 24 months of life. It just seems profoundly wrong to induce the level of stress involved in perpetual loss. The child's adaptation to that loss would have to be to shut themselves off from their own feelings, which Allan Schore talks about so beautifully, about the etiology of psychopathology.

If you think about a day as a unit of life, the experience of going through the rhythm of a day is important to the young child, and wrapping up the day in the embrace of your primary attachment figure, that has an important kind of rhythm to it. Closing your eyes and letting the day go is a huge transition, made easier if you've got trust that everything's going to be ok. But it is not because you've been ripped away from your primary caregiver! So it is not ok! What do you do with that? You're terrified!

PRIMARY CARERS AND THE PROBLEM OF GENDER

McIntosh: From the perspective of interpersonal neurobiology, is the concept of a primary caregiver central when we are talking about infants?

Siegel: Absolutely. Two hundred million years ago, when we became mammals and attachment began, the limbic system started evolving its capacity for the young to be connected and co-regulated by the caregiver. This does not exist in fish, it is not in reptiles, it is not in amphibians; it is in us,

mammals. At least for 200 million years, we've had the need for a primary caregiver to co-regulate us, to protect us and make us feel balanced and regulated as young infants. The state of being separated, for a baby, is equivalent to the feeling of impending death. So it is not just "oh, I feel better with my primary caregiver," it is that "I feel like I am not going to die without that person." It is that serious.

McIntosh: Questions that arise often in the family law arena include these: Can you have two primary caregivers? Is there any evidence about the brains of mothers and fathers working any differently over the care-giving tasks?

Siegel: Others may say no, you do not have two primary attachment figures, but I think you can over time, within the same home. But those parents do different things. In divorce, having two primary attachment figures is probably different. I am not the person to ask about the gender question, because I have a peculiar aversion to gender-specific generalizations. I know there is neurobiological research that demonstrates differences. I just cannot get myself to take those findings seriously because of my own experience as a father, because of my own experience of my parents, because of my experience as a therapist. Both men and women have deep potentials for caring for infants.

McIntosh: The gender issue is something I would like to dismiss too, but it is endemic to family law and it perpetually rears its head in court decisions and influences policy directions.

Siegel: My understanding of attachment categories is that they are totally gender neutral. I know people say women are more integrated because their corpus callosum is thicker. So what? That does not mean you cannot have a loving relationship as a male with an infant. Now, we do have these things called gender roles, where the male feels like he has to go out and earn money, and the female thinks that she has to be at home. But I think that is a sociologically reinforced, perhaps genetically induced tendency, but it does not have to be fixed at all. I've seen plenty of fathers be unbelievable primary caregivers, and the woman is out and about working. And the children do extremely well. Attachment categories are gender-neutral.

McIntosh: If we could hose down the gender debate about attachment, then we might actually get down to talking about the function of a primary caregiver: whether you are the mother or the father, what is it that a primary attachment figure does to support optimal development? I see that as the discussion that is most needed. Allan Schore talks about the importance of psychological gender and the ability to fulfill the functions of the primary caregiver role: being nurturing, responsive, and a secure base for comfort.

Siegel: Absolutely! I mean, if you outline the basics of a primary caregiver, you see how gender neutral it is. The primary caregiver is someone who is tuned in to the internal experience of the child, not just the child's behavior. That is the simplest way to say it. Males can do it, and females can do it. And some females cannot do it, and some males cannot do it. It is really a matter of seeing the internal world, not just managing behavior. And this reflective function can be taught: most can learn to have mindsight enabling us to perceive our own and others' internal worlds.

RESILIENCE THROUGH ATTACHMENT

McIntosh: People talk about a critical period of attachment development being zero to three, and thereafter, there seems to be an assumption that children can manage just about anything. What influences the older child's ability to tolerate stress, to manage parent conflict, and to manage the practicalities of living in a divorced family?

Siegel: I agree with Alan Sroufe's take on that question: resilience is based on having at least one relationship, even if it is infrequent, where you feel fully seen, and authentically known by another person. When a child does not have that, it makes them vulnerable, and it makes their stress response not as well developed. With that, you see impairments in synaptic connectivity. Children exposed to abuse in their early years of life have epigenetic changes to the part of the brain that regulates the stress response, the HPA axis, which controls cortisol secretion. Epigenetic changes are when you have alterations in the molecular regulation of gene expression in the nuclei of neurons in specific regions of the brain. Abuse and neglect have a negative effect on the brain by impairing growth of the brain,

so brains are smaller, and the integrative fibers of the brain are reduced. We think this is caused by high levels of cortisol, the stress hormone, that ultimately can negatively impact the brain.

The reason I am bringing that up is that if you have a child in a high-conflict situation who hasn't established an effective stress response, you're going to have a child who will be highly vulnerable to an ongoing load of stress, especially when adolescence hits. In contrast, if you have a child with wonderful upbringing, then by 24 to 36 months, that child's systems are set on a good path, and he or she will be able to deal with later life perturbations in a healthier way because they have an internal regulatory system set up that can keep them in equilibrium. With that attachment and interpersonal foundation well laid in the first 3 years of life, difficult experiences they might encounter in the future will be much easier for them to deal with.

McIntosh: If you have not had optimal experiences, and your brain is suboptimally prepared to deal with stresses, then you aren't as ready or able to deal with further stress?

Siegel: Exactly, so there is no such thing as "at three, you're ready for anything." You're not emotionally inoculated. Some kids do not have brain systems that are prepared to deal with more life stresses. In fact, just the opposite; both epigenetically and synaptically, they are compromised. So, especially with high conflict divorce in the preschool years, where of course divorce does not pop out of nowhere, you would definitely not see 3 years of age as some cutoff that arbitrarily says "now the kid is free-sailing, whatever storms he may encounter." On the contrary, you need to realize that things are likely to be especially difficult for that child.

McIntosh: Professor Siegel, thank you for your insights and for such a clear translation of some very complex research.

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