Journal of Systemic Therapies, Vol. 34, No. 2, 2015, pp. 59–74

# NEUROBIOLOGY FOR YOUR NARRATIVE: HOW BRAIN SCIENCE CAN INFLUENCE NARRATIVE WORK

JEFFREY ZIMMERMAN
Bay Area Family Therapy Training Associates (BAFTTA)
MARIE-NATHALIE BEAUDOIN
Skills for Kids, Parents, & Schools (SKIPS)

*This article reviews some ideas from brain sciences that are potentially helpful to the process of Narrative Therapy. These include the primacy of affect, memory systems, and aspects of our resonance system. The integration with Narrative ideas and practices is illustrated by work done with a 27-year-old woman struggling with a difficult dating experience.*

Recent advances in brain science have opened the door to greater understandings about the relationship between our genetically programmed neural networks and our subsequent lived experience (Siegel, 1999). More specifically, what has become clear is the extent to which these neural networks shape our experience and the extent to which experience can influence the way these networks evolve. Inevitably, knowing this has led to the question of how this knowledge might guide helping professionals to create a more effective and efficient process. The purpose of this article is to describe our understandings of specific ideas from brain science to give you a glimpse of why we are excited by them, and to begin an exploration of their potential impact on Narrative work.

In this article we will review some of these ideas from affective neuroscience and the rapidly growing field of Interpersonal Neurobiology (IPNB). It is meant to build on what we set forth previously (Beaudoin & Zimmerman, 2011) and represents a continued work in process in integrating two seemingly diverse bodies of inquiry. Throughout, we will share pieces of work with a client to illustrate some possible ways these ideas can influence the nuances of Narrative practice. The particular illustrations were chosen to highlight the contribution of IPNB to our thinking and practice and do not necessarily reflect our overall work. Being a first-generation Narrative Therapist (JZ), and both of us teaching

Address correspondence to Jeff Zimmerman at baftta@aol.com or Marie-Nathalie Beaudoin at mnbeaudoin@gmail.com

Narrative therapy for many years, the process we are engaged in with our clients is fundamentally a Narrative one.

## WHAT IS A NARRATIVE PROCESS?

Therapists who use a Narrative Therapy approach (Freedman & Combs, 1996; White, 2007; White & Epston, 1990; Zimmerman & Dickerson, 1996) have long been focused on clients' lived experience, and the meaning individuals give to this experience. When we first started doing this work in the mid-1980s, this was a sharp departure from work based on structural models of individuals or families, which pathologized and problemitized individuals. Instead, we understood the meaning/story as the problem and not the person. We were interested in talking about these problem-stories in a manner that externalized them, in an effort to counter the common practice of internalizing them in persons, and to create room for the person to notice other possibilities. Once room was created, a person could notice/locate lived experience that didn't fit with problem-influenced conclusions, establishing a basis for new meaning that could be built upon. These alternative experiences, labeled "unique outcomes" by Michael White, were usually unattended to and unexpected given the problem story, yet represented possibly important moments of anti-problem efforts, labeled "unique outcomes" by Michael White. Entering into these unique outcomes allowed the client to experience being more of the person he or she preferred (as opposed to the experience of being under the influence of the problem).

But a Narrative process involved more than externalized problems and unique outcomes; we actively appreciated the skills and knowledges the clients brought with them and saw the therapeutic process as a collaborative one. We liked the effects of standing with clients, helping them push aside the problems that got in the way of them reaching an end that they desired.

While we understood the importance of working with a client's lived experience, we wrote about this in a way that emphasized the cognitive component of meaning making, instead of the affective aspect of experience. What we now also understand is that what we were externalizing was the influence of particular brain states (see Beaudoin & Zimmerman, 2011) and that meaning making (i.e., stories) has strong bodily-based influences. The person may not be the problem, but the problem is influenced from within his or her body. Hopefully this article will help further clarify these understandings.

## EMOTIONAL EXPERIENCE

In 2005, I (JZ), based on my readings in IPNB, began pointing to the importance of making sure that positive and negative affect was directly present in Narrative

work (affect's valence is referred to in this way in this literature; affect intensity is another important variable). More precisely, bringing the influence of subcortical emotional systems directly into people's experience of problems would not only be consistent with brain structure and function (Panksepp, 2009), but would also open up additional possibilities. While affect is considered to be the external expression of these emotional systems, and feelings the subjective experience of the person, in the IPNB literature, issues related to these experiences are referred to as "affect management" (Montgomery, 2013). Emotional experiences are first processed in the amygdala, the most primitive part of the limbic system. Stories are the result of using higher cortical processes to make meaning of limbic firing. To access these emotional systems requires using the part of one's brain that involves experiencing; simply narrating without "experiencing" likely results in a less effective process (Panksepp, 2009). In other words, engaging clients in narrative conversations and attempting to restory their experiences without ensuring the presence of associated emotions is less likely to result in therapeutic progress.

We would like to reemphasize the critical importance of not only having emotions present in clinical conversations, but also examining their manifestations in the client's body for maximally effective clinical work (Beaudoin & Zimmerman, 2011). Angus and Greenberg (2011) suggest the same in their work that combines Emotion-Focused Therapy with Narrative practices of reflection and storying of experience. Put simply, based on what brain science has demonstrated about the strong influence of these emotional systems, we believe that emotions have to be internalized (i.e., felt) before they can be most effectively externalized. As we have also previously noted, neurobiologists have a saying "to name it is to tame it," with the caveat that the accuracy of naming the experience (i.e., feeling the emotions that are there) is related to the naming's effectiveness to tame (Siegel, 2010a). Naming means bringing forth a relevant (affective-based) experience and putting a cognitive label on it to help contain/quiet limbic firing.

Dan Siegel (2007, 2010a, 2010b) believes that each person's ability to handle these emotions falls within a certain window of tolerance, beyond which an individual's ability to handle the situation can become difficult. This means that when clients are confronted by affect at an intensity level, whether positive or negative, beyond their unique comfort zone, they are at risk of (in our words) "being captured by problems." A window would represent, in Narrative Therapy terms, the range of experience over which a person can hold onto his or her preferred story without the problem taking over.

Siegel suggests that these problems may bring either an experience of chaos and create disorganization, or an experience that creates rigidity and places limits on response flexibility. These "problems" modulate the amount of affect experienced, transforming an intolerable amount of amygdala firing into a tolerable experience for the person. For example, the problem "acting out" might be a way to manage a chaotic experience, while "avoidance" might rigidly dampen an intolerable amount of affect.

When working with clinical material, therapists may wish to keep in mind three aspects of their clients' windows of tolerance: (1) the area outside a person's window of tolerance in which certain experiences invite the problem (creating either chaos or rigidity), (2) the borders that represent the fragile boundary between affect that is able to be handled and reactive, problem-influenced responding, and (3) the center of the window, which is associated with comfortable problem management. Not much has been written on the clinical use of windows of tolerance (see Montgomery, 2013, for a discussion of window of tolerance and management of affect from a defense mechanism perspective). As Narrative therapists, we have been thinking of the process of pursuing unique outcomes as navigating conversations around the borders of windows of tolerance. In our work, we do so by exploring *moments* when clients experienced affect at an intensity level at which they were at risk of falling outside of their zone of "non-problem-influenced" functioning, yet somehow managed to stay in control (referred to by us as "unique outcome moments"). This is an understanding, with a new emphasis, of the old Narrative Therapy practice of noticing unique outcomes.

Extracting the *experiential* description of these moments of control has helped our clients become more keenly aware of their own competent self (bringing positive affect with it) and the various skills they use to hold onto their preferred selves in dire situations (Beaudoin, 2010). In this process (if the experience is truly embodied), clients also have an experience of tolerating the affect, albeit with the help of the therapist. We have found that the repetition of these embodied experiences at the border of the windows of tolerance, and the articulating and strengthening of skills, progressively increases clients' comfort in that zone, which results in the expansion of their windows of tolerance. Experiencing the affect in a manageable way (again, with therapist support) creates a process that thickens the specific neural networks for emotional regulation that are currently being underused (letting more affect in for those using dampening strategies, and increasing comfort with lower levels of affect for those using affect increasing strategies). A person is able to be the self he or she prefers to be more often.

In addition, specifically contrasting what happened moment by moment during these instances of problem management with what would have happened if the problem experience had taken over strengthens clients' abilities to handle moments of intolerable affect, and therefore their ability to either avert or willfully shift away from a problem experience. Furthermore, going back and forth between "unique problem moments" and "unique outcome moments" allows the weaker neural firing of outcome moments to pair and "borrow" strength from the stronger firing problem moments (see LeDoux, 2002, for a general discussion of such pairing). Conversations focused on these unique outcome moments also provide an effective way of gathering information about the problem, since the problem is discussed from the safe position of having successfully managed it. This strategy is often useful for those who cannot tolerate straightforward sharing of the problem experience (White, 2005).

From this perspective, it is easy to see one reason why "rational" conversations may appear interesting and insightful when clients are in the office, but when con-

fronted with a situation in their lives that invites affect at an intensity level greater than they are comfortable with, the problematic experiences reassert themselves. Therapeutic material that seemed so logical in the office, especially when the client is supported by the therapist, may exert little influence over an intensity of affect he or she is simply not used to experiencing directly. For logical therapeutic insights to be effective, they need to be paired with affective material. LeDoux (2002, p. 292) offers a diagram that illustrates the differences between kinds of conversations (i.e., the "just talking" kind versus the kind that links cognitions with emotion) and their different linkages in the brain to the amygdala.

Similarly, since all experiences have an impact on the brain, especially when loaded with affect (LeDoux, 2002), therapists must realize that conversations that focus strictly on problems run the risk of simply strengthening less desirable neural networks. This has been discussed by previous authors as possible re-traumatizing or thickening of problem-saturated descriptions (White, 2005). To help prevent problem thickening, therapists must be sure that their responses to these problem moments invite an embodied experience for the client of not only the problem, but also what is referred to as "corrective" attunement in the IPNB literature (Siegel, 2007, 2010b). From a Narrative Therapy perspective, this is similar to the therapist providing an experience of a client's preferred version being seen in ways that the client may not have experienced very frequently. One difference is that in Narrative work the client's affective state is not explicitly addressed. Nevertheless, being seen and accepted provides relational support for non-problem-saturated identities. The hope here is that embodied and attuned conversations will have the effect of increasing the client's ability to effectively manage his or her own affect in ways that don't involve cooperation with a problem.

## CLINICAL INTERLUDE I

We'd like to illustrate these ideas with the story of Annalisa[1] (27), who consulted Marie-Nathalie after a painful dating experience. The transcript will be discussed by the authors, with the inner dialogue of the therapist reflected and the concepts presented in this article expanded upon.

> A: (crying the whole time) I dated this guy and he was a piece of work. I let myself down so much; I cringe at the thought of what he said to me. I have no spine. He nit-picked at me and manipulated me so much. I feel soo embarrassed and shameful. He was an asshole, and the memories of what he did to me take my breath away. . . . I just got too vulnerable, now I'm different. I used to have a strong backbone. Now those memories will always affect my self-esteem forever. I gave him so many chances but he went too far. I left him 3 months ago but I still think of him every day and what he did, I'm so embarrassed and ashamed, it's like he is still there in my mind, and I can't believe I let him do these things to me, I'll never be the same again. . . .

[1]Not her real name.

JZ: This seems like a good example of affect gone wild . . . it had taken your client over . . . she couldn't quite manage it. . . .

MN: Yes, all the negative affect in her body was influencing the meaning she was ascribing to her identity and pushing her affect intensity beyond her window of tolerance. She was not leaving any space for me to speak, not even to just acknowledge my understanding. At the time, I wondered for a brief moment if simply being attuned to her experience a little longer would be the best way to help her (lending her my right brain) or if stepping in as soon as possible and getting a hold of the problem by externalizing would be more productive. Since she seemed to be repeating herself content-wise and started using demeaning language towards herself, I decided to interrupt.

JZ: Just to clarify for our readers, "lending her my right brain" refers to the way brain science has demonstrated that we are hard wired to connect through non-verbal, affective, right brain processes. Attunement is understood to be therapists' right brain helping to "regulate" clients' firing limbic system and corresponding right brain activation. This connection offers the possibility of helping a person to hold onto themselves without problems taking over. . . . Let's hear where you went next with this client.

MN: So, Annalisa, let me make sure I'm getting this right and getting the whole picture in my mind. You were with this guy and felt he didn't treat you well, you gave him many chances, and at some point 3 months ago, you decided to end the relationship. The shame and embarrassment is keeping memories in your mind and making you cringe, even though you actually left him. The shame and embarrassment make you feel like you didn't use the strong backbone you had before. Did I get this right? (nods) Can I ask you how else the shame and embarrassment is affecting you?
A: I have a monster low self-esteem now. . . . I was in so much denial and now I can't stop letting myself down and I can't let this go. . . . I'm naturally a Pollyanna. . . . I was trying to figure myself out and thought it would be nice to have someone in my life after all this time single. I'm so pissed at myself.
MN: So the shame and embarrassment is making it difficult to let this go, giving you a low self-esteem, leaving you pissed at yourself, and making it difficult to stop letting yourself down. Is the shame and embarrassment there every day?
A: Yes, I wake up with the shame and embarrassment and it follows me everywhere, all day, I can never get a break from it. If I even so slightly enjoy someone's company, the shame and embarrassment quickly reminds me what I've done and makes me feel like I'm not worth hanging out with anyone.
MN: Would you agree that the shame and embarrassment have almost become like a habit of the mind or like a computer program in your brain?
A: Yes! It does feel like that!

MN: Annalisa is now using the externalized language and is becoming less tearful. I continue examining the effects of shame and embarrassment in her daily life and use the metaphor of it being like a mental habit, such as a program or highway in her brain (Beaudoin, 2010). This seems to provide relief, as it does

with many clients, and heightens her hopefulness and a sense that it can be different. The externalization succeeds in helping her develop an observer's view, as it is affectively connected, and appears to be taming the firing of negative emotions from her limbic system, which is now falling within her window of tolerance. I attempted to get more information on the ending of the relationship, which I imagined would provide an entry point into efforts, intentions, and skills.

MN: So there is this program of shame and embarrassment in your brain that constantly reminds you of certain memories you dislike, and makes you feel bad about yourself. At the same time, you mentioned that you actually ended the relationship. Can you tell me what helped you end the relationship and how that took place?
A: I decided to stop this because I was stressing way too much and he went too far. He wanted things in the bedroom that I don't even want to talk about but that I just couldn't do. I can see now that these were all games he was playing on me. I have sensations of mortification still. It takes me breath away. I can't let it go. My head reminds me of everything, and what I said that was not me. I wish I could redo . . . the person I was before and now is different. I allowed that chaos and I can't believe I let that happen. I can't seem to forget I screwed up. I know I did this to myself. I should have listened to my gut, my gut was loud and clear. I should. . . .
MN: (interrupting) So you left him because "he went too far" and you decided to put a stop on the stress this was causing you. When you say that you should have listened to your gut, can you give me an example of what you mean and share a moment when your gut was telling you something about this relationship?

JZ: I noticed in reading the transcript that affect began flooding her again, and pulled her out of her window of tolerance. Affect regulation is a process that occurs in the relationship between client and therapist. . . . It involves acceptance, understanding, and, for Narrative therapists, externalization. Eventually, through double listening, it involves going to moments that reflect the client's skills and knowledges . . . , which you just did. It's interesting to think about how different the process would be if, instead of being overrun with affect, she was "reporting" this information, with very little affect. In that case, you would have to go to problem moments early in the process, to create a context for that affect to emerge.
MN: Yes, I agree.

Since a better understanding of the neurobiology of bringing forth moments, and of responding to them, also requires an appreciation of the storage processes in the brain, let's introduce readers to these concepts.

## STORING AND STORYING OF EXPERIENCE

How does stored experience affect the client's window of tolerance? Most therapists know very little about how experience is stored, even though memories provide the very fabric of much of therapeutic conversations. All experience is stored, but not

all is stored with the same strength, leading to different probabilities of influence (Siegel, 1999). These memories do not reflect a "videotaped version" or "truth" about an experience, but rather a neural track whose influence is stronger or weaker depending on the amount and type of experience behind it. An often used analogy is to compare this to a computer (Levitin, 2006); pictures aren't really stored on your computer, just bits of information that represent these pictures. The number of pictures you have of something, as well as the emotional experience evoked by the picture, determines its significance.

Furthermore, a memory brought forth in a clinical conversation is influenced by that particular context, and by all the experiences that have occurred since the time the original memory was formed (Siegel, 1999). It follows then that once brought forth, these memories do not go back in storage in the same way. They might end up stronger or weaker (i.e., a probability of greater or less influence), but always somewhat different. This knowledge has important implications in terms of what we choose to focus on and when in our therapeutic conversations.

Michael White (2004) became interested in the influence of memories, and wrote about them and their relationship to trauma. We would like to emphasize two important forms of memory, implicit and explicit. These memories are stored and processed in what is often called the "emotional brain" (limbic system), with implicit memories processed in the amygdala and explicit memories in the hippocampus (LeDoux, 1996). LeDoux makes a critical distinction for clinicians between emotional memory stored in the amygdala (the emotional experience itself) and memory of emotions in the hippocampus (the conscious act of remembering feeling a certain way). Accessing the emotions directly means accessing the amygdala; its firing directly influences the client's window of tolerance. While the usual developmental course is for the higher limbic structures (such as the hippocampus) and the right frontal cortex to assert more control over time, for some clients (for example, those with early traumatic experiences), the amygdala is still "calling the shots" much of the time. One effect of these higher structures becoming more influential is "seeing" a bigger picture than the reactive amygdala provides, which allows for more "mature" decision making about how to respond to emotional invitations (Montgomery, 2013; Shore, 2012).

As far as implicit memories go, they are formed without conscious purpose and are unassociated with recollections of specific events (Siegel, 1999). They can be re-triggered without a person being aware that the material is resurfacing from the past and infiltrating present experiences. In other words, they can shape our experiences of the present without being noticed in awareness. For example, a client may have an experience of jealousy with a partner that is colored by past experiences of sibling rivalry, without being aware that much of this affective reaction comes from another time. The influence of implicit memories can affect a client's window of tolerance, making it narrower. Implicit memories are often considered to be "floating" in the brain and body, as they have not been put into any context and thus are unintegrated into autobiographical accounts (Siegel, 2010a).

Explicit memories, however, involve the act of remembering facts or events and require conscious, directed attention to form (Siegel, 1999). When people willingly attempt to remember something, or recall a specific event that clearly occurred in the past, they are recalling an explicit memory. These memories are connected to a sense of time and context. It is in the hippocampus that explicit memories are combined with implicit emotional memories to create story; we have already noted how some experiences (e.g., trauma) can result in this process being disrupted. As much of the IPNB literature focuses on the importance of optimizing neural functioning in the brain through integration (Siegel, 2010a, 2010b), connecting implicit experiences with explicit memories (i.e., storying) is seen as critical to optimal functioning.

Neurotransmitters and hormones, such as cortisol, produced during emotional experiences tend to make for experiences coded with more influence and resulting in a complex link between memories and emotions (LeDoux, 1996; Siegel, 1999). Affect has such a powerful role in the organization of memories that when people are in a specific affective state (for example, the one we have labeled depression), they have an increased likelihood of remembering other moments associated with that same brain state (called mood congruent recall; LeDoux, 1996). Another important implication of this is that when inviting a client to look for memories (of problems or of anti-problem moments or relationships), recall will be influenced by the client's current mood.

Let's now see how Annalisa responded to Marie-Nathalie's question about a *moment* where she had a "gut feeling" about this relationship.

## CLINICAL INTERLUDE II

A: An example of my gut telling me. . . . Well, right from the beginning, he sent me flowers at the office too soon. So when we went to the restaurant that week, I asked him what he wanted in a relationship, and if he was looking for a girlfriend. I also just wanted to be clear that I don't want kids. . . . He became upset and said he was never asked the "g" question before. The way he responded to me, I remember feeling like I should leave but I didn't, I backpedaled. . . . I wish I had been cordial and said, "Ok. we won't hang out again." I gave him the authority because he had many other girlfriends and I hadn't dated before. I think he just wanted to sleep with me and criticized me to weaken me. The shame keeps on reminding me to not forget I did this but I don't want to hold on to it either. . . .

MN: So at the restaurant, at the very beginning, your gut was telling you that you should leave. Can you tell me more about how that felt, how would you describe the sensation?

A: (thinking) Well. . . . I kind of had a wave of nausea.

MN: A wave of nausea. So I'm trying to picture you sitting at the restaurant, can you go back there in your mind and tell me how else your body felt?

A: I'm not sure. . . .

MN: Can you close your eyes, and reconnect with the memory of sitting at the table, was there a tablecloth? (nods) Were you seated face to face? (nods)

JZ: So you're recreating the physical setting of the event to facilitate the reconnection with the memory. . . .

MN: Yes, some aspects of the memory were explicit, meaning she was conscious of this experience, even if she didn't pay much attention to it, and so it was easily recalled. Other aspects of the memory were implicit, meaning she was not aware of this aspect of her experience and couldn't access it until the therapeutic conversation reactivated the relevant neural networks. After recreating the setting of the restaurant, Annalisa was better able to describe the useful internal experiences, which were warning her about this relationship.

A: I felt that my face became flushed, red, and my shoulders tightened. And there was a sense that I should just stand and leave right away.
MN: Your face was flushed, red, your shoulders tightened and you felt like leaving. Did you feel any change in how you were breathing?
A: I'm not sure . . . but I think I first held my breath because I became nervous, and then I was breathing faster.

To understand why boosting her awareness of bodily sensations is helpful requires an understanding of our resonance system, which is closely tied into our bodies and our affective systems, and is the next piece of neurobiology we believe is important to therapeutic responses. This system accounts for the process of seeing others and ourselves by providing us not only a felt experience of the other, but also a felt experience of ourselves.

## RESONANCE EXPERIENCE

In about 14 milliseconds, visual information from the therapist reaches a client's amygdala (Keysers, Xiao, Foldiak, & Perret, 2001, cited in Montgomery, 2013), where an appraisal is made and then relayed to the client's resonance system for final processing and response determination. Since many clients experience self-doubt, discouragement, being overwhelmed, and shame, the experience of a therapist's internal state can have a strong impact on a client's ability to manage his or her own affect and maintain a window of tolerance without problems taking over. Indeed, Shore (2012) suggests that clients "borrow" the right brain of the therapist as part of their affect management strategy (as we suggested earlier had occurred between MN and Annalisa). He believes this leads to greater "stability" over time (in Narrative Therapy terms, an ability to hold onto one's preferred self). For example, when Annalisa walked in, my (MN) attention became acutely focused on her intense waterfall of emotions while also sensing my own space of calm. My conscious mind focused on following her fast-paced speech, and my body automatically grounded itself in a mindful state of receiving, hearing, and understanding her experience. I resonated with the moment-by-moment unfolding of her experience and sensed her distress without losing myself into it. This

attunement to and resonance with her experience provided the first step towards helping her hold onto her preferred emotional state.

The relationship of the resonance process to therapeutic success makes the question of the therapist's own windows of tolerance and his or her style of affect management likely important. Therefore, an understanding of how the resonance system works might evoke the following questions: What might influence the client's reading of the therapist? What might influence the therapist's reading of the client? What kinds of responses make a difference? What might aid therapists to respond in helpful ways? What mechanisms in the brain are involved in this process?

Inevitably, clients will (nonconsciously) "read" the response of the therapist; this might be influenced by synaptic shadows from the past (Siegel, 2010a, 2010b) and by the way the therapist is responding to them. Synaptic shadows are another way to think about implicit memories from the past and, as previously suggested, influence one's interpretive conclusions. Therapists are not immune from falling into the shadows either. In addition to the shadows, therapists have to find a way to harness their own attention to stay focused on the client and "out of their own head." To be successful at navigating those waters, Siegel (2007, 2010b) recommends a position for therapists he summarizes with the acronym COAL, standing for Curiosity, Openness, and Acceptance, leading to an experience of Love. These sound a lot like the much written about critical common factors across therapy models, documented as key to success (Duncan, Miller, Wampold, & Hubble, 2010). We wonder if some therapeutic models/approaches have the effect of facilitating this more? More specifically, might some approaches put us in positions (e.g., evaluative, knowing) that have us reacting in ways that make it less likely the client's resonance system picks up the support we all prefer to offer?

The mirror neuron system is an important part of our resonance system in the brain. Mirror neurons were discovered when it was found that the same part of the brain shows activity when an individual performs an action as when an individual witnesses another performing the same action (Siegel, 2010a). Interestingly, people who tend to be more empathic have been shown to have a greater activation of mirror neurons (Fishbane, 2013). Extensive research on these cells has revealed that they also constitute an internal program to interpret and mimic others' intentions (Iacoboni, 2009). This system is specific enough to react differently (show a different level of neural activity) to two identical behavioral gestures performed with different intentions. In other words, human beings are hard wired to make assumption about others' intentions. However, as the information is relayed through the limbic system, the neural maps that are created are strongly influenced by past emotional experience, leading to interpretations that are affected by these experiences. These discoveries suggest that it is useful to consider what might contribute to developing a resonance system that would pick up more accurate present-time signals from another, and not merely from one's own experiential history.

One kind of practice that appears to make a big difference in helping one be more available to what is presently occurring, and to be less influenced by past experi-

ences, is mindfulness meditation (Kabat-Zinn, 2003). Given also the relationship of mindfulness training to the development of integrative fibers in the brain (Siegel, 2007, 2010b), you can see why neuroscientists are so enthusiastic about this kind of intervention. In an interesting side note, Narrative therapists have long encouraged their clients to, in between sessions, "pay attention" to the problem. This process, often occurring in conjunction with an end-of-session summary, allows clients to notice the problem's appearance, the effects it is having, and perhaps any times they were able to do what they wanted despite the problem. This, in effect, encourages mindfulness. Meditation practice would inevitably help the client in this task.

Mindfulness practices involve focusing attention, often on the breath. This has the effect of quieting the "top down" produced chatter (Siegel, 2007) and opening one up to more "direct" experiencing. Bodily sensations and thoughts arising at any given moment can be experienced without reacting to them in either an emotional or evaluative way. In a sense, everything is externalized. What feelings are influencing me? What's influencing my client? What do I think about either? For example, I (JZ) combine breath awareness with Dan Siegel's "Wheel of Awareness" practice (2007, 2010a, 2010b) in a way that I have learned to quiet my head, go into my hub, and experience the client more directly and calmly. The data in support of these practices are exceptionally strong; in 2005, Lazar and colleagues published a landmark study reporting measurable changes in the brain after 8 weeks of mindfulness meditation. In other words, daily meditation experience can modify brain structures previously thought to be fixed for life (Lazar et al., 2005).

As suggested, mindfulness practices can also be extremely helpful to therapists in their effort to fully attend to clients. At the minimum, these practices can have the effect of increasing our "presence" (Siegel, 2007). Siegel uses the term "mindsight" to refer to the use of mindfulness practices in seeing oneself and others (Siegel, 2007, 2010a, 2010b). Mindsight not only contributes to presence, but subsequently to an attuned relationship with our clients. According to Siegel, this attunement is facilitated by a sharpening of our focused attention on our clients, by bringing in their internal worlds and by experiencing their flow of energy and information. Siegel believes that resonance is achieved when our internal state is changed by their flow. An even more complex mindful position would be to achieve resonance with a client while at the same time *observing* the resonant interaction with him or her. A starting point towards developing this focus might be using meditation practices to begin noticing our own bodily experiences, as it is a critical part in picking up information from others (Siegel, 2010b).

For clients, asking body questions and encouraging them to notice bodily responses when the problem is or isn't around helps develop their anterior insula (the part of the brain where a picture of one's body is located; Siegel, 2010). This eventually will allow for greater awareness of their bodily states (as opposed to being influenced by their bodily states without consciousness). Being able to be more "in touch" with one's own body will create internal resonance and thus allow for better picking up of signals (and creating useful neural maps) from the

body of another (of course, this is equally true for therapists). Clients under the influence of a problem mostly notice information that confirms and reinforces the problem. Some feel the problem in their bodies, while others, who have fallen under the influence of problems that help dampen affect, do not. The ability to notice problems in the body allows clients to develop more direct affect/problem management strategies. In addition, experiencing problems in the body often has the effect of spontaneously provoking new meaning making. Furthermore, noticing bodily sensations when problems are *least* present offers possible entry points into desirable experiences of oneself and, as with problem-influenced sensations, also invites new meaning making.

## CLINICAL INTERLUDE III

MN: So your face flushed, you felt red, your shoulders tightened, your breath was first held and then became fast, you had nausea and felt like standing up and leaving. If you had an image which represented how you felt inside, what would it be?
A: I guess there was a sense of urgency, like there was a fire, maybe my insides were on fire, especially my face, it felt hot.
MN: Might this sense of urgency and fire connect to the strong backbone you mentioned having earlier?
A: Yes . . . the fire wanted to summon the strong backbone into action. It wanted me to use the strong backbone to do something about the situation.
MN: This sense of fire and urgency summoning the strong backbone into action, was it also present when you actually ended the relationship?
A: Yes, actually! Now that you mention it, that's exactly how it felt! I remember sitting down on my couch at home, infuriated still by the previous evening and feeling this fire to call him and break him the news: I was done with him.
MN: What would have happened if you had not ended the relationship, who would you have become?
A: Aiee. . . . I never even thought of that. . . . I would have become increasingly weak, embarrassed, ashamed, my self-esteem would have become down in the dumps . . . and . . . I think I would have lost myself entirely.
MN: So you would have become more weak, embarrassed, ashamed, and with a lower self-esteem. What does it feel like to realize you have made decisions, which prevented you from losing yourself entirely?
A: (smiling widely now) Well, I guess, if we see it that way, I feel kind of proud, especially since he tried calling me back for weeks, and I was very firm about my decision, I didn't bulge.
MN: You didn't bulge even if he called you back many times. How were you different when you were firm about your decision?
A: I was more . . . hum . . . powerful and assertive. I spoke my mind, and was very clear.
MN: When you are more powerful, and assertive, and speak your mind clearly, what kind of person do you become?
A: I become . . . strong like I have some confidence in me, and guys better not play games with me . . . that kind of person . . . confident.

MN: A confident person! What does it mean about someone if they are able to "give chances" but eventually decide to end the relationship and speak their mind clearly and assertively, with confidence?
A: (proudly) It means that I do have a spine! I don't need to feel embarrassed and ashamed!

JZ: Can you specify how Interpersonal Neurobiology (IPNB) made a difference in the narrative practices you engaged in? And can you pull apart some of the different theoretical vantage points?
MN: The influence of IPNB, and the way we have been thinking about our work, had me more attentive to the affective components first, and to the content of "her story" second. Responding with my right brain was grounding and comforting of her affective state, and I paid close attention to how our therapeutic conversation would infuse her memory with new meanings about her identity. I used your "momenting" idea as an active way to focus on unique outcomes (unique outcome moments). I also delved into an exploration of her bodily responses; while I have always been interested in this aspect of experience (see Beaudoin, 2005), it was not clearly incorporated in classic Narrative theory. Practices to examine bodily sensations as they relate to problems and preferred identities seem crucial with the new understandings arising from IPNB.
JZ: Yes, Narrative theory stresses the importance of not locating the problem in the person. However, a more precise distinction might be that locating it in the body is different than situating it in an identity; it does not have the same harmful effects.

From a theoretical vantage point, the session ended with a summary of the new story and a detailed physical description of this preferred experience. Since memories go back in storage changed by new experiences, the neural recombination of these different pieces of information had lasting effects, especially since they were infused with powerful affective meaning. This process has contributed to transforming emotional memories into memories of emotions stored explicitly in Annalisa's hippocampus and reduced the likelihood that unwanted images and feelings will infiltrate her everyday life. In sum, from an IPNB angle, Annalisa has integrated her affective experience, widened her window of tolerance, and strengthened the memories associated with a confident way of being. From a narrative perspective, she has re-authored the story of herself as confident and capable of having a strong backbone, even in dating relationships, and could now follow through on her stated intention to "stop letting herself down" and stand firmly on the values she preferred to hold in relationships.

## CONCLUSIONS

As Narrative therapists, we have found that using these "brain science" ideas has contributed to richer descriptions of certain Narrative ideas and practices.

A greater focus on affect has led to the use of "moments" to create and highlight experience for our clients, helping them to notice and experience both the problem and potential developments away from the problem in a more embodied way. Meaning becomes more grounded in the affect that is influencing this meaning.

Understanding the nuances of memory has contributed to paying greater attention to what we bring forth and when and what facilitates memory formation and reformation. In addition, the importance of implicit memory to story formation and to problem supporting responses cannot be overstated.

Mindfulness practices have contributed to our better being able to attend to our own and our clients' experiences. Using the "body" has opened up a new arena for helping clients notice the problem and intervene in it; the same might be said for us as well.

We hope that this has piqued your interest and that it will encourage you to read about and bring some neurobiology ideas and practices into your clinical work.

## REFERENCES

Angus, L. E., & Greenberg, L. S. (2011). *Working with narrative in emotion-focused therapy: Changing stories, healing lives.* Washingon, DC: American Psychological Association.

Beaudoin, M.-N. (2005). Agency and choice in the face of trauma: A narrative therapy map. *Journal of Systemic Therapies*, *24*(4), 32–50.

Beaudoin, M.-N. (2010). *The SKiLL-ionaire in every child: Boosting children's socio-emotional skills using the latest in brain research*. San Francisco, CA: Goshawk Publications.

Beaudoin, M.-N., & Zimmerman, J. (2011). Narrative therapy and Interpersonal Neurobiology: Revisiting classic practices, developing new emphases. *Journal of Systemic Therapies*, *30*(1), 1–13.

Duncan, B. L., Miller, S. D., Wampold, B. E., & Hubble, M. A. (Eds.) (2010). *The heart and soul of change: Delivering what works in therapy* (2nd ed.). Washington, DC: American Psychological Association.

Fishbane, M. D. (2013). *Loving with the brain in mind: Neurobiology and couple therapy*. New York, NY: W.W. Norton.

Freedman, J., & Combs, G. (1996). *Narrative therapy: The social construction of preferred realities*. New York, NY: W.W. Norton.

Iacoboni, M. (2009). *Mirroring people: The new science of how we connect with others*. New York, NY: Picador.

Kabat-Zinn, J. (2003). *Coming to our senses: Healing ourselves and the world through mindfulness*. New York, NY: W.W. Norton.

Keysers, C., Xiao, D. K., Foldiak, P., & Perret, D. I. (2001). The speed of sight. *Journal of Cognitive Neuroscience*, *13*, 90–101.

Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., . . . Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *NeuroReport*, *16*(17), 1893–1897.

LeDoux, J. (1996). *The emotional brain: The mysterious underpinnings of emotional life*. New York, NY: Simon Schuster.

LeDoux, J. (2002). *Synaptic self: How our brains become who we are*. New York, NY: Penguin Books.

Levitin, D. J. (2006). *This is your brain on music: The science of a human obsession*. New York, NY: Penguin Group.

Montgomery, A. (2013). *Neurobiology essentials for clinicians: What every therapist needs to know*. New York, NY: W. W. Norton.

Panksepp, J. (2009). Brain emotional systems and qualities of mental life: From animal models of affect to implications for psychotherapeutics. In D. Fosha, D. J. Siegel, & M. Soloman (Eds.), *The healing power of emotion: Affective neuroscience, development, and clinical practice* (pp. 1–26). New York, NY: W.W. Norton.

Shore, A. N. (2012). *The science of the art of psychotherapy*. New York, NY: W.W. Norton.

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

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

Siegel, D. J. (2010a). *Mindsight: The new science of personal transformation*. New York, NY: Random House.

Siegel, D. J. (2010b). *The mindful therapist: A clinician's guide to mindsight and neural integration*. New York, NY: W.W. Norton.

White, M. (2004). Working with people who are suffering the consequences of multiple trauma: A narrative perspective. *International Journal of Narrative Therapy and Community Work*, *1*, 47–76.

White, M. (2005). Children, trauma and subordinate story development. *International Journal of Narrative Therapy and Community Work*, *3–4*, 10–21.

White, M. (2007). *Maps of narrative practice*. New York, NY: W.W. Norton.

White, M., & Epston, D. (1990). *Narrative means to therapeutic ends*. New York, NY: W. W. Norton.

Zimmerman, J., & Dickerson, V. (1996). *If problems talked: Narrative therapy in action*. New York, NY: Guilford Press.