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Using Concepts from Interpersonal Neurobiology in Revisiting Psychodynamic Theory

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This article discusses major concepts of developmental theory in terms of their concurrence with neurobiological information. Regulation theory is used to summarize the development and functions of the right hemisphere, the workings of two distinct memory systems, and right-brain involvement in attachment functions. The clinical relevance of interpersonal neurobiology to transference and countertransference is illustrated with a clinical case example.

KEYWORDS interpersonal neurobiology, Regulation theory, right brain, developmental psychodynamic theory

INTRODUCTION

The classic theoretical constructs of psychoanalytic thought need to be reexamined in light of the expanding knowledge about the structure and development of the infant brain. Depending upon the theoretical perspective, this growing field is known variously as developmental neuropsychoanalysis, developmental affective neuroscience, or interpersonal neurobiology. Using these updated constructs helps make sense of the origins of the unconscious mind, of the psychobiological underpinnings of attachment and infant development, and of the impact of early relational experiences. As the right brain plays a unique role in these phenomena, intersubjectivity, transference, and countertransference may be understood as relational right-brain-to-right-brain communications. Not only are there
new ways to conceptualize what happens between a mother and her infant, there are also implications for the treatment process (Schore, 2003a). Although extensive research has yielded a wealth of new information and diverse perspectives, I focus this article on the guiding conceptual framework of regulation theory (Schore, 2011; Schore & Schore, 2008).

The science explaining these observed phenomena is readily accessible to the social work clinician. Developing knowledge of basic neurobiology adds an important layer to our comprehension of development and psychotherapy. In fact, Wilkinson (2010) noted that

"an interdisciplinary approach that values the insights from the fathers of psychoanalysis alongside insights from attachment research, parent-infant psychotherapy research, and the neurobiology of emotion should no longer be considered an optional "extra" in the world of psychotherapy for a few to pursue as a special interest. (p. 192)"

Mental health practitioners may benefit from an awareness of ways that plasticity affects the social construction of the right hemisphere—in infancy and later life. There are compelling data on the change process in development that resonate with the change process in treatment. None of the early developmental psychoanalytic pioneers had it exactly right (Palombo, Bendicsen, & Koch, 2009). Each theorist has identified one or more parts of the puzzle that remain useful when examined through the lens of neurological evidence. Other concepts need to be understood within a historical context and viewed as stepping stones to our current approaches. Science can be embraced as a useful framework to elucidate the biopsychosocial-cultural underpinnings of clinical social work practice—that of body, brain, and mind as an integrated whole within the social and cultural environment.

This perspective indicates a need for clinicians to develop knowledge of normal brain development from infancy onward as well as the impact of relational experiences upon the developing child’s brain, mind, and body. Fortified with such emerging wisdom, those clinicians may develop a deeper understanding of problematic or symptomatic behaviors presented by clients and shape the designing of services, programs, and policies. Developmental neuroscientists Roth and Sweatt (2011) concluded the following:

"Abusive and neglectful experiences from the caregiver are known to leave a child particularly susceptible to cognitive and mental dysfunction. Indeed, there is a significant association of reported childhood maltreatment and the later diagnosis of adolescent and adulthood schizophrenia, borderline personality disorder, posttraumatic stress disorder, and major depression. (p. 400)"

Development occurs in a psychosocial context. The individual does not grow in isolation and thus cannot be fully understood in isolation. Empirical
evidence reveals that environmental influences and genetic influences are strong and pervasive (Roth & Sweatt). Authors of most current models of human development now describe an epigenetic mechanism that mediates gene–environment interaction during early critical periods of brain development (Roth & Sweatt). As the nature/nurture debate has been put to rest, clinicians are now better able to work with both influences in the intimate world of psychotherapy.

An effort should be made to institute an interdisciplinary approach that includes concepts from interpersonal neurobiology. Freud (1910/1959a) recognized this need. In his discussion of lay analysis, he observed, “a scheme of training for analysis has still to be created. It must include elements from the mental sciences, from psychology, the history of civilization and sociology, as well as from anatomy, biology, and the study of evolution” (p. 252). Although a number of graduate-level and institute programs in clinical social work have included some neurobiology in their curricula, many fall short of this vision. A true integration of these complementary disciplines will help practitioners be more effective in any clinical setting.

While stressing the need to include neurobiological perspectives, I revisit the benefit of also reviewing the psychodynamic constructs originated by Freud, Klein, Fairbairn, Winnicott, Bowlby, Stern, Fonagy, and Schore as additional tools to understand individuals with a broad range of biopsychosocial disorders (Palombo et al., 2009). To restate, our field “very much needs a theory and practice where the best of the old is conserved yet where the new can be integrated and used” (Wilkinson, 2010, p. 185).

Pioneering explorers of the unconscious, including Spitz, Erikson, and Mahler (Palombo et al., 2009), carefully observed and documented the relational, emotional, and behavioral concomitants of what we now know to be the neurobiological unfolding of the right hemisphere, what Schore (2003) called the “biological substrate of the human unconscious.” This concept is echoed in recent neuroscientific writings by Tucker and Moller (2007) who stated that, “The right-hemisphere’s specialization for emotional communication through nonverbal channels seems to suggest a domain of the mind that is close to the motivationally charged psychoanalytic unconscious” (p. 91). In addition, Winnicott (1971) and Bowlby (2000) meticulously studied mothers and babies and were able to select the significant relational developmental moments that informed theory development. In a detailed review of guide to developmental theories, Palombo et al. (2009) introduced the ways that Stern, Kohut, and other self-psychologists brought the constructs of mirroring attunement into focus. Then, a continued emphasis on the centrality of relationship was promoted by various scholar-practitioners including Mitchell and Black (1995), Schore (2003a, 2011), Bromberg (2011), and the Boston Change Process Study Group (2010), among others. This expanding knowledge of early development was further influenced by the infant research conducted by Beebe and Lachmann.
(2002), Tronick (2007), and others who speculated about the ways that object relations affect “psychic structure.” Neuroscientists can now help identify these essential developmental processes that explicate the inter-relational dyadic concepts of psychic beginnings as they emerge in the treatment process.

To review the scope of this article, I use regulation theory (Schore & Schore, 2008) to summarize the development and functions of the right hemisphere, the workings of two distinct memory systems, and right-brain involvement in attachment functions. In the next section, I then demonstrate the clinical relevance of interpersonal neurobiology to transference and countertransference processes and conclude with an illustration of a disguised clinical case vignette.

Throughout the article I note the major concepts derived from object relations theory, self-psychology, intersubjectivity, relational approaches, and trauma theory in terms of their concurrence with neurobiological information. These interpersonal neurobiological constructs can be seen as ways of understanding the unconscious, implicit mind in the right brain, and the conscious explicit mind of the left brain (Schore, 2003b).

**NEUROBIOLOGY INFORMATION AND THEORY CONSTRUCTS**

**Right- and Left-Hemisphere Development**

The ways that the brain is structured and how it functions need to be understood on a broad level. The cerebral cortex comprises left and right hemispheres, connected with bands of tissue called the corpus callosum, which serve to transfer information between them, and help to integrate functions of the two hemispheres. This structure does not begin to develop until the second year of life (Carter, Aldridge, Page, & Parker, 2009, p. 124). Recent neurobiological information teaches that these are actually two separate brains, each with a different processing system. The right hemisphere is in its growth spurt during the first 2 years of life and is dominant for a more global assessment and view of the inner and outer worlds. It uses nonverbal communication, including tone of voice, gesture, facial expressions of affect, and perception in the receiving of signals from outside. It also is directly connected to the autonomic nervous system and holds the awareness of physiological states coming up from the body (Carter et al., 2009, p. 57). This early-maturing right hemisphere is involved in creating a coherent implicit sense of self that is connected by emotionally salient experiences and memories (Schore & Schore, 2008). Although the right brain experiences a major growth spurt in infancy, it continues more minor growth increases at various times over the life span. This plasticity of the emotional brain allows for later changes. Glass (2008) noted, “Recent research in brain imaging, molecular biology, and neurogenetics has shown that psychotherapy...”
changes brain function and structure” (p. 1587), apparently altering brain structures formed early on in development.

The left hemisphere begins its growth spurt at 18 months and becomes dominant at 3 years. Its processing system is based more narrowly on linearity and logic. This left brain responds to words, grammar, and a rational analytic approach to the world (Applegate & Shapiro, 2005; Siegel, 2003). These left-side capacities must connect with the subjective emotional self-experience stored in the right side to have an integrated autobiographical sense of self (Siegel, 2003). It is the corpus callosum that allows for this neural integration of the hemispheres. It first forms connections from the right hemisphere to the left, and then the left back to the right. It is functioning by age 3 but continues to grow throughout the life span. “Women, on average, have a greater density of fibers in the CC than men; this may account for some differences between the sexes in emotional response” (Carter et al., 2009, p. 124). For men and women integration and communication are vital between and within the complex structures of the two cerebral hemispheres. Stressful life experiences, including traumatic events, may impair the growth of the connections in the corpus callosum, thus interfering with the hemispheric integration needed for a coherent sense of self and life events (Smith, 2011).

McGilchrist (2009) noted, “The differences between the two brain hemispheres are profound. Each creates a coherent, utterly different and often incompatible version of the world with competing priorities and values (p. 35). He went on to say:

The representation of the two hemispheres is not equal, and that while both contribute to our knowledge of the world, . . . one hemisphere, the right hemisphere, has precedence in that it understands the knowledge that the other comes to have, and is alone able to synthesize what both know into a usable whole. (p. 40)

The right hemisphere specializes in bringing together in consciousness different elements, including information taken in through the ears, eyes, and other sensory organs, and from memory, so as to generate the richly complex but coherent world that we experience. In summary, if the left hemisphere is the hemisphere of “what,” the right hemisphere, with its preoccupation with context, the relational aspects of experience, emotion, and the nuances of expression, could be said to the hemisphere of “how”(p. 93), and “why” we see the world this way. After describing the developmental processes that affect the right and left hemispheres of an individual’s brain in childhood and adolescence, the notion of “plasticity” offers promising opportunities for change within a psychotherapeutic treatment relationship. I now provide a brief review of lateralized memory systems as they are directly associated with the right- and left-brain hemispheric functions discussed earlier.
Lateralized Memory Systems

There are multiple perspectives in relation to the study of neurobiology and memory that require acknowledgment (Doyère, Debiec, Monfils, Schafe, & LeDoux, 2007; Ludmer, Dudai, & Rubin, 2011; Koriat, Goldsmith, & Panky, 2003; Safer, Breslin, Boesch, & Cerquerita, 2007). However, in this article, I focus primarily on the paradigm of regulation theory (Schore & Schore, 2008). We have several memory systems; the most relevant to psychotherapy are verbal, declarative, or explicit memory, and nonverbal, implicit, or procedural memory. Explicit memory, which includes semantic verbal memory or factual information, does not begin to develop until around age 2. The explicit memory system is structured to remember things consciously, including event details, and contextual aspects of experience. The hippocampus and dorsolateral prefrontal cortex in the left hemisphere work together as language, meaning, and temporal aspects of events are combined in narratives and set down in long-term memory storage (Applegate & Shapiro, 2005; Carter et al., 2009, p. 156).

On the other hand, the implicit memory system is present from birth. This memory system operates rapidly and unconsciously and is heavily connected to the autonomic nervous system. It is organized to give an emotional valence to events, to detect safety and threat, and is subjectively experienced as emotional memory. This earliest type of memory is right lateralized, unconscious, implicit, bodily based, and emotional. It does not necessarily translate into verbal expressions. The infant perceives the environment and registers it in sensory experiences that are not consciously nor explicitly remembered, but that can be implicitly recognized, and therefore exert powerful implicit influences on future experience (Applegate & Shapiro, 2005). This system stores procedural information, that is, acquired skills, the “how-to” memory, and emotional and unconscious responses that are seen in our fundamental ways of moving through the world (Smith, 2011).

In a “good-enough” developmental environment the two memory systems become highly coordinated, but under the threat of trauma and extreme stress, they can disengage so that semantic memory and affective elements become dissociated. For example, relational trauma experiences are stored in right-brain implicit memory. This right-brain system is the area of the affective, bodily-based self that we work with in psychodynamic psychotherapy, as compared to the explicit system that is more the realm of counseling and cognitive-behavioral therapy (Schore, 2012). To quote Wilkinson (2010):

Memory processing consists of encoding and retrieval, and plays a vital part in allowing us to develop a sense of self as well as a sense of self in relation to others over time. Memory makes possible the pattern-matching and meaning-making processes that allow us to build on
earlier experience in a creative way, that enable us to make sense of current experience, and to regulate our affect in the light of past experience. (p. 29)

Information and experiences we have been exposed to in the past are organized into neural representations that are stored at various cortical and subcortical sites. Essentially, they are reassembled when activated in the present. After being recalled, they are disassembled and restored, ready to be reassembled again (Schacter & Addis, 2007, p. 774).

The experience of remembering “overwrites” the memory, so each time an event is brought to mind it is really a recollection of the last time we remembered it. Hence, memories gradually change over the years, until eventually they might bear very little resemblance to the original event. (Carter et al., 2009, p. 160)

The very act of remembering explicit events and implicit affective experiences within the context of a supportive dyadic relationship allows the memory to be reconsolidated and the effects to be altered. That is how synaptic plasticity allows us to change the emotional impact of early experience (Mancia, 2007, p. 86). In summary, after discussing the right- and left-brain hemispheric structure and functions and lateralized memory within a regulation theoretical context, I now elaborate on ways that right-brain function affects attachments.

RIGHT-BRAIN INVOLVEMENT IN ATTACHMENT FUNCTIONS

An infant begins to develop a sense of self in the context of a relational object-seeking state. Essential concepts presented by Fairbairn (Grotstein & Rinsley, 1994), Sullivan (Chapman, 1976), and Winnicott (Winnicott, Shepherd, & Davis, 1989) correlate with an understanding of how the right hemisphere develops in infancy. Right-brain functions typically involve nonverbal, emotionally focused, and visual, prosodic, gestural, and facial expressions as a mode of communicating, as well as projected states that are picked up by the caregiver or therapist (Schore, 2003b). So, Klein’s (Hinshelwood, 1994) concept of projective identification is supported by this explanation of unconscious communication yet challenged in relation to the content. A regulation theoretical perspective suggests that negative aggressive states are not primary. Instead, the interactional process is bidirectional rather than unidirectional. In fact, it is the positive, loving, playful, and comforting interchanges that help shape a secure, confident right mind. There appears to be an absence of neurobiological evidence to support the death instinct as well. Right brain functions stress survival
and protection of the individual’s safety associated with extreme efforts to protect oneself, including dissociation in response to the most severe trauma. The concept of attunement or resonance correlates with Kohut’s ideas about mirroring and self-object functions; it is the basis of right-brain-to-right-brain communication highlighted in Schore’s early work (1994).

Confirming this right-brain-to-right-brain interpersonal neurobiological model, in a near-infrared spectroscopy study of infant–mother attachment at 12 months, the authors concluded “our results are in agreement with that of Schore (2000) who addressed the importance of the right hemisphere in the attachment system” (Minagawa-Kawai et al., 2009, p. 289).

The elements of the right hemisphere begin to develop in the last trimester of pregnancy. This hemisphere is dominant through the third year as the cortex more than doubles in size by overproducing neurons and connections that are then pruned back over time. The emotion-processing circuits of the limbic system, which are directly influenced by attachment experiences, are more heavily connected into the right hemisphere, than the later developing left (Schore, 2003a). The specific parts of the limbic system function in fractions of a second, beneath levels of conscious awareness (Carter et al., 2009, p. 124).

Within the limbic system, the subcortical amygdala directs us to either pay attention or ignore environmental experiences and makes a preliminary and rough evaluation of the safety or danger of the people and circumstances the infant encounters. It contains neurons that fire specifically in response to the emotional expression of faces, especially the eyes. It acts rapidly at levels beneath conscious awareness and responds to nonconscious stimuli. The right amygdala is the source of survival affects, fear, terror, and aggression, and of the “fight-flight-freeze” reactions to external stimuli. It is also an important generator of implicit (procedural) memory, the only form of memory available for the first 2 years of age. Later in the first year, two other cortical limbic structures come online—the anterior cingulate, and last the orbitofrontal cortex. The latter has strong connections with the amygdala and thereby represents the highest level of affect regulation. The right lateralized orbitofrontal system represents the control system of attachment and generates internal working models in implicit memory. These memories are nonverbal, bodily based, and affectively charged, influencing the developing child’s emerging capacity for affect regulation.

In early prenatal development, the amygdala forms connections with the stress-regulating hypothalamic-pituitary-adrenal (HPA) axis. In the last trimester before birth, its growth is sensitively responsive to the mother’s physiological and emotional state (Schore, 2011), thus underscoring the “experience-dependent” nature of human development from its earliest beginnings. Winnicott (1971) understood this concept, exemplified in his notions of maternal preoccupation and “good enough” mothering. The
extent of growth of limbic and cortical connections is epigenetically programmed to form through the relational experiences we have with our primary attachment figures in the postnatal period, during the first 18 months of life (Schore, 2003a). Thus, the idea of a self that unfolds by itself is impossible. Instead, the human being is relational from the beginning. The functions of the limbic regions resonate with Winnicott’s and Stern’s (Palombo et al., 2009) ideas of the psychobiological affective core of the self and are sculpted by the earliest interactions with our caregivers, thus underlining the importance of infant attachment experiences in the shaping of our emotional capacities. In adolescence, this region undergoes a further proliferation and pruning process that reshapes the personality.

Attachment is mediated by nonverbal emotional communication. This capacity to understand and convey nonverbal messages varies from person to person, depending on early mother–infant experiences. People who have secure attachments may be more adept; their reading of the nonverbal messages of others tends to be more accurate, whereas their own nonverbal communications tend to be clearer and more direct (Schachner, Shaver, & Mikulincer, 2005).

Insecurely attached individuals have problematic nonverbal communication partly dependent on attachment style. In the expressive dimension, insecure avoidant or dismissing individuals lean toward being quite restricted. “Their facial expressions reveal less, they gaze at and touch others less, and their tone of voice may convey less positive feeling. In attachment related contexts, they show less nonverbal support seeking, and more turning away and gaze aversion” (Wallin, 2007, p. 262). In contrast, insecure-anxious or preoccupied individuals are biased toward highly expressive nonverbal behavior, especially when they are seeking support and/or when expressing negative emotions.

With regard to sensitivity in receiving nonverbal messages, particularly those signifying distress or neediness, avoidantly attached individuals seem to be mind-blind to them or ignore them, whereas anxiously attached individuals lean toward overresponsiveness, often imagining signals instead of accurately perceiving them (Wallin, 2007). Those individuals classified as having disorganized disoriented attachments associated with abuse and neglect have the poorest ability to read faces accurately and tend to dissociate under stress. This includes transferenceal stresses within the therapeutic alliance (Schore, 2003a).

In summary, attending to the neurobiological explication of right- and left-brain hemispheric function, lateralized memory and effects on attachment sets the stage for the next section of the article. Here, I translate the neurobiological concepts in an analysis of relevant psychodynamic constructs of transference and countertransference phenomena in the processes of psychotherapy.
NEUROBIOLOGY AND TRANSFERENCE/COUNTERTRANSFERENCE

Despite the existence of a number of distinct theoretical perspectives that may guide clinical social work practice, the concepts of transference and countertransference represent a common ground. Transference is defined as “an expression of the patient’s implicit perceptions and implicit memories” (Bornstein, 1999). Freud’s (1912/1959b) insight into transference has merit; yet neither Freud (1912/1959b) nor Klein (Hinshelwood, 1994) viewed countertransference as relational. In the current neuropsychoanalytic literature, we can see the crossover between neurobiological and psychoanalytic understanding.

Regulation theory (Schore & Schore, 2008) shows us that, in this intersubjective dialogue, the psychobiologically attuned, intuitive clinician, from the first point of contact, is learning the nonverbal moment-to-moment rhythmic structures of the client’s internal states. She is relatively flexibly and fluidly modifying her own behavior to synchronize with that structure. This interaction cocreates a growth-facilitating context for the organization of the therapeutic alliance with the client. On a practical level, all of these skills are subsumed under the concept of attunement, a bidirectional process (Schore, 2003a; Wilkinson, 2010).

The attachment between therapist and client is established over time, allowing for the expression of experiences that resonate with the original infant–mother intersubjective history of the first 2 years, that is, being with the client in a subjectively present, quiet enlivened way. Over the course of the treatment, the sensitive empathic clinician’s monitoring of unconscious process, rather than content, calls for right-brain attention to matching the patient’s implicit affective-arousal states. The empathic therapist also resonates with the client’s simultaneous implicit expressions of engagement and disengagement within the coconstructed intersubjective field. This in turn allows the clinician to act as an interactive regulator of the patient’s psychobiological states. Such work implies a profound commitment by both participants in the therapeutic dyad and a deep emotional involvement on the part of the therapist (Tutte, 2004), especially in dealing with patients with a trauma history and patients with personality disorders, early neglect, and disrupted attachment histories.

Maroda (2005) pointed out that Freud has been vindicated by positing transference as an established pattern of relating and emotional responding that is cued by something in the present. However, the affective states and thoughts that are stimulated often have more to do with past experience than present ones. Even though Freud intuitively understood the importance of reliving these affective states, he incorrectly concluded that the client could experience a catharsis and achieve new insights just by talking about them. The absence of knowledge about mechanisms for early right-brain affective expression and regulation prevented him from recognizing the importance.
of a therapist’s emotional participation in recognizing, expressing, and integrating affective states. Such work places great personal demands on a therapist. If eye contact was too stressful for Freud, how could he conceive of a workday marked by one deep, self-revealing emotional exchange after another? Especially in difficult cases, the type of emotional availability we are discussing requires so much energy and attention from the analyst, as well as self-awareness, that it takes its toll on us if we are truly engaged in a right- and lefthemispheric way. In fact, Freud (1910/1959a) stated that it was critical for the analyst to “recognize . . . counter-transference in himself and overcome it” (emphasis added by author; p. 257).

Mundo (2006) pointed out that “when patients are asked to remember the significant moments inducing change during their treatment they usually remember affect-charged moments of interaction with the therapist” rather than the interpretations that were offered (p. 684). When an individual’s earliest experiences have been seriously flawed, or “present circumstances have given rise to very stressful relational experience, then the past pattern will lock in and may result in a very powerful negative transference that may destroy the unique opportunity that therapy offers to experience something different” (Wilkinson, 2010, p. 91). In these circumstances, left-brain work cannot affect the strong negative affective states. The solution must lie in a relational affect-regulatory approach. As Lewis, Amini, and Lannon (2000) pointed out, “People do not learn emotional modulation as they do geometry or the names of state capitals” (p. 171). Rather, they learn it implicitly from “the presence of an adept external modulator.” The therapist must pay attention to all of the nonverbal communications and be responsible for holding the transference in such a way to facilitate, rather than stalemate, the treatment.

Interpersonal Neurobiology and Transference/Countertransference

*How does neurobiology inform our comprehension of these phenomena?* The right brain nonverbally communicates its unconscious states to other right brains that are tuned to receive these communications. Regulation theory thus describes how implicit systems of the therapist interact with implicit systems of the patient; to paraphrase Allan Schore (2011), psychotherapy is not the “talking cure,” it is the “communicating” cure. According to Wilkinson (2010),

Interactions in the consulting room express affective experience rising from implicit early memory; such interactions occur because of the affective re-experiencing that occurs within the transference. Through the transference relationship with the therapist, the client is able to explore his or her own deeply established patterns of reacting to another, patterns which are formed by earlier experience. Through the countertransference, the therapist is first able to live them with the
client, then through the therapeutic process, to examine these recurring patterns. (pp. 62–63)

These nonverbal affective mind–body communications are expressions of the right brain. The therapist’s right hemisphere allows her to know the patient “from the inside out” (Bromberg, 1991, p. 399). To accomplish this, the clinician must access his or her own bodily based intuitive responses to the patient’s communications. Mathews (2006) evocatively portrays this omnipresent implicit process of bodily communications:

The body is clearly an instrument of physical processes, an instrument that can hear, see, touch and smell the world around us. This sensitive instrument also has the ability to tune in to the psyche: to listen to its subtle voice, hear its silent music and search into its darkness for meaning. (p. 17)

Transference and Neurobiology

Transference and its therapeutic use is a universal principle underlying many psychotherapies. Even neuroscientists describe this concept as “representations of past emotional experiences . . . retrieved by the right hemisphere and . . . incorporated into the reasoning process” (Shuren & Grafman, 2002, p. 918). Through transference, our patients have the potential to communicate, reexperience, understand, and transform their most problematic patterns of relating to themselves and others. Freud (1912/1959b) noted that transference is “an original, archaic method of communication between individuals.” In contrast, Ulanov (2001) suggested that in the case of early attachment dysregulation, “the transference-countertransference field carries the agony that words cannot capture because injury occurred before words did” (p. 69).

The right hemisphere holds representations of emotional states associated with events experienced by the individual. The self and object representations are linked by a specific affective state and then stored in implicit memory in the right brain. When the individual encounters a scenario that is familiar in any aspect of this self-object-affect experience, these representations are retrieved by the right hemisphere and are incorporated into the current affective state and reasoning process. The past emerges in the present. Transference distortions involve emotional awareness influenced by unconscious fear, triggered by voices and faces and other threat cues that are “read” with the right amygdala.

The earlier and more pervasive the early relational stressors or trauma, the more intense the transference. Krystal (1988) pointed out that the nonverbal communication of the resulting dysregulated psychobiological state implicitly elicits an intensely negatively charged, bodily based response. Perhaps this is Klein’s (Hinshelwood, 1994) baby—where the “angry envious
"projections" are the ultimate form of protest, the dysregulated attachment communications of an abused child. Neuroscience helps us understand that this state-dependent learning of affectively charged information is critical. Retrieval of information is minimal when the participant’s current state differs from that in which the information was acquired. Therefore, achieving a particular bodily state is necessary to access certain knowledge. These are the right-hemisphere cortical and subcortical limbic-autonomic states discussed earlier that relate to implicit memory.

Meares (2005) added, “The intrusion of unconscious traumatic memory offers an opportunity to process the trauma, which is now alive in the present” (p. 54). He pointed out that unconscious traumatic memories are expressed in the therapeutic conversation. This implicit memory directs the patient’s physiology, tone of voice, posture, gaze, and bodily state. This generalized memory of a series of similar traumatic events also includes the form of relatedness in which the trauma took place. The therapist is experienced as an analog of the misattuning other who inflicted traumata that interfered with emergence of the implicit self, that is, transferential rekindling of implicit memories of early relational attachment trauma. Meares also pointed out that “transference is seen as the manifestation of unconscious traumatic memory as it intrudes upon the larger consciousness of self, breaking it up, stunting it, and even at times, taking it over entirely” (p. 65). Remember that the memories of attachment trauma as well as the positive early emotional communications are stored in the right brain, especially the subcortical right amygdala.

Research suggests that there is a bias in the emotional perception of others (Mikulincer & Shaver, 2003), a good definition of transference. Anxiously attached adults are prone to assume that others are similar to them and see projected evidence of actual traits of their own in the other (i.e., false consensus). Avoidantly attached adults are prone to assume that they are different and distinct from others and see in them projected evidence of their own unwanted traits (i.e., false distinctiveness) (Wallin, 2007). These patterns of bias and projection play a role in transference reactions and may also affect countertransference responses, as well as influencing the interaction between transference and countertransference phenomena. In general, it seems that patients with problematic attachment histories have difficulty accurately decoding nonverbal cues, such as facial expressions, and are consequently vulnerable to misinterpreting the emotions and intentions of others (Schore, 2003a). This research supports Bowlby’s (2000) early formulation that there is a tendency of insecure working models of attachment to be self-perpetuating and may be the basis of the therapeutic challenge.

Countertransference and Neurobiology

Transference–countertransference transactions represent nonconscious nonverbal right-brain-mind-body communications. Transference (Bornstein,
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1999) is expressed in visual and auditory affective cues quickly appraised from the client's face. Countertransference is similarly currently observed as nonverbal and implicit; the therapist's “autonomic responses that are reactions on an unconscious level to nonverbal messages” (Jacobs, 1994, p. 745). In monitoring countertransferential responses, the clinician's right brain tracks at a preconscious level not only the arousal rhythms and flows of the patient's affective states, but also her own interoceptive bodily based affective responses to the patient's implicit facial, gestural, and prosodic communications.

The countertransference is a very particular form of musing about one's own body-brain-mind response as part of the experience of being with the client; it is musing that brings creative knowledge of oneself and the other via the unconscious communication of self states and relational patterns from the client to the therapist. (Wilkinson, 2010, p. 74)

It is certainly true that the clinician's left-brain conscious mind is an important contributor to the treatment process. But perhaps more than other treatment modalities, psychodynamic psychotherapeutic models have focused upon the critical functions of the therapist's "unconscious right mind." A neuropsychoanalytic right-brain perspective of the treatment process allows for a deeper understanding of the critical factors that operate at implicit levels of the therapeutic alliance, beneath the exchanges of language and explicit cognitions.

Winnicott (1971) mentioned: “In order to use the mutual experience one must have 'in one's bones' a theory of the emotional development of the child and the relationship of the child to the environmental factors” (p. 34). By referring to “in one's bones,” he may have been considering the clinician's sensitivity to his or her countertransferential autonomic “somatic markers.” The therapist's detection of her own interoceptive responses that resonate with patient's autonomic reactions to threatening stimuli equals the therapist's countertransferential visceral reaction to the patient.

Countertransference is determined by the fit between the preexisting structures in the therapist's intrapsychic world with the patients' projections toward the therapist. These “intrapsychic structures” located in the empathic therapist's right brain are dominant for the reception, expression, and communication of bodily based emotional states and affect regulation and allow for what Mitrani (2001) called “taking the transference” (p. 1085). Meares (2005) stated,

Not only is the therapist being unconsciously influenced by a series of slight and, in some cases, subliminal signals, so also is the patient. Details of the therapist's posture, gaze, tone of voice, even respiration,
are recorded and processed. A sophisticated therapist may use this processing in a beneficial way, potentiating a change in the patient's state without, or in addition to, the use of words. (p. 24)

Freudian drive theorists have historically viewed countertransference through the perception of the emotion-inhibiting left hemisphere. An overflow of intense affects can disorganize the linear, analytic, verbal functions of the explicit left brain, the “left mind.” But from the perspective of the emotion-processing right hemisphere, countertransference can also be problematic in moments of the clinician’s emotional overinhibition. Thus, a potentially difficult countertransferential problem may be activated by a prolonged or massive disengagement from the intersubjective field.

Sidoli (2000) talked about seeing her countertransference as coming from her experience in infant observation, where the nonverbal communication is essential for the development of trust in the therapeutic relationship and the recognition of the infant still inside. I agree, and to that end, I emphasize finding a way to be with each client that is psychobiologically attuned to the patient’s internal state. In such transactions, the therapist allows for the cocreation of an intersubjective field. The therapist’s capacity to engage in right-brain-to-right-brain communication is essential to the treatment. Schore (1994) noted that spontaneous nonverbal transference–countertransference interactions at preconscious–unconscious levels represent right-hemisphere-to-right hemisphere face-to-face communications of fast-acting, automatic, regulated, and dysregulated bodily based emotional states between patient and therapist. Mancia (2007) said,

If we put our analytical ears to the “musical dimension” of the transference, we can reach those deeper unconscious structures related to the patient’s earliest and most significant relational experiences hidden away in the implicit memory as part of an unpressed unconscious. (p. 59)

This therapeutic mechanism is especially critical in the treatment of “relational trauma” (Schore, 2011). According to Valent (1999), “Transference and countertransference may be the only way infants or severely traumatized persons can communicate their stories of distress, and are therefore central tools for discerning unprocessed or defended events” (p. 35). Neuroscience now reveals that “Imaging studies on adults with a history of childhood maltreatment indicate that the frontal cortex, corpus callosum, amygdala . . . HPA axis and cerebellum are particularly impacted by these experiences” (Roth & Sweatt, 2011, p. 400). Effective psychotherapy with clients who present with such histories must affect all of these structures noted.
A brief case example illustrates the concepts drawn from the synthesis of constructs from neurobiology and psychodynamic theory.

Rochelle M. introduced herself with one question: “are you willing to take my case? . . . I may be too much for you.” She was in her early fifties and had participated in therapy throughout childhood and all her adult life. She struggled with severe obsessive-compulsive disorder (OCD) in the form of washing rituals, compulsive time management, as well as constant anxiety and terror. She has a hunchback that she covers with baggy clothing, is extremely thin, and is constantly moving her feet and legs. Her speech is rapid and pressured often repeating the same idea many times; she also expresses a sense of humor and keen insight and can describe her state of mind clearly and in great detail. However, she cannot describe how anything feels in her body. Instead, she notes that her head and body are not connected and her body and its functions are an embarrassment to her. Early on, we focused on her breathing, grounding herself, and other sensorimotor exercises (Ogden, Minton, & Pain, 2006). Often she can only take deep breaths and relax while in my presence, although she tries to practice at home when she is “spinning” with anxiety.

Rochelle M. states that all her previous therapy experiences added to her dysregulation, were ineffective, and focused on “fixing” her symptoms and changing her thoughts. She never felt connected to the therapists and ended up reassuring them and taking the blame for her “failure” to get better, when faced with a discouraged therapist. Our relationship is different. Our working agreement is that I would not try to DO anything, but that we would BE together and I would try to help her identify and share her pain and despair.

How does the neurobiology influence my thinking and feeling in this case? My understanding of the terrified child desperately trying to use her rational intelligence to cope with an intolerable emotional situation always occupied my mind. Her parents were emotionally unavailable as attuning objects, her father intrusive and physically frightening, her mother inadequate and neglectful. The necessary experiences for the expedienc dependent maturation of the right brain were only there in spurts. Her autoregulatory abilities are distorted and not available in the right brain; she relies on left-brain control to try and mitigate the constant terror. Rochelle M. has been unresponsive to medication. As her limbic system is in a state of life-threat arousal at all times, her rituals involve the left-hemisphere’s attempt to reduce the paralyzing anxiety. These activities were effective earlier in her life but have become a problem in themselves and are now disconnected from the anxiety they fail to mitigate.

Within the therapeutic alliance, I stress affect attunement while communicating calm and acceptance. I aim to avoid being overwhelmed at how
difficult things are for her and, instead, provide a steady supportive presence that conveys I can “handle her case.” This fits with Winnicott’s et al. (1989) holding environment and the affect attunement theory grounded in neurobiology. I am convinced that a drive theory or ego psychology approach of defense and conflict interpretation would not effect change in this woman. The importance of using the brain’s plasticity involves starting over. This careful and slow process provides relief of anxiety and helps her reduce the fear-induced behaviors. The approach is based on being with as opposed to pushing or intruding. The client is viewed as a complete and complex individual as opposed to an assemblage of different behaviors. My countertransference signals my response to her earlier experiences as the frightened child. I am certain that experiencing a connection in the state of terror will eventually allow for some easing of her “life threat” (Porges, 2003) arousal. The transference–countertransference interactions are the path we take to reach the emotional state of the terrified baby that can hardly bear to be alive in the present. She notes that I am the first therapist she has missed when I have taken a vacation. Clearly, the attachment is growing on both sides. We have worked together for just under 2 years, and Rochelle M. has never missed an appointment. She has been able to move into her own apartment and live by herself for the first time in her life. However, when she is in a panic state, she has as yet been unable to call me in between sessions. She has sent a few e-mails when I am on vacation that have helped her stay connected. Encouraging her to ask for help when in a dysregulated state is a current focus of our sessions.

Rochelle M. has accepted that she does not know how this therapy is going to turn out, but that realization seems ok to both of us. This awareness even provides some relief in sharing that neither of us can predict the shape of her future, yet we work with a shared goal to ease her intense fears and make her life somewhat more livable. At times, it is hard for both of us to tolerate the fierceness of her terror and the pain associated with her sense of isolation and despair. When I slip into “left-brain” musings, she notices that I have lost the connection, and we get back on track. A strong sense of the psychobiological core of this intersubjective field keeps us going along a therapeutic path that is grounded in neurobiologically informed attachment and psychodynamic theories.

CONCLUSION

The science of interpersonal neurobiology has added a rich dimension to our therapeutic understanding in the field of psychotherapy. I have utilized regulation theory to focus on three specific areas: right- and left-hemispheric development, implicit and explicit memory, and right-brain attachment systems. I then used this model to more deeply understood transference and
countertransference phenomena in treatment. These ideas provide objective and subjective data about what the unconscious mind is, how it develops, and how it can be changed. It brings the biopsychosocial-cultural underpinnings of clinical social work practice to life in a new framework—that of body, brain, and mind as an integrated whole within the social and cultural environment.

How do these data correspond with early psychoanalytic theories? The centrality of drives as the primary motivator as originally conceived by Freud and Klein lacks empirical evidence. Instead, the newborn is object seeking, and object needing, from the very beginning. The handling and holding are all important in helping the newborn to integrate its internal body functions and its ability to relate to the primary attachment figure who interprets the world for it and induces trust and safety. There is a motivationally informed emotion-processing unconscious. It emerges out of this earliest relational environment and is located in the right brain, which is the seat of implicit and procedural memory, and in its holistic way of grasping the inner and outer world.

Intersubjectivity is thus more than a match or communication of explicit cognitions. The intersubjective field coconstructed by two individuals includes not just two minds but two bodies (Schore, 1994, 2003a, b). At the psychobiological core of the intersubjective field is the attachment bond of emotional communication and interactive regulation, the fundamental process of nonconscious attachment dynamics. Implicit unconscious intersubjective transactions are interactively communicated. The nonverbal communication involves regulated and dysregulated psychobiological somatic processes that mediate shared unconscious and conscious emotional states, along with mental contents. The essential biological purpose of intersubjective communications in all human interactions, including those embedded in the psychobiological core of the therapeutic alliance, is the regulation of right-brain/mind/body states. These ideas resonate with Shaw’s (2004) conclusion,

Psychotherapy is an inherently embodied process. If psychotherapy is an investigation into the intersubjective space between client and therapist, then as a profession we need to take our bodily reactions much more seriously than we have so far because . . . the body is “the very basis of human subjectivity.” (p. 271)

But what about language and interpretation? From the vantage point of psychotherapy, “words have limitations” (Wilkinson, 2010, p. 89). They can be used defensively by either the client or the therapist, a stream of chatter can be an attempt to shut out the therapist, or from the other side it can be the way to avoid the painful material coming from the client. Knox (2008) argued convincingly that,
interpretation is about words which, by the fact that we need to use them, convey the separateness of one mind from another and so may be unbearable to someone who cannot yet be sure that he or she can be allowed to have a much more direct emotional impact on the analyst, that the analyst is not afraid of the patient’s need for close attunement. (p. 35)

The fast-acting unconscious processing of facial expressions takes precedence over the slower world of words, thus we must not only “watch what we say” we must attend to “how we are” to understand our impact in the therapeutic dyad.

Contemporary psychodynamic psychotherapy now “stands at the interface of what might be termed the cognitive-affective divide” (Wilkinson, 2010, p. 186). We need to include the changing of cognitions and the affective relational aspects of our intimate connections with clients and the way in which they relate to the early right-brained experience of the child in relation to the primary caregiver. “It is the capacity for (regulation), integration and interconnectivity, both within and without, that gives rise to a mature mind” (p. 186). We know that to be effective, we must pay attention to the scope of mind–body interconnections. The perspective of regulation theory grounded in interpersonal neurobiology sheds clarity on the many psychodynamic concepts social work psychotherapists have been relying on for decades.

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REFERENCES


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