Becoming a Neurobiologically-Informed Play Therapist

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This article offers a foundation for becoming a neurobiologically informed play therapist. Following a discussion of the history of neurobiologically informed approaches to treatment an overview of key principles of neurobiology is provided, synthesized from publications by leaders in the field. Principles are then used to explain play therapy interventions used in client cases. Drawing on concepts from recent neurobiology, this article ends with recommendations toward becoming a more neurobiologically informed play therapist.

Keywords: child intervention, neurobiology, play therapy

More information about the human brain is available than at any other point in history. Although most practitioners understand basic concepts about the brain and are familiar with terms such as cortex and limbic system, there remains a gap between awareness of these concepts and the application of them to clinical practice. In an era in which accountability is emphasized and evidence-based-practice is a requirement in many settings, it is essential that play therapists take advantage of an understanding of neurobiology to inform and justify clinical decision-making.

History

Contributions of neuroscience in the clinical field began with Freud (as cited in Centonze, Siracusano, Calabresi, & Bernardi, 2004), whose original aim was to connect his observations of human behavior with neuroanatomy. Subsequent endeavors to incorporate neuroscience into mental health were centered around the cognitive revolution, increasing research support for cognitive–behavioral therapy (Montgomery, 2013). Cognitive neuroscientists scrutinized the function of cognition in the brain, believing that emotion and cognition were indistinguishable (LeDoux, 1996). The understanding of the mind has expanded significantly since that work, with the field coming to more broadly accept that cognition and emotion are interconnected but distinct and are influenced via input from the body and lower brain regulatory systems. One example of this shifted perspective is the theory of affective neurobiology pioneered by Panksepp (Panksepp, 1998; Panksepp & Biven, 2012). Affective neurobiology distinguishes affective from cognitive process and further evidences the interconnectedness between sensory and visceral process in the body and emotional and cognitive process in the brain (Porges, 2011). This perspective is exciting for play therapists because it may explain and support the play therapy process, which has always incorporated expressive, sensory-motor, and cognitive-emotional therapeutic attributes.

In general, brain research confirms that experience (e.g., play) influences neuronal function and brain structure (Kay, 2009; Siegel, 2001, 2012) and that the core therapeutic media that alter brain structure, which are emphasized in all models of play therapy, are experience and relationship (Kay, 2009; Siegel & Bryson, 2011). However, the recent voluminous literature on neurobiology is complex, making it difficult to provide a succinct and clear explanation of its application to guide play therapists. Hence, this article reviews fundamental principles of neurobiology about which play therapists ought to be informed, illustrates these applications of these ideas to case segments, and discusses recommendations for how play ther-
apists can become neurobiologically informed clinicians.

**Neurobiologically-Informed Play Therapy**

What, exactly, is neurobiologically informed play therapy? There is not yet an agreed-on definition in the field. For the purposes of this article, the authors will explore principles of neurobiology as they explain and inform play therapy interventions.

The goal of play therapy is “to help clients prevent or resolve psychosocial difficulties and achieve optimal growth and development” (Association for Play Therapy, n.d.). Many, if not all, elements of play therapy can be explained via neurobiological principles. For example, play therapy approaches emphasize the establishment of a warm, accepting, supportive therapeutic relationship (Axline, 1969; Booth & Jernberg, 2010; Kestly, 2014; Landreth, 2012; Van Fleet, Sywulak, & Sinscak, 2010), which is consistent with neurobiological research demonstrating the importance of feeling understood and connected to an adult in regulating a child’s developing brain, particularly in quieting an aroused limbic system (Perry, 2009; Schore, 2001; Siegel, 2012; Sroufe, Coffino, & Carlson, 2010). Neurobiological research also demonstrates that the act of play in itself is regulating (Panksepp, 1998; Panksepp & Biven, 2012). And finally, the use of toys and other props in play therapy offers a tactile, sensory experience that provides an opportunity for a child to process his or her experiences (Malchiodi, 2014).

A neurobiologically informed play therapist would be able to use explanations of play therapy such as those introduced in the previous paragraph to inform clinical decision making. To support play therapists in this attempt, the authors now offer a review of key, interrelated principles of neurobiology and briefly illustrate their application in play therapy.

**Key Principles of Neurobiology**

1. **The Brain Develops and Is Organized From the Bottom Up**

A basic understanding of neurobiology, as relevant to psychotherapeutic intervention, begins with recognition of the hierarchical nature of the brain. For the purposes of this article, the brain has three basic parts: brainstem, limbic system, and cortex (MacLean, 1994; Panksepp, 1998; Siegel, 2012; van der Kolk, 2014). These parts of the brain evolve in order, and they develop sequentially (Center on the Developing Child, 2015; van der Kolk, 2014). The brainstem develops in utero and matures in the first year of life, the limbic system matures during childhood, and the cortex becomes fully developed during early adulthood (Perry, 2004, 2009). Although distinct, these elements operate in concert with one another via serotenergic, norepinephrine and dopaminergic neuromodulator systems, among others (Center on the Developing Child, 2015; Perry, 2009).

The brainstem is the part of our brain responsible for essential bodily functions such as breathing, heart rate, blood pressure, temperature, and sleep, as well as perception of threat (Perry, 2004; Siegel, 2012; van der Kolk, 2014). The brainstem must be functional at birth for an infant to survive, but is further organized via predictable and regulating sensory experiences throughout the first year of life (Perry, 2006). Changes to the brainstem beyond that time period require significant, repeated experiences (Perry, 2006). Dysregulation in the brainstem as a result of early neglect, abuse or repeated traumatic experiences later in childhood is associated with symptoms including sleep difficulties, elevated heart rate, sensory integration problems, appetite disturbances, and inattention (Neigh, Gillespie, & Nemeroff, 2009; Perry, 2006; van der Kolk, 2014). Children with these disruptions need a predictable environment rich with rhythmic, repetitive somatosensory experiences to organize or reorganize this area of the brain (Perry, 2006).

The next area of the brain to develop is the limbic system. The limbic system is involved in emotional reactions, attachment and relational connections, motivation, and integration of memory (Panksepp, 1998; Siegel, 2012; van der Kolk, 2014). This area of the brain is immature at birth but develops through interaction with the environment. A child whose primary environmental experiences are positive and safe will make associations between the experience of safety and other co-occurring stimuli, like the smell or touch of a parent, and store that template for future application in other relationships or contexts. Conversely, a child whose world is frightening and unpredictable will
come to make associations between stimuli that accompany those sensations (e.g., the sound of a loud voice) and activate threat responses when those stimuli are presented again in the future (Perry, 2009; van der Kolk, 2014). Children who have negative and frightening experiences while the limbic system is developing are likely to be emotionally dysregulated and display attachment problems. They need repeated safe, positive, nurturing interactions with others in order to modify the associations they have made between past experiences of people and negative experiences (Hughes & Baylin, 2012; Perry, 2006).

The third, and most advanced, area of the human brain is the cortex, which continues to develop into the mid-20s. This part of the brain is responsible for advanced cognition, such as reasoning, problem solving, abstract thought, and language (Siegel, 2012; van der Kolk, 2014). By definition, all children have a cortex that is not yet fully developed. However, children whose cortical development is below that of typically developing peers will have more difficulty with impulsivity, judgment, and (possibly) academic performance. Additionally, the development of more advanced areas of the brain depends on successful organization of lower areas; therefore, children who have experiences that interfere with either brainstem or limbic system organization are likely to display cortical development deficits as well (Perry, 2006). Of all brain systems, the cortex is the easiest to modify, as it can be accessed consciously and changed via verbal input. Many talk-based therapies (e.g., cognitive–behavioral therapy) that focused on increasing the security of his attachment to his adoptive mother.

Ruben was an extremely reactive 6-year-old boy who wedged himself into corners and covered his head with a blanket when distressed; he also yelled, “NOOOOO! Never!” when asked to do something unfamiliar, and made growling noises to display his frustration. He had difficulty sleeping and eating, and showed significant separation and school anxiety. Ruben was adopted from Latin America at age two; little history before then is known. A neurobiologically informed approach to play therapy would consider the possibility that Ruben’s symptoms could be attributable, at least in part, to dysregulation in his brainstem and limbic systems, and the clinician would include interventions targeting those areas in any treatment plan. Indeed, Ruben’s play therapist literally chased him in circles inside the building at the beginning of sessions, as initiated by Ruben (who dashed down a stairwell just before the therapist’s office door). Following this rhythmic somatosensory activity that likely calmed his brainstem, Ruben was able to be focused and emotionally present for the remainder of the play therapy session, which focused on increasing the security of his attachment to his adoptive mother.

2. The Brain has Specific Mechanisms for Assessing and Responding to Threat, and Under Chronic Threat Permanent Brain Changes May Result

Though the limbic system has already been discussed in the previous section, its importance in influencing emotional and behavioral regulation bears further explanation. The amygdala, a structure located in the limbic system, is the core of emotional function that assesses and responds to threat (Davies, 2002; Hughes & Baylin, 2012; Panksepp & Biven, 2012). Since the amygdala serves to scan and receive all external stimuli as well as visceral inputs, activation of the amygdala can cause intense emotion, such as aggression or fear (Hughes & Baylin, 2012; Kay, 2009; Panksepp & Biven, 2012). Under such threat, neural pathways are directed to immediately reach the amygdala (LeDoux, 1996) and evoke physiological reactions such as increased heart rate and elevated blood pressure (Applegate & Shapiro, 2005; Hughes & Baylin, 2012; LeDoux, 1996; Panksepp & Biven, 2012). If threat is detected as an extreme danger, furthermore, the amygdala activates parasympathetic system in central nervous system, which leads to the fight/flight/freeze response.

The hypothalamic-pituitary-adrenal (HPA) axis is another area of the brain involved in stress response. The HPA, known as a major mediating pathway in the response to stress, releases steroid hormones, notably cortisol (Neigh, Gillespie, & Nemeroff, 2009). Research reveals that excessive chronic exposure to these stress hormones can damage neurons, especially those in the hippocampus (Kay, 2009; Schacter, 1996), an area of the brain involved in memory, conscious processing (Applegate & Shapiro, 2005; Davies, 2002; Kay, 2009), and regulation of the stress response system (Andersen, Morris, Amaral, Bliss, & O’Keefe, 2007). Such prolonged exposure results in chronically elevated cortisol level (Kay, 2009;
Sammy was an 8-year-old boy who was referred by his mother for bouts of acute anxiety around food. Sammy’s parents were divorced when Sammy was four after years of a violent relationship. According to his mother, Sammy was a hypervigilant and anxious child in general but ever since he choked on a gummy vitamin about three months before treatment his anxiety had escalated to a level that she could not tolerate. Sammy had continuously been fearful of and reluctant to eat solid food. Sammy appeared to have made an association between sensations accompanying food and the fear that he experienced when he was choking. When Sammy came to therapy, he appeared guarded and afraid. He initially refused to go into the therapy room but entered it when he was playfully greeted with a turtle puppet. It was apparent that playful engagement counterbalanced the alarm system (Kestly, 2014; Panksepp & Biven, 2012) in his brain. At the beginning of each session, Sammy needed some playful interactions to regulate his discomfort and hypervigilance. Once he was more regulated, smells and tactile sensations were able to be identified as the primary triggers for his fear of food. Therefore, a variety of toy props were accessed to increase his tolerance of these sensory inputs. During this period, it was also identified that Sammy was easily triggered by loud sounds. The play therapist quickly learned that Sammy had been traumatized by his mother’s reaction with sounds of panic when the choking incident happened. His mother’s concerned reaction at that moment seemed to activate the trauma associations in Sammy’s brain. From a neurobiological perspective it seems likely that Sammy easily released high levels of cortisol because of prolonged exposure to violence in his early years. To modulate his stress response system, the play therapist usually began with high energy activities to regulate his fear level and then moved on to lower arousal sensory based activities that increased attention to sensations in his body and processed his sensory experience. Eventually, he was able to identify the intensity and scope of his body’s reactions to his thoughts of solid food. He was gradually able to cope with his fear by being aware of the sensations around solid food, and his fear of choking decreased. He also processed his suppressed traumatic experience in response to witnessing domestic violence through sandtray. Though he was not consciously aware that his highly charged affect was related to a history of witnessing violence, Sammy’s implicitly based experience of trauma was able to be processed in this case because of the play therapist’s understanding of neurobiological impacts on Sammy’s brain after the traumatic experience. This case illustrates the important application of the concepts of stress response system in designing and conducting play therapy session.

3. The Best Way to Interact With a Child Depends on Which Areas of the Brain Are Dominant at a Given Moment

As discussed earlier, the brain develops in a sequential manner (Perry, 2006, 2009). It functions under threat in this way, as well. When someone perceives a threat in the environment the brain activates an alarm response, redirecting energy to the parts of the brain most likely to help the individual cope, specifically the limbic system and brainstem (Applegate & Shapiro, 2005; Perry, Pollard, Blakely, Baker, & Vigilante, 1995; van McEwen, 2004) and eventually leads to the dysfunctions of the hippocampus (McEwen, 2004; Schacter, 1996). Furthermore, being exposed to chronic threat leads to alterations in receptor systems in the HPA axis (Neigh, Gillespie, & Nemeroff, 2009), culminating in the development of mood and anxiety disorders later in life (Chapman et al., 2004; Dube et al., 2001; Gladstone et al., 2004).

When the stress response system is activated by a traumatic experience, the brain makes an association between the traumatic experience and the accompanying sensory stimuli (e.g., sights, sounds, sensations, tastes, etc.). This associative function in the brain offers clinical applications for play therapists in their work with children who present with trauma and anxiety disorders. Traumatized children may respond with an acute fear response to sensory stimuli they associate with traumatic memories, even when there is no specific threat in the present moment. In turn, an acute fear response is often accompanied by emotional and behavioral dysregulation. In other words, the body remembers a threat that children once experienced. Thus, the utilization of sensory-based play therapy interventions to alter trauma associations in the brain is key to success in treating dysregulation induced by traumatic experience (Gil, 2006; Malchiodi, 2014).
It’s important to understand which areas of the brain have diminished activity as a result of a perceived threat because information is being processed by the child only via systems in the brain that are currently activated (Perry, 2009). Therefore, trying to reason (a cortical function) with someone being driven by lower brain regions is likely to be ineffective, as is relying on an intervention that requires anticipation of future consequences, such as a behavior plan (Kestly, 2014; Perry, 2006). A play therapist who understands that a child’s access to higher brain functions may be limited by the stress response can therefore gauge and select effective interventions based on his or her judgment of which brain systems the child is currently relying on most heavily in response to a perceived threat. Interventions focused on movement and breathing may be helpful in restoring balance between higher and lower areas of the brain when the lower brain areas have become activated (van der Kolk, 2014). Specifically, a child who is responding primarily from the limbic system is likely to benefit from more relationally driven interventions such as child-centered play therapy, whereas a child reacting from the brainstem needs safety, space, time, and movement to be able to reregulate and access higher areas of the brain (Perry, 2006).

Tiana was an 11-year-old girl adopted from the child welfare system at age seven. She stole compulsively, was described by her parents as “lazy” with regard to schoolwork and hygiene, and was impervious to behavior systems the parents and school attempted to implement. Tiana seemed to initially find the therapy environment threatening, as evidenced by replies to questions with blank stares or one-word answers. She appeared to be mildly dissociating while offering superficially compliant responses (Perry et al., 1995), suggesting her brainstem and perhaps limbic systems were in control during therapy. The therapist realized that verbally based cortical interventions would be ineffective, and that in this case even limbically oriented nondirective play therapy seemed to activate a threat response, as evidenced by her willingness to play only board games rather than engage in any creative or expressive play. Because structured activities like games appeared to be less threatening for Tiana, the therapist engaged her in more directive play therapy (e.g., playing school, and assigning Tiana the role of teacher). Enacting a familiar role that gave Tiana control decreased her sense of threat, thus restoring access to more advanced brain functions (e.g., speech). It also facilitated pleasure in play, opening the possibility of client-led play therapy.

4. Changing a Memory Requires Activation of the Areas of the Brain Used to Form the Memory

Understanding how memory works is key to understanding how an individual processes and reacts to his or her environment. Sensory input is filtered through the brain’s record of past experiences to determine a response to the current situation (Perry, 2006). The brain may respond to a stimulus by activating a threat response (as already discussed), remaining neutral, or reacting positively in response to the sensory input. Thus, how a person responds to a stimulus such as the smell of a particular perfume will depend on his previous experience of similar olfactory input. To better understand this, the definition of memory needs to be clarified.

Most people think of memory as the ability to consciously recall a past experience, (e.g., what one had for lunch the previous day, or the capitol of Washington state). That type of memory is known as explicit memory and has subtypes of episodic and semantic (Hughes & Baylin, 2012; Kay, 2009; Siegel, 2012). Episodic memory is essentially autobiographical recall about some past experience, whereas semantic memory is factual. Formation of explicit memory requires that the hippocampus, a part of the limbic system, be mature and activated. Activation of the hippocampus is what creates the sense that a memory is coming from the past, and allows for conscious recall of past experiences. Children can elicit and play through these sorts of memories in therapy with relative ease. However, this is not the type of memory that is most influential in determining a person’s immediate response to incoming sensory experience. Rather, that occurs through another memory mechanism.

The other major type of memory, implicit memory, is quite different from explicit memory. Implicit memory is formed outside of conscious awareness, via the association of two co-occurring stimuli (Hughes & Baylin, 2012; Kay, 2009; Siegel, 2012). As explained previ-
ously, this is the type of memory involved in the creation of associations between sensory stimuli and traumatic events. Although active throughout life, implicit memory is the only type of memory available in infancy and very early childhood. It is why people cannot consciously recall what happened during infancy; the hippocampus was not yet developed enough for conscious memory encoding to occur. Young children do remember, though—the sound of a parent’s voice, the sight of a familiar face—and their emotional reactions to these sensory inputs become linked in the brain to those sights, sounds, smells, and so forth. Thus, when presented with similar sensory stimuli in the future they react with the same emotions with which they have previously associated that input. Those reactions, although lacking a sensation of coming from the past, are actually implicit memories.

When all goes well, implicit memory allows children to experience pleasure in relationships and enjoyment in exploration of the world, leading to generalizations of experiences into mental models via which future events are interpreted (Siegel, 2012). However, negative experiences are also encoded implicitly, and activated by the presentation of co-occurring stimuli in the future as well. No amount of verbal explanation will change someone’s implicit memories and the mental models that result from them. Rather, for this type of memory to be altered, the same sensory-based neural systems involved in the creation of the memory must be activated.

James was a 7-year-old boy who was bitten by a dog at the park, requiring him to receive stitches. The incident created an immediate and persistent fear of all dogs. Though James’s parents explained to him that not all dogs are like the one who bit him, his debilitating fear remained. To address the fear, the therapist used knowledge of both types of memory. First, the therapist used James’s explicit memory capacity to educate him about how to tell whether a dog is likely to bite by taking turns in the office pretending to have characteristics of a biting or nonbiting dog (e.g., growling and backing away vs. tail wagging). The cortical ability to recognize cues for dangerous dogs increased James’s sense of control over whether he might be bitten, which slightly reduced his fear. To meaningfully alter his fear level the therapist also presented James with various interactions with dogs, coaching him to use his new skills to assess a dog’s safety and approach the dog when no indicators of risk were present. This required several walks in the park, as well as the borrowing and walking of a colleague’s dog. Had James not had multiple sensory-rich, non-threatening experiences with new dogs, his implicit association between dogs and pain would have persisted and been activated whenever he encountered one. The play therapist’s understanding of this neurobiological principle informed the selection of an exposure therapy as an effective intervention (Knell & Dasari, 2006).


Advances in neurobiology have stimulated an expansion of attachment theory and research, which stresses the significance of the relationship in clinical practice (Hughes, 2004; Neigh, Gillespie, & Nemeroff, 2009; Perry, 2009; Schore, 2001, 2003; Schore & Schore, 2008; Siegel & Bryson, 2011; Wooglar, 2013). The evidence thus far suggests that a young child’s developing brain is likely to be affected by the attuned interactions between the parent–child dyad (Schore, 2001, 2003; Schore & Schore, 2008), which are the foundation of the attachment process (Bowlby, 1969, 1973, 1980, 1988). Thus, attachment has a critical role in the development of right brain regulatory systems (Fonagy, Gergely, Jurist, & Target, 2002; Schore & Schore, 2008). Indeed, it is now widely accepted that early emotional relationships substantially influence brain development and affect regulatory (limbic) systems in the brain (Davies, 2002; Perry, 2009; Schore & Schore, 2008; Siegel & Bryson, 2011). These affect regulatory processes evolve during the infant’s first six months through a meaningful, reciprocal attachment relationship with the primary caregiver (Bowlby, 1969, 1973, 1980, 1988). To put it another way, a meaningful attachment relationship functions as the relational base of affect regulation (Applegate & Shapiro, 2005; Hughes & Baylin, 2012). In support of this reciprocal attachment relationship, research emphasizes the importance of calming
Another aspect of attachment theory that is supported by principles of neurobiology is the concept of an internal working model (Bowlby, 1969, 1973, 1980, 1988). From both attachment and neurobiological perspectives, children create inner representations of their experiences of themselves and others that include both cognitive and affective aspects of significant and subjective interactions with primary caregivers. Attuned, rhythmic, repetitive, and reciprocal interactions in parent–child dyads (Schore & Schore, 2008) are most likely to help the child develop a positive internal working model that buttresses the child’s ability to strive in the world. The human brain is described as an “organ of adaptation” (Cozolino, 2006, p. 6) to the outer world; that is, it strives or fails through positive and negative interactions with the environment. It is no longer surprising that early adversities due to abuse and maltreatment cause critical damage to the neurological functions of affect regulation and autobiographical narrative coherence, among others (Perry, 2009; Schore & Schore, 2008; Siegel, 2001; Siegel & Bryson, 2011). The child that comes from a deprived early experience could benefit from attachment-based play therapy that offers the experience of caring, attuned interaction. This new caring experience presumably calms the limbic area and helps to create new neural pathways in the brain, that leads to building a healthy attachment relationship.

Karl was a 3-year-old boy who was domestically adopted at birth. Karl was described as a sensitive and hypervigilant child who often became inconsolably distressed. Sarah, Karl’s adoptive mother, reported experiencing unmanageable levels of stress in responding to Karl. She found herself becoming anxious whenever Karl was upset. Recognizing Sarah’s lack of confidence in providing parental assistance to regulate Karl, the therapist first began to work with Sarah to rebuild her confidence and capacity to parent Karl. Realizing that Karl and Sarah’s right brain-to-right brain communication was likely out-of-sync, resulting in mutual defensiveness in their relationship, the therapist also implemented an attachment-based play therapy model such as Theraplay® (Booth & Jernberg, 2010) to provide them a new experience of “right-to-right brain prosodic communication” (Schore & Schore, 2008, p. 14). Karl became better regulated as their attachment relationship strengthened.

**Recommendations**

Play therapists have long struggled to legitimize work we intuitively know to be valuable to our clients yet which is often questioned by parents, the public and even our colleagues in psychology, counseling and social work. One of the appeals of a neurobiologically informed approach to practice is that it translates the important work play therapists do with children into scientific terms. This scientific explanation may help parents understand why we use play in working with children. It can also be helpful in clinical decision-making, offering the opportunity to consider a child’s moment-by-moment neurobiological functioning in selecting interventions. This stands in contrast to relying on symptom-driven approaches or theoretical models that prescribe particular ways of interacting, which may or may not be useful for a child at a given time. Related to this, a neurobiologically informed understanding of work with a child allows the clinician to select interventions most likely to impact the areas of the brain in which the child’s overall functioning suggests a deficit while recruiting those areas with relative strength to promote positive development.

The overview of principles of neurobiology provided in this article is meant to act as an introduction to the use of neurobiology in play therapy. There are a number of steps play therapists can take to continue to increase their skill at incorporating neurobiology into practice.

First, play therapists should continue to enhance their understanding of neurobiology via reading, continuing education, and conversation with other play therapists familiar with principles of neurobiology. Related to this, play therapists should also practice explaining the neurobiological basis for play therapy interventions in lay friendly terms that can be understood by parents, school officials, and funding sources. It is essential to be able to communicate an understanding of the impact of children’s experi-
ences on their brains, and how play-based interventions are likely to help promote healthy brain development.

Second, play therapists can use neurobiology to support treatment plans. This is especially important because principles of neurobiology suggest that interventions will vary in their effectiveness depending upon the cognitive and emotional state of the child, something current evidence based practice models rarely take into account when establishing treatment efficacy. In practice, this might involve adding a section that identifying the neurobiological principle underlying an intervention choice to a treatment plan, whether the plan is used primarily within a practice setting or is shared with third-party payers such as insurance companies. Additionally, principles of neurobiology can be provided as a rationale when recommending that a parent’s or school handle problem behavior in a way that matches the child’s neurodevelopmental rather than chronological age. Principles of neurobiology offer leverage in justifying interventions with children.

Third, even without knowing specific brain structures and functions, play therapists can use themselves in neurobiologically informed ways. Although this article has emphasized knowledge of specific aspects of neurobiology and their implications for treatment, the one principle that underlies all of this knowledge is that humans are relational creatures whose brain development (and thus well-being) depends on interaction with other well-regulated human beings. Play therapists who seek to integrate neurobiological aspects into their practice must also become aware of the nonverbal signals they are sending during interactions with child clients, (e.g., tone of voice, body posture, etc.). This is essential to create a neurobiological resonance between therapist and client, and to provide an authentic and supportive relational environment for children who are working on regulating their developing brains. This is a foundation of neurobiologically informed play therapy practice.

Neurobiologically informed play therapy is a valuable asset in establishing and explaining a treatment plan for a child client, and one that offers flexibility to the clinician in assessing a child’s moment-by-moment needs. As play therapists become more neurobiologically informed we are likely to find that our work with children is more effective, and makes sense both to us and to those to whom we explain it. Increased effectiveness and improved explanation are of benefit to the child clients whom we have dedicated our careers to helping.

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