Navigating the "Unhappy Constellation" of Dissociative Identity Disorder, Infant Trauma, and Type D Attachment

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Patients with a current diagnosis of Dissociative Identity Disorder and a history of infant abuse may present for therapy with a constellation of neurobiological and socioemotional issues. During the initial stages of therapy, clinicians' primary goal is to stabilize the patient and reduce acute symptoms. Understanding the most effective way to achieve this baseline goal requires the clinician to appreciate the chronic neurobiological effects of trauma for a patient abused during infancy. Through an attachment theory lens, this paper will discuss the effects of infant trauma on the brain, review traditional methods used to stabilize the patient, postulate complementary strategies discussed in the literature, and recommend directions for future research.

Modern day psychologists define dissociation as a condition when thoughts, feelings, and experiences fail to integrate into the consciousness and become fragmented (Bernstein & Putnam, 1986; Spiegel & Cardena, 1991). Dissociative experiences exist on a continuum, ranging from common (i.e., daydreaming and déjà-vu) to pathological (i.e., failure to integrate thought, feelings, and emotions) (Mulder, Beautrais, Joyce, & Ferguson, 1998). Normal dissociative experiences are highly prevalent in the general population. Ross, Joshi, and Currie (1990) conducted one of the first studies on dissociation in a normal sample. From an initial population of 650,000 people, they selected 1055 individuals using a stratified random sampling method. They reported that dissociative experiences were common in at least a quarter of the sample.

The American Psychiatric Association (American Psychiatric Association, 2000b) categorizes four clinically significant dissociative disorders: Depersonalization Disorder (American Psychiatric Association, 2000a), Dissociative Amnesia (American Psychiatric Association, 2000c), Dissociative Fugue (American Psychiatric Association, 2000d), and Dissociative Identity Disorder (American Psychiatric Association, 2000e). Specifically, Dissociative Identity Disorder (DID), previously referred to as Multiple Personality Disorder, is the alternation of two or more distinct personality states with impaired recall of important information (American Psychiatric Association, 2000b). The prevalence of DID in the U.S. population is between 6% and 10% (Foote, Smolin, Kaplan, Legatt, & Lipschitz, 2006). However, since this disorder often goes unrecognized, it is difficult to accurately estimate the prevalence.

This review will discuss a) the history and definition of dissociation, b) the criteria for diagnosis of dissociative disorders, c) the relationship of dissociation to infant trauma, d) the neurobiology of infant trauma and attachment, e) the various theories of infant attachment, and f) the phases of treatment for dissociative identity disorder. Lastly, with special attention to the first phase of treatment, a history of both infant trauma and Type D attachment, the authors propose complementary strategies to address stabilization and symptom reduction for adult patients with a history of infant trauma and a diagnosis of DID.

Defining Dissociation and Dissociative Disorders

The concept of dissociative disorders stems from Janet's (1886) psychological experiments with his patient Lucie, who displayed spells of hypnosis where she neither remembered events nor felt physical pain. Eventually, Janet trained Lucie to enter a hypnotic state by asking her to concentrate on a conversation that he held with a third party. As she concentrated, Janet whispered questions to her and she wrote the answers on a sheet of paper. Lucie signed these pieces of paper as "Adriene." Janet reported that Lucie's consciousness had three states, which included Lucie 1, Lucie 2, and Lucie 3 (i.e., "Adriene"). Shortly after Janet hypnotized "Lucie 1," this state was quickly interrupted by "Lucie 2." "Lucie 2" retained memory for every episode for which she was present and also had the uncanny ability to remember events during which "Lucie 1" was present. "Lucie 3," also known as "Adriene," could remember every experience from "Luci 1" and "Luci 2" and she recalled events that occurred in early childhood. Janet argued that "Adriene" represented total consciousness as Lucie displayed conscious actions and felt physical pain when she became "Adriene" (van der Hart & Horst, 1989). Janet asserted that Lucie displayed dissociative phenomena as a

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result of a trauma that occurred when she was 7 years old (van der Hart & Horst, 1989). Research today challenges whether Lucie had a true case of DID or whether she is simply an illustration of a therapist's influence over a patient (Piper & Merskey, 2004).

The current diagnostic criteria in the DSM-IV for Dissociative Disorders are as follows (American Psychiatric Association, 2000b):

1. The presence of two or more distinct identity or personality states, each with its own relatively enduring pattern of perceiving, relating to, and thinking about the environment and self.
2. At least two of these identities or personality states recurrently take control of the person's behavior.
3. Inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness.
4. The disturbance is not due to the direct physiological effects of a substance (e.g., blackouts or chaotic behavior during alcohol intoxication) or a general medical condition (e.g., complex partial seizures).
5. In children, the symptoms are not attributable to imaginary playmates or other fantasy play. A patient's history, x-rays, blood tests, and other procedures can be used to eliminate the possibility that symptoms are due to traumatic brain injury, medication, sleep deprivation, or intoxicants, all of which can mimic symptoms of DID.

Before diagnosing a client with DID, differential medical and psychological diagnoses should be carefully considered. For example, therapists must clarify whether a patient's symptoms are not a physiological response to substance abuse or a general medical condition (e.g., complex partial seizures). A client's medical history, blood tests, and x-rays will rule out symptoms from substance abuse, sleep deprivation, and other issues that produce symptoms which mimic those of DID. Differential psychological diagnoses for DID include, but are not limited to, Psychotic Disorders, Anxiety Disorders, Somatization Disorders, and Personality Disorders. Clinicians may utilize the Dissociative Disorders Interview Schedule to discriminate between various DSM-IV diagnoses (American Psychiatric Association, 2000b; Ross & Ellason, 2005). After the therapist addresses the differential diagnoses, the therapist may use The Structured Clinical Interview for DSM-IV Dissociative disorders to diagnose dissociative disorders. The next step is to create a plan to treat the patient in light of the DID diagnosis. Often categorized as a population with limited social capacity, poor boundaries, and manipulative character traits, patients with DID certainly pose a significant challenge to therapists (ISSD, 2005; McAllister et al., 2001).

Dissociation and Infant Trauma

Studies speculate a link between dissociation and the experience of trauma (Ferguson & Dacey, 1997; Mulder et al., 1998; Sanders & Moore, 1999), especially when trauma occurred in childhood (Zlotnick et al., 1996). Children, namely infants, may resort to dissociation to cope with trauma because of their limited range of coping strategies (Schore, 2001). There is a growing recognition that consequences of infant victimization include: (a) psychological maladjustment (Yehuda, Halligan, & Grossman, 2001), (b) altered brain development (Keverne, 2004; Schore, 2001, 2002), and (c) delayed socioemotional growth (Main & Hesse, 1990).

Relationships are also seen between dissociation and Posttraumatic Stress Disorder-like symptoms (Farley & Keaney, 1997), bulimic symptoms (Reto, Dalenberg, & Coe, 1993), and self-mutilation (Briere & Gil, 1998). While dissociation protects the infant psyche from trauma, it ultimately becomes a maladaptive coping strategy in adulthood (Schore, 2001).

While research continues to point to an association between trauma and dissociation, Frankel (1996) and Piper and Merskey (2004) warn against claiming causation between two variables when research points only to association. Nevertheless, dissociation presents in many survivors of childhood abuse who may seek assistance from a trained psychologist. Therefore, therapists must be prepared to treat patients with a diagnosis of DID who report a history of childhood abuse. Moreover, due to the tenuous causal relationship between childhood abuse and DID, therapists should not assume that the patient's history of childhood abuse caused DID in adulthood (Piper & Merskey, 2004).

Infant Attachment

Infant attachment is assessed through a standardized laboratory procedure when the infant is between 12 and 18 months old (Ainsworth, 1982). Clinicians observe the infant during two brief episodes of separation and reunion with the primary caregiver. The infants' response in the scenario is meant to reflect the relationship that the infant and caregiver maintain in the home (Ainsworth, Blehar, Waters, & Wall, 1978). Initially, there were three classes of attachment: secure (type B: infant cries at separation and is easily comforted at reunion), insecure-avoidant (type A: infant cries at separation and avoids caregiver at reunion), and insecure-ambivalent (type C: infant cries at separation and is not easily comforted at reunion). Several years later, Main and Solomon (1986) created a disorganized (type D) attachment type for children whose behaviors did not reflect a coherent pattern. The creation of this fourth category emerged when researchers reported that a portion of infants demonstrated an absence of an organized emotional regulation strategy during stressful periods (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Main & Solomon, 1990). Behaviors fell on a continuum, ranging from abstract (observer's expectation of infant patterns) to obvious (freezing of movement and dazed expression for 30 seconds or longer).

Infants categorized as having a Type D attachments display one of the following: disordering of expected temporal sequences, simultaneous display of contradictory behavior patterns, incomplete or undirected movements and expressions, direct indices of confusion and apprehension, and behavioral stilling (Main & Solomon, 1990). Research on the disorganized attachment bond report four findings that distinguish D attachments from the others: (1) attachment status is independent across caregivers (Main & Solomon, 1986), (2) caregivers reported unresolved attachment-related trauma issues (Main, 1983; Main & Cassidy, 1988; Main, Kaplan, & Cassidy, 1985), (3) a majority of infants with abusive parents display type D attachment as compared with a minority of control infants (Egeland & Stroufe, 1981; Main & Hesse, 1990), and (4) 5 years later a majority of children displayed controlling and parental behaviors toward their parents (Main & Cassidy, 1988). At a 5-year follow-up, researchers found that when children displayed a type D attachment with one caregiver and a different classification with another caregiver during infancy, attachment status remained the same with the former caregiver and changed to either type B or C with the other caregiver (Main & Hesse, 1990). When interviewers asked mothers about their children's separation, mothers' responses remained fearful and disorganized (Main & Hesse, 1990). Research also points to the relationship between disorganized attachment behavior and dissociation, which will be discussed in greater depths in this paper (Hesse & Main, 2000).

Neurobiology of Attachment and Trauma

Animal models provide researchers with a solid foundation on which to understand the long-term neurological consequences of child abuse (Gutman & Nemeroff, 2002). Stemming from classical articles that report the effects of maternal separation on the squirrel monkey (Coe, Lulbach, & Schneider, 2002), current research demonstrates the long-term neurobiological changes in animals that are subjected to prenatal and post-natal stressors (Nemeroff, 2004). Generally, studies show that periods of maternal separation may cause neurobiological issues that resemble mood and anxiety disorders (Nemeroff, 2004).

Research on non-human primate models also supports the notion of a sensitive period of neurobiological development and attachment with the mother. Hubel and Wiesel (1979) sought to test the importance of sensitive periods of development in cats by blocking the visual input to one eye of a cat during a sensitive period. Results showed that the cat suffered permanent impairment in that eye. When researchers tested this theory on children (Taylor & Taylor, 1979), they found that children have irreversible reduction in visual acuity if they have cataracts or squint beyond the age of 8 to 10 years old. These findings suggest that external influences during sensitive periods have major consequences on healthy development. Is it safe to extend these findings to other areas of the human brain where stunted development

may not display as readily as it may in certain human brain regions or in animal brains?

The literature has only recently begun to explore the qualities of trauma at the infant stage of development (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). Beginning in pregnancy and continuing through age 2 years old, the infant brain is the most plastic and requires an immense amount of energy to develop (Perry et al., 1995). Reflective of the animal studies described earlier, infants also have sensitive periods of development (Perry et al., 1995) when their brains are receptive to novel information but also highly susceptible to the effects of abuse (Schore, 2001). Although the sequence of brain development is not influenced by the infant's environment, the quality of brain development relies upon the external stimuli provided by the caregiver (Schore, 1994).

The infant brain expects certain experiences to occur during infancy. For example, the infant expects for the mother to regulate her emotional states (Schore, 1994), minimizing the negative and maximizing the positive (Schore, 1997). The infant expects this type of warmth from the mother since she is the only person that the infant knows, and it depends upon the mother to care for its basic survival needs. This includes all executive functioning tasks, arguably one of the most important of which is the infant's reliance on the mother to modulate its emotional and physical response to external stimuli (Streeck-Fisher & van der Kolk, 2000). The immature infant brain lacks the sophistication to cope with trauma in the ways used by healthy adults (Perry et al., 1995; Schore, 2001). When the mother fails to regulate the infant's response to stimuli by soothing and calming the baby, the infant must rely on its primitive coping mechanisms. Primarily, the infant brain responds to trauma in two ways: hyperarousal and dissociation (Perry et al., 1995).

When an infant feels distressed, its autonomic nervous system is activated and it screams and cries (Schore, 2001). When the primary caretaker fails to comfort the child, it becomes increasingly agitated and its sympathetic nervous system (SNS) becomes hyperaroused (Perry et al., 1995), a phenomenon that Gellhorn (1967) labeled egotropic arousal. During egotropic arousal, high levels of corticopin releasing factor (CRF) and noradrenaline are released into the bloodstream (Brown et al., 1982). When CRF and noradrenaline are secreted, a rush of adrenaline surges through the body. This chemical reaction causes the brain to enter a hypermetabolic state (Schore, 2001).

At this stage in the stress response, the processes that are essential to the infant's survival become hyperaroused and secondary processes are inhibited (Perry et al., 1995). The infant's heart rate increases, eyes dilate, and breathing quickens (Schore, 2001). The baby is fully alert and hypersensitive to its dangerous environment. To preserve energy for survival needs, the infant's digestion and reproductive urges are inhibited (Schore, 2001). Although infant and adult reactions to stress hold some similarities,

there is one critical difference that places infants at a higher risk for developing maladaptive coping strategies in later years; infants cannot choose how they react to stress in the same manner as adults. Cannon (1929) called his stress response theory "fight or flight" because the person who experiences the stress prepares to either fight the danger or to flee from it. Infants do not have the luxury to decide whether to fight or flight (Perry et al., 1995). They can do neither.

The irony for infants with abusive parents is that the person to whom they literally cry for help is the one who harms them. After many failed attempts at crying for its mother's attention, the infant will abandon this help-seeking behavior (Perry, 1995). At this point, the infant has moved through the "fight or flight" continuum and enters the dissociative continuum (Schore, 2001). Instead of seeking help and attention from the mother in the form of crying, infants who dissociate retreat inward and cease to interact with their external or internal environments (Schore et al., 1994). When infants experience a helpless and desperate situation, their parasympathetic regulatory system begins inhibiting certain brain processes in order to protect them from the dangerous situation. Instead of expending energy on processes to prepare for a fight mentality (i.e., quick heart rate, dilated pupils), the body enters a state of conservation withdrawal (Kaufman & Rosenblum, 1967). Unlike the overarousal experienced in the primary stages of trauma, dissociation involves numbing, avoidance, compliance, and restricted affect (Putnam & Loewenstein, 1993). The infant brain responds to stress in this manner to numb the physical pain of abuse and to remain virtually invisible as a strategy for protecting itself against further harm (Perry et al., 1995; Schore, 1994). Instead of utilizing complex systems in the cortical-limbic region to modulate stress, the infant who dissociates relies on primitive autoregulatory systems found in subcortical-limbic brain regions (Schore, 2001).

In an effort to maintain homeostasis during egotrophic hyperarousal, parasympathetic trophotropic arousal (Gellhorn, 1967) occurs for the infant. Simultaneous activation of the sympathetic-adrenal-medullary and hypothalamic-pituitary-adrenal (HPA) axes typically occurs during acute stress, but eventually they operate independently (Schore, 2001). When an infant experiences chronic trauma, both the sympathetic energy-expending and parasympathetic energy-conserving components of the infant's developing autonomic nervous system are hyperactivated (Perry et al., 1995). Despite the rush of adrenaline surging throughout the infant's body during the acute response to stress (SNS activation), the infant's brain begins secreting opioids, which decrease blood pressure and heart rate and inhibit processes like crying (PNS activation). Schore (2001) describes this paradox as the infant's body and brain "riding the brake and the gas at the same time" (p. 231). The simultaneous arousal of these two systems (Putnam, 1997) may explain why infants classified as having a type D attachment rapidly shift into primitive sympathetic

states. Among other criteria, Main and Solomon (1990) characterized Type D infants as displaying undirected expressions and contradictory behavior. A chronically abused infant who rapidly shifts between sympathetic hyperarousal and hyperparasympathetic dissociation will meet these criteria. The infant may display distress in the form of crying and shrieking (sympathetic hyperarousal) followed immediately by emotional withdrawal and blunted affect (hyperparasympathetic dissociation).

Since abused infants' brains are in a perpetual state of survival mode, they lack the limbic formation and organization displayed by infants reared in healthier households (Schore, 1994). An infant with an underdeveloped limbic system may display difficulty adapting to changing environments and organizing novel information (Mesulam, 1998). An infant's stress response sets the pattern for later stress responses (van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Therefore, an infant who chronically hyperarouses and dissociates in response to a traumatic situation will likely classify as having a type D attachment and may utilize dissociative behaviors later in life (Van Ijzendoorn, et al., 1999). Individuals prone to entering dissociative states may utilize this primitive defense not only during acute stress but also moderate and mild stress (Schore, 2001). When dissociation becomes an instinctual reaction to trauma, the infant's emotional intelligence is stunted (Schore, 2001).

Research suggests that chronic childhood abuse may severely impact the orbitofrontal cortex (Balbernie, 2001; Schore, 1994, 2001, 2002), an area of the limbic system involved in cognitive processes like emotional regulation and positive affect (Anderson, Bechara, Damasio, Tranel, & Damasio, 1990). Development of this part of the brain depends on interpersonal relationships during infancy, which include but are not limited to attachment bonds with the mother (Balbernie, 2001; Schore, 2000). The orbitofrontal cortex assesses the infant's internal state and regulates its emotional reactivity (Balbernie, 2001). Well-adjusted children react appropriately to aversive stimuli in their environments, whereas maladjusted children may overreact to external stimuli or dissociate entirely (Schore, 1994). An underdeveloped orbitofrontal cortex may result in a lack of flexibility to cope with aversive stimuli and a limited array of cognitive coping strategies like self-soothing (Morgan, Romanski, & LeDoux, 1993).

Patients with a history of infant trauma and a current DID diagnosis likely suffer from many of the neurobiological issues discussed above. Intense psychotherapy may affect not only the socioemotional well-being of the patient, but also the patient's neurobiological reactions to stress. A landmark study by Paquette et al., (2003) found that cognitive and behavioral changes achieved during psychotherapy lead to regional brain alterations in patients diagnosed with major depression or Obsessive Compulsive Disorder. Researchers chose subjects suffering from spider phobia ($n = 12$) and measured their regional

brain activity before and after cognitive behavioral therapy (CBT) using fMRI. Before completion of CBT, fMRI scans taken during fear states showed a significant activation of the right dorsolateral prefrontal cortex, the parahippocampal gyrus, and the associative cortical areas, bilaterally. After completion of CBT, significant activation was not shown in the dorsolateral prefrontal cortex or the parahippocampal gyrus. This study, the first to measure the effects of therapy on brain states, shows that therapy has the potential to change patients' reaction to stressful stimuli. As noted earlier, an underdeveloped limbic system greatly impedes the patient's ability to cope with stressful situations beyond primitive responses. Therapists may work with patients to change their maladaptive responses to stress, which were systematically created during infancy. Working with the patient to develop more sophisticated responses to stressful situations can be addressed during phase one of treatment. This is a vital step that will provide the patient with the necessary tools to combat intense issues in later treatment phases (i.e., traumatic memories and "alter" reintegration).

Treating Dissociative Identity Disorder

The International Society for Study of Dissociation (ISSD) recognized the complexities in treating patients with DID and created a set of guidelines for therapists to follow (ISSD, 2005). The ISSD recognizes that patients with a complicated trauma related disorder, such as DID, are most appropriately treated with a phase or stage oriented approach. Typically, treatment includes three stages: (a) Enacting safety, stabilization, and symptom reduction, (b) working directly and in depth with traumatic memories, and (c) utilizing identity integration and rehabilitation (ISSD, 2005).

Each phase of treatment is important to the patient's mental health and physical safety (ISSD, 2005). Yet, the literature is imbalanced in the amount of research dedicated to each phase. The number of studies that discuss traumatic memories and identity integration outweigh those that address safety, stabilization, and symptom reduction. Aside from the growing body of research studying the efficacy of using pharmacological modalities to stabilize patients with DID (ISSD, 2005; Putnam & Loewenstein, 1993), the stabilization phase of treatment for DID has only recently begun to receive attention. Considering phase one is the groundwork upon which the therapeutic relationship is built, it is surprising that more research is not dedicated to studying the initial stages of the patient-therapist relationship. To fill the gap in the literature on the first phase of treatment, this paper will focus solely on safety, stabilization, and symptom reduction.

Many patients with DID focus primarily on establishing a trusting relationship with the service provider, often for a substantial amount of their time in treatment (McAllister et al., 2001; ISSD, 2005). This finding may illustrate the difficulty for patients to reduce symptoms and remain stable. Patients with a long abuse history, reaching as far back as

infancy, may demand a longer and more in depth focus on the safety and trust issues that are discussed in phase one (ISSD, 2005) to ensure a healthy dependency on the therapist (Steele, van der Hart, & Nijenhuis, 2001). When patient and therapist explore how to increase the patient's feelings of internal and external safety and learn strategies that reduce her symptoms, the patient may become more functional in therapy and in her daily activities (ISSD, 2005). While this is an ideal scenario, it is not easily achieved.

The Early Phase of Treatment: Setting Biopsychosocially Competent Boundaries

A healthy therapeutic relationship is a delicate balance among sympathetic listening skills, re-parenting tactics, and boundary setting (Peternelj-Taylor, 2002). While maintaining appropriate boundaries with every patient is important to the therapeutic relationship (Atkins & Stein, 1993), it is especially important when working with childhood abuse survivors (Briere & Elliot, 1994). The power dynamic presented in therapy mimics the relationship that survivors had with their caregiver(s): the patient (or, child) seeks help and nurturance from the therapist (or, caregiver) (Peternelj-Taylor, 2002). The therapist and caregiver hold the power in the relationship, while the patient and child are the vulnerable counterparts seeking guidance.

One of the goals in therapy is to guide and nurture the patient without re-traumatizing or abusing her (McAllister et al., 2001). When a therapist treats a patient without violating her boundaries, the patient's inherent belief that caretakers will compromise ethics and morals for their own personal gain is challenged (Boyrs, 1994). When the creation of boundaries stems from the therapists deep understanding of the patient's issues surrounding trust and intimacy, they are a healthy and essential part of the therapeutic process.

Therapists who blindly and defensively follow rules solely to protect themselves from malpractice claims are usually inefficient and negligent to the unique needs of their patients (Boyrs, 1994; Lazarus, 1994). Lazarus illustrates this point with an example when he disregarded traditional boundaries with a "difficult" patient by inviting the patient to share a meal with him. Ultimately, the boundary violation was a "turning point" in therapy and served to dramatically reduce the patient's hostility.

While many therapists may take offense to this example, it is used to illustrate why boundaries exist in therapy, when clinicians may appropriately disregard certain boundaries, and how boundary negotiation occurs between therapist and client. For instance, Lazarus reports that a traditional boundary violation resulted in improved patient functioning. While many therapists may assert that sharing a meal with a patient is unethical, Lazarus's unconventional relationship with the patient serves to remind us that patients are human beings that thrive on warmth and compassion.

Does this mean that therapists who set boundaries with patients are treating them in a detached manner? Boyrs

(1994) asserts that adherence to boundaries does not equate to depersonalized and cold therapy. Rather, strict boundaries during therapy may serve to model for the patient how she can create boundaries within herself to reduce the sense of fragmentation experienced by many patients with DID. The opposing viewpoints in the literature on boundaries serve to create a continuum for which therapists can personally decide the end on which they will practice. Although Boyrs (1994) and Lazarus (1994) disagree on a number of tenets regarding clinical boundaries, they both agree on at least one overarching concept: therapists who engage in "rote, mindless rule following" are performing a disservice to their clients (Boyrs, 1994, p. 273).

Trauma-induced Neurobiological Changes and their Influence on Treatment

Challenging "mindless rule following" may not always include walking the fine line of boundary infraction with the patient. It may include assessing parts of the patient's internal systems that are not traditionally part of psychotherapy. Analyzing and discussing the patient's neurobiology is a way that therapists can understand the patient in a fresh and innovative light that defies tradition. Neurobiological changes in brain structure may have significant effects on the therapeutic process.

Studies report that parahippocampal gyrus, hippocampus, and amygdala volumes were smaller in participants with DID than healthy control groups (Ehling, Nijenhuis, & Krikke, 2008). As described earlier, Schore (2001) reports that corticolimbic areas of the abused infant brain do not develop appropriately, which results in compromised intra- and interpersonal interactions. Although psychologists are still in the preliminary stages of understanding exactly how certain neuroanatomical brain changes affect daily functioning, researchers have a sound grasp on the functions of certain parts of the brain.

Immature functioning in certain brain regions may impact the fluidity of the therapeutic process. Research demonstrates that the hippocampus is an integral component to learning and memory (Vargha-Khadem et al., 1997) and is particularly sensitive to stress (Sapolsky, 1996). Specifically, the hippocampus is responsible for placing a memory in the appropriate time, place, and context, as well as integrating memories as they occur (Holscher, 2003). Patients with a history of infant abuse will likely have a hippocampus that is dramatically reduced in volume in comparison to patients who have not experienced severe trauma (Stein, Koverola, Hanna, Torchia, & McClarty, 1997).

Although the literature has yet to directly address how brain abnormalities affect the therapeutic process, studies have analyzed this phenomenon in other contexts. For example, Saigh, Mroueh, and Bremner (1997) studied academic performance in traumatized adolescents in Beirut. Compared with a non-traumatized group and a traumatized group without PTSD, the participants with past trauma and confounding PTSD had greater deficits in academic performance. Since therapy is a place where patients learn about themselves and their diagnoses, similar issues may extend to the therapy office.

When setting boundaries with a traumatized population, the therapist may present information using a number of different modalities throughout treatment. This may include verbal, physical, and pictorial representations presented consistently during therapy. Since a primary function of the corticolimbic system is to regulate appropriate interactions with others and moderate emotional reaction, patients may have difficulty accepting the boundaries and verbally communicating why they are resistant.

In this case, the therapist may include non-verbal activities like art (Chapman, Morabito, Ladakakos, Schreier, & Knudson, 2001), dance (Gray, 2001), and sandplay (Daniels & McGuire, 1998) into the session. Research on these types of alternative therapy is scarce and needs further investigation to support their efficacy as independent modalities. The limited literature on these therapy models indicate their effectiveness in reducing PTSD symptoms in children (Chapman et al., 2001), rebuilding adults' sense of self after torture (Gray, 2001), and communicating recurrent nightmares in adult war survivors (Daniels & McGuire, 1998).

Reduced hippocampal volume and immature corticolimbic system in traumatized populations are only two examples of the several brain structures affected by chronic abuse and stress. Therapists can manage patient care by understanding the neuropsychological literature and modifying treatment plans to account for the unique neural functioning of each patient. Patients who consistently violate boundaries may have difficulty accepting those limitations into their neural networks and respecting them in therapy.

Patients with a history of abuse starting in infancy have learned to dissociate in order to protect themselves from a caretaker chronically violating physical, emotion, and mental boundaries. Therefore, the transition into therapy will likely reflect that history. Literally, trauma has reshaped patients' brains. Since the patient experienced abuse at the hands of a caretaker during infancy, the therapist should consider assessing the patients' psychopathology and neurobiology under an attachment lens.

Traditional Strategies for Treating Dissociative Identity Disorder

Talk therapy and alternative interventions. Talking is a major part of most therapy sessions. When treating survivors of trauma who dissociate, a multidisciplinary approach to treatment may prove effective since the patient may not have the words to express her emotions verbally. Schore (2001) offers persuasive evidence that right brain development is severely impeded in chronically abused children. The areas that respond to the traumatic event are those located primarily in the right hemisphere, for example the right

amygdala. Given the underdevelopment of those areas during infancy, neural networks connecting experiences with emotions in certain brain centers may not have formed. Perhaps this is a reason why infants store memories of abuse in their limbic system, which is considered a major network for emotions (Schore, 2001). What effect does this abnormal storing of events have in later years? Van der Hart, Bolt, and van der Kolk (2005) explain that when a person remembers a traumatic event the primary language and speech areas shut down. Therefore, when patients arrive at therapy years after the abuse occurred, they may present with overwhelming emotions and limited verbal capacity. Clinicians may use alternative ways of understanding the patient's physical and emotional state aside from verbal communication, like utilizing grounding and containment strategies as a means to assist clients in achieving stability during and after therapy (ISSD, 2005). These strategies may be used during phase one of treatment to teach the patient a series of healthy coping mechanisms that she may employ throughout the therapeutic process.

The following section includes a brief outline on the traditional therapeutic techniques of grounding and containment as well as a review of the sparse literature on complementary forms of treatment such as exercise and meditation. These techniques will be reviewed in light of the attachment issues and neurobiological functioning in adults abused as infants. Self-soothing techniques like grounding and containment may be especially useful for adults with an infant abuse history since they do not require that the patient express herself verbally. Instead, they ask the patient to connect her mind and body in novel ways. These are likely invaluable additions to therapy sessions with trauma survivors since they are tools that the patient may adopt as coping techniques in her everyday life. These techniques empower the patient to regulate her own emotional responses to stress, which she may lack as a result of an underdeveloped corticolimbic system.

Grounding and containment. When a patient enters a dissociative state during therapy, clinicians may use that moment as an opportunity to work with the client on grounding and containment techniques. Getler (2005) describes grounding techniques as "tools to help the patient stay in the here and now" (p. 69). Therapists can remind the patient where she is, the date and month, and other facts that will help her remain in reality. Therapist may encourage patient to feel her own body and touch physical objects in the room (Getler, 2005). The therapist may use grounding techniques at various points during the session to meter the patient's disclosure, as well as to help her remain emotionally and physically present.

Diaphramatic breathing is another strategy that provides patients with a means to center the self and modulate overwhelming feelings. Aside from providing the patient with a technique to collect her thoughts and feelings, deep breathing also grounds the patient in the moment and reminds her that she is physically present. Therapists may also discuss ways to temper an oncoming dissociative state by identifying behaviors that occur just before the patient dissociates. Brown, Russell, Thorton, and Dunn (1999) report that discussing patients' visual responses to dissociation like field constriction, fogginess, and difficulty concentrating on stimuli, are effective for connecting mind and body for patients who have eating disorders. Therapist may consider teaching these techniques during initial sessions of treatment to provide the patient with healthy coping mechanisms that she may use during more intense parts of treatment.

To date, research in the area of grounding and containment needs randomized controlled studies that assess the efficacy of these techniques for trauma survivors. Research endeavors may include an analysis of how therapists teach these techniques and the manner in which patients receive the instruction. Understanding the effects of these techniques on patients during therapy and in their daily lives will allow for a more standardized approach to treating patients with a history of infant trauma and a DID diagnosis.

Complementary Treatment Strategies

Exercise. Since Morgan and Goldston's (1987) observation that psychiatric patients who were unfit were more depressed than their physically fit counterparts, researchers continue to study the relationship between physical fitness and mental health. A review paper by Byrne and Byrne (1993) tentatively reports that exercise programs decrease depression and anxiety while enhancing positive mood. Similarly, Steptoe and Butler (1996) showed that rigorous exercise was related to a decrease in emotional distress. In a very recent study, Moor, Stubbe, Boomsma, and Geus (2006) collected data on a sample ($N = 19,288$) of twins who exercised a minimum of 60 minutes weekly at 4 METs (Metabolic Energy Expenditure Index). Exercisers were less anxious (-.18 SD), depressed (-.29 SD), and neurotic (-.14) than non-exercisers. Exercisers were also more extraverted (+ .32 SD) and achieved higher scores in areas of sensation seeking (+.25 SD, - + .47 SD) than non-exercisers.

While studies have shown that exercise is effective in reducing mild to moderate anxiety symptoms, research does not adequately identify the specific components of exercise that may alleviate anxiety symptoms (Jorm et al., 2004). Further research is needed to understand how exercise affects psychopathology in patients that report infant trauma.

Meditation. Four out of five randomized controlled studies that examined the effects of meditation on anxiety report that meditation produced equivalent effects to other forms of relaxation (i.e., muscular relaxation, biofeedback) (Jorm et al., 2004). A recent study (Simpson et al., 2007) evaluated whether a 10-day Vipassana meditation course offered in a minimum security prison was associated with participants ($N = 302$) substance use and psychological distress outcomes at 3-months. Results indicate that there was no significant difference in PTSD symptom severity between patients who completed the meditation and those

who did not. The meditation course was associated with improvements in drug use and drinking outcomes for those with and without PTSD symptoms.

In his descriptions of Kundalini Yoga Meditation Techniques, Shannahoff-Khalsa (2004) discusses how mentally ill patients, specifically those with depression and sleep disorders, may use these techniques to battle their condition(s). "Tuning in," a technique used before the practice of any Kundalini practice, gives the experience of "being in a womb of healing energy" (p. 93). The practice leads the patient into a meditative trance through a combination of chanting and deep breathing exercises. Further research is needed to understand how specific meditation techniques affect individual symptomatology in patients with DID.

Conclusion

Bridging the research gap between the fields of neurology and psychology is the next logical step in the study of infant trauma and DID. The authors assert that the overall goal is to develop a holistic view of the neurobiological and psychological effects of infant abuse on the adult survivor and to effectively treat them. Future research endeavors should focus on reporting the relationship between neurobiology and psychology in patients with DID and a history of infant abuse. Academic neurological literature clearly outlines the devastating effects of chronic emotional and physical trauma to the anatomy and physiology of the developing infant brain. Academic psychological literature illustrates the attachment and boundary issues that manifest in therapy with adults survivors of childhood abuse. First, the authors encourage researchers to build on these studies in addition to the work of Schore (1994, 1996, 2001) and Perry et al. (1995) to develop a comprehensive understanding of how infant trauma impacts and disrupts child and adult socioemotional adjustment.

Secondly, more longitudinal studies are needed to understand how the brain changes along the developmental continuum, and which specific types of infant abuse (i.e., Shaken Baby Syndrome, sexual abuse) produce effects that alter development. Understanding the interaction between a patient's neurobiological systems and their development can greatly improve clinical care and guide treatment. In recent years, infant research on relational trauma has been growing steadily. As this knowledge base develops, new clinical tools will provide therapists with better assessment measures for evaluating trauma survivors and their families presenting for treatment.

Lastly, future research endeavors should also study how infants removed from abusive households and placed in protective care may or may not develop secure attachments to other caregivers (i.e., foster parents). Clinically, this will provide therapists with information regarding the creation of attachment bonds with foster parents. With this information

therapists may develop attachment techniques to teach protective caretakers as they learn how to develop secure attachment bonds with their infant. This may have great public health implications since healthy development of cortical regions is associated with appropriate intra- and interpersonal communication and emotional regulation in adulthood.

In closing, understanding physicians' and therapists' experiences working with abusive families and treating neglected infants is an essential component to the existing literature on infant abuse. When neurologists and psychologists collaborate on understanding how abuse affects the patients across the lifespan, the literature may move closer to identifying a causal relationship between childhood abuse and dissociation. Identifying the relationship among infant attachment to caregiver, neurobiological changes after infant trauma, and adult psychopathology will allow for comprehensive, multi-disciplinary treatment of patients with DID and a history of infant abuse.

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