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The Neuroscience of Human Relationships

Attachment and the Developing Social Brain

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Chapter 18

Borderline Personality Disorder: When Attachment Fails

I just love torturing people for not loving me enough.

—An anonymous poet

People with borderline personality disorder live on an emotional roller coaster. They inexplicably spin from fear, anguish, and pain into a sense of calm, only to lurch, once again, into an overwhelming sense of fear and anger. They experience criticism, shame, and abandonment from all directions as they hang on for their emotional lives. When confronted with even a hint of criticism or rejection, these people become emotionally overwhelmed and catapulted into drastically fluctuating moods, unstable perceptions, and rocky relationships. Friends and family suffer with them: They are targets of rage, accused of sadistically causing pain, and bewildered by unpredictable shifts in mood and behavior. Borderline personality is truly an interpersonal disorder, created in a social milieu, triggered by close relationships, and destructive to social connectedness.

What we witness in the lives of borderline clients is the result of a profound disruption of the development and integration of social brain systems and the ability to regulate emotion. The histories and symptoms of borderline clients strongly suggest that early attachment was experienced as highly traumatic and sometimes life-threatening (Fonagy, Target, & Gergely, 2000). Attachment trauma can result from physical and/or sexual abuse, neglect, or profound misattunement between parent and child.

Mood disorders have also been shown to occur at above-average rates in these patients and their parents, a likely contributing factor to difficulties in emotional regulation. Whatever the cause, the child is unable to utilize others in the development of secure attachment and to regulate overwhelming anxiety and fear. The result is that real or imagined abandonment triggers a state of terror, similar to what any young primate experiences when physically abandoned by its mother.

Jasmine—An Emotional Roller Coaster

Jasmine was an attractive woman in her late 20s who had moved to the West Coast about a year earlier to take a job in an advertising firm. She came to see me complaining of depression, anxiety, and estrangement from her family, as well as repeated failures in relationships. She seemed nervous about discussing personal issues, so we focused on her job during our early sessions. She was fun to talk to and easy to get along with, making me wonder why she had so much difficulty in relationships; I would soon find out. Jasmine came into my office for our fifth session with a big smile, bubbling over with enthusiasm about what had happened in the days since our last meeting. She was working on a new advertising campaign that she found challenging and exciting. This campaign was important to her company, and her boss was counting on her to do a good job. She was touched and honored by the faith he seemed to be placing in her.

As we had gotten to know each other, she described some of the specifics of the ad campaign, interactions with her coworkers, and the feedback they were getting from clients. Jasmine made sure to include details about her contributions to the project and how much better she was at many aspects of the job than her coworkers, despite the fact that they seemed to receive the kudos she deserved. She also mentioned that her stress levels were high and that she found it difficult to sleep and find time to rest and exercise. After a year of living in her apartment, she still hadn't found the time to empty the last few boxes or hang up her pictures. In passing, I mentioned that she might consider taking some time off to relax for a day or two.

As I finished making this suggestion, Jasmine's expression changed. At first she seemed to recede behind her eyes, and then they became tearful

as her expression turned soft and vulnerable. I barely had time to grow accustomed to her sadness when rage began to emerge through her tears. When I broke the silence by asking her what she was feeling, it was as if someone else were now in the room. She sprang from the couch like a cat and paced the floor in front of me.

"My boss knows that I can't handle this job," she yelled. "That bastard is just setting me up to fail so he can fire me! I know he doesn't respect my work. He treats me like shit! He never asks me to go out after work like the others and I know they talk behind my back. They all think I'm pathetic." She sat and glared at me. I was flabbergasted, but she wasn't through yet. Pointing her finger at me, she shouted, "You! You're just as bad! You think I'm some pathetic bimbo who has to pay you to be her friend. You don't want me to succeed, so you don't lose your cash cow. You have mortgage payments to make and vacations to take. You tell me to take some time off like it's nothing. What? You don't think my job means anything? You want me to go home to live with my parents so you won't have to see me anymore? Is that it?"

If looks could kill, I wouldn't be telling this story. Still, I hung on in silence as she fell back onto the couch, threw the pillows at the wall, and proceeded to curl up like a child. I tried to remain centered and not allow my own feelings of anxiety and defensiveness to interfere with my availability to her. I focused on my breathing and tried to stay in an open and receptive state of mind. The word *borderline* may have flashed through my head, but my role as her therapist was to remain connected, accepting, and not to punish Jasmine for punishing me. I knew better than to focus on her attacks. Something had triggered a feeling of abandonment within her, and I was seeing just how overwhelming and profoundly frightening that experience was to her.

We sat in silence together for a few minutes. Finally, when it felt right to reach out to her, I said quietly, "I'm sorry you feel so rejected, so alone. I know your work is difficult and that you're under a lot of pressure. When I suggested you take time off, I really was only thinking of how it might be good for you and even help you do a better job in the long run." Another few minutes went by in silence. I watched her face gradually work through the different expressions I had seen before, this time in reverse order.

Jasmine looked over to me with a gentle smile. "Guess what I did yesterday?" Her voice was that of a coy young girl. "My sister dropped my niece off while she was having her hair done. We put on our bathing suits, went down to the beach, and made sandcastles. We had ice cream and she sat on my lap, and we rocked back and forth and sang songs. I love spending time with her. She thinks I'm the greatest thing in the world. All she wants to do is play and talk to me." I nodded my head and asked, "Did it feel good for you?" She opened her eyes wide, pushed out her lower lip in a child's pout, and slowly nodded.

I asked Jasmine if she was worried about going back to work the next day, given the things she had said about her boss. She dismissed my concern with a wave of her hand and said, "Naw, he's a really good guy, and I think he likes me." Our time was about up, so we scheduled our next appointment. As I walked her to the door, she stopped and picked up the pillows and put them back on the couch. When we got to the door, she reached out, squeezed my arm affectionately, and said, "You're the greatest."

When Borderlines Attack

Jasmine complained of a wide range of compulsive symptoms, including substance abuse, hypersexuality, eating disorders, and excessive shopping. She seemed unable to regulate anything she did. When she dieted, she would grow dangerously thin. When she went off the diet, she would expand many dress sizes. She tried all sorts of solutions, including changing religions, having relationships with women, and moving around the country. Each attempted solution led to a realization that there was no escape. As Jasmine put it, "I keep running into myself wherever I go."

Although what she talked about changed from session to session, the emotional pattern remained the same. She came into the session in a positive state of mind. After a while, some association of hers or something I would say triggered a feeling of rejection, criticism, or abandonment. This was followed by a period of anger, rage, and withdrawal. If I argued with her or tried to talk her out of her feelings, her anger escalated and I became part of the problem. If I accepted her anger and was able to make an empathic response, she became reregulated and shifted into a contrite

mode. She would then share an experience of a positive connection with someone, a disclosure apparently triggered by my empathy for her.

This pattern of connection, disconnection, and reconnection occurred many times in our relationship. I think of what Jasmine and I experienced as paralleling what happens with children and their parents countless times during childhood. It is the outward expression of the day-to-day experience of young children as they go through cycles of regulation, dysregulation, and reregulation, their parents serving as external frontal lobes, helping them to navigate the emotional ups and downs of life. Repeating this process thousands of times creates an unconscious expectation of regulation. Therapy is an attempt to build new memory later in life when it was not successfully established early on. This is "a memory for the future," a pattern that contains the thought, "I can survive these feelings" and that reregulation is "just around the corner." This positive background affect allows us to feel that the glass is half full, to have the confidence to take risks, and to stay on course when things don't go our way.

This was not the memory pattern laid down during Jasmine's childhood. Her mother, a rigid and distant woman (who may have suffered from obsessive–compulsive disorder) had little tolerance for any negative feelings. She had no idea how frightened and ashamed Jasmine felt, and if she did, she was incapable of soothing her. Jasmine's brother was usually off playing sports, and her father was away at work. She spent many days playing alone, intensely focused on her activities in order to avoid any interaction with her mother, who only seemed to make things worse. Her primary memory from childhood was of being frightened and lonely while doing everything she could to keep from interacting with the people around her. Jasmine's glass was perpetually half empty. Each new connection between us evoked old patterns that became the work of therapy, the foiling of anger and fear, and the rebuilding of regulation and trust.

The Brain of the Borderline

Although Jasmine's brain has never been scanned, the brains of patients who share her symptoms have been explored. Traditional neuropsychological testing has demonstrated frontal and temporal lobe dysfunction

in borderline patients (Paris et al., 1999; Swirsky-Sacchetti et al., 1993). When the actual structure and functioning of their brains are examined, patients such as Jasmine demonstrate abnormalities in size, activation patterns, and neurochemical levels in several brain regions (Cowdry et al., 1985; Johnson et al., 2003; Lange et al., 2005; Lyoo et al., 1998).

As we might expect, the ways in which borderline brains differ from normal brains are found in networks of the social brain and those involved in regulating impulses and emotions (Bazanis et al., 2002; Dinn et al., 2004; Johnson et al., 2003). Borderline patients have smaller hippocampi, amygdala, left orbital medial and right anterior cingulate cortices (Brambilla et al., 2004; Driessen et al., 2000; Schmahl et al., 2003b; van Elst et al., 2003). And although smaller hippocampi have been discovered in many psychiatric and medical disorders, this pattern of abnormalities in multiple structures of the social brain may be more specific to borderline personality disorder (Bremner et al., 2000; Johnson et al., 2003).

At rest, the brains of borderline patients demonstrate hypometabolism in prefrontal and anterior cingulate cortices. These individuals are underaroused on measures of heart rate, skin conductance, and pain sensitivity (Bohus et al., 2000; de la Fuente et al., 1997; Goyer et al., 1994; Herpertz et al., 1999). But when borderline patients are shown slides of emotionally adverse situations, they show greater than normal activation in the amygdala, prefrontal cortex, temporal and occipital lobes, and the fusiform gyrus (Herpertz et al., 2001a; Johnson et al., 2003; Juengling et al., 2003). Interestingly, higher levels of neurotoxins have also been found in the frontal lobes of these patients (van Elst et al., 2001). Simultaneously, the hippocampus, which is required for reality testing, new learning, and amygdala modulation, becomes hypometabolic (Juengling et al., 2003).

These findings suggest that interpersonal situations result in hyperactivation of networks throughout the social brain, putting the brain on high alert for danger while simultaneously decreasing inhibition, reality testing, and emotional control—a potent one–two punch to the social brain. When borderline patients experience negative feelings, they are overwhelmed and unable to use conscious cortical processing to test their reactions or to solve problems. They lose perspective, the ability to remember ever feeling good, or the idea that they may ever feel good

again. Overwhelming fear and lack of perspective combine to create the experience that their very life is at risk. As one client put it, "When I get that way, I get so upset that I set off a bomb when a fly swatter would be enough."

The neurotransmitters regulating the social brain are also abnormal in borderline patients, who demonstrate low serotonin synthesis and diminished serotonin regulation in their frontal cortices (Leyton et al., 2001; Soloff et al., 2000). These findings correlate with increased impulsivity, depression, difficulty being soothed, and decreased emotional inhibition. Borderline patients also have heightened and/or unstable levels of norepinephrine, triggered by unregulated activation of the amygdala. A number of neurotransmitter systems within the social brain, including serotonin, norepinephrine, dopamine, and GABA, are most likely involved in the affective and behavioral instability experienced by borderline patients (Gurvits et al., 2000). Table 18.1 summarizes some of the possible neurodevelopmental dysfunctions in someone with borderline personality disorder.

There certainly exists the possibility that there is a genetic predisposition to the formation of this disorder, and, for some, this genetic bias may override the availability of good parenting. This may be what occurs when a mood disorder is present in the family, especially in the child who will come to have borderline personality disorder as an adult. The evidence is quite strong, however, that what we see in borderline symptoms is related, at least in part, to early attachment failures, and that these failures are translated into lasting neurodevelopmental damage.

One of the central tools of the psychotherapist is the interpretation. Simply put, an interpretation is a statement that attempts to make unconscious material conscious. Borderline clients often demonstrate extreme negative emotional reactions to interpretations. They may become violent, leave the consulting room, and engage in self-injurious behavior. Early in my relationship with Jasmine, I suggested that she used her anger to hold others at a distance, resulting in her being rejected. She screamed at me, shook her head, and stormed out of the room. It took days before she would answer my calls, and then only to tell me that she felt I was blaming her for all her problems. This was just one of many times that she told me that I would never see her again.

Table 18.1. **Possible Neurodevelopmental Dysfunctions in Borderline Personality Disorder**

Inadequate development and integration of hierarchical systems of the social brain that organize attachment schema and affect regulation *(orbital medial prefrontal, anterior cingulate, insula, amygdala)*
Inadequate development of the social engagement system *(vagal brake)*, resulting in gross sympathetic responses (vs. subtler vagal regulation) in social situations (bomb vs. fly swatter)
Dysregulation of systems supplying and modulating *serotonin, norepinephrine, dopamine,* and *endogenous opioids,* neurotransmitters that regulate arousal, mood, well-being, and reward
Inadequate development of *spindle cells* in the *anterior cingulate,* resulting in a lack of integration between internal and external experience, boundary development, and identity formation
Heightened and prolonged stress creating *dysregulation of cortisol secretion* and *receptor development,* resulting in cell loss and decreased immunological functioning
Hippocampal compromise, resulting in decreased reality testing, memory functioning, and affective regulation; immunological compromise contributes to physical difficulties and ongoing physical distress and medical trauma
Anterior cingulate, insula, and hippocampal compromise, affecting the development and organization of the *parietal lobes,* affecting the somatic sense of self and boundary formation (Swinton, 2003)
Amygdaloid memory systems are primed to scan for, and react to, an ever-increasing number of abandonment cues through words, facial expressions, eye movements, and all other social behaviors (Schmahl et al., 2003a; Schmahl et al., 2003b)
Amygdaloid dyscontrol heightens the impact of early memory on adult functioning, decreases reality testing, and increases the impact of early bonding failures on contemporary relationships
Conditioned secretion of *endogenous endorphins* through self-harm is reinforced as a way of down-regulating overwhelming fear states

Decompensation in the face of interpretations may reflect a rapid shift from frontal to subcortical (amygdala) dominance, manifesting in an emotional storm and functional regression. Borderline patients lack the ability to be mindful of their own thoughts when they are emotionally aroused. That is, they lose the ability to think about their own thinking—which makes self-monitoring across emotional states almost impossible. The ability to self-reflect and regulate affect—two requirements of being able to benefit from interpretations—are severely impaired.

Activation of the amygdala (and the related physiological and biological changes) is at the heart of the modulation of emotional and traumatic memory (Cahill & McGaugh, 1998). The release of norepinephrine during the stress response serves to heighten the activation of the amygdala, inhibiting the neural networks (frontal–hippocampal) that could contextualize and attenuate the response (McGaugh, 1990). Both interpretations and abandonment cues trigger a kind of post traumatic flashback of life-threatening proportions for borderline patients. Patients become consumed and overwhelmed with fear and desperately try to stop their pain by any means possible. This disproportionate reaction is one reason why they have a catastrophic reaction to separation and are so afraid of being alone. These reactions in borderline patients may be our best window to the chaotic emotional world of early childhood.

Self-Harm

Adults who engage in repeated self-harm almost always describe childhoods that included abuse, neglect, cruel teasing, and shame at the hands of caretakers (Mazza & Reynolds, 1998; Pfeffer et al., 1997; Zoroglu et al., 2003). This correlation has led many theorists to explore the significance of self-harm as an ongoing psychic involvement with destructive parents. Abuse experiences are kept alive within networks of implicit social memory and intrude into conscious awareness when cued by criticism, rejection, or loss. Because of the correlation between negative attachment experiences and self-harm, suicide has been hypothesized to be a final act of compliance with the parents' perceived wish for the death of the child (Green, 1978).

Repeated suicide attempts are often unintentionally reinforced by the rapid attention of health care professionals, family, and friends (Schwartz, 1979). This form of attention becomes a means of affective regulation that parallels the distress calls of young primates, whose endorphin levels drop in the absence of the mother, then raise when the mother returns and calms her young. The appearance of health care professionals may do the same. I have worked with a number of clients who automatically and unconsciously translated their abandonment panic into suicidal thoughts and self-destructive behaviors.

Endogenous opioids also appear to be involved in severe cases of self-harm and suicide (van der Kolk, 1988; Villalba & Harrington, 2003). In case of injury, endorphins provide analgesia for pain to allow us to continue to fight or flee (Pitman et al., 1990). This endorphin system, originally used to cope with pain, was adapted by later evolving networks of attachment and bonding to reinforce affiliative behavior with positive emotional states. As we saw in Chapter 8, endorphin levels rise and fall and rise again in both infant and mother as they draw near one another, separate, and reunite. The endorphin system and its role in the modulation of attachment and proximity may be central to borderline pathology and account for the lack of treatment success with antidepressant medications, which target serotonergic and dopaminergic neurotransmitter systems (Corrigan et al., 2000; Winchel & Stanley, 1991).

The analgesic effects of these morphine-like substances may also account for the reports of reduced anxiety and sense of calm after cutting or burning. Research has demonstrated that self-harm decreases or terminates completely when patients are given a drug to block the soothing and reinforcing effects of endogenous opioids (Pitman et al., 1990; van der Kolk, 1988). Their release in response to fear and stress may help most individuals modulate emotional states and enhance coping and problem solving (Fanselow, 1986; Kirmayer & Carroll, 1987). This system may not become activated under normal conditions in borderline individuals, and self-harm might be a way to move past a higher threshold for endorphin release. This idea is supported by the fact that those who report analgesia during self-mutilation also show less pain sensitivity, even in states of calm (Bohus et al., 2000).

Self-Loathing

It seems clear that borderline personality has early psychological and neurobiological origins that result in fundamental disturbances of identity and emotion. The core of borderline experiences may be organized and stored within the early formation of the insula, anterior cingulate, OMPFC, and amygdala. One of the most fundamental emotional realities for the borderline client is a sense of profound shame. Shame, as we talked about in the previous chapter, is the experience of the self as

defective, bad, and worthy of rejection. This feeling is almost never based on recalled behavior but rather on a bodily intuition that is more *felt* than thought. Many people with borderline personality disorder are exceptionally conscientious, careful to abide by the law, and keep their agreements with others to a fault. It seems as children, however, they experienced themselves as objects of disgust. This experience then becomes the core sense of self. To become aware of the self for a borderline patient is to feel repulsive and unlovable, and launches him or her into a spiral of internal chaos. When these patients look within, all they feel is pain. To feel is to feel badly about the self.

Organized like a map of the body, the insula cortex and anterior cingulate connect primitive bodily states with the experience and expression of emotion, behavior, and cognition; both structures are involved with mediating the gamut of emotions from disgust to love (Bartels & Zeki, 2000; Calder et al., 2003; Carr et al., 2003; Phan et al., 2002). It appears that the insula is central to the organization and experience of our core sense of self in space and our ability to distinguish between self and others (Bechara & Naqvi, 2004; Critchley et al., 2004; Farrer & Frith, 2002; Gundel et al., 2004). Interestingly, both the insula and anterior cingulate become activated when subjects are asked to recall behavior for which they felt ashamed (Shin et al., 2000).

Disgust is a very primitive emotion shaped by evolution to make us reflexively retreat from potential danger. The facial expressions of disgust depict an attempt to expel food from the mouth and back away from the object of our distaste. Our aversion to corpses and bodily damage puts us on guard and makes us wary of both potential predators and toxic microorganisms. Overall, the emotion of disgust is one of avoidance and expulsion, either from the body or from one's presence. Given what we have learned thus far, the possibility exists that the early experiences of borderline individuals may lead them to pair the sense of self with disgust. This pairing could occur when feeling pushed away, abandoned, or seeing a look of disgust on a caretaker's face. The extreme reactions seen in borderline individuals may be a function of the need to escape an unbearable self.

Given its functions and early development, the insula may be responsible for the basic associations between a sense of one's bodily

states and what come to be labeled through language as emotions. For example, in the context of secure attachment, the insula may associate feelings of love with the organization of self-awareness. These early neural connections may establish a lifelong sense of self-love, well-being, and an expectation of positive outcomes. On the other hand, if the infant experiences neglect, abuse, or sees disgust or despair in the eyes of caretakers, the insula may come to associate the experience of self with disgust, shame, pain, discomfort, and rejection. For these individuals, to become self-aware would trigger despair, rage, and self-loathing; in these instances, the self would be something to avoid at all costs.

Disorders of Extreme Stress

Van der Kolk and his colleagues have made a compelling argument for the possibility that borderline personality disorder shares a common etiology with other disorders in terms of early and severe stress. They (and others) cite somatization disorder, dissociative identity disorders, alexithymia, and borderline personality disorder as different symptomatic outcomes of early traumatic experiences (Maaranen et al., 2004; Maaranen et al., 2005; Nijenhuis et al., 2003; van der Kolk et al., 1996). In field trials for the *DSM–IV* (American Psychiatric Association, 2000), they found that all these patients shared difficult histories and suffer from anxiety, identity disturbances, blocked affect, and severe emotional and cognitive dysregulation, as seen in PTSD. This finding led them to propose a broader category that cuts across previous diagnostic lines. Their new diagnosis, called disorders of extreme stress not otherwise specified (DESNOS), is described as containing the following symptoms (Luxenberg et al., 2001):

- Impairment of affective regulation
- Compulsive and self-destructive behaviors
- Amnesia and dissociation
- Somatization
- Distorted relations with others
- Loss of sustaining beliefs

Each of the disorders subsumed by DESNOS in the DSM represents different strategies of adaptation to early and overwhelming impingements. Dissociators employ the imaginative capacities of the frontal lobes to shut off the experience of emotional pain, creating alternate experiences, worlds, and identities. Those with PTSD suffer from the oscillating dysregulation of emotional arousal when cued by both conscious and unconscious associations. Somatizers and alexthymics demonstrate a disconnection between the cognitive and emotional processing that is centered in the left and right cortices (Spitzer et al., 2004). Alexithymia in adulthood correlates with having been an unwanted child, and attachment patterns tend to be insecure, either avoidant/dismissing or preoccupied and fearful (Fukunishi et al., 1999; Taylor & Bagby, 2004). The degree of emotional facial expressions is negatively correlated with somatic symptoms. Put another way, the less a person reveals emotions in his or her facial expressions, the more somatic symptoms they tend to experience (Malatesta, Jonas, & Izard, 1987).

DESNOS offers a unifying construct that ties together multiple diagnoses with similar causes and symptoms. Examining the process of the brain's adaptation to early interpersonal trauma may provide a way of understanding borderline personality disorder that will help us better treat this painful and debilitating social condition. Early stress disrupts the growth, integration, and regulation of the many neural networks that contribute to healthy cognitive and emotional functioning. The fact that interpersonal trauma results in a higher risk of DESNOS than natural disasters and accidents points to the vital importance of early relationships and the profound impact that disruptions of bonding, attachment, and loving care have on the developing social brain.