Original article

A psychobiological view of the borderline personality construct

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INTRODUCTION

Individuals with the diagnosis of borderline personality disorder have been the focus of intense clinical concern within psychiatry over the past three decades. This condition is associated with high degrees of morbidity and a significant level of mortality by means of suicide. Patients with borderline personality disorder have been estimated to constitute approximately 11% of psychiatric outpatients and 19% of inpatients.[1] Treatment and management is considered difficult and carries significant risks.

The history of the development of the concept of borderline personality disorder, is comprehensively reviewed by Linehan.[1] Between 1938 and the late 1970s, borderline personality disorder was characterized in psychoanalytic terms. Subsequently, a phenomenological approach was developed, due largely to the work of John Gunderson and the publication of DSM-III in 1980.

Since that time, there have been very considerable advances in neuroscience and in understanding the neurobiology of attachment. As a result of this progress, the links between psychology and biology, between genetics and environmental factors, have become more specifically defined. In this respect, we could say that we have now arrived at the era of a psychobiological paradigm within psychiatry.

In this paper, it is proposed that borderline personality disorder is fundamentally a disorder of affect regulation determined by genetic and interpersonal factors. In order to substantiate this proposition, I will draw upon four lines of enquiry: 1) dimensional theories of personality; 2) attachment theory; 3) neurobiology; and 4) childhood sexual abuse.

PERSONALITY DIMENSIONS

DSM-IV is based on a categorical approach to personality classification. The disadvantages of this have been reviewed by Livesley.[2] DSM-IV has nine criteria for borderline personality disorder, of which any five are required to make the diagnosis.

Borderline personality defined in this way is a very heterogeneous concept.[3] However, when a dimensional approach is taken, it is possible to identify certain key components of the disorder.

In a dimensional view, personality traits are seen as continuous variables along continua on which all members of the population can be located. These continua extend to both normal and pathological personality types.

Cloninger identifies four key temperamental traits as the basis of his dimensional theory:[4] 1) novelty seeking; 2) harm avoidance; 3) reward dependence; and 4) persistence.

In Cloninger's theory, Cluster B personalities are characterized by high novelty seeking, high harm avoidance and low reward dependence. These basic dimensions appear to be heritable.

Common to most theories of borderline personality, are the key traits of affective instability or affective dysregulation and impulsivity or impulsive aggression.

Livesley,[3] has also developed a dimensional understanding of personality, derived from the Dimensional Assessment of Personality Pathology Basic-Questionnaire. Livesley identifies four central factors from this, one of which is "emotional dysregulation." He also argues that underlying neurobiological processes are genetically determined.

Affective instability or emotional dysregulation may be the most central and key feature of borderline personality. The earliest reference to this appears to be from Donald Klein.[5] It is interesting to recall that Klein and Rifkin were the first to use a mood stabilizer, lithium, in the treatment of these patients.[6]

Marsha Linehan coming from a completely different theoretical framework also identifies emotional dysregulation as central to her biosocial theory of borderline personality disorder.[1] While genetically determined affective instability and impulsive aggression may predispose to the development of borderline personality, these traits by themselves are not sufficient to produce the condition. The addition of specific environmental factors is required.

There are several genetic studies examining alterations in neurotransmitter biosynthesis that may underlie the inherited component of these traits. For example, much work has be done on

reduced serotonin activity in individuals with impulsive aggressive traits, so that an abnormality of serotonin metabolism may constitute this genetic predisposition.[7]

Borderline features appear to change over time. During adolescence and early adulthood, patients exhibit much more impulsivity and self-harm. With age, these features seem to diminish considerably.[8-10] The problems with affect continue throughout life and give support to the idea that it is the affective dysfunction that is central to the condition.

ATTACHMENT THEORY

Attachment theory was developed by John Bowlby.[11-15] This theory is one of the most important developments within psychiatry, since Freud, and represents a huge qualitative change in our understanding of childhood relationships and the development of personality.

Bowlby had his precursors in the psychoanalytic movement, particularly the British school e.g. Fairbairn; Winnicott.[15] These Object-Relations theorists had emphasized that individuals are essentially, "object-seeking". They seek to have relationships. This was a major shift from Freud's drive and conflict theories, but Bowlby went beyond this by deciphering an empirical basis to this "object seeking." He discovered this in Ethology, the study of animal behavior. Bowlby came to the conclusion that Attachment was a critical part of normal human development and behavior.

Attachment is characterized by:

Proximity seeking: the infant seeks to be close to the maternal figure.

Separation distress or protest: when the infant is separated or distant from the mother, he is distressed and signals this by vocalizations and changes in affect

A secure base: when the infant develops a healthy attachment, the mother becomes a "secure base," from which the infant can venture forth and explore his surroundings.

In the psychoanalytical literature, Margaret Mahler's theory of separation and individuation overlaps to some considerable degree Bowlby's ideas, but there are important and at times subtle differences.[15-17]

When infants reach a certain age, within the first year of life, they begin to explore their environment and tentatively crawl away from the mother. However, they can only go so far before they become anxious and look back to seek eye contact with the mother. This gives them a sense of safety and security. The infant is learning to become independent, but only to a limited degree. He has to go back to the mother, in Mahler's terms, to "refuel."

Nothing more characteristically represents the behavior of patients with borderline personality disorder than this dynamic between attachment and separation.[18] Clinically, one of the most fundamental features of borderline personality is proximity seeking. Borderline patients have a tremendous need to be in close proximity to an attachment figure, which may be a parent, a spouse or a therapist. The most central issues of the borderline are those of separation, rejection, abandonment and frantic efforts to avoid aloneness. When the borderline is separated from an attachment figure, he or she experiences a drop in mood, a change of affect which can be restored by coming into close proximity to the attachment figure. In therapy, this manifests in demands for increasing frequency of sessions, increased telephone calls and behaviors that result in the drawing together of the patient and therapist.

In summary, separation results in a negative change in affect, proximity restores affect.

With this background, it can be proposed that all clinical behaviors of the borderline personality are an attempt to restore affective homeostasis!

NEUROBIOLOGY

Developments in neuroscience are providing support and tangibility to previous psychological and psychoanalytical ideas.[19-21]

Jaak Panksepp proposes that mammals have a specific neurocircuit that underlies affiliation and attachment. He observed that most reptiles abandon their offspring whereas mammals remain attached to them. Mammals therefore appear to have a different neurobiological organization than reptiles. Panksepp proposes that there are specific neurocircuits that underlie attachment behavior in

mothers, infants and in peer-bonding. Panksepp identifies a number of neurochemicals that appear to be fundamental to these processes: oxytocin, prolactin and the endogenous opioids.

Opiates appear to inhibit separation distress. If an animal experiencing separation distress is given external opiates, this will soothe it and reduce separation distress and separation vocalizations. Separation distress is most powerfully inhibited by brain opioids that act at the mu receptor. These same receptors mediate opiate addiction.

Touch also activates endogenous opioid systems and this may be the basis for the positive soothing effects of touch e.g. petting animals and hugging of babies.

Oxytocin and prolactin may also play a role in contact comfort. It is notable that oxytocin can inhibit the development of tolerance to opiates. Drug dependency appears to stimulate the same pathways that are involved in social interaction.

In infants, separation from the mother leads to distress vocalizations. This in turn stimulates a response from her. Panksepp notes that all the neurochemicals that reduce separation distress promote social attachment or bonding. Key areas in the brain that appear to be involved in this are the cingulate cortex, septal area, the bed nucleus of the stria terminalas, the preoptic area, the dorsomedial thalamus and the periaqueductal grey.[21]

There is some evidence that brain serotonin modulates the separation response[19] (p.275). Increased levels of serotonin reduce distress vocalizations in animals. Medications that increase serotonin activity in humans i.e. serotonin reuptake inhibitors, improve social confidence. This may be the psychobiological equivalent to a reduction in separation anxiety.

In this context, it is extremely interesting to note that serotonin stimulates the production and secretion of oxytocin and vasopressin in the hypothalamus.[22,23] Jorgensen has also demonstrated that fluoxetine increases oxytocin and vasopressin release. The interconnection between these serotonin and neuropeptide systems opens up new avenues for psychopharmacological research.

There is also much animal work identifying the effect of infant separation on the stress hormones. Separation in animals appears to activate corticotropin which leads to the activation of the pituitary adrenal stress response. This in turn depletes serotonin, norepinephrine and dopamine leading to the features of depression and despair.[24,25]

Allan Schore,[26] states that the regulation of affect is a central "organizing principal of human development and motivation." Schore indicates that the first three years of life are critical for the development of the right brain. The maturation of the right brain, which includes frontal and limbic areas, depends on the nature and quality of the attachment relationship with the mother. This is where psychology and neurobiology collide. This is the essence of the psychobiological model.

Secure attachment leads to the healthy development of the right brain and to optimal infant mental health.

Conversely, traumatic attachment leads to impaired development of the right brain and predisposition to mental illness.[27]

Psychological events are here creating biological facts. The literature on this overlaps with the literature on posttraumatic stress disorder and the impact of trauma on brain development.

Attachment quality affects the developing connections in the limbic system which are involved in the regulation of affect. Schore points out that the mother and child appear to synchronize the intensity of their affective interaction. In mothers and infants, there appears to be a reciprocal response between eye gaze, facial expression and the rhythm and tempo of interaction. There is a mutual attunement in resonance and in empathy. This synchrony appears to be very important for the development of healthy attachment and affect regulation. When the mother or mother figure is responsive to the infant, it reduces the affects associated with distress. Good quality attachment reduces negative affect, but also amplifies positive emotions which allow the infant to explore and grow, that is to become separate and autonomous.

Schore quotes Sroufe,[28] in stating that "attachment is the dyadic regulation of emotion." Proximity regulates emotion and not only that, where attachment is disrupted it can lead to

permanent changes in emotion regulation. Clearly, where there is an abusive, abandoning or neglectful parent, attachment is calamitous. The clinical literature supports the association of borderline personality disorder with these types of disturbed attachment relationships.

SEXUAL ABUSE

There is a vast literature on childhood sexual abuse and its relationship to borderline personality. This has been reviewed extensively by Mary Zanarini.[29,30] It is clear that not all people with borderline personality disorder have experienced childhood sexual abuse. Conversely, non-borderline personality disorders also have a significant incidence of childhood sexual abuse. In other words, childhood sexual abuse is neither necessary nor sufficient to result in the development of borderline personality disorder. Certain characteristics of the sexual abuse may be associated with borderline personality disorder: the severity of the abuse, whether penetration was involved, the existence of multiple abusers. It is not clear why some individuals develop borderline personality disorder, others posttraumatic stress disorder and yet others develop both conditions.[31] Age of onset of the abuse, the role of relatives or non-relatives may also be factors in this differentiation.[8-10]

Self-harm behaviors such as cutting, are very prominent in both borderline personality disorder and posttraumatic stress disorder. These behaviors could be understood as promoting proximity by eliciting responses from care providers. Many authors have noted the affect regulating properties of self-harm.[32,33] Inpatient adolescents describe that self-injury reduces dysphoric affect and this behavior has been compared to an addiction. Could it be that the positive effect results from the release of opioids in response to self-injury, thereby simulating the attachment response?

CONCLUSION

In conclusion, there is support from diverse sources in the clinical and basic sciences literature for the proposition that borderline personality disorder is a psychobiological disorder of

affect regulation, determined by genetic and interpersonal factors. The central feature of this condition is affective dysregulation. Predisposing genetic traits, combined with adverse attachment experiences, give rise to the condition known as borderline personality disorder. The review of these mechanisms has significant implications for the prevention and treatment of this condition.

Prevention should be directed at the early childhood environment and the quality and availability of attachment figures. The focus of treatment should be directed primarily towards the regulation of affect, by means of medication, psychotherapy and skills training. With regard to medication, mood stabilizers may have a specially important role,[34-36] though more randomized controlled trials are required to substantiate this. Further basic research focused on neuropeptides, opioids and their interactions with the serotonin system may result in productive new approaches to psychopharmacological intervention.

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ABSTRACT

Objective: *To review and reformulate the concept of borderline personality disorder in the light of advances in neuroscience and infant development.*

Method: *Medline was searched using the key words: borderline personality, attachment, affect regulation, neurobiology, childhood sexual abuse, mood stabilizers.*

Results: *There are genetic predispositions to specific personality traits which appear central to the concept of borderline personality disorder. These traits combine with impaired attachment relationships and childhood abuse to give rise to the constellation of difficulties known as borderline personality disorder.*

Conclusion: *Borderline personality disorder is a psychobiological disorder of affect regulation caused by genetic and interpersonal factors.*

Clinical implications: *Prevention should be directed towards the early childhood environment and the quality and availability of attachment figures. The focus of treatment should be the regulation of affect by means of medication, psychotherapy and skills training. Basic research on the relationship between neuropeptides and serotonin could lead to new approaches to psychopharmacological intervention.*

Limitations: *Neuroscientific research is based primarily on animal experimentation and may not be fully extrapolated to humans. There are very few randomized controlled trials of antidepressants and mood stabilizers in borderline personality disorder. Due to the vastness of the neuroscientific and clinical literature, this review is selective in focus.*

Keywords: *Borderline personality disorder, personality dimensions, attachment, neurobiology, childhood sexual abuse, mood stabilizers, oxytocin.*

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