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Cascades of Emotion: The Emergence of Borderline Personality Disorder from Emotional and Behavioral Dysregulation

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Abstract

Theories of borderline personality disorder (BPD) have often considered it a disorder involving both emotional and behavioral dysregulation (Linehan, 1993), yet the connection between these phenomena has been elusive. The following paper proposes the Emotional Cascade Model, a model that attempts to establish a clear relationship between emotional dysregulation and the wide array of dysregulated behaviors found in BPD. In this model, subsequent to an emotional stimulus, ruminative processes result in a positive feedback loop that increases emotional intensity, and this emotional intensity leads to ensuing behavioral dysregulation. These behaviors then provide negative feedback, in the form of distraction, which induces temporary reduction of negative emotion and thus relief. The model is presented in a framework in which BPD is considered an emergent phenomenon (Lewin, 1992), where the disorder arises from the total interactions of a network containing emotional cascades and other important factors. The model is then evaluated in light of various theories and therapeutic traditions, including both cognitive-behavioral and psychodynamic, indicating that it is a model that may transcend traditional theoretical and therapeutic doctrines.

Keywords

borderline personality disorder; rumination; emotion dysregulation; non-suicidal self-injury; dialectical behavior therapy

Cascades of Emotion: The Emergence of Borderline Personality Disorder from Emotional and Behavioral Dysregulation

Linehan (1993) has proposed a comprehensive biopsychosocial theory of BPD in which she asserts that individuals who develop BPD are surrounded by an invalidating environment, one in which communication of emotional experience is met by erratic, inappropriate, and extreme responses by others. In combination with biological predispositions, individuals with BPD then develop an emotional vulnerability that results in: 1) heightened sensitivity to emotional stimuli, 2) experiencing emotions as extremely intense, and 3) a slow return to emotional baseline. Linehan also posits that this development of emotion dysregulation results in the development of subsequent behavioral dysregulation (defined here as behaviors that are difficult to control and result in impairment in the affected individual's functioning) because

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these behaviors provide a way for an individual to shift attention away from unpleasant emotional states. However, this connection between emotional and behavioral dysregulation spurs yet another question: Why don't less potent forms of distraction such as taking a cold shower, watching television, or talking to a friend provide enough distraction to shift attention away from an emotional state? In fact, why is it that taking attention away from emotional stimuli even helps dampen emotional experience at all?

The model presented in this article builds upon Linehan's model, integrating findings from the field of emotion regulation with clinical research on behavioral dysregulation to better understand borderline personality disorder. The Emotional Cascade model posits that individuals with BPD undergo what is called an "emotional cascade," where rumination on negative affect induces behavioral dysregulation. An emotional cascade is the result of a positive feedback loop where high levels of rumination on negative affect increase emotional intensity, and in response this increase in emotional intensity results in increased rumination. This cycle may generate an amplified emotional response to even minute amounts of emotional stimuli, and this cycle is self-perpetuating so that it may last for an extended amount of time. Furthermore, an emotional cascade may result in such an aversive emotional response that some of the most effective ways for individuals with BPD to reduce their negative affect involve behaviors that produce potent physical stimuli (such as the pain and visual sensations resulting from self-injurious behavior). Thus, dysregulated behaviors may serve as forms of distraction for individuals with BPD, allowing them to shift their attention from negative affective stimuli and in effect "short-circuit" the emotional cascade. Other factors that may influence emotional cascades, such as catastrophizing, thought suppression, and low distress tolerance, are discussed as well. BPD is then presented as an "emergent" phenomenon and the model is evaluated in light of other theories of and therapeutic traditions for BPD, resulting in a conclusion that this model may provide a unifying framework for differing theories and traditions.

Borderline Personality Disorder

Borderline personality disorder (BPD) is a chronic and severe disorder characterized by chaotic interpersonal relationships, affective instability, anger control problems, identity diffusion, various forms of impulsive behaviors, chronic feelings of emptiness, and self-injurious and suicidal behavior (DSM-IV, 1994). This disorder affects between 2–5% of the population and is the most commonly diagnosed personality disorder in both inpatient and outpatient settings (Widiger & Trull, 1993). Individuals with BPD have significant functional impairments and have an extremely high rate (between 5–7%) of death by suicide (Duberstein & Conwell, 1997). These individuals are among the most frequent users of the health care system among mentally disordered individuals, with regards to physician visits, emergency room visits and hospitalization (Hueston, Mainous, & Schilling, 1996). Thus, BPD poses a significant public health concern that warrants further empirical investigation of underlying psychopathological traits and processes.

Support for Linehan's Model

There is some research that supports the role of affect instability and intensity in BPD and Linehan's views on emotion dysfunction. Cowdry et al. (1991) conducted a study in which patients with BPD rated their general mood two times each day, and they found that patients with BPD had greater morning-to-evening mood variability and a more random distribution of morning moods than did depressed patients and controls. Koenigsberg et al. (2002) found that patients with BPD experienced greater emotional lability with regard to anger, anxiety, and oscillation between depression and anxiety than patients with depression, cyclothymia, and bipolar II disorder. In a 24-hour experience sampling study with BPD and healthy control participants, Ebner-Priemer and colleagues (2007) found heightened affective instability for

both emotional valence and distress in the BPD group. In another experience sampling study taking place over the duration of a month, Trull et al. (2008) found that BPD patients regularly experienced more extreme changes in hostile, fearful, and sad affect than depressed patients. Finally, Yen, Zlotnick, and Costello (2002) found that affect intensity was associated with number of BPD symptoms in patients diagnosed with BPD.

Evidence thus appears to support the emotion dysfunction component of Linehan's biopsychosocial model of BPD. Although current research provides preliminary evidence for this model of emotion dysregulation, the specific mechanisms that cause emotion dysregulation in BPD are still unclear. Furthermore, exactly how emotion dysregulation incites behavioral dysregulation remains unclear. This may be where the Emotional Cascade Model of BPD provides incremental understanding of BPD, especially with regard to the relationship between emotional and behavioral dysregulation. But first, to understand the Emotional Cascade Model, an understanding of rumination and behavioral dysregulation is essential.

Rumination and Amplification of Negative Affect

Ruminative processes may serve as a common underlying cause of behavioral dysregulation in BPD, as will shortly be seen in the description of the Emotional Cascade model. Rumination (Nolen-Hoeksema, 1991) is the tendency to repetitively think about the causes, situational factors, and consequences of one's negative emotional experience – in other words continuously thinking about and focusing attention on emotionally relevant stimuli. Rumination tends to be an unhelpful, if not pernicious, cognitive approach to emotion regulation. Why do people do it then? Many people ruminate because they believe (incorrectly) that doing so will increase their understanding of the situation and aid in problem-solving (Papageorgiou & Wells, 2001).

The use of rumination has generally been found to magnify negative affect as well as increase its duration (see Thomsen, 2006 for a review). Furthermore, as negative affect increases, so does the attention paid to emotion (Fredrickson & Branigan, 2005; Salovey, 1992). For example, Moberly and Watkins (2008) found evidence for a bidirectional relationship between BPD and negative affect using an experience sampling design (in non-BPD subjects). Additional evidence for the amplification properties of rumination on negative affect was provided by an experimental rumination induction study by Donaldson and Lam (2004), who found that depressed individuals in a rumination condition showed a significant deterioration in mood; however, control participants in a rumination condition did not show deterioration in mood. These findings were replicated in a study by Lavender and Watkins (2004), who found that a rumination induction increased both negative affect and negative future thinking in depressed individuals compared to controls. Rumination also appears to influence various affective states in the same manner. For example, Rusting and Nolen-Hoeksema (1998) demonstrated that rumination on anger increased feelings of anger following an experimental angry mood induction, whereas participants who were distracted following the angry mood induction showed significantly lower levels of anger.

Rumination has also been connected to borderline personality disorder in three studies. In one study examining rumination in the context of BPD, Abela et al. (2003) found that participants diagnosed with BPD had significantly higher levels of rumination than individuals diagnosed with major depressive disorder. This finding was unexpected given that research has established a strong connection between rumination and depression (Just & Alloy, 1997). A second study linking rumination to BPD was conducted by Smith et al. (2006), who examined rumination among all Axis II personality disorders. They found that of all the Axis II disorders, rumination was uniquely related to dimensions of BPD in college students, even after controlling for depression. The third study used structural equation modeling to link BPD to rumination and found that BPD symptoms (as assessed by a structured clinical interview)

predicted high levels of anger rumination, catastrophizing, and brooding (intense rumination on depressed affect) even after controlling for current symptoms of depression (Selby, Anestis, Bender, & Joiner, 2008). In summary, rumination appears to magnify negative affect and has been associated with BPD, but additional work is needed to solidify and clarify this relationship.

Dysregulated Behaviors in BPD

Some diagnostic criteria for BPD can be satisfied by a variety of dysregulated behaviors, which we define here as behaviors that are difficult to control and result in harm to the patient or impairment in daily and interpersonal functioning. Many of these behaviors have been found to have affect regulating properties and some have been linked to rumination as well. One of the most intriguing BPD behaviors that has well established emotion regulation functions and is associated with rumination is non-suicidal self-injury (NSSI; Arney & Crowther, 2008; Briere & Gil, 1998; Brown, Comtois, & Linehan, 2002; Hilt et al., 2008; Selby, Anestis, Bender, & Joiner, 2008). Rumination and affect regulation have also been associated with bulimic behaviors (Nolen-Hoeksema et al., 2007; Selby, Anestis, & Joiner, 2008; Steiger et al., 2005; Smyth et al. 2007), suicide attempts (Selby, Anestis, & Joiner, 2008), and alcohol use (Cooper et al., 1995; Nolen-Hoeksema & Harrell, 2002; Nolen-Hoeksema et al., 2007; Selby, Anestis, & Joiner, 2008). The role of substance use as a form of coping behavior in BPD is also supported by findings that individuals comorbid with BPD and a substance use disorder report substance craving and use in response to negative emotional states, social rejection, and tension more than substance using individuals without a diagnosis of BPD (Kruegelbach et al., 1993). Other behaviors that may be dysregulated and may potentially have affect regulating properties in BPD (but have yet to be associated with rumination and emotion regulation) may be reckless driving, impulsive spending, shoplifting, and pathological gambling.

Individuals with BPD have also been shown to have dysregulated interpersonal behaviors, such as quarrelsome behavior toward others (Russell et al., 2007). These behaviors may also have affect regulating properties. For example, excessive reassurance seeking has been associated with both BPD and rumination (Selby, Anestis, & Joiner, 2008). Aggressive behaviors commonly found in BPD, such as throwing objects or hitting someone, have also been linked to rumination (Bushman et al., 2001; Bushman et al., 2005, Anestis et al., in press). Other interpersonal behaviors that may be dysregulated and potentially regulate negative affect include begging, threatening or pleading with someone, verbal fights, threatening suicide or self-injury, repeated phone calls, and risky sexual behaviors. More research is needed to determine if these interpersonal behaviors are also related to rumination and affect regulation.

The Emotional Cascade Model

Emotional Cascading Effect

The Emotional Cascade Model attempts to provide a direct link between emotion dysregulation and behavioral dysregulation in BPD through a process called an “emotional cascade.” In an emotional cascade, BPD individuals may experience a positive feedback loop where the tendency to ruminate on negative emotional thoughts and feelings increases levels of negative affect, and in turn the increase in negative affect increases levels of attention to emotional stimuli, thus resulting in more rumination. In essence, this cycle causes a flood of racing negative emotional thoughts, which in turn increase levels of negative affect in a vicious, repetitive cycle. This phenomenon may account for the extreme emotional experience observed in BPD, as well as why dysregulated behaviors are so central to BPD.

The emotional cascade process is helpful for understanding the wide array of emotional disturbances in BPD because rumination can magnify negative affects of different valences

(i.e., sadness, anger, fear). It also helps explain why minor negative emotional stimuli may be followed by emotional experience that spirals out of control. Furthermore, rumination is a process that has been shown to extend the length of negative emotional experiences. Rumination would thus appear to account for the emotional intensity seen in BPD, as well as the heightened sensitivity to emotional stimuli and slow return to emotional baseline proposed by Linehan. Consequently, what may seem like a trivial event (such as a simple remark by a friend or family member) may cause an individual with BPD to intensely ruminate on the negative emotions induced by the remark. This may then create an extremely intense negative mood state, one that it is impervious to mild distractions in daily life, due to the intensity of the rumination process. The self-perpetuating effects of rumination may then account for the slow return to emotional baseline that Linehan has described. It is the intensity of emotional cascades that may instigate dysregulated behaviors.

Behavior as Distraction from Rumination

Behavioral dysregulation in BPD, in the perspective of the Emotional Cascade Model, would serve as a suite of methods of “distraction” that break-up the emotional cascade process. Due to such an intense ruminative process, normally effective strategies such as cognitive reappraisal (changing how one thinks about a situation) or normal methods of distraction such as talking to a friend, or going for a walk, may not be distracting enough to dampen the emotional cascade process and stop the cycle of increasing negative affect. BPD individuals may instead focus their attention on the physical sensations associated with a dysregulated behavior, such as the pain or the sight of blood associated with non-suicidal self-injury (NSSI), or the influence of a drug, in order to distract themselves from ruminative thoughts. This distraction “short-circuits” the emotional cascade, halting the build up and intensity of negative emotions and allowing these emotions to subside because attention is no longer on emotion. In this sense, a dysregulated behavior provides negative feedback to the emotional cascade, interfering with the ruminative processes. This interference then shifts the system of emotion dysregulation into a more stable state of lower negative affect. This same pattern of behavioral distraction may extend to various forms of behavioral dysregulation in BPD, including interpersonal and aggressive behaviors.

If distraction is helpful at regulating emotion, then why is it that other forms of distraction such as a taking a cold shower are not as effective as extreme forms of behavioral dysregulation such as NSSI or substance abuse? Rumination has been linked to many psychological disorders, and not all individuals who ruminate engage in behavioral dysregulation. This may be because individuals with other disorders, such as depression, experience smaller emotional cascades, yet for these individuals the rumination may be less intense than it is for individuals with BPD. This may be why taking a cold shower or talking to a friend may help someone feeling depressed or anxious, but these behaviors may not divert enough attention away from emotional experience to distract an individual with BPD. Also, behaviors such as taking a cold shower may not provide enough distraction to occupy most of an individual’s mind. For example, it may be easier to ruminate in the shower than while experiencing physical pain or gorging on food. Thus, semi-distracting behaviors may not absorb enough attention to fully distract from rumination and emotion.

Using dysregulated behaviors to distract from rumination may have neurobiological foundations as well. For example, Ray and colleagues (2005) found that increases in rumination on negative affect (in non-BPD subjects) correlated with increased activation of the left ventrolateral prefrontal cortex and left amygdala during an induced rumination procedure; both neural structures have been shown to activate during the experience of negative affect (Phan et al., 2003). Interestingly, Schmahl et al. (2006) found that increases in pain (through a self-harm proxy) decreased activity in the amygdala of patients with BPD. Based on the findings

of these studies, emotional cascades may increase activity in the amygdala, while dysregulated behaviors may then decrease activity in this same area.

What Starts an Emotional Cascade?

Perhaps the most important part of an emotional cascade is what emotional stimulus “kick-starts” it? This may be where Linehan’s (1993) concept of emotional invalidation plays a key role. Emotional invalidation is a broad construct that consists of the behaviors of other individuals directed toward the individual with BPD, and can include interactions such as ignoring, criticism, and abuse. The invalidating actions of others would make many non-BPD people respond in a negative way, but in individuals with BPD these interactions may initiate emotional cascades. Stiglmayer et al. (2005) found that, among individuals with BPD, commonly reported reasons for experiencing states of aversive negative affect during daily monitoring were rejection, being alone, and failure. Individuals with BPD may also be more sensitive to emotionally threatening cues in their environment. For example, BPD individuals have been shown to have hypervigilance to both positive and negative cues on an emotional Stroop task (Sieswerda et al., 2007). This was especially true for schema-related negative cues such as, “I am inherently unacceptable.” Other psychological theories of BPD, which will be discussed later, propose other personality components that may also contribute to the initiation of emotional cascades, such as difficulty understanding the motivations of others (Fonagy & Bateman, 2008) or identity diffusion (Clarkin, Yeomans, & Kernberg, 2006).

In addition to environmental and cognitive/personality factors, one emotional cascade may also lead to another. For example, although engaging in a dysregulated behavior may result in decreased emotional intensity, this state of emotion, though somewhat stable, is not fully so. Following some dysregulated behaviors, individuals with BPD may experience another emotional cascade based on negative emotions resulting from the original dysregulated behavior (e.g. guilt, shame). This process in which one dysregulated behavior may lead to another is an example of what is called *circular causality* (Haken, 1977). A vivid example of this may be a binge that arises from an emotional cascade, where the binge itself then initiates another emotional cascade that results in purging behavior. This may be because feelings of shame or guilt for engaging in the behavior may follow, and subsequently cause a new emotional cascade. This hypothesis is supported by the findings that shame, in particular, is highly correlated with rumination and it has been hypothesized that shame induces rumination (Orth, Berking, & Burkhardt, 2006).

Other Factors that May Interact with Rumination

Although rumination may be the driving force of emotional cascades, there may be other cognitive/ personality factors that interplay with rumination to potentially maintain or aggravate emotional cascades. We will briefly examine three of these potential factors: catastrophizing/worry, thought suppression, and low distress tolerance. It should be noted, however, that there may be others in addition to these that may be revealed through future research.

Catastrophizing and Worry

Research suggests that multiple ruminative processes may exist (Watkins, 2008), and although they may be somewhat different from each other, many still appear to have the same result of increasing negative affect. One of the most relevant ones in BPD may be catastrophizing (Garnefski, Kraaij & Spinhoven, 2001), which is the tendency to continuously think about how terrible a situation is and emphasize the negative implications for the future. Catastrophizing appears to be an extreme form of worry; this is important because evidence suggests that rumination and worry share a similar process, with rumination being a process of focusing

attention primarily on current and past emotional stimuli, and worry being a process of focusing attention on the future implications of a current situation (Fresco et al., 2002; Watkins, 2008; Watkins, Moulds, & Mackintosh, 2005). Both catastrophizing and worrying have been shown to magnify negative affect in a similar manner as rumination, especially distress and anxiety related to future consequences of a situation (Fresco et al., 2002; McLaughlin, Borkovec, & Sibrava, 2007).

Catastrophizing has also been associated with BPD (Selby, Anestis, Bender, & Joiner, 2008). One aspect of BPD where catastrophizing is likely to play an important role is related to the diagnostic criterion of frantic efforts to avoid real or imagined abandonment, with the key word being “imagined.” An individual with BPD may catastrophize a comment or action by someone he or she cares about, and believe that this is a sign of abandonment. This may then cause an emotional cascade due to thinking of how terrible the future will be because of this event, and as a result he or she may do something, such as plead or threaten, in order to obtain some evidence to calm his or her worries and distract the emotional cascade. Catastrophizing may also contribute to paranoia in individuals with BPD. For example, catastrophizing may lead them to accuse a romantic partner of infidelity. Another example might be when an individual with BPD gets pulled over by a police officer and is given a speeding ticket. The individual may then catastrophize that all police officers are after him or her, which indeed may appear very paranoid. Thus, catastrophizing and worry may be specific types of rumination that result in emotional cascades, and more research is needed to determine if they also result in more specific dysregulated behaviors, such as pleading with someone not to leave.

Thought Suppression in BPD

Recent studies have provided evidence for the role of thought suppression in BPD symptomatology, and it may be an important factor that interacts with rumination during emotional cascades. Thought suppression refers to a deliberate attempt to reduce the frequency or intensity of unpleasant cognitions, in other words, trying not to think about something. A tendency to engage in thought suppression has been linked to a variety of negative psychological consequences in general (Purdon, 1999; Wegner et al., 1987). Recent meta-analyses suggest that deliberate attempts to suppress specific thoughts may actually have a paradoxical “rebound” effect where the frequency of the unwanted thought increases following efforts to suppress it (Abramowitz, Tolin, & Street, 2001; Wenzlaff & Wegner, 2000). Cheavens et al. (2005) examined the role of thought suppression in BPD. They found that thought suppression fully mediated the relationship between negative affect intensity/reactivity and BPD symptoms. In a similar study Rosenthal and colleagues (2005) replicated this finding.

The findings on thought suppression provide further support for the role of rumination and emotional cascade in BPD, and in fact rumination and thought suppression appear to have a reciprocal relationship. Erber and Wegner (1996) have suggested that rumination is a result of thought suppression, caused by the rebound effects of thought suppression. On the other hand, Martin and Tesser (1996) have suggested that thought suppression not only results from rumination, but is an active attempt to inhibit a ruminative response. Although no studies to our knowledge have provided evidence for the causal link between rumination and thought suppression, Erskine, Kvavilashvili, and Kornbrot (2007) recently showed that thought suppression was predicted by rumination – which suggests that if rumination is present, thought suppression is likely to be present as well. Although more evidence is needed to clarify the relationship between rumination and thought suppression, it seems possible that a BPD individual who is ruminating may attempt to suppress those thoughts and in doing so increase rumination. Likewise, even if thought suppression comes immediately after an emotional stimulus, the result may be more rumination and more negative affect.

Low Distress Tolerance

Distress tolerance is another factor that may interact with emotional cascades. Distress tolerance refers to an individual's ability to withstand either emotional or physical discomfort and maintain goal-oriented behavior in light of that distress (Simons & Gaher, 2005). Distress tolerance has been primarily studied in the context of behavioral tasks, but more research is needed on the cognitive and biological contributors to the trait. For example, low distress tolerance may be a function of decreased self-efficacy. If this were true, then low distress tolerance might actually be beliefs such as "I can't handle this," even if the problem is tolerable. Alternatively, low distress tolerance could be a congenital or neurobiologically based trait in which individuals differ in the amount of emotional and physiological stimulation that they can handle. Regardless, if an individual has low distress tolerance, then he or she may be even less likely to withstand emotional cascades, which may result in a worse presentation of dysregulated behavior than in someone who can tolerate more distress.

A recent study found evidence for low distress tolerance in BPD. Using a computerized distress inducing task, Gratz and colleagues (2006) found that, when compared to individuals without a personality disorder, outpatients with BPD were less willing both to tolerate emotional distress in order to pursue goal-directed behavior, and to approach a potentially distressing situation. This indicates that some individuals with BPD may not only have difficulty tolerating distress, but they may also be aware of the onset of emotional cascades, and when they begin to feel distress they may immediately engage in a behavior that dampens the emotional cascade early, thus avoiding the more intense affective states.

The Emergence of BPD from the Perspective of the Emotional Cascade Model

Emotional cascades have generally been presented as real-time phenomena, where there is an event, an emotional cascade, and a dysregulated behavior. Yet a consideration of emotional cascades as only real-time phenomena may result in the question, "How do real-time emotional cascades result in such a complex disorder?" In answer to this question, we present a framework that integrates many components that may be involved in the emergence of BPD, all of which are tied together through emotional cascades and behavioral dysregulation, which are at the center of the framework. This section is meant to help tie many factors together, and may be useful for conceptualizing BPD in clinical settings and developing future research hypotheses.

Emergence refers to the phenomenon of a complex system arising from the collaborative interactions of a network of components (Lewin, 1992). For example, an ecosystem emerges from the interactions of various components including climate, flora and fauna, and geography. Another example is the economy, which is a global network that is composed of interacting nations, markets, corporations, and people, and when one of these areas changes the entire network is influenced. In this same way, BPD may emerge from the interacting network of components discussed in this paper, with emotional cascades existing at the heart of the network. Figure 1 displays important constructs and risk factors that research has identified in BPD (although it is not exhaustive), along with emotional cascades and behavioral dysregulation. As displayed in this diagram, the synthesis of these various interactions between constructs and a pattern of emotional cascades and behavioral dysregulation may be what results in the emergence of BPD over time. The alternative view, that BPD is not an emergent phenomenon, restricts many of these components from feeding back into each other because the model would be more focused on a unidirectional path of causation. Allowing bidirectional causation for these factors allows the model to make predictions that those proximal elements, such as distorted cognitions, not only influence emotional cascades, but the resultant behavioral dysregulation can also modify distorted cognitions (take the circular causality of bingeing and purging for example). Furthermore, the emergence view of BPD aids in an understanding of BPD that crosses traditional theoretical and therapeutic traditions.

The conceptualization of BPD as an emergent phenomenon allows for symptoms and related factors of BPD to relate within the emotional cascade network, whereas previous models have viewed many of the symptoms of BPD as related, but not necessarily fundamentally connected. The view of BPD as an emergent phenomenon also allows for the integration of biological and environmental risk factors with cognitive and behavioral factors that maintain the disorder. Furthermore, an emergent view of BPD allows for the network to have both bottom-up and top-down effects on the maintenance of the disorder. For example, childhood abuse may influence future distorted cognitions and hypervigilance toward others, which may then contribute to emotional cascades. Yet, as BPD individuals engage in dysregulated behaviors, others around them may begin to respond even more negatively toward them, most likely in ways that propagate emotional cascades (e.g. by accusing the individual of being manipulative or calling them “crazy”). This top-down interaction could be called “expectancy validation,” a process that may strengthen distorted cognitions about others or create new ones (e.g., “everyone thinks I’m crazy”). Alternatively, things such as distress tolerance may decrease with the experience of more and more emotional cascades, resulting in a decreased threshold for dysregulated behavior.

The idea that BPD may be an emergent phenomenon is, to our knowledge, a novel idea, but has potential in guiding future research on the disorder. By including emotional cascades into a network of factors associated with BPD, a more parsimonious understanding of the disorder arises, one that can also incorporate past and current theories of BPD, as will soon be discussed. This conceptualization may be useful to clinicians as they attempt to conceptualize the difficulties that their patients face and that influence treatment, as well as guide researchers in attempting to understand how many of the problems in BPD may be related. It may also inspire researchers to focus attention on factors that contribute to emotional cascades and top-down processes such as expectancy validation.

General Discussion

Current Support for the Model

Evidence has been presented throughout the description of the Emotional Cascade Model that has linked rumination to various dysregulated behaviors and to BPD as well (Abela et al., 2003; Smith et al., 2006; Selby, Anestis, Bender, & Joiner, 2008, for example). These studies also suggest that rumination is associated with BPD in a way that is unique from depression (although additional studies are needed to provide further support for this hypothesis). Additional evidence of the connection between heightened affect and behavioral dysregulation comes from studies using daily monitoring, which have demonstrated increasing negative affect prior to dysregulated behavior (binging and purging in particular; Smyth et al., 2007; Wegner et al., 2005) and decreased levels of negative affect following these behaviors (Smyth et al., 2007). These studies need to be replicated in individuals with BPD, however. Daily monitoring studies with individuals with BPD have also demonstrated increases in negative affect following stressful daily events (Glaser et al., 2008), and this daily affective instability is often associated with daily behavioral and interpersonal problems (Russell et al., 2007).

In a recent study, the Emotional Cascade Model was examined in a sample of undergraduates diagnosed with BPD and control subjects. In this study, Selby, Anestis, Bender, & Joiner (2008) used structural equation modeling and found that rumination partially mediated the relationship between symptoms of BPD (as assessed by a structured clinical interview) and a behavioral dysregulation latent variable (comprised of excessive reassurance seeking, bulimic behaviors, drinking to cope, NSSI, and suicidal symptoms), even after controlling for symptoms of depression and symptoms of other Cluster B personality disorders. The model also provided a good fit to the data. In this same study they also conducted a rumination induction where all subjects were instructed to ruminate for five minutes about something in

their life that was upsetting to them. They found that the individuals diagnosed with BPD not only had higher self-reported baseline negative affect, but they also demonstrated greater reactivity and intensity of negative affect following the rumination induction than control subjects. These findings remained significant even after controlling for current symptoms of depression and symptoms of other Cluster B personality disorders. The results of this study provide additional evidence for the role of rumination in BPD and dysregulated behaviors, and this study also provided some evidence to support the notion that individuals with BPD may ruminate at higher levels than individuals experiencing depressive symptoms. This study did not find a full mediational effect for rumination, however, and instead rumination only partially mediated the relationship between BPD symptoms and behavioral dysregulation.

Thus, there is some evidence that supports the Emotional Cascade Model. The current state of research suggests that there are numerous behaviors that appear to have affect regulating properties in general, and furthermore that many of these behaviors are present in individuals with BPD. Moreover, one common link between many of these dysregulated behaviors, as well as BPD, appears to be rumination. Yet, despite this evidence, further research is needed to test the Emotional Cascade Model of BPD, especially in individuals with BPD in clinical samples. Additional evidence is also needed to corroborate that individuals with BPD ruminate more intensely and frequently than individuals with other disorders such as depression, alcohol use disorders, and bulimia nervosa.

Comparing the Emotional Cascade Model to Previous Theories

The Emotional Cascade Model provides a potential next step toward understanding borderline personality disorder, yet it is only able to do so because of the contributions and advances of previous theories. For example, Linehan's (1993) was the first theory to suggest that BPD could be a disorder primarily caused by emotion dysregulation. Linehan's theory was also the first theory to suggest that there may be a connection between emotional and behavioral dysregulation, and furthermore that emotion dysregulation was often caused by invalidation and criticism by others. Another important contribution of Linehan's theory is the suggestion that dysregulated behaviors redirect attention away from negative affect. Despite the great advances that Linehan's theory has contributed to the understanding of BPD, there are areas where the theory is unclear. For example, the theory doesn't explain why invalidation leads to emotional and behavioral dysregulation, or why dysregulated behaviors are needed to reduce negative affect rather than behaviors such as reading a book or talking to a friend. The Emotional Cascade Model is incremental to Linehan's theory in that it provides potential a potential mechanism through which invalidation, emotion dysregulation, and behavioral dysregulation are all related. It also explains why there is such an array of dysregulated behaviors in BPD, suggesting that many of these behaviors may effectively distract from rumination.

Another theory that has greatly contributed to the understanding of NSSI is the Experiential Avoidance Theory of NSSI (Chapman et al., 2005). Although not a theory of BPD per se, this theory could be applied to many dysregulated behaviors found in individuals with BPD. The Experiential Avoidance Theory of NSSI suggests that when individuals experience emotion dysregulation and negative affect, they engage in another behavior (NSSI in particular) as a way of escaping the negative affect they are experiencing. This model provides some explanation for the function of NSSI, which is to reduce the negative affect BPD patients feel through mechanisms such as distraction and self-punishment, and by removing negative affect they negatively reinforce the behavior. Although Experiential Avoidance Theory incrementally contributes to the understanding of NSSI and helps explain why individuals would engage in such behavior, the mechanisms through which emotional experience is avoided remain unclear. For example, the Experiential Avoidance Theory does not explain why other behaviors

(watching TV, taking a cold shower) are not used instead of NSSI; it is also unclear as to why, if negative affect is to be avoided, individuals do not engage in NSSI every time they experience something upsetting (e.g. why not engage in NSSI multiple times each day)? The Emotional Cascade Model clarifies some of these questions, such as positing that dysregulated behaviors have strong physical sensations that are particularly effective at distracting, especially compared to reading a book or talking to a friend, for example. This model also explains why individuals with BPD do not engage in dysregulated behavior every time they feel negative affect: they may feel negative affect, but if they don't ruminate (due to strong distractions in their environment, such as a project at work), then the emotion will likely pass without the need of a dysregulated behavior.

Some other theories that have contributed to the understanding of behavioral dysregulation are Baumeister's (1990) Escape Theory of suicide and Heatherton and Baumeister's (1991) Escape Theory of binge-eating. Escape theories generally posit that individuals engage in behaviors such as binge-eating or suicidal behavior as a way of distracting or escaping from aversive self-awareness. One major contribution of both of these theories is that they suggest cognitive factors that may contribute to dysregulated behaviors. They also suggest that these behaviors may function by redirecting attention from negative thoughts about oneself to the behavior. These models are perhaps the closest to the Emotional Cascade Model because they suggest overwhelming negative affect due to self-focused attention as well as behavioral distraction from negative self-thoughts. One important area that is unclear in Escape Theories, however, is that many people experience negative thoughts about themselves (i.e. depressed individuals) yet do not have dysregulated behavior at the same level as those with BPD. The Emotional Cascade Model is incremental here in that negative thoughts about one's self can instigate an emotional cascade, depending on level of rumination. This helps create a direct link between distorted cognitions and behavioral dysregulation.

Two important psychodynamic therapies have also garnered recent empirical support in the treatment of BPD, and the theoretical traditions of these therapies may also be compatible with the Emotional Cascade Model¹. The first, Transference-Focused Psychotherapy (TFP; Clarkin, Yeomans, & Kernberg, 2006), involves an object-relations approach to the development of BPD. In this model BPD results from an underlying identity diffusion that causes inaccurate representations of self versus other. In a process referred to as "splitting," blurred representations of self versus other are dichotomized into totally positive or totally negative extremes. These split views of self/other are often paired with intense affective experience. Unlike Linehan's (1993) model, which focuses primarily on the affective dysregulation that results from problematic interactions with others, the TFP model focuses more on the underlying personality structure that causes affective dysregulation. Dysregulated behavior is also viewed as an effect of identity diffusion rather than affective experience per se, although both are highly related. The Emotional Cascade Model is compatible with the TFP view of BPD in that identity diffusion and problematic relational views of others are important factors that may contribute to emotional cascades. In fact, problematic object-relation dyads could potentially be included as an additional box in Figure 1, as a factor that contributes to emotional cascades along with hypersensitivity and distorted cognitions. One drawback of the TFP view is that it does not have a primary focus on dysregulated behaviors, so the mechanisms that link identity diffusion to dysregulated behaviors are unclear. By integrating the Emotional Cascade Model with the TFP view, the bulk of the theory of BPD from TFP remains intact and a plausible mechanism of how identity diffusion instigates behavioral dysregulation could be accounted for (i.e. emotional cascades).

¹The authors would like to acknowledge one of the reviewers, who suggested that the model was compatible with psychodynamic traditions as well as cognitive-behavioral, which were originally the primary focus.

A second psychodynamic theoretical approach which has some supporting evidence is the Mentalization Model of Mentalization-Based Psychotherapy for BPD (MBT; Fonagy & Bateman, 2008). In this approach BPD is considered to result from deficits in the patient's ability to accurately evaluate his or her own mental state and understand how his or her perceptions of the world relate to other people around them. They also have deficits in evaluating the minds and motivations of others. These deficits in the ability to accurately perceive the world are referred to as problems with "mentalization." These difficulties with mentalization can result in impractical mental approaches to understanding situations, such as difficulty distinguishing plausible motivations of others from unlikely ones, dissociation, and becoming preoccupied with physical experience. The MBT approach to BPD is also compatible with the Emotional Cascade Model, particularly with regard to factors that may instigate emotional cascades. If an individual has difficulty understanding themselves and others, he or she may be more likely to ruminate about these problems in an unsuccessful attempt to understand the factors surrounding the situation. Additionally, the tendency to engage in concrete thought, where imagined "what if" possibilities are perceived as real by the patient, may be similar to catastrophizing – which we have discussed as form of rumination. Finally, the preoccupation with physical experience in the mentalization model is consistent with the use of physical stimuli that result from dysregulated behaviors for distraction in the model presented here. Thus, the Emotional Cascade Model may provide a common ground between cognitive-behavioral and psychodynamic approaches to conceptualizing BPD.

The Emotional Cascade Model of BPD builds on and integrates previous existing theories of borderline personality disorder, emotion regulation, and different theories of behavioral dysregulation to create a framework for understanding a complex and pernicious disorder. Yet, not only does this model encompass previous theories, it is also different than previous models because the view of BPD as an emergent phenomenon integrates multiple levels of understanding BPD. The emergent view of BPD allows for the simultaneous understanding of emotional experience and behavioral tendencies, to congenital and environmental factors, to top-down effects of having the disorder (expectancy validation). This view also results in a model that can generate many testable hypotheses at various levels of BPD experience.

Importantly, the Emotional Cascade Model is parsimonious. It provides an understanding of various questions surrounding the disorder with relatively few components: for example, why there are such wide arrays of dysregulated behaviors in BPD, and how can something such as rumination result in a complex and chronic disorder? The Emotional Cascade Model explains many of these complex problems using a relatively small network of interacting components, with emotional cascades at the heart of this network. This parsimonious view also allows for the identification of potential mechanisms for change in current evidence based therapies for BPD.

A Unifying Mechanism of Change in Therapy

There are a few therapies for BPD that have demonstrated efficacy through randomized-controlled trials, including: DBT (Linehan et al., 2006), MBT (Bateman & Fonagy, 2008), and TFP (Levy, Meehan, et al., 2006). How is it that three very different approaches to the treatment of BPD could ease the symptoms of BPD in similar ways? The Emotional Cascade Model may provide an answer to this question and at the same time illustrate a potential mechanism of change that transcends traditional therapeutic doctrines. Emotional cascades may also serve as a unifying framework for the treatment of BPD, finding common ground across multiple treatment approaches such as DBT, MBP, and TFP.

The primary mechanism of change that may alleviate symptoms of BPD, according to the Emotional Cascade Model, is the reduction of rumination. This change may be present in DBT, through mindfulness exercises that distract from emotional experience by focusing attention

on physical stimuli (such as breathing). Some evidence also exists that mindfulness is an effective way to reduce rumination in depressed individuals (Broderick, 2005). Alternatively, one of the proposed mechanisms of change in TFP is improved reflective functioning through in-session clarification and confrontation of the patient's relational-affects and identity diffusion (Levy, Clarkin, et al., 2006). This process may result in more cognitive flexibility and a better understanding of the underlying factors that lead to affective experience in the patient (Levy, Clarkin, et al., 2006). The techniques of TFP may reduce emotional cascades by enhancing the patient's reflective functioning on problems and relationships with others, rather than ruminating about them. Finally, a proposed mechanism of change in MBT is helping the patient better understand his or her moment-to-moment state of mind and affect (Bateman & Fonagy, 2008), and MBT may help reduce emotional cascades by replacing ruminative thought processes with a clearer, constructive, and less emotion-focused approach to problem solving.

The view of BPD as an emergent phenomenon also helps bridge these theoretical approaches, which previously focused on one part or another of the network displayed in Figure 1. It is also useful for understanding how different treatment approaches can have common ground. For example, the DBT conceptualization of BPD focuses primarily on the emotional and behavioral dysregulation components of BPD, while psychodynamic approaches focus on the factors that elicit intense emotional experience. Furthermore, invalidation, object-relations dyads, and mentalization deficits may not be exclusive of each other, but may be inter-related problems that contribute to emotional cascades. The emergent view of BPD takes all of this into consideration, as many of these various factors may be linked through emotional cascades.

Future research should investigate decreases in rumination as a mechanism of change in these therapies. One important way to test this hypothesized mechanism would be to assess rumination levels prior to therapy, after therapy, and then in the years after therapy has taken place. If mindfulness, reflective functioning, and mentalization all decrease rumination, the effects should, ideally, be observed as reduced rumination for years after therapy. If data are consistent with this hypothesis, then additional research may be warranted to examine differences in the amount of rumination reduction that each therapy provides.

Possible Limitations of the Model

Although the Emotional Cascade model of BPD provides incremental understanding of many of the behavioral and emotional symptoms of this disorder, it does have limitations. For example, identity diffusion is not well explained or accounted for by this model. It is possible that the symptoms of identity disturbance contribute to emotional cascades, as has been discussed related to the TFP view of BPD. For example, problems with identity may lead to maladaptive cognitions, negative views of others, or feelings of emptiness. Wilkinson-Ryan and Westen (2000) have found that two specific factors of identity disturbance, painful incoherence (feelings of distress about lacking a coherent sense of self), and lack of commitment (difficulties committing to goals or maintaining a constant set of values) are highly related to the emotion dysregulation features of BPD. So identity disturbance phenomena may be part of what contributes to emotional cascades in BPD, but more research is needed to determine why this may be and if there is a relationship between identity diffusion and rumination.

Dissociation is also another complex phenomenon that is not well described by this model. Dissociation is described as a feeling of detachment or estrangement from one's self and could consist of sensations such as being an outside observer of one's self, or as if being in a dream. Dissociation may be a response to such an extreme emotional cascade that the individual just shuts his or her mind down, or it may also be a covert behavior similar to daydreaming – a cognitive way of distracting by focusing on imaginary stimuli such as an out-of-body

experience. More research on the causes and effects of dissociation are needed before the Emotional Cascade model can attempt to explain this phenomenon.

One final area where the Emotional Cascade Model may fall short is in the understanding of why intimate relationships are an area of extreme difficulty for individuals with BPD. Currently, the model attributes equal weight to problematic interpersonal factors that initiate emotional cascades, whether the problem is with a romantic partner or a coworker, when the former may actually be more relevant. One recent study found evidence that perception of parental invalidation during childhood (i.e. “my parents didn’t show me affection”) mediated the relationship between symptoms of BPD and current romantic relationship dysfunction (Selby, Braithwaite, Joiner, & Fincham, in press). This finding suggests that experiences with parents may set the stage for the factors that contribute to emotional cascades (i.e. distorted cognitions). Intimate relationships with others may also be more involved due to higher frequency of interactions that cause problems to ruminate on (i.e. fear of abandonment) than other interpersonal relationships, such as relationships at work. This may be a place where psychodynamic traditions offer additional conceptual alternatives, as intimacy is often a focus in these traditions. Additional research on factors that initiate emotional cascades, especially in the context of intimate relationships, may provide more information on this shortcoming of the Emotional Cascade Model.

Conclusion

The purpose of this paper was to describe the Emotional Cascade Model of BPD and to provide a review of research supporting this model. In the Emotional Cascade Model individuals with BPD undergo what is termed an emotional cascade, a process in which an emotion eliciting event causes a negative emotion to arise in the individual. The individual then ruminates intensely, which increases the intensity of the emotion. As the intensity of the emotion rises, the individual finds that it is more and more difficult to divert attention away from emotional experience, and as a result rumination increases, such that a positive feedback loop is formed. The increase in emotional intensity then results in the behavioral dysregulations that are hallmarks of BPD, which may serve as a suite of potent methods of distraction for the individual. BPD was also presented in as an emergent phenomenon, where the disorder is the result of a complex network of interacting factors, and at the center of that network are emotional cascades. Finally, the model was compared with other theories of BPD, and the model appears to be one that can unify current theories and treatment modalities. It is hoped that the Emotional Cascade Model of BPD, which provides a novel theoretical account of the genesis of BPD, will inspire new directions of research and treatment for this severe personality disorder.

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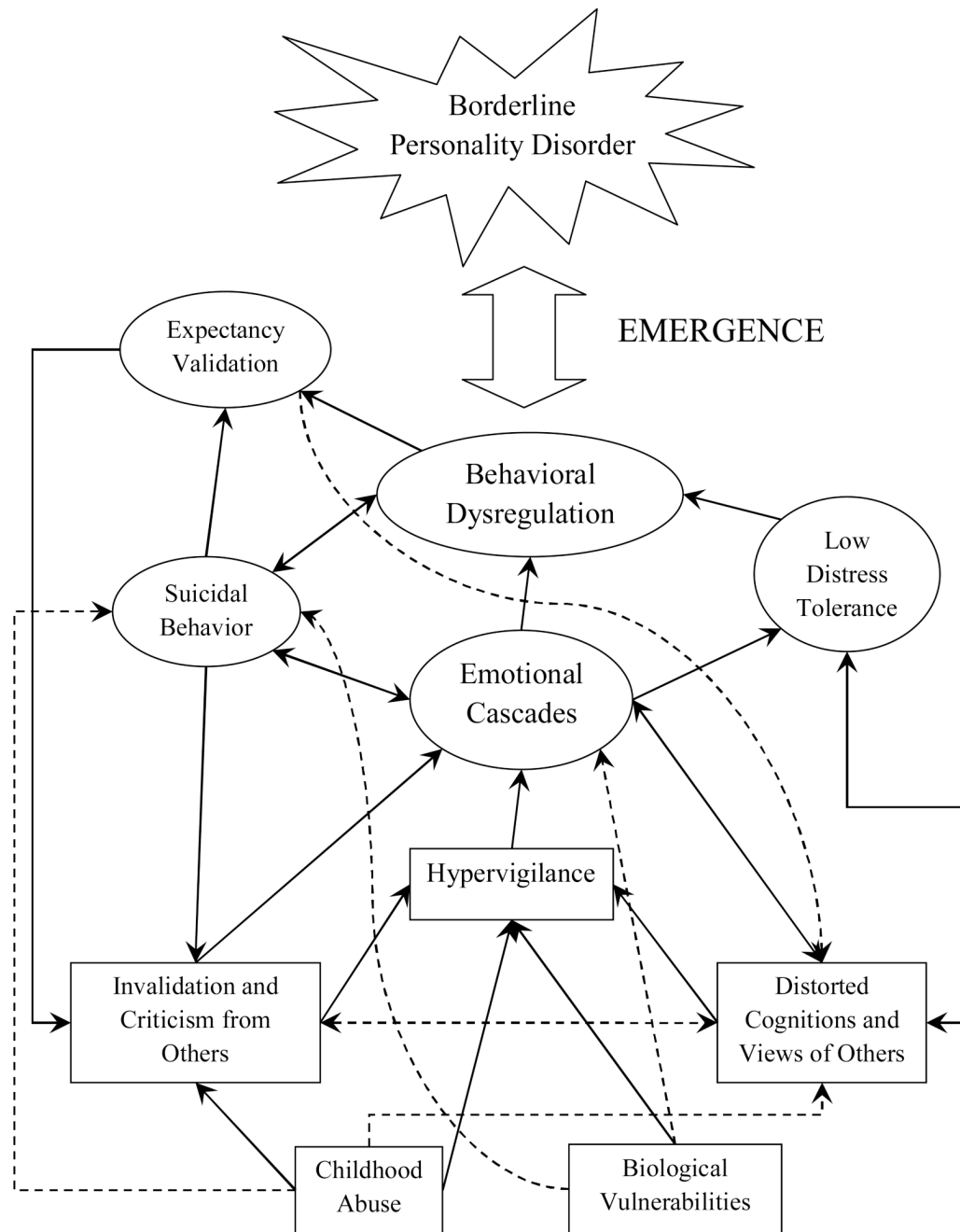


Figure 1.
Emergence of BPD

In this figure a network of factors associated with BPD are presented interacting with each other, as well as with emotional cascades and dysregulated behavior (the heart of the network). Squares represent proximal and distal factors that may influence emotional cascades, and circles represent potential factors that may arise from and modify those proximal factors. The combination of interactions among the components of this network may be what results in the emergence of BPD. All paths indicate positive feedback, dashed paths are presented for ease of following multiple connecting paths.