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Review

The borderline interpersonal-affective systems (BIAS) model: Extending understanding of the interpersonal context of borderline personality disorder

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ABSTRACT

Prominent explanatory models for borderline personality disorder (BPD) are intrapersonal in nature and hold that it is an emotional disorder. However, the empirical support for emotional models of BPD is mixed. Refinements to BPD explanatory models are needed to increase the precision with which BPD can be understood and treated. Drawing on existing theoretical and empirical research in BPD, this manuscript presents the Borderline Interpersonal-Affective Systems (BIAS) model. The BIAS model purports that harmful early life relationships and subsequent conflictual relationships lead individuals with BPD to develop a sensitivity to interpersonal threat in the form of attentional and appraisal biases. Individuals with BPD are posited to 1) experience heightened emotional reactivity specifically to perceived interpersonal threat and 2) engage in destructive behaviors both to regulate increasing emotion and to meet interpersonal needs. We review the empirical support for each component of the BIAS model, along with the role of the cognitions, emotions, and behaviors of significant others in influencing BIAS model processes in individuals with BPD over time. The BIAS model highlights a novel way of understanding and integrating interpersonal and emotional components of the disorder. Key directives for future research and clinical implications are discussed.

Borderline Personality Disorder (BPD) is a debilitating disorder affecting ~1.4% of the population (Lenzenweger, Lane, Loranger, & Kessler, 2007). Up to 84% of those with BPD have engaged in suicidal or self-harming behavior (Soloff, Lynch, & Kelly, 2002) and 10% die by suicide (Paris & Zweig-Frank, 2001). Addressing the dire public health problem posed by BPD requires sharp understanding of the nature of the disorder and what maintains it. In this work, we review the empirical support for emotional disorder models of BPD, followed by brief reviews of existing interpersonal models of BPD and their limitations. Building on these emotional and interpersonal explanatory models, and growing literatures examining the interpersonal context of emotion, we argue that BPD is most accurately conceptualized as a disorder of disrupted interpersonal processes, including interpersonally-specific emotional processes, and review the empirical support for a revised, interpersonally-specific emotional model of BPD called the Borderline Interpersonal Affective Systems (BIAS) model. We conclude with discussion of its clinical and empirical implications.

1. Is borderline personality disorder an emotional disorder?

Several contemporary models of BPD hold that it is an emotional disorder. Linehan's (1993) Biosocial Theory is arguably the most prominent of such models, suggesting that emotion dysregulation is the core of BPD, and all BPD diagnostic criteria are either direct consequences of, or maladaptive attempts to regulate, dysregulated emotion processes. Linehan (1993) purports that emotion dysregulation is comprised of several emotional components including heightened emotional sensitivity (i.e., lowered thresholds for emotion responses) emotional reactivity (i.e., larger magnitudes of changes in emotion from baseline), slow emotional returns to baseline, and emotion regulation deficits (i.e., difficulty modulating emotion dynamics, automatically or volitionally; Gross & Thompson, 2007). More recently, Sauer-Zavala and Barlow (2014) also suggested that BPD is a quintessential "emotional disorder" characterized by frequent and intense negative emotion and negative reactions to, and avoidance of, such emotions (see Sauer-Zavala & Barlow, 2014, for review). These works thus converge in

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highlighting problematic emotion processes as the core of BPD, although the specific emotion processes that they emphasize vary.

Empirical literature supports the utility of focusing on emotion in BPD. Extensive research suggests that individuals with BPD exhibit elevated negative emotion at rest compared to controls across self-reported and physiological indices (e.g., Ebner-Priemer et al., 2007; Elices et al., 2012; Feliu-Soler et al., 2013; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2010; Kuo, Fitzpatrick, Metcalfe, & McMain, 2016; Kuo & Linehan, 2009; Scott, Levy, & Granger, 2013). Furthermore, some of the most destructive BPD-relevant behavior such as self-harming behavior (e.g., Soloff et al., 2002) and substance use (Sansone & Sansone, 2011)–serve emotion regulatory functions (e.g., Andover & Morris, 2014; Khantzian, 1997). Accordingly, frontline BPD treatments such as Dialectical Behavior Therapy (DBT) focus on improving emotion regulation through skills training (Linehan, 1993, 2015). This focus appears to be advisable, as the use of DBT skills is associated with better BPD treatment outcomes (e.g., Probst et al., 2018).

However, an extensive body of experimental evidence examining other forms of emotional problems in BPD is mixed. Of note, there are many ways that emotion processes can be disrupted, and a full review of each is beyond the scope of this paper. Here, we focus on particularly prominent emotion processes that have been studied in relation to BPD. Using emotion inductions, several experimental studies suggest that individuals with BPD have higher emotional reactivity compared to control groups (e.g., Austin, Rinolio, & Porges, 2007; Baskin-Sommers, Vitale, MacCoon, & Newman, 2012; Chapman, Dixon-Gordon, Butler, & Walters, 2015; Chapman, Walters, & Dixon-Gordon, 2014; Dixon-Gordon, Gratz, Breetz, & Tull, 2013; Dixon-Gordon, Gratz, & Tull, 2013; Ebner-Priemer et al., 2005; Elices et al., 2012; Gratz et al., 2010; Gratz, Richmond, Dixon-Gordon, Chapman, & Tull, 2019; Reichenberger et al., 2017; Rosenthal et al., 2016). However, different studies and indices within the same studies does not support the presence of heightened emotional reactivity in BPD (e.g., Baskin-Sommers et al., 2012; Chapman et al., 2014; Chapman et al., 2015; Dixon-Gordon, Gratz, & Tull, 2013; Elices et al., 2012; Feliu-Soler et al., 2013; Gratz et al., 2010; Gratz et al., 2019; Jacob et al., 2009; Kuo & Linehan, 2009; Kuo et al., 2016; Sansone, Wiederman, Hatic, & Flath, 2010; Rosenthal et al., 2016; Scott et al., 2013), or suggests that BPD is characterized by reduced emotional reactivity (e.g., Baschnagel, Coffey, Hawk, Schumacher, & Holloman, 2013; Chapman et al., 2015; Elices et al., 2012; Herpertz et al., 2000; Herpertz, Kunert, Schwenger, & Sass, 1999; Pfaltz et al., 2015; Scott et al., 2013; Smoski et al., 2011), relative to control groups. Research on other emotion processes yield a similar pattern of findings. At least three studies suggest that, relative to control groups, individuals with BPD or high BPD features exhibit slower emotional returns to baseline in some emotional indices (e.g., heart rate, respiratory sinus arrythmia, some self-report indices), but not in others (e.g., skin conductance responses, other self-report indices; Chapman et al., 2015; Ebner-Priemer et al., 2015; Fitzpatrick & Kuo, 2015). Several other studies reveal that return to baseline following provocation is not different in BPD and control groups across self-report and physiological indices (e.g., Gratz et al., 2010; Jacob et al., 2009; Scheel et al., 2013; Scott et al., 2013; Weinberg, Klonsky, & Hajcak, 2009).

Several studies have also examined whether BPD is characterized by emotion regulation deficits. Findings generally suggest that individuals with BPD can implement emotion regulation strategies following emotion inductions to downregulate emotion to the same extent as others. In particular, the vast majority of studies suggest that individuals with BPD can downregulate self-reported, sympathetic, and parasympathetic indices of emotion as effectively (e.g., Chapman, Rosenthal, & Leung, 2009; Krause-Utz, Walther, Lis, Schmahl, & Bohus, 2019; Kuo et al., 2016; Lang et al., 2012; Marissen, Meuleman, & Franken, 2010; Ruocco, Medaglia, Ayaz, & Chute, 2010; Schulze et al., 2011) or *more* effectively (Chapman et al., 2009) than control groups, although they retrospectively report having greater difficulties doing so (Daros, Guevara, Uliaszek, McMain, & Ruocco, 2018). Individuals with BPD or high BPD features also select emotion regulation strategies that are appropriately matched to varying emotional stimuli (Kuo, Fitzpatrick, Krantz, & Zeifman, 2017; Sauer et al., 2016). Furthermore, although higher BPD features predicts more frequent use of destructive emotion regulation strategies in daily life (e.g., self-harm, substance use), it also predicts more frequent use of generally adaptive strategies (e.g., talking to friends; Fitzpatrick, Khoury, & Kuo, 2018).

In summary, mixed findings on emotion processes clearly indicates that not all emotion processes are dysregulated in BPD across all indices, all of the time. Yet, individuals with BPD may experience some atypical emotional processes (e.g., elevated baseline emotion), and BPD treatment research suggests that there is clinical utility to conceptualizing and treating BPD as an emotional disorder. Dysregulated emotion processes may also only be evident for specific types of emotions in BPD. Indeed, although no research to knowledge has compared emotion processes across each specific emotion in BPD, some empirical works have particularly focused on anger and shame (e.g., Gratz et al., 2010; Peters & Geiger, 2016; Peters, Geiger, Smart, & Baer, 2014). To this end, some works have documented heightened emotional reactivity in shame (Chapman et al., 2015; Gratz et al., 2010) and hostility (Chapman et al., 2015), but not other emotions in BPD, and others provide evidence for anger and anxiety reactivity in the disorder (Koenigsberg et al., 2002). Further, some research suggests that return to baseline of anger may be particularly slow (Fitzpatrick & Kuo, 2015; Jacob et al., 2008). However, these works are preliminary. Given that extensive evidence suggests that many core emotion processes are intact in the disorder, conceptualizing BPD solely and pervasively as an emotional disorder without specifying when or why emotional problems emerge may be limiting. There is a critical need to revise and update explanatory theories of BPD in order to increase the precision with which BPD can be understood and, consequently, treated.

2. Situating emotion in its interpersonal context

Current conceptualizations of BPD as an emotional disorder suggest that problems with emotion processes are pervasive across intrapersonal and interpersonal contexts (Linehan, 1993; Sauer-Zavala & Barlow, 2014). However, emotion processes do not occur in a vacuum, but rather exist within a complex social context in which people influence them (e.g., Barthel, Hay, Doan, & Hofmann, 2018; Meehan, Clarkin, & Lenzenweger, 2018; Zaki & Williams, 2013). Accordingly, researchers are advancing a growing field of that examines emotional processes in an interpersonal context (e.g., interpersonal emotion regulation; Zaki & Williams, 2013). Indeed, in a review of BPD models, Meehan et al. (2018) comment that mixed findings on emotional and interpersonal deficits in BPD can be explained by understanding them as a complex interaction of underlying neurobiological and behavioral features that operate within an interpersonal context.

2.1. *Interpersonal dysfunction and BPD*

The interpersonal contexts in which emotion processes occur may be particularly relevant to BPD because interpersonal dysfunction is highly characteristic of this disorder. BPD is characterized by chaotic and volatile relationships, along with frantic efforts to avoid abandonment (American Psychiatric Association, 2013). Individuals with BPD tend to have relationships with less social support and more arguments and criticism than healthy controls (HCs; Lazarus & Cheavens, 2017) or low BPD severity participants (Beeney, Hallquist, Clifton, Lazarus, & Pilkonis, 2018). Compared to control groups, those with BPD are also more prone to romantic relationship dysfunction (Hill et al., 2008; Navarro-Gómez, Frías, & Palma, 2017), and couples in which one partner is diagnosed with BPD report lower relationship satisfaction and higher distress, conflict, dissolution, and violence (Bouchard, Sabourin, Lussier, & Villeneuve, 2009; Hill et al., 2011).

Interpersonal dysfunction may also relate to both the maintenance of

other BPD symptoms. For example, as many as 73% of the most lethal suicide attempts in BPD are precipitated by interpersonal events (Brodsky, Groves, Oquendo, Mann, & Stanley, 2006). In addition, interpersonal factors predict suicide threats (Wedig, Frankenburg, Bradford Reich, Fitzmaurice, & Zanarini, 2013) and non-suicidal self-injury (Kehrer & Linehan, 1996) in BPD. In a 6-year longitudinal study, individuals whose BPD symptoms remitted were more likely to have non-distressed intimate relationships than those whose did not (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005). These results suggest that interpersonal dysfunction may both characterize and drive BPD pathology.

Despite these findings, emotional models of BPD do not address the role of interpersonal dysfunction in relation to emotion processes (Linehan, 1993; Sauer-Zavala & Barlow, 2014). Linehan (1993) acknowledges the role of interpersonal processes in the *development* of BPD, purporting emotion dysregulation arises from a transaction between children who are biologically vulnerable to it and invalidating social environments. Such invalidating environments theoretically reinforce emotional escalations, punish emotional displays, and oversimplify the ease of various forms of problem solving. Although Linehan (1993) suggests interpersonal transactions are discussed in the etiology of emotion dysregulation in BPD, the putative maintaining mechanisms for BPD in adulthood are exclusively composed of *intra*personal emotion processes. Explanatory models of BPD that comprehensively explain how interpersonal dysfunction intersects with emotional processes have the potential to improve precision and accuracy in BPD treatment.

Building on Linehan's (1993) assertion that individuals with BPD regulate intense emotion through destructive emotion regulatory behaviors such as self-harm, Fruzzetti and Fantozzi (2008) suggest that individuals with BPD struggle to accurately express emotions in close relationships. This perpetuates conflict in their relationships because it leads significant others to respond to inaccurate expressed emotions (e.g., anger) rather than underlying primary emotions (e.g., shame). The authors posit that such responses from significant others are invalidating (Fruzzetti & Fantozzi, 2008) and escalate emotion over time (Fruzzetti, Shenk, & Hoffman, 2005). During interactions with individuals with BPD, significant others are purported to experience increases in emotion and become more judgemental of either themselves, which leads to withdrawal, or the individual with BPD, which leads to attack behavior. Withdrawal and attack behaviors increase conflict and emotion in both individuals and become learned patterns over time.

Fruzzetti et al.' (2005; 2008) work has been instrumental in expanding intrapersonal emotional models of BPD and illuminating the potential role of significant others and their own cognitions, emotions, and behavior in maintaining BPD. However, this theory still holds that BPD is an emotional disorder exacerbated by interpersonal dysfunction. A growing body of literature highlights the role of problems in interpersonal cognitions, interpersonally-specific emotion processes, and interpersonal behaviors that may characterize the disorder above and beyond its emotional correlates. Although Fruzzetti et al.' (2005; 2008) have integrated emotional models of BPD into broader interpersonal systems, they do not account for other interpersonal dysfunction processes in the disorder. Such theorizing may therefore neglect core interpersonal components that are key to the development and maintenance of BPD.

2.2. Interpersonal theories of BPD

Fortunately, the notion that BPD, and indeed all personality disorders, are best conceptualized from an interpersonal frame is not new. For several decades, psychoanalytic, object relations, and attachment theorists highlighted that internal representations of the self, other, and the emotional experiences that connect them (i.e., object relations) are distorted in BPD (e.g., Benjamin, 1987; Clarkin, Lenzenweger, Yeomans, Levy, & Kernberg, 2007; Fonagy, Luyten, & Strathearn, 2011; Gunderson, 1996; Kernberg, 1975, 2004; Masterson & Rinsley, 1975). Shared themes across many of these early theoretical works suggest that BPD originates from histories of problematic early relationships (e.g., Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004; Benjamin, 1987; Kernberg, 2004), and, consequently, is characterized by varied misperceptions of oneself and others. Several theorists have suggested that problematic early relationships theoretically result in an expectation of threat or abandonment in later life relationships (Benjamin, 1987; Fonagy et al., 2011), impaired mentalization (i.e., the ability to reflect on the mental states of oneself or others; Sharp et al., 2011; Levy, 2005, Fonagy & Bateman, 2008; Bender & Skodol, 2007), or problematic object relations. Such object relations theoretically feature low empathy and perspective taking (Clarkin et al., 2007) or "splitting" wherein individuals oscillate between perceiving themselves and others in idealized or threatening/persecutory terms (Kernberg, 1975, 2004). Many of these theorists further assert that BPD symptoms reflect an attempt to manage rapidly shifting negative internal representations of oneself and others (Clarkin et al., 2007; Kernberg, 1975, 2004). For example, Benjamin (1987; 1993) suggests that self-injurious episodes in BPD are precipitated by perceived abandonment from a significant other which is then internalized as intense self-criticism that is externalized as self-injury. Importantly, several early interpersonal theorists, such as Kernberg (1975, 2004), align with emotional models in highlighting temperamental proclivities towards emotion problems in BPD, which may be exacerbated by early life experiences.

More recently, numerous theorists have commented on the centrality of interpersonal dysfunction in the development of BPD pathology (see Fonagy & Bateman, 2008; Gunderson & Lyons-Ruth, 2008; Depue & Lenzenweger, 2001; Hopwood, Schade, & Pincus, 2014). Several of these works are innovative in their integration of interpersonal and emotional BPD mechanisms. For example, like Linehan (1993), Hopwood et al. (2014) suggest that a "temperamental predisposition for emotional lability and disinhibition coupled with invalidating, uncertain, and chaotic environments" (pp. 302) elicits BPD. Mentalization-based theories also synthesize emotional and interpersonal models of BPD, noting that emotion regulatory problems central to BPD develop as a result of insufficient mirroring from early attachment figures, which prohibits learning adequate emotion regulation (Fonagy & Bateman, 2008). However, these theorists diverge from Linehan (1993) in emphasizing that such early experiences lead to misperceptions of other's internal states, motives, and behaviors, which is a core component of the disorder. Furthermore, cognitive theorists highlight interpersonal schemas that theoretically characterize BPD and may lead to high emotional reactivity and related processes in the disorder. For example, McGinn and Young (1996) highlight that individuals with BPD possess an "abused/abandoned" child schema-mode wherein they believe that others will hurt, abandon, punish, or otherwise harm them. Aligned with Object Relations theorists (Kernberg, 1975, 2004), Beck and Freeman (1990) suggests that dichotomous thinking, wherein people with BPD oscillate between very positive and negative perceptions of themselves or others, leads to the high emotional reactivity.

In sum, many have suggested that BPD is an interpersonal disorder. However, existing theoretical literature lacks precision regarding the specific ways individuals with BPD may misperceive others, and the potential relationship of such misperception to emotional problems, leading researchers to interpret and test these theories in various ways. This may contribute to their mixed empirical support. For example, Jańczak (2018) suggests that research examining individuals with BPD's capacity to mentalize or infer mental states of others is mixed due to high variability in its operationalization. Consistent with the recommendations of others (e.g., Beck & Freeman, 1990; Meehan et al., 2018), theoretical works that highlight the specific, testable interpersonal processes that elicit problematic emotion in BPD, and the ways in which they maintain the disorder, would provide key directives for therapeutic intervention.

Furthermore, interpersonal models of BPD require attention to the way interactive relationships between individuals with BPD and their

significant others, and the intrapersonal cognitions, emotions, and behaviors that each member of a dyad contributes to this interaction, maintain BPD. Although several emotional and interpersonal theories highlight transactional relationships between individuals with BPD and significant others in the *etiology* of BPD, few precisely illustrate the ways in which such transactions inform its *maintenance* later in life, and those that do have limitations. Namely, Fruzzetti et al. (2005; 2008) discuss transactional behavior between individuals with BPD and significant others that maintain emotion dysregulation but de-emphasize potentially central interpersonal components of the disorder. Benjamin (1987) articulated ways in which significant others may reinforce self-destructive behavior in BPD through subsequent decreases in aversive interpersonal experiences and increases in nurturance. Attachment theories likewise emphasize the ways in which individuals with BPD recapitulate negative relationship schemas from childhood resulting in repetitive experiences of rejection and reinforced negative expectations about the self and others (Fonagy et al., 2011). However, these works do not identify specific and modifiable interpersonally-oriented intrapersonal cognitive and emotional processes that individuals with BPD and significant others experience in adulthood, and the ways they interact to maintain the pathology. Although these theories are critical to informing BPD interventions, precise interpersonal and emotional treatment targets remain unclear.

3. The core tenets of the BIAS model

Advancing understanding of BPD requires theoretical innovations derived from existing BPD theory and research that incorporate empirically-supported intrapersonal and interpersonal components of the disorder together. In an effort to address this gap in the literature, we developed the Borderline Interpersonal-Affective Systems model (i.e., the BIAS model; see Fig. 1 for core components). The BIAS model outlines *intrapersonal* cognitions, emotions, and behaviors that individuals with BPD and their significant others bring to *interpersonal* interactions to maintain BPD over time. It specifically posits that BPD is an interpersonal-emotional disorder, wherein interpersonal content elicits, exacerbates, and is exacerbated by, emotional problems. These interpersonal and emotional problems subsequently inform other domains of BPD pathology. Below we review the central tenets of the BIAS model, followed by the empirical support for each component. We conceptualize the BIAS model as inherently interpersonal, in that it delineates the ways in which interpersonally-themed cognitions, emotions, and behavior in individuals with BPD and their significant other interact interpersonally to maintain the disorder over time. However, in this work we focus on the interpersonally-themed cognitions, emotions, and behavior of individuals with BPD, given that these areas have received substantially more empirical attention. To advance the latter interactive components, we synthesize this work by discussing the roles of significant others in maintaining BPD given the core tenets purported by the BIAS model, and conclude by discussing clinical implications, and directions for future research.

The BIAS model both overlaps with and diverges from existing theoretical work in BPD. Like several BPD theorists, we argue that dysfunctional early life relationships (e.g., Benjamin, 1987; Clarkin et al., 2007; Fonagy & Bateman, 2008; Hopwood et al., 2014; Kernberg, 2004; Linehan, 1993), and subsequent conflictual relationships (Fruzzetti & Fantozzi, 2008) disrupt later perceptions of others and emotional reactivity to those perceptions in BPD. Several theorists suggest that problematic relationships early in life and subsequent histories of conflict inform a proclivity towards misperceiving the intentions, perceptions, or behaviors of others in BPD (e.g., Beck & Freeman, 1990; Benjamin, 1987; Clarkin et al., 2007; Fonagy & Bateman, 2008; Hopwood et al., 2014; Kernberg, 1975; Kernberg, 2004; McGinn & Young, 1996). Similarly, we specifically hypothesize that such early experiences increase individuals with BPD's sensitivity to interpersonal threat. Interpersonal threat sensitivity is evident in two particular processes: attentional bias towards signs of interpersonal threat and an appraisal bias of interpersonal stimuli as negative and threatening. We argue that interpersonal threat sensitivity elicits heightened emotional reactivity, which, as other BPD theorists have asserted (e.g., Hopwood et al., 2014), is *not* pervasive but rather specific to interpersonal stimuli and cues. We further posit that emotional reactivity promotes problematic communication behaviors in individuals with BPD that exacerbate conflict and further escalate their emotional reactivity. This assertion reflects

Core components of the Borderline Interpersonal-Affective Systems (BIAS) model

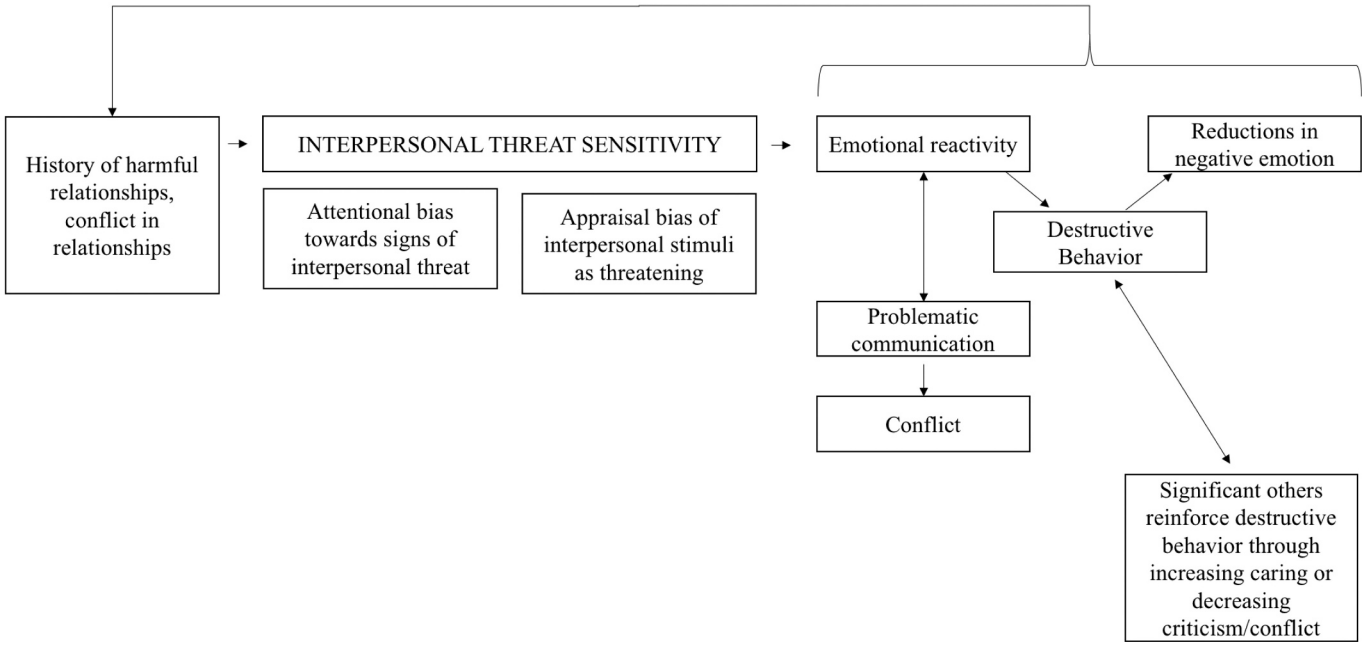

Fig. 1. Core components of the Borderline Interpersonal-Affective Systems (BIAS) model.

Fruzzetti and Fantozzi (2008), who posit that high emotional arousal increases judgmental thinking, inaccurate expression of emotion and repetitive patterns of problematic behavior, and Benjamin (1987), who posit that expressions of rage in BPD further reify perceptions of rejection/abandonment by eliciting consistent behavior from significant others. Consistent with emotional models of BPD (e.g., Linehan, 1993), we suggest that high emotional reactivity leads to the engagement of destructive behaviors and, like Benjamin (1987), we emphasize that they that have both intrapersonal (i.e., regulating negative emotion) and interpersonal (i.e., eliciting care or reducing conflict) functions. Destructive behaviors in BPD are thus reinforced by two primary pathways: their emotion regulatory effect and the ways significant others respond to them. Fruzzetti and Fantozzi (2008) suggest that misunderstanding and invalidation in conflict cyclically increase emotional vulnerability and, consequently, subsequent conflict. In a similar vein, we argue that high levels of conflict, emotion, and destructive behavior in individuals with BPD and their significant others contribute to histories of conflict and strengthen interpersonal threat sensitivities over time, recapitulating a cycle of problematic interpersonal and emotional processes.

We suggest that several BPD diagnostic criteria reflect the consequences of interpersonal threat sensitivity and its ensuing conflict (i.e., frantic efforts to avoid abandonment, intense and stormy relationships, stress-induced paranoid ideation; American Psychiatric Association, 2013). Other BPD diagnostic criteria may reflect efforts to accommodate relationships in order to prevent perceived interpersonal threats from being realized. For example, we posit that individuals with BPD may experience a lack of cohesive identity and emptiness (American Psychiatric Association, 2013) as a result of an excessive focus on others and over-engagement in behaviors aimed at protecting themselves from interpersonal threats and losses (e.g., over-accommodating and conforming to others). Finally, consistent with emotional models of BPD (Linehan, 1993), we agree that several other BPD criteria may reflect consequences of emotional problems or attempts to regulate them (i.e., emotional reactivity, difficulty controlling anger, impulsivity, self-destructive behavior, dissociation; American Psychiatric Association, 2013), but posit that such problems are specifically elicited by interpersonal threat sensitivity. Below we review the evidence for individual components of the BIAS model.

4. Histories of problematic relationships

There is little debate that BPD is associated with disrupted relationships early in life. Individuals with BPD have high rates of childhood maltreatment, including physical, sexual, and emotional abuse or neglect (McFetridge, Milner, Gavin, & Levita, 2015), and more adult relationship aggression, conflict, and violence (e.g., Stepp, Smith, Morse, Hallquist, & Pilkonis, 2012; Weinstein, Gleason, & Oltmanns, 2012), which prospectively predicts BPD symptom severity (Spatz Widom, Czaja, & Paris, 2009). In addition to early childhood relationships, there is also evidence that individuals with BPD make proximal and distal interpersonal decisions that increase their likelihood of having conflictual relationships. Individuals with BPD prefer fewer relationships that are closer and more intense (Beeney et al., 2018; Lazarus & Cheavens, 2017; Stepp, Pilkonis, Yaggi, Morse, & Feske, 2009), and such intensity appears to occur early in relationship formation and in the lifespan. Adolescents with BPD endorse high levels of early intimacy, affection, and commitment (e.g., sharing personal information, expressing confidence that the relationship will last) that is non-normative for their developmental level (Lazarus et al., 2019). In addition, among adolescents, BPD symptoms are associated with greater willingness to do anything to keep their romantic relationship and greater worries that their partner might cheat (Lazarus et al., 2019). Such high intensity, paired with a potential willingness to accept problematic interpersonal behavior or relationships, may increase vulnerability to later problems and conflict. Further, experimental data suggests that, in monetary exchange tasks, people with BPD are more willing to choose partners who exclude people other than the individual with BPD (Jeung, Vollmann, Herpertz, & Schwieren, 2020). More exclusive relationships may be particularly intense wherein one's well-being is highly contingent upon other individuals. This literature indirectly suggests that the way that individuals with BPD relate to others (i.e., with intensity), and the characteristics of people with whom they form relationships, may increase the likelihood of later conflict. Attachment theorists suggest that individuals with early histories of conflictual caregiving relationships develop relationship expectancies about harm or rejection that are elicited by perceived interpersonal threats (Fonagy et al., 2011). Insecure, preoccupied and disorganized attachment styles marked by an expectation that attachment figures are hostile and untrustworthy have been associated with BPD (Lyons-Ruth, Melnick, Patrick, & Hobson, 2007). Collectively, individuals with BPD's past experiences with genuinely harmful and/or neglectful people, paired with histories of intense and conflictual relationships, may lead them to develop and confirm negative expectations that others may hurt, abandon, or reject them.

5. Sensitivity to interpersonal threat

5.1. Interpersonal threat attention biases

Several studies suggest that BPD is characterized by a heightened attentional bias towards negative or threatening information, with some suggesting that this is particularly the case for negative *interpersonal* information. Attentional bias in BPD has been predominantly studied using emotional stroop and facial dot probe paradigms. In the former, participants are shown emotional and neutral words of varying colors and instructed to identify the word colour. Slower reaction time in naming the colour of the emotional words compared to the non-emotional words indicates a greater attentional bias to emotional stimuli (Mathews & MacLeod, 1985). Some research suggests that people with BPD exhibit a greater attentional bias towards generic, non-interpersonal emotional words relative to HCs (Sieswerda, Arntz, Mertens, & Vertommen, 2006), but not necessarily relative to clinical control groups (Arntz, Appels, & Sieswerda, 2000). However, other studies do not support the presence of an attentional bias in BPD to *non-interpersonal* negative, anger, or sadness stimuli (Sprok, Rader, Kendall, & Yoder, 2000). Such findings may be mixed because attentional biases in BPD may not be pervasive across all negative stimuli, but rather specific to interpersonal or currently distressing negative stimuli. For example, in one study, individuals with BPD exhibited attentional biases relative to HCs towards information that was currently distressing them, but not generally negative, neutral, or previously distressing (Wingenfeld et al., 2009).

Several studies suggest that BPD involves attentional biases specifically to "BPD schema consistent" information, much of which is interpersonally-themed, emphasizing feelings of powerlessness/vulnerability, unacceptability, and the malevolence and dangerousness of others. Individuals with BPD exhibit greater attentional bias to such cues relative to non-clinical and clinical control groups (Sieswerda et al., 2006; Sieswerda, Arntz, & Kindt, 2007). Meta-analyses accordingly support that BPD is characterized by an attentional bias towards general negative emotion content, which is heightened when using such BPD-relevant (i.e., often interpersonal) content (Kaiser, Jacob, Domes, & Arntz, 2016). Individuals with BPD may thus be particularly biased towards content that reflects negative beliefs about themselves and their relationships.

Findings are more mixed using the facial dot probe task paradigm. In this task, participants are presented with photographs of faces with varying emotional expressions on either side of a screen and are asked to press a button indicating which side of the screen a subsequent visual marker appears. Individuals with greater attentional bias towards emotional information have a quicker reaction time for visual markers

that appear on the same side as emotional faces. Some research in this area suggests that BPD is characterized by a bias towards negative (von Ceumern-Lindenstjerna et al., 2010), threatening, fearful, or angry facial content (Bertsch et al., 2017; Jovev et al., 2012). However, other studies suggest that BPD features correlate with avoidance of threatening facial stimuli (Berenson et al., 2009). Further, meta-analysis suggests that, although BPD involves attentional bias towards BPD-relevant and negative information from emotional stroop paradigms, it is characterized by an attentional bias towards positive, but not negative, facial stimuli in visual dot probe tasks. Drawing on these findings, the authors suggested that these paradigms represent distinct attentional processes, and that attentional biases towards negative information in BPD may be more verbal/conceptual (i.e., emotional stroop paradigms) than visual (e.g., visual dot probe tasks; Kaiser et al., 2016). This interpretation is consistent with the notion that individuals with BPD are particularly vigilant for signs that are thematic and representative of interpersonal threat, rather than visual information specifically. However, authors of this meta-analysis highlighted that there were few visual dot probe paradigm studies to draw on. Further research is therefore needed to clarify mixed findings using visual dot probe paradigms and more conclusively identify the nature of attentional biases across these tasks in BPD.

5.2. Interpersonal threat appraisal biases

In addition to being more likely to attend to threatening interpersonal information, individuals with BPD may also be more likely to appraise it negatively. Although there are some contradictory findings in the literature (Donges, Dukalski, Kersting, & Suslow, 2015; Lynch et al., 2006; Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010; Wagner & Linehan, 1999), several studies suggest that BPD involves a negative appraisal bias of interpersonal information. For example, individuals with BPD overattribute negative (Dyck et al., 2009; Scott, Levy, Adams, & Stevenson, 2011), angry (Bertsch et al., 2017; Domes et al., 2008), or less positive (Thome et al., 2016) mental states to faces, or experience them as less trustworthy (Miano, Fertuck, Arntz, & Stanley, 2013). Similarly, people with BPD interpret characters in brief film clips as having more negative personality characteristics than HCs, and as exhibiting greater aggression and threat than both HCs and a depression control group (Barnow et al., 2009). People with BPD also rate characters in film clips more extremely in either positive or negative directions when the content is BPD-relevant (e.g., sexual abuse of a child, rejection), but not generic (e.g., business disagreement; Veen & Arntz, 2000), and recall standardized interpersonal events more negatively than HCs (Winter, Koplin, Schmahl, Bohus, & Lis, 2016). Some researchers have purported biological mechanisms to interpersonal appraisal biases in BPD; Stanley and Siever (2010) suggest that dysregulated oxytocin in BPD may distort the ability to accurately read social cues and establish trust, and increased vasopressin may contribute to increased aggression specifically in close interpersonal relationships. However, although there is some evidence that individuals with BPD exhibit negative appraisal biases specifically to BPD-relevant social interactions rather than generic ones (Veen & Arntz, 2000), most studies have not directly compared appraisal biases to interpersonal versus non-interpersonal stimuli in BPD. It is thus not clear if BPD involves generally or interpersonally-specific appraisal biases.

A robust research literature suggests that individuals with BPD are also more likely to expect, perceive, and respond to, rejection (i.e., rejection sensitivity; Downey, Mougios, Ayduk, London, & Shoda, 2004). Several questionnaire-based studies suggest that rejection sensitivity is higher in individuals with BPD than HCs and clinical control groups (Berenson et al., 2016; Staebler, Helbing, Rosenbach, & Renneberg, 2011), predicts the presence of BPD in outpatients (Chesin, Fertuck, Goodman, Lichenstein, & Stanley, 2015), and is associated with higher BPD severity (e.g., De Panfilis, Meehan, Cain, & Clarkin, 2016; Goodman, Fertuck, Chesin, Lichenstein, & Stanley, 2014; Lazarus, Southward, & Cheavens, 2016; Miano et al., 2013; Peters, Smart, & Baer, 2015; Rosenbach & Renneberg, 2014; Sato, Fonagy, & Luyten, 2018; Selby, Ward, & Joiner, 2010; Zielinski & Veilleux, 2014). Although a minority of studies suggest that individuals with BPD do not exhibit statistically significant differences in rejection sensitivity to other clinical groups (Berenson et al., 2016), meta-analyses support that rejection sensitivity is hallmark to BPD and is associated with greater BPD severity (Cavicchioli & Maffei, 2019; Foxhall, Hamilton-Giachritsis, & Button, 2019). Ambulatory monitoring research corroborates that individuals with higher BPD symptoms or BPD diagnoses have more frequent perceptions of rejection and less frequent perceptions of acceptance in daily life (Lazarus et al., 2018). Further, experimental research shows that people with BPD are also more likely to report greater threats to their perceived control, belonging, self-esteem, and meaningful existence in response to social ostracism stressors than those without BPD (Dixon-Gordon, Gratz, & Tull, 2013). Extensive evidence also suggests that individuals with BPD have appraisal biases towards perceiving others with greater distrust early in interactions (Fertuck, Grinband, & Stanley, 2013; Franzen et al., 2011; Zsolt, Seres, Aspan, Nikoletta, & Keri, 2009), and assume that others will reject or slight them despite evidence that they are being included (Bungert et al., 2015; De Panfilis, Riva, Preti, Cabrino, & Marchesi, 2015; King-Casas et al., 2008; Liebke et al., 2018; Staebler et al., 2011). Finally, females with BPD exhibit a bias towards viewing their male partner as untrustworthy, particularly after personally or relationship-threatening situations (Miano, Fertuck, Roepke, & Dziobek, 2017).

Taken together, individuals with BPD may exhibit a tendency to over-attend to interpersonally-threatening information and interpret interpersonal information as more negative and threatening, in addition to perceiving, expecting, and responding more strongly to, rejection and unfairness. These attentional and appraisal biases stimulate heightened emotional responses and exacerbate dysfunction in relationships that may already be prone to intensity and volatility.

6. Heightened emotional reactivity to interpersonal threat

Emotion theorists suggest that the deployment of attention towards, and subsequent appraisal of, a stimulus works synergistically to inform the emotional reactivity that follows it (Gross, 1998). Such interpersonal attention and appraisal biases may culminate in particularly pronounced emotional reactivity in BPD. Many studies using non-interpersonal stimuli typically suggest that individuals with BPD do not exhibit statistically significant differences in emotional reactivity (e.g., Elices et al., 2012; Feliu-Soler et al., 2013; Gratz et al., 2019; Jacob et al., 2009; Kuo et al., 2016; Kuo & Linehan, 2009; Rosenthal et al., 2016; Sansone et al., 2010) or exhibit *reduced* emotional reactivity (e.g., Baschnagel et al., 2013; Elices et al., 2012; Herpertz et al., 1999; Herpertz et al., 2000; Pfaltz et al., 2015; Smoski et al., 2011) relative to control groups. However, studies suggest that individuals with BPD do exhibit heightened self-reported and physiological emotional reactivity in response to interpersonally threatening stimuli involving sexual abuse, social rejection, or negative evaluation compared to HC, low BPD feature, psychotic, and outpatient groups (e.g., Austin et al., 2007; Chapman et al., 2014; Chapman et al., 2015; Elices et al., 2012; Gratz et al., 2010; Gratz et al., 2019; Krauch et al., 2018; Reichenberger et al., 2017). Evidence for interpersonally-specific heightened emotional reactivity in BPD is strengthened by two studies which used both interpersonal and non-interpersonal stressors and showed that, while interpersonally-themed stimuli elicit heightened emotional reactivity in BPD relative to control groups, generic intrapersonal ones do not (Elices et al., 2012; Sauer, Arens, Stopsack, Spitzer, & Barnow, 2014).

Collectively, findings suggest that individuals with BPD display heightened emotional reactivity relative to healthy and clinical control groups in response to interpersonal stimuli but not necessarily intrapersonal ones. Individuals with BPD may therefore display heightened emotional reactivity in the context of their relationships, contributing to

the dysfunctional, deteriorating, and subsequently emotionally evocative, nature of those relationships over time. Indeed, heightened emotional reactivity to interpersonal stressors likely reciprocally interferes with the capacity to accurately perceive, and thus communicate with, others over time.

7. Problematic communication and destructive emotion regulatory behaviors

Less research has examined the ways in which communication changes as a function of emotional reactivity in BPD. One study found that, for participants with BPD (but not HCs), emotional reactivity predicted increases in negative communication behavior following a threatening discussion with a romantic partner (Miano, Grosselli, Roepke, & Dziobek, 2017). Thus, when emotional reactivity is prompted by an interpersonal conflict or discussion, individuals with BPD may experience a deterioration in effective communication, contributing to conflict and further exacerbations in emotional reactivity. Studies also suggest that emotional reactivity prompts the engagement of destructive behaviors that characterize BPD such as self-harm (e.g., Armey, Crowther, & Miller, 2011). Individuals with BPD may be particularly vulnerable to engaging in such destructive behaviors to regulate emotion when they are provoked by perceptions of interpersonal threat. One study asked participants with high and low BPD features to engage in problem solving in response to an interpersonal problem before and after a social rejection stressor. Following the stressor, people with high BPD features showed greater reductions in relevant solutions, and greater increases in inappropriate solutions (e.g., self-harm, aggression, substance use), than those with low BPD features. Moreover, emotional reactivity mediated the relationship between BPD features and ineffective social problem-solving ability following the stressor (Dixon-Gordon, Chapman, Lovasz, & Walters, 2011). Taken together, these findings suggest that potentially destructive behaviors that have been associated with BPD may occur in response to emotional reactivity and may be precipitated by perceptions of interpersonal threat.

7.1. Contingencies of destructive behavior

Common destructive behaviors that occur in response to negative emotion in BPD may be reinforced over time both because they serve emotion regulatory functions and meet interpersonal needs. This pattern has been particularly studied with respect to self-injury. Converging research highlights two predominant functions of self-injurious behavior: directly regulating negative emotion and meeting interpersonal needs such as communicating distress, eliciting support, escaping unwanted situations, and promoting belonging (e.g., Bentley, Nock, & Barlow, 2014; Klonsky, Glenn, Styer, Olino, & Washburn, 2015; Taylor et al., 2018). Although emotion regulatory functions of self-injurious behavior are common in BPD (e.g., Vansteelandt et al., 2017), the presence of BPD features predicts a higher likelihood of endorsing both intrapersonal *and* interpersonal functions of self-injury (Gardner, Dodsworth, & Klonsky, 2016). Destructive behaviors may therefore serve dual functions for individuals with BPD, by directly down-regulating negative emotion, and also by altering aversive interpersonal situations. However, more research is needed to examine the potentially interpersonal function of other destructive emotion regulatory behaviors in BPD.

In sum, individuals with BPD are particularly likely to: (a) have histories of harmful and conflictual relationships; (b) over-attend to interpersonal threat information; (c) interpret interpersonal information as more negative and threatening; (d) have heightened emotional reactivity to perceptions of interpersonal threat; (e) experience increases in problematic communication behaviors in response to increases in emotion; and (f) engage in destructive behaviors in response to emotion increases that may function to simultaneously regulate negative emotion and meet interpersonal needs. Such intense emotion, conflict, and destructive behaviors (e.g., suicide attempts) tax relationships over time, potentially intensifying the subsequent volatility of individuals with BPD's relationships, heightening attentional and appraisal biases, and consequent emotional problems, in a destructive cycle.

8. The role of significant others in BIAS model processes

Emotion researchers suggest that individual emotion processes are nested within an interpersonal interaction in which both people are attempting to regulate their own and each other's emotion (Zaki & Williams, 2013). Each component of the BIAS model thus occurs in parallel in individuals with BPD and their significant others (e.g., friends, family members, romantic partners). These processes interact between people, synergistically maintaining each other – and BPD – over time. In an effort to guide future research and potential intervention development, below we present a theoretical model on the ways in which cognitions, emotions, and behaviors may interact between those with BPD and significant others to maintain BPD.

As visually represented in Fig. 2, given the likely interpersonal antecedents and consequences of cognitive (i.e., interpersonal threat sensitivity), emotional (i.e., emotional reactivity), and behavioral (i.e., destructive behavior) problems in BPD, we posit that significant others' cognitions, emotions, and behaviors may interact with that of individuals with BPD to inadvertently elicit and reinforce cycles of dysfunction over time. While research shows that significant others of those with BPD report elevated depression, anxiety, grief, and burden (Bailey & Grenyer, 2013), there is considerably less research on their cognitions, emotions, and behaviors, and the ways in which they contribute to cognitive, emotional, and behavioral processes in individuals with BPD.

Consistent with other theorists (e.g., Fruzzetti & Fantozzi, 2008), we contend that histories of intense, aversive conflict with individuals with BPD may lead significant others to hold negative cognitions about their relationship (e.g., "conflict is dangerous") and the individual with BPD (e.g., "she is manipulating me" or "she cannot handle distress"). Significant others may therefore develop their own hypervigilance for signs that the individual with BPD is in distress and at risk of engaging in distressing and destructive behavior. Furthermore, given a potential history of conflict and destructive behaviors, significant others may come to interpret signs of conflict and emotion as highly threatening or problematic.

Dyadic models specific to other psychological disorders suggest that significant others of those with psychological disorders avoid conflict-laden discussions to protect their loved ones from distress, which only serves to exacerbate the disorder over time (e.g., Campbell, Renshaw, Kashdan, Curby, & Carter, 2017; Monson & Fredman, 2012). Consistent with these models and other BPD theories (Fruzzetti & Fantozzi, 2008), we suggest that, as a result of their negative cognitions, significant others may attempt to avoid potentially conflictual conversations that may provoke emotional reactivity in individuals with BPD and lead to destructive behaviors. Indeed, we assert that significant others of individuals with BPD may attempt to escape negative emotions by withdrawing attention or ending a difficult conversation, rather than engaging in approach behaviors like problem-solving, validating emotion, or tolerating distress (e.g., Fruzzetti & Fantozzi, 2008). Although potentially protective in the short-term, conflict avoidance is associated with relationship distress (e.g., Gottman & Krokoff, 1989), presumably because it prevents individuals from improving or repairing relationships, building distress tolerance, and learning adaptive ways to manage conflict. The gradual escalation of interpersonal dysfunction associated with conflict avoidance may increase individuals with BPDs' hypervigilance for signs of interpersonal threat (e.g., abandonment) over time. Accommodating avoidance of distressing content may also obstruct individuals with BPD's acquisition of emotion regulation skills.

In addition, significant other's negative cognitions about their relationship and individuals with BPD may increase their emotional

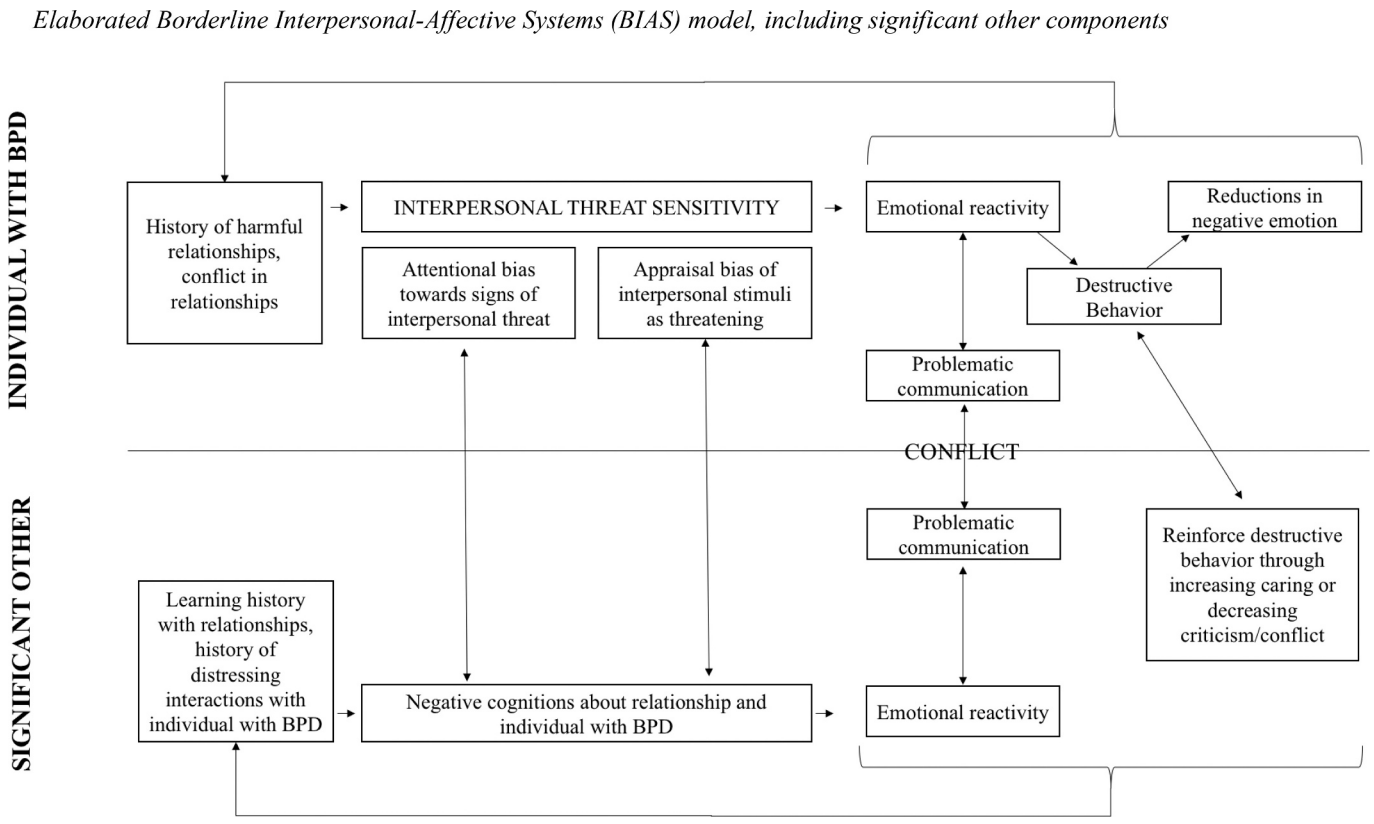

Fig. 2. Elaborated Borderline Interpersonal-Affective Systems (BIAS) model, including significant other components.

reactivity during conflict with individuals with BPD, leading to further withdrawal or attack behavior. Both withdrawal or attack behavior likely escalate individuals with BPD's emotion, exacerbating communication problems and conflict over time (Fruzzetti et al., 2005; Fruzzetti & Fantozzi, 2008). Heightened emotional reactivity in the significant other and in the individual with BPD may therefore mutually reinforce and escalate each other over time, promoting and prolonging conflict and increasing the likelihood that the individual with BPD will engage in problematic emotion regulatory behavior.

Significant others' withdrawal and avoidance may also inadvertently promote common problematic communication patterns, such as the demand-withdraw pattern in which one person withdraws and the other pursues with escalating approach or attack behavior (e.g., Christensen, 1987). Faced with intense emotion and ineffective expression from their loved one with BPD, significant others may thus avoid, shut down, or withdraw (Fruzzetti & Fantozzi, 2008). Indeed, the relationships of individuals with BPD are characterized by more demand-withdraw patterns; specifically, men in relationships with women with BPD report more avoidance of intimacy than non-BPD couples (Bouchard et al., 2009). Withdrawal from significant others may escalate subsequent emotion and approach-oriented behavior in the individual with BPD, exacerbating emotion, problematic communication, and conflict in both individuals and prompting destructive behaviors (e.g., self-harm) from the individual with BPD.

The destructive behavior engaged in by people with BPD in response to increasing emotion, including self-injurious behaviors, is likely to have significant and deleterious consequences for significant others. Approximately 75% of carers reported awareness of a past suicide attempt of their loved one with BPD, and over a third reported seeking professional support for themselves in response to it and not receiving any (Lawn & McMahon, 2015). Destructive behaviors and associated distress may contribute to the higher rates of breakups, conflict, and problematic communication, and low rates of social support and relationship satisfaction in individuals with BPD's relationships (Beeney et al., 2018; Bouchard et al., 2009). In self-injuring adolescents (the majority of which had BPD), there was greater instability in closeness between the adolescent and their mother and best friend after engaging in non-suicidal self-injury (Santangelo et al., 2017). However, significant other's acute responses to such destructive behavior may also maintain them. Given that those with BPD may be particularly likely to engage in self-injurious behaviors for interpersonal reasons, responses of significant others may positively (i.e., increases in care, comfort) or negatively (i.e., withdrawal of conflict, aversive demands) reinforce such self-injurious behaviors (e.g., Benjamin, 1987; Fruzzetti & Fantozzi, 2008). In this way, the behavior of both members of the dyad may strengthen a destructive interactive cycle of interpersonal and emotional dysfunction. The high levels of conflict that accompany the relationships of those with BPD may increase cognitive biases in both individuals with BPD (i.e., interpersonal threat sensitivity) and their significant others (i.e., negative cognitions about their relationship and individuals with BPD) over time, recapitulating this destructive cycle.

9. Clinical implications

The BIAS model has important implications for treatment. To date, frontline BPD treatments emphasize emotion regulation skills training in order to treat BPD and reduce its associated life-threatening behaviors (e.g., Linehan, 1993, 2015). The reviewed literature that informs the BIAS model suggests that BPD treatment could be optimized with expanded focus from the emotional deficits in the disorder to the interpersonal contexts in which they are likely to present themselves. An extensive body of literature supports the inclusion of significant others in treatments for individual psychological disorders (Fischer, Baucom, & Cohen, 2016). Several studies show that conjoint interventions simultaneously improve psychological disorders with comparable or better treatment outcomes to individual interventions along with additional improvements in relational functioning and significant other health and well-being (e.g., Fischer et al., 2016). Given that interpersonal distress

and dysfunction is a core symptom of BPD and presents a critical context in which emotional problems occur, conjoint interventions may be particularly indicated for this population. Treating BPD symptoms in a conjoint frame offers the potential to speed acquisition and generalization of therapeutic skills and improve the interpersonal contexts that prompt, exacerbate, and reinforce BPD symptoms to optimize outcomes (Fitzpatrick, Wagner, & Monson, 2019). Given that significant others of individuals with BPD also experience elevated rates of their own mental health problems (Bailey & Grenyer, 2013), conjoint interventions may also broaden outcomes to include that of a significant other's mental health. If clinicians continue to work with individuals with BPD in an individual therapy treatment frame, they are advised not to assume that emotional deficits in BPD are pervasive and instead to assess the (interpersonal) situations, attentional biases, and appraisals that may play a role in their evocation, as well as whether problematic emotion regulatory behaviors influence, and are maintained by, significant other behavior. They may also encourage clients to recruit significant others to avoid reinforcing destructive behavior.

Most critically, the BIAS model underscores the inextricable linkages between intrapersonal and interpersonal functioning in BPD. Thus, relationships wherein members experience high levels of intrapersonal problems with emotion and communication are likely to experience dysfunction, and relationships that are dysfunctional in this way are likely to elicit and promote such individual difficulties in their members. The BIAS model therefore advocates for a systemic, multi-level approach to BPD intervention, wherein both individual and relationship functioning are targeted concurrently to dismantle the negative transactional cycle between them that may maintain BPD, instead of exclusively targeting one or the other. We encourage researchers and clinicians to develop, refine, and test such interventions.

10. Future directions

The theoretical model presented in this paper builds upon existing emotional and interpersonal theory and research and provides a synthesized framework from which to understand and treat a complicated disorder. However, it has not yet been directly subjected to empirical testing, and ongoing research is necessary to test the full models depicted in Figs. 1 and 2 directly, including their hypothesized mediational relationships, within a conjoint framework in which one individual has BPD. Several specific areas of inquiry are recommended. First, experimental research that directly compares interpersonal to non-interpersonal stimuli are needed to better understand whether attentional biases are interpersonally-specific. Second, experimental research dominates BPD emotion and attentional research and offers important insights into the precise nature of the biases that are present in BPD but is limited in its ecological validity. More studies that use behavioral methodologies like communication analyses and conflict tasks in which dyads are observed engaging in specific interactions will complement this body of experimental research and provide data that is externally valid with direct clinical applications. Third, and relatedly, there is very little research that examines the interpersonal contingencies of destructive behavior in BPD. This area of inquiry is critical to identify whether significant other behavior may be a key treatment target in reducing destructive and often life-threatening behavior in BPD. Ecological momentary assessment methods in dyads wherein one member has BPD are particularly well suited to elucidate such relationships. Research is also needed to disentangle the temporal precedence of hypothesized BIAS variables in predicting BPD pathology broadly and destructive behaviors specifically, which could inform intervention timing (e.g., emphasizing relationship communication skills before emotion regulation training or vice versa).

Finally, although the BIAS model provides a framework for understanding the contribution of significant others to BPD, the vast majority of the BIAS model that focuses on significant other cognition, emotion, and behavior is speculative. More research is needed to understand the precise nature of significant other cognitions, emotions, and behaviors as they exist and contribute to BPD, and ecological momentary assessment methods may be particularly useful to this end. Further, the BIAS model relates specifically to dyads in which one person has BPD and one does not. However, significant others of individuals with BPD may also have elevated levels of psychopathology that could contribute to conflictual interactions (Beeney et al., 2018; Bouchard et al., 2009). Studies that examine how dual psychopathology informs, or alters, the BIAS model are therefore needed.

11. Conclusions

BPD is a complicated and lethal disorder characterized by disruptions in emotional, interpersonal, and behavioral dysfunction. Emotional models of BPD have ushered in a fruitful era of efficacious BPD interventions and have begun to demystify what was previously often thought of as an "untreatable" disorder. However, conceptualizing BPD as solely an emotional disorder is misaligned with research that shows mixed or null findings regarding emotion problems in BPD. Interpersonal theories of BPD acknowledge the broader interpersonal context in which BPD operates, but lack precise specification of the modifiable cognitive and emotional interpersonal processes that individuals with BPD and their significant others experience in adulthood. We presented a new model of BPD that asserts that emotion problems in BPD are frequently elicited, exacerbated, or exacerbating of, interpersonal dysfunction. The BIAS model highlights that individuals with BPD and their loved ones become trapped in a cycle of intense, conflictual relationship processes; heightened attentional biases towards signs of interpersonal threat; negative appraisal biases of interpersonal information; heightened emotional responses to interpersonal information; and destructive behaviors that may be inadvertently reinforced by loved ones and exacerbate relationships over time. This model encourages clinicians and researchers to pursue BPD interventions that incorporate significant others to optimize BPD treatment.

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Declaration of Competing Interest

None of the authors have any conflicts of interest to disclose.

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