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**Borderline Personality Symptoms and Relationship Threat: The Moderating Role of  
Perceived Parental Rejection**

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**Abstract**

Individuals with borderline personality disorder (BPD) often perceive relationship threats more intensely, resulting in increased emotional reactivity. However, this link has never been examined with physiological measures in “real time,” nor have reports of perceived parental rejection ever been investigated as a potential moderator of this link. To fill this gap, the present study induced romantic relationship threat, after which participants completed an emotional reactivity task while electroencephalography data were recorded. Results reveal that higher levels of BPD features were associated with increased emotional reactivity, indicated by larger late positive potential (LPP) amplitudes, to negative stimuli in the face of a romantic relationship threat. Results also indicate that perceived parental rejection moderates said link, in that individuals with high BPD features and high perceived parental rejection have decreased emotional reactivity to negative stimuli following a relationship threat. Findings have implications for treatment of BPD clients who have experienced parental rejection in childhood, as well as implications for couples’ counseling in the face of relationship threat.

### **Borderline Personality Symptoms and Relationship Threat: The Moderating Role of Perceived Parental Rejection**

Borderline personality disorder (BPD) is a Cluster B personality disorder characterized by symptoms such as emotional reactivity and turbulent romantic relationships, both of which can cause a significant amount of impairment in daily functioning (American Psychological Association, 2013). Other noteworthy features of BPD include the tendency to maintain adverse impressions of significant others (Daley et al., 2000) and the tendency to possess an insecure attachment style (Critchfield, 2008; Hashworth, 2021). In addition to these symptoms, individuals with BPD also typically have an acute reactivity to perceived romantic relationship threats. Specifically, individuals with BPD often experience a hypersensitivity to anticipated rejection, especially when a relationship threat is introduced and feelings of trust in their partner are low (Miano et al., 2016). In support of this claim, Miano and colleagues (2017) determined that individuals with BPD feel more stressed when facing situations that threaten their romantic relationships than do healthy controls, suggesting that individuals with BPD tend to have a higher emotional sensitivity to perceived relationship threats.

#### **Emotional Reactivity in Borderline Personality Disorder**

Even outside of relationship threat, the general emotional reactivity that is present in BPD has been shown to be a fundamental contributor to some of the more dangerous behaviors linked to this disorder, such as non-suicidal self-injury (NSSI), suicidal behavior, or other impulsive behaviors (Chapman, 2019), though it is most commonly linked to interpersonal problems, features that were all measured via self-report questionnaires. For instance, in a study conducted in 2016, researchers uncovered that affective instability in individuals with BPD mainly revealed itself within an interpersonal context (Sharp, 2016). Similarly, Sadikaj and colleagues (2013)

discovered that emotional reactivity issues in participants with BPD directly predicted interpersonal problems in their close relationships. However, many other studies have pointed out the bidirectional relationship between emotional reactivity and interpersonal issues, suggesting that relationship difficulties may predict emotional reactivity as well (Haliczer et al., 2021; Dixon-Gordon et al., 2013).

As noted, there is evidence to suggest that perceived relationship threat might be a particularly strong trigger of emotional reactivity among individuals with BPD. For instance, Miano and colleagues (2017) found that individuals with BPD displayed increased emotional reactivity while experiencing romantic relationship threat. However, the mechanisms by which this occurs are unclear (Fisher et al., 2010; Norona et al., 2018). This is due, in part, to the ubiquitous use of retroactive, self-report measurements of emotional reactivity and relationship threat. Given that emotional reactivity and an acute sensitivity to perceived relationship threats are considered to be some of the main features of BPD, it is important to examine BPD symptomology as a predictor of this emotional reactivity following this type of threat in real time, using more objective measures.

One way to evaluate in-the-moment emotional reactivity is through the use of event-related potentials (ERPs). In particular, the late positive potential (LPP) is an ERP that measures emotional reactivity by assessing the amount of attentional resources allotted for reacting to emotional stimuli, with larger ERP amplitudes to negative stimuli indicating a heightened level of negative emotions resulting from that stimulus (Hajcak et al., 2010; Hajcak & Nieuwenhuis, 2006; Hajcak, MacNamara, & Olvet, 2010). As LPPs can measure emotional reactivity at the neural, rather than self-report, level, they are well-suited to measure an individual's objective emotional reaction ability in real time.

### **Perceived Parental Rejection**

In addition to the links among emotional reactivity, BPD, and perceived relationship threat, previous literature has established a strong connection between BPD symptoms and childhood trauma, with as high as 80% of individuals with BPD reporting some sort of emotional or physical abuse (Cattane et al., 2017). The link between childhood trauma and BPD features relates to the theory of perceived parental rejection, as detailed in parental acceptance-rejection theory (PARTheory), which suggests that every person requires positive responses from the people closest to them: parents for children, and romantic partners for adults (Rohner & Brothers, 1999). The theory details that rejected children and adults are more likely to come from troubled families where negative childhood experiences were not uncommon (Schimmenti & Bifulco, 2015; Grady et al., 2017). PARTheory also proposes that rejected children are more likely to view the world negatively, maintain an unfavorable self-image, and experience insecure attachments in their adult interpersonal relationships, specifically in their romantic relationships – all of which bear a notable resemblance to the main features of individuals with BPD. Parental rejection is also associated with an increased reactivity to perceived threat (McCory et al., 2011). Although BPD is associated with both parental rejection and an increased reactivity to threat, the field has yet to examine parental rejection as a moderator of the link between BPD and threat-related emotional reactivity.

### **The Present Study**

The present study aimed to uncover if high BPD features negatively affect emotional reactivity after exposure to an experimentally induced romantic relationship threat, as well as whether perceived parental rejection in childhood moderates this link. Considering the vast body of literature relating BPD to emotional reactivity, I predicted that participants with high levels of

BPD features would have higher levels of emotional reactivity in the face of a potential romantic relationship threat, as evidenced by larger LPP amplitudes (suggesting a stronger emotional response). In addition to this, I hypothesized that perceived parental rejection in childhood would moderate this effect in individuals with high levels of BPD features, such that those with higher levels of perceived parental rejection would have even higher levels of emotional reactivity in the face of relationship threat. These findings are critical in understanding how to maintain favorable romantic relationship functioning in individuals with BPD and how perceived parental rejection can exacerbate the romantic relationship problems of individuals with BPD.

## **Method**

### **Participants**

30 participants ( $M$  age = 19.48 years, 23 female) who were currently in a romantic relationship were recruited via an undergraduate participant pool and participated in the present study in exchange for course credit. Several participants were lost due to user error in EEG data collection ( $n = 2$ ), an EEG trigger not sending ( $n = 1$ ), withdrawing from the study mid-experiment ( $n = 1$ ), and correctly guessing the experimental manipulation ( $n = 1$ ), leaving 25 participants (see Table 1 below).

### **Procedures**

Participants arrived at the lab for a one-hour session, at which point they met briefly with researchers in order to (1) confirm their study eligibility (i.e., that they were still in a romantic relationship) and (2) provide their informed consent for participation. Researchers then led participants into an adjacent room to (3) cap them for EEG recording, after which they (4) completed survey measures (listed below), the last of which contained the Unspoken Complaint manipulation (detailed below; Murray et al., 2002). After completing all the questionnaires and

receiving Unspoken Complaint feedback from the researcher (detailed below), participants (5) completed an emotional reactivity task while their brain activity was recorded, which is also described below. At the end of the procedure, participants were debriefed on the nature of the study and were granted credit for participating.

### ***Unspoken Complaint Manipulation***

The Unspoken Complaint paradigm involves administering a bogus measure that Murray and colleagues (2002) titled the Interpersonal Behaviors Inventory (IBI). The measure aims to convince participants that their romantic partners harbor complaints about their personality or behaviors that they have yet to share with them, which will likely incite future conflicts and increase risk of relationship termination. In the present study, a similar bogus inventory was developed based on the procedures of Murray and colleagues (2002) to target mundane, negative relationship behaviors (e.g., partner wishing to engage in activities unrelated to the participant's interests) to ensure participants would easily score highly on the measure. Two of the 19 items on the scale were taken directly from the IBI, and the remaining 17 were designed based on these sample items. Per Murray et al. (2002), 10 out of the 19 items on the scale emphasized that the participant's partner may find them irritating (e.g., "How often does your partner tease you about some aspect of your personality or behavior?"), and the remaining nine items focused on more neutral behaviors (e.g., "How often does your partner call you on the phone?"). After participants completed the IBI (following their completion of all other, non-manipulation measures), a researcher explained that they had earned a score of 76, which was described as a significantly higher score relative to the population mean. The researcher then explained that this high score meant that their partner likely had some unspoken complaints about their personality and behaviors that research had shown would later turn into major sources of conflict.

### ***Emotional Reactivity Task***

Once all participants received feedback, researchers oriented them to their brain activity and verbally instructed them on how to complete the next and final task. They were instructed to observe 40 negatively-valenced (e.g., a car crash or cockroach) images and 40 neutral (e.g., a spoon or paperclip) images taken from the Open Affective Standardized Image Set (OASIS; Kurdi et al., 2017). At the beginning of each trial, participants viewed a fixation cross for 500 ms and the word “LOOK” for 2000 ms, after which the OASIS image appeared for 4000 ms. The word “LOOK” instructed participants to merely view the upcoming negatively valenced or neutral image without attempting to alter their emotional response. The task consisted of a total of 80 trials (40 look neutral, 40 look negative) with a midpoint break (e.g., Zhang et al., 2019). Participants were also instructed to decrease their emotional responses to negative stimuli during this experimental session, although these data are not relevant to the present study.

### ***Manipulation Check***

Once participants finished the emotional reactivity task, they were asked to articulate what they believed to be the purpose of the study. Data from participants who correctly guessed the experimental manipulation ( $n = 1$ ) were not included in analyses.

## **Measures**

### ***Borderline Personality Disorder Features***

The Personality Assessment Inventory, Borderline Features Scale (PAI-BOR; Morey, 1991) is a 24-item measure of BPD symptoms, measuring affective instability (e.g., “My mood can shift quite suddenly”), identity problems (e.g., “I often wonder what I should do with my life”), negative relationships (e.g., “My relationships have been stormy”), and self-harm (e.g., “When I’m upset, I typically do something to hurt myself”). Responses were provided using a

scale that ranged from 0 (*False, not at all true*) to 3 (*Very true*). Previous research has found the PAI-BOR to have adequate psychometric properties, and internal consistency in the present study was  $\alpha = .85$  (Gardner & Qualter, 2009; Morey 2014).

### ***Perceived Parental Rejection***

Perceived parental acceptance and rejection was assessed using the Parental Acceptance-Rejection Questionnaire (PARQ; Rohner et al., 1978). The PARQ measures individuals' perceptions of primary care-giver rejection by assessing the factors of hostility/aggression (e.g., "Punished me severely when they were angry"), indifference/neglect (e.g., "Paid no attention to me"), warmth/affection, which was reversed scored (e.g., "Hugged and kissed me when I was good"), and undifferentiated rejection (e.g., "Seemed to dislike me"). The PARQ has been found to possess adequate psychometric properties and an internal consistency of  $\alpha = .96$  in the present study (Rohner, 2020; Rohner et al., 1985).

### **Electrophysiological Recording and Data Reduction**

32 Ag/AgCl electrodes embedded within an electro-cap with a forehead ground and referenced online via the frontocentral electrode (FCz) recorded EEG data. After recording, data were processed using MATLAB plugins EEGLAB and ERPLAB (Delorme & Makeig, 2004; Lopez-Calderon & Luck, 2014). Researchers ensured that all impedances were below 20 K $\Omega$  and digitized data at 512 Hz via ANT acquisition hardware (Advanced Neuro Technology, Enschede, The Netherlands). Data were band-pass filtered via a basic FIR filter from 0.2 to 20 Hz and then re-referenced to the average of the mastoids. Researchers corrected eye blinks via independent components analysis (ICA). Data were then baselined using the average voltage between -200 ms and 0 ms prestimulus and epochs were then extracted from 200 ms prestimulus to 4000 ms poststimulus for each trial. Researchers removed artifacts by Z-transforming the voltages at

each epoch, averaging them across electrodes, and disposing of epochs with Z-scores greater than 20. The LPP was quantified as the mean amplitude between 820 and 1200 ms poststimulus at a centroparietal region of interest (ROI; Cz, CP1, CP2, Pz) established through visual inspection and prior work (e.g., Jordan et al., 2021; Kinney et al., 2019; MacNamara et al., 2019). Data were analyzed using SPSS (Version 24).

### Results

In order to assess differences in participants' emotional reactivity to differently-valenced stimuli, a dependent-samples *t*-test was conducted to investigate the difference in LPP amplitudes when participants were viewing negative stimuli versus neutral stimuli (see Figure 1 for a depiction of the LPP for each trial type). Results indicated that the difference between these groups was not statistically significant,  $t(24) = -1.71, p = .101$ , which did not support initial hypotheses that emotional reactivity during "Look Negative" trials would be significantly larger than during "Look Neutral" trials. However, in order to directly examine emotional reactivity to negative stimuli above and beyond general emotional reactivity (i.e., reactivity following neutral stimuli) for each individual participant, LPP difference scores were computed by subtracting participants' "Look Neutral" LPP amplitudes from their "Look Negative" amplitudes. See Table 2 for the means and standard deviations of each variable.

A moderated regression analysis was then conducted to determine if PAI-BOR scores not only predicted higher LPP scores, but also whether PARQ scores influenced this relationship. Using Hayes' PROCESS (version 4, model 1), PAI-BOR scores were entered into the model as the predictor variable, with LPP difference scores as the outcome variable and PARQ scores as a moderator. Results demonstrated that, contrary to hypotheses, higher BPD features were associated with smaller LPP difference scores,  $t(21) = -2.64, p = .015$ . Higher PARQ scores also

unexpectedly linked to smaller LPP difference scores,  $t(21) = -2.59, p = .017$ . Results further revealed that PARQ scores moderated the relationship between BPD features and LPP differences amplitudes,  $t(21) = 2.83, p = .010$ , such that, for individuals with low parental rejection, higher BPD features tended to decrease LPP difference scores,  $t(21) = -2.25, p = .036$ . Moderate levels of parental rejection had no effect on the relationship between BPD symptoms and LPP difference amplitudes,  $t(21) = -1.33, p = .199$ . Consistent with hypotheses, among individuals with high BPD features, having higher parental rejection was associated with higher levels of emotional reactivity to negative stimuli,  $t(21) = 2.11, p = .045$ . See Figure 2 for an illustration of moderation results.

### Discussion

The goal of the present study was to uncover whether Borderline features were related to increased emotional reactivity in the face of a romantic relationship threat, as well as whether perceived parental rejection moderated this association. It was hypothesized that higher BPD features would be linked to increased emotional reactivity to negative stimuli after receiving a relationship threat, as evidenced by larger LPP difference scores. It was also hypothesized that perceived parental rejection would moderate this connection, in that higher levels of both BPD features and perceived parental rejection would be associated with further increased emotional reactivity to negative stimuli. This first hypothesis was not supported, such that participants with higher levels of BPD symptoms demonstrated decreased emotional reactivity following relationship threat than did participants with lower BPD symptoms. However, the second hypothesis on perceived parental rejection as a moderating variable was supported, in that the addition of high levels of perceived parental rejection to high BPD features led to higher LPP

difference scores. Additionally, the finding that participants did not have larger LPPs in response to negative stimuli when compared to neutral stimuli was also unexpected.

The lack of a significant difference between the LPPs of participants when they were viewing neutral images versus negative images is not consistent with research that indicates LPP scores are typically higher after viewing emotionally significant stimuli (Kujawa et al., 2012; Schupp et al., 2012). Indeed, the consensus of previous literature reveals that there should be a significant, observable difference between participants' emotional reactions to neutral stimuli (evidenced by smaller LPPs) and to negative stimuli (evidenced by larger LPPs). In the present study, however, the lack of difference between these trials may be due to the order of procedure. Specifically, since all participants received the romantic relationship threat immediately prior to completing the emotional reactivity task, the initial negative affect participants experienced after receiving the unspoken complaint feedback may have saturated into all trial types of the emotional reactivity task. This is consistent with existing research indicating that receiving a threat immediately prior to an emotional task can lead to overall increased emotional arousal (Zhou et al., 2021), especially in those with BPD (Miano et al., 2017).

The finding that high BPD features lead to larger LPP difference scores at high levels of perceived parental rejection, supports initial hypotheses and establishes perceived parental rejection as a moderator of the link between threat-induced emotional reactivity and BPD features. Prior literature has shown that perceived parental rejection is associated with many of the core symptoms that define BPD, such as a negative view of self, an insecure attachment style, turbulent romantic relationships, and an increased sensitivity to perceived threat (Cattane et al., 2017; Rohner & Brothers, 1999; McCrory et al., 2011). This moderating effect could indicate that perceived parental rejection is an early attachment injury that may lead individuals with high

BPD features to react more strongly to threats they encounter later in life (e.g., a perceived romantic relationship threat). Indeed, a study conducted by Critchfield and colleagues (2008) revealed that insecure attachment in individuals with BPD was associated with heightened emotional reactivity in the context of their interpersonal relationships. Although the literature reveals a significant overlap between the features of BPD and perceived parental rejection, the field had yet to determine the effect these perceptions of childhood rejection may have upon emotional reactivity in BPD. This research therefore supports and expands upon this previous work by providing physiological evidence of how perceived parental rejection moderates the direct link between high BPD features and increased emotional reactivity following romantic relationship threat.

The findings that higher BPD features and higher PARQ scores are each individually associated with smaller LPP difference scores, while surprising, are in line with existing research on avoidant attachment and dissociation following caregiving neglect and BPD symptoms, respectively. Regarding the inverse association between parental rejection and emotional reactivity, previous research reveals that low perceptions of parental warmth are linked to avoidant attachment, suggesting that those who experience parental rejection may attempt to emotionally disengage with negatively-valenced stimuli during times of distress (e.g., following a perceived romantic relationship threat; Casselman & McKenzie, 2014; Güngör & Bornstein, 2010). With respect to the finding that high BPD scores are also associated with lower emotional reactivity in the face of threat, it is important to note that these analyses examine the impact of borderline features on LPP difference scores above and beyond the effects of parental rejection. Given that previous research indicates that almost 80% of individuals with BPD report some sort of neglect in childhood, it appears that exhibiting high levels of BPD features without any

instances of perceived parental rejection is considerably rare for those with the disorder and may even manifest as an atypical display of BPD (Cattane et al., 2017). Thus, the decrease in emotional reactivity for those with high levels of BPD, when controlling for the influence of parental rejection in early childhood, may be reflective of the frequency with which individuals who have high BPD symptoms utilize dissociation in order to disconnect from unwanted internal experiences (e.g., feelings of distress following romantic relationship threat; Krause-Utz et al., 2021; Bichescu-Burian et al., 2017; Korzekwa et al., 2009). Taken together, as early childhood maltreatment is merely a common correlate of BPD and not a diagnostic criterion, these findings beg the question of whether the core symptom of heightened emotional reactivity might disappear for those with BPD outside of the context of perceived parental rejection.

The results of the present study harbor distinct implications for future research and clinical practice. Particularly, it is critical for future work to both consider the developmental history of individuals with BPD, as well as to measure the physiological correlates of the phenomena within the disorder. Additionally, it is important for clinicians to consider contextual factors like perceived parental rejection when treating patients with elevated BPD symptoms, as this developmental history might increase the risk of intense, overwhelming experiences of emotional reactivity in the context of perceived relationship threat. Such findings support the continued intervention practices of Dialectical-Behavioral Therapy (DBT), which teach individuals with BPD how to effectively regulate their emotions and tolerate distress, particularly within the context of their romantic relationships (Linehan, 1987).

It is important to note that there are some limitations to this study. For example, the present study used a self-report measure of BPD features instead of recruiting individuals with a formal BPD diagnosis. Even though self-reported high levels of BPD symptoms are associated

with an increased possibility of BPD diagnosis, it would be misguided to generalize the results of this study to a clinical population (Jacobo et al., 2007). Additionally, the fact that the present study only recruited college students may hinder our ability to generalize to other kinds of romantic relationships, such as older, married couples. Indeed, existing research has found that age and relationship length are often correlated with relationship satisfaction (Graham et al., 2011), although other work suggests that college student romantic relationships are quite similar to married adult relationships in a variety of ways (e.g., Braithwaite et al., 2010). Further, not only was the sample size of the present study relatively small (although consistent with other studies implementing EEG tasks; e.g., Langeslag et al., 2020; Endrass et al., 2014), but the sample was also largely homogeneous, so future studies would benefit from recruiting a sample that is larger and more diverse. Finally, future research should directly assess adult attachment styles to clarify the mechanisms by which high BPD features and high perceived parental rejection levels lead to increased emotional reactivity following a relationship threat – an area with meaningful implications for tailoring evidence-based clinical interventions to those experiencing these attachment patterns and symptoms.

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**Table 1***Demographic Information*

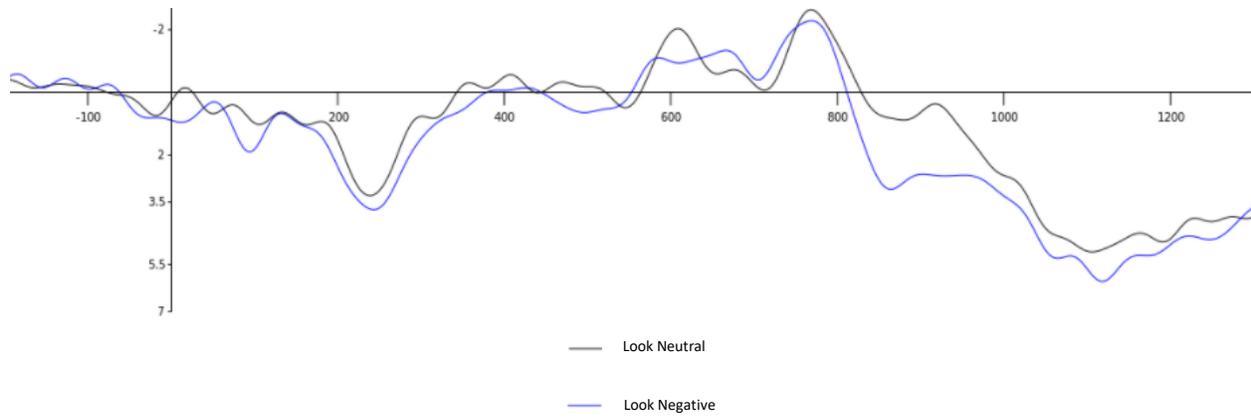
Baseline Characteristic	<i>n</i>	%
Gender		
Female	19	76
Male	5	20
Non-binary	1	4
Sexual Orientation		
Straight	18	72
Bisexual	5	20
Pansexual	2	8
Ethnicity		
White	18	72
Black	1	4
Asian American	1	4
Native American	1	4
Hispanic or Latine	4	16
Biracial or Multiracial	0	0
Other	0	0
	<i>M</i>	<i>SD</i>
Age (years)	19.46	2.36
	<i>M</i>	<i>SD</i>
Relationship length (days)	399.80	365.35

**Table 2***Means and Standard Deviations for All Variables*

Variable	<i>M</i>	<i>SD</i>
PAI-BOR	27.67	10.20
PARQ	39.43	16.77
LPP_LookNeg	3.91	3.90
LPP_LookNeut	2.78	3.40
LPPdiff	1.08	3.18

**Figure 1**

*LPP at Centroparietal ROI for “Look Negative” and “Look Neutral” Trials*



**Figure 2**

*Illustration of Moderation Results*

