

**Nomothetic and Idiographic Patterns of Responses to Emotions in  
Borderline Personality Disorder**

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This research was partially supported by grant K23MH106648 to Shannon Sauer-Zavala.

Shannon Sauer-Zavala receives royalties from Oxford University Press in her role as an author of the treatment on which the intervention involved in the primary study is based. No other authors report any conflicts of interest.

**In press at Personality Disorders: Theory, Research, and Treatment**

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## RESPONSES TO EMOTION IN BPD

**Abstract**

According to Linehan's (1993a) biosocial theory, emotion dysregulation is a core feature of borderline personality disorder (BPD). Despite significant advances in our understanding of emotion dysregulation in BPD, the specific associations among prompting events, discrete emotions, and selected regulation strategies (adaptive *and* maladaptive) have not yet been detailed. We explored these relations in a daily diary study of eight participants ( $M_{\text{age}} = 21.57$ , 63% female; 63% Asian) with BPD over 10-12 weeks. Participants reported prompting events of interpersonal conflict, emotional experiences of anxiety, and strategies of problem-solving and intentional avoidance most frequently. We found several unique relations between regulation strategies and both prompting events and discrete emotions, nomothetically (across all participants) and idiographically (within specific participants). These patterns contribute to an enriched understanding of the emotional experiences of people with BPD, and demonstrate the value of collecting and considering both group-level *and* person-specific data on emotion regulation processes within this population.

*Keywords:* borderline personality disorder; ecological momentary assessment; emotion; emotion regulation

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### **Nomothetic and Idiographic Patterns of Responses to Emotions in Borderline Personality Disorder**

Borderline personality disorder (BPD) is a relatively common psychiatric disorder affecting approximately 1-4% of the general population (Torgersen, 2009), 10% of psychiatric outpatients, and 20% of psychiatric inpatients (Lieb et al., 2004). It is characterized in part by dysfunction in three core domains: emotion dysregulation (e.g., affective instability, intense anger), behavioral difficulties (e.g., self-injurious behaviors, impulsive sex, substance use, disordered eating), and interpersonal hypersensitivity (e.g., fear of abandonment, interpersonal conflicts). Dysfunction in these areas is often linked with further impairments in occupational, social, and leisure domains (Crawford et al., 2005; Torgersen, 2009).

Emotion dysregulation, in particular, is considered a core feature of BPD in one of the leading theories of the disorder (i.e., Linehan's biosocial theory; Linehan, 1993a). Emotion dysregulation can be characterized by emotion sensitivity, heightened and labile negative affect, deficits in adaptive regulation strategies, and over-reliance on maladaptive regulation strategies (Carpenter & Trull, 2013). BPD has also been conceptualized as an "emotional disorder" (Sauer-Zavala & Barlow, 2014) characterized by aversive, avoidant reactions to frequently occurring negative emotions that prompt efforts to escape or avoid these emotions (Barlow, 1991; Campbell-Sills & Barlow, 2007). These reactions, which function to dampen intense emotions, represent maladaptive regulation strategies described by Carpenter and Trull (2013). Moreover, there is even evidence that the behavioral and interpersonal problems observed in BPD can be accounted for by high-order emotional dysfunction (Sanislow et al., 2002), and that affective instability may lie at the core of the full dimension of BPD features (Southward & Cheavens, 2018).

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### **Prompting Events and Emotion Regulation Strategies in BPD**

Gross's (2015) process model of emotion regulation describes several strategies a person may use at different stages of an emotional experience. These strategies include situation selection techniques (e.g., avoidance); situation modifications (e.g., problem-solving); attentional strategies (e.g., distraction, rumination); cognitive changes (e.g., reappraisal); and response modulations (e.g., emotion expression or suppression). Recent research in this area has also highlighted acceptance as an important emotion regulation strategy (Aldao et al., 2010). Use of these strategies can be adaptive or maladaptive, depending on their context as well as their short-term *and* long-term impacts (Aldao et al., 2010). Pervasive patterns of maladaptive regulation strategy use have been associated with a range of emotional disorders (Aldao et al., 2010); in the case of BPD, more maladaptive emotion regulation is often prompted by interpersonal situations. For example, compared to healthy controls, those with BPD report more intense negative emotions (e.g., sadness, loneliness, resentment, anger) after social rejection. Moreover, people with elevated BPD features report greater negative affect in response to social rejection than non-social negative evaluation (Chapman et al., 2014).

Impulsivity is a prototypical regulation strategy for those with BPD and includes substance use, overeating, risky sex, and impulsive spending (American Psychiatric Association [APA], 2013). Across multiple studies, people with BPD report greater impulsivity than both healthy controls and clinical comparison groups (McCloskey et al., 2009). Impulsive behaviors may be negatively reinforced because they can dampen intense emotions in the short-term; however, impulsivity often results in unwanted long-term consequences (Linehan, 1993a) and, thus, can be conceptualized as a maladaptive emotion regulation strategy. People with BPD are

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also prone to using more subtle maladaptive techniques to dampen strong emotions, including avoidance (Iverson et al., 2012), distraction (Jacob et al., 2011), and suppression (Sauer & Baer, 2009). Paradoxically, people with BPD also use techniques that *amplify* their emotional experiences (e.g., rumination, “venting”/emotion expression), although these may also serve an avoidant function. For example, amplifying or “digging in” to anger (e.g., by listening to loud music or blaming others) has been shown to ameliorate other, potentially more vulnerable emotions (i.e., shame; Cassiello-Robbins et al., 2019).

Because of this over-reliance on maladaptive regulation strategies, a primary goal of many emotion-focused interventions for BPD is to increase individuals’ use of adaptive emotion regulation. Broadly speaking, these strategies are acceptance-based (e.g., mindfulness: encouraging patients to take a nonjudgmental, present-focused stance toward emotions) and/or change-based (e.g., problem-solving: encouraging patients to make life changes that decrease emotion-triggering events). However, BPD is an extremely heterogenous disorder, so the specific relations between prompting events, emotions, and individual regulation strategies may vary substantially among individuals. This variability can impact the effectiveness of emotion-focused interventions for any given person.

### **Relations Among Prompting Events, Emotions, and Emotion Regulation Strategies in BPD**

Recently, research characterizing emotional dynamics in those with BPD has been conducted using ecological momentary assessment (EMA). In EMA designs (e.g., diary studies, experience sampling, event-based sampling; Moskowitz & Young, 2006), individuals repeatedly report on their real-time experiences which can reveal patterns of specific events and emotions that prompt specific behaviors. These designs allow researchers to ping participants at various points in their day to maximize ecological validity and minimize recall bias (Shiffman et al.,

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2008). Given that individuals with BPD exhibit more negatively-valenced recall bias than healthy controls (Ebner-Priemer et al., 2006), EMA designs may be necessary to more accurately understand the real-time functioning of those with BPD.

Using EMA designs, researchers have shown that individuals with BPD report a greater number and intensity of negative emotions than do healthy controls (Berenson et al., 2011; Ebner-Priemer et al., 2015, 2007) and other clinical samples (Glaser et al., 2008; Trull et al., 2008). Further evidence suggests that greater emotional intensity is related to the use of more maladaptive emotion regulation strategies in people with BPD (Selby & Joiner, 2009). Among people with BPD or elevated BPD features, more intense momentary negative emotions have been associated with more impulsive behaviors (Tomko et al., 2015), including greater alcohol consumption (Jahng et al., 2011), non-suicidal self-injury (Andrewes et al., 2017; Harpøth et al., 2020), and rumination in response to stressful events (Yaroslavsky et al., 2019). However, with a few exceptions (Berenson et al., 2011; Southward et al., in press), negative emotionality has been operationalized as a *combination* of several distinct emotions (e.g., anger, anxiety, disgust, “down,” fear, guilt, insecurity, loneliness, rage, sadness, shame). Given the centrality of emotion dysregulation to BPD, as well as the finding that individuals with BPD report more complex and secondary emotions than do healthy controls (Ebner-Priemer et al., 2007), it is important to understand the *specific and discrete* emotions experienced by individuals with BPD. A more granular understanding of these emotional experiences may help researchers predict specific maladaptive emotion regulation strategy usage.

Only one EMA study to our knowledge (Chaudhury et al., 2017) has simultaneously assessed the relations among external events, emotional responses, and regulation strategies in people with BPD. For one week, 50 participants with BPD reported all three aspects of their

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emotional experiences six times per day. Interpersonal disagreements were the strongest predictor of increased negative affect. In response to negative affect, participants reported “keeping themselves busy” most often and “calming themselves down” least often, while both “thinking positively” and “doing something good for oneself” uniquely predicted decreases in negative affect. Although these results provide a rich understanding of the emotional experiences among people with BPD, they did not assess whether specific prompts or emotions *predicted* regulation strategies. Furthermore, because the data was collected over one week, stability of these relations over a longer period of time is unknown. Finally, to our knowledge, no researchers have assessed these relations in the context of a treatment study to see whether these patterns change following an intervention.

Cognitive-behavioral interventions for BPD aim to reduce emotionally-avoidant behaviors by teaching a variety of regulation strategies. These strategies are designed to facilitate an approach-oriented relationship with emotions, and are associated with decreases in negative emotions and maladaptive behaviors (Kliem et al., 2010). However, these treatments can be time- and resource-intensive (e.g., dialectical behavior therapy; Neacsiu & Linehan, 2014), and include multiple components that may be more or less useful for a given emotion, context, or individual patient. More granular data on the specific emotions, idiosyncratic triggers, and characteristic responses of individual patients can help clinicians tailor treatment, particularly when time and resources are limited.

### **Current Study**

The current study is an exploratory secondary analysis of a 10-12-week intervention-based, daily diary study assessing specific emotion regulation strategy use in individuals with BPD (Sauer-Zavala et al., 2020). Participants provided descriptive accounts of the prompting

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events for their emotions that were grouped into relevant categories and reported their experience of several discrete emotions (i.e., anger, sadness, anxiety, guilt/shame). Participants also labeled their responses to each emotional experience as one of five emotion regulation strategies: impulsivity, intentional avoidance, amplification, problem-solving, or mindful acceptance.

Because nomothetic and idiographic perspectives can each offer unique contributions to this literature, the aims of this study were to determine: (1) nomothetic frequencies of specific emotions, proximal factors, and regulation strategies reported by people with BPD; (2a) predictors of specific regulation strategies, including study phase, BPD severity, overall emotion intensity, specific emotion type, specific emotion intensity, and proximal factors (i.e., prompting events and provocations); (2b) the moderating effect of study phase on other relevant predictors; (3) whether BPD severity moderated relations between specific regulation strategies, study phase, emotions, and emotion intensity; and (4) idiographic predictors of specific regulation strategies, including emotion types, intensity of certain emotions, and study phase. We also examined similarities and differences in these relations at the group and individual levels. Given the novelty of this study, we did not have specific hypotheses about the relations between specific emotions, proximal factors, and regulation strategies. However, we did expect that any relations would be stronger among people with greater baseline BPD severity, and that participants would report an increase in their adaptive skill use (e.g., problem-solving and mindful acceptance) over the course of the study. We hypothesized that the use of change-based strategies (i.e., impulsivity, intentional avoidance, and problem-solving) would be associated with more intense emotional experiences (regardless of type), whereas more acceptance-based strategies (i.e., acceptance, digging in) would be associated with less intense emotions.

## **Materials & Methods**



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### **Participants**

Eight individuals with BPD ( $M_{age} = 21.57$ ,  $SD_{age} = 3.05$ ; 63% female; 63% Asian; 88% non-Hispanic; 88% not taking any psychotropic medications) participated in the present study (Table 1). Inclusion criteria consisted of: (1) a Diagnostic and Statistical Manual, 5<sup>th</sup> edition (DSM-5; APA, 2013) diagnosis of BPD as assessed by the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II; Gibbon et al., 1997); (2) willingness to maintain a stable dose of prescribed psychotropic medication and to abstain from additional psychosocial treatment for the duration of the study; (3) fluency in English; and (4) access to a personal smartphone. Exclusion criteria consisted of conditions that would require immediate treatment, e.g., (1) current mania, schizophrenia or schizoaffective disorder, or organic mental disorder as assessed via the Anxiety Disorders Interview Schedule (ADIS-5; Brown & Barlow, 2014); (2) clear and current suicidal intent; and (3) current or recent (within three months) substance dependence. Participants were recruited from local treatment sites, online postings, and direct emails to individuals with BPD that had participated in other (non-treatment) studies conducted by our group. Interested potential participants completed a brief telephone screening; eligible individuals then received an in-person assessment and provided informed consent.

### **Study Design**

All study procedures were approved by the local university Institutional Review Board. Using a multiple-baseline single-case experimental design (SCED; Barlow et al., 2009), participants completed three sequential study phases: baseline (2-4 weeks), intervention (4 weeks), and follow-up (4 weeks). Throughout all study phases, participants received one daily reminder to complete reports of their strong emotions and responses, with the expectation that they enter a minimum of one emotional experience per day. In these data captures (Table 2),

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participants (1) identified the emotions experienced each day from four options: anger, sadness, anxiety, and guilt/shame; (2) reported the intensity of these emotions on a Likert-type scale from 1 (*none at all*) – 5 (*greatest intensity*); and (3) identified which of five regulation strategies they used in response to these emotions: intentional avoidance, amplifying, acting impulsively, problem-solving, and mindful acceptance. Plain English examples of each behavior were provided in the moment and were tailored to the identified emotion. Participants also provided free response descriptions of the stressor prompting the emotion and their subsequent response.

In the intervention phase, participants received the Countering Emotional Behaviors module of the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP; Barlow et al., 2018). This module focuses on changing emotions by identifying and changing maladaptive emotional behaviors. In 50-min sessions, participants practiced identifying their maladaptive emotion regulation strategies and linking them to their short-term and long-term consequences. They identified behavioral urges elicited by their emotions (e.g., the urge to isolate when experiencing sadness) and alternative actions they could use instead (e.g., reaching out to a friend). Finally, they planned how to use these alternative actions. All treatment sessions were conducted by a licensed clinical psychologist or advanced doctoral student, all of whom are certified experts in the UP. Average therapist competence ratings were high (4.89 on a 5-point scale). For full study procedures, please see Sauer-Zavala, et al. (2020).

### Measures

**Demographics.** Participants reported their demographic characteristics at baseline. These included age, gender identity, racial and ethnic background, and any current medications.

**Zanarini Rating Scale for BPD.** The Zanarini Rating Scale for BPD (ZAN-BPD; (Zanarini et al., 2015) is a 9-item self-report scale designed to assess the severity of nine DSM-5

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criteria for BPD experienced over the prior week. Participants rate each criterion on a 0-4 Likert-type scale, with each anchor uniquely reflecting the corresponding item. ZAN-BPD items demonstrated good internal consistency in the current sample (Cronbach's alpha = .84).

### Data Analysis

**Identifying proximal factors.** Participant-provided qualitative descriptions of the events preceding emotional experiences were categorized and coded by three independent raters. The rating team was composed of one doctoral student, one masters student, and one undergraduate student. In the first stage, raters met over three sessions to review a subset of event descriptions and discuss common themes therein. Using this inductive approach, raters consolidated similar themes until (a) no new themes emerged and (b) each identified theme was categorically distinct (Table 3). In the second stage, the senior rater coded each event description, and 195 of the descriptions (25% of the data) were randomly selected for independent coding by all three raters. For each description, binary codes (0 – not present; 1 – present) were assigned to each theme. Descriptions could be, and often were, defined by multiple themes. Raters met biweekly to determine inter-rater reliability and reach final consensus on ratings. Raters demonstrated initial consensus on 93% of descriptions.

**Nomothetic data.** We used SPSS version 25 to examine frequencies in the occurrence of each emotion and regulation strategy across participants as a function of study phase. We further calculated the average emotional intensity across participants for each phase.

Because observations were nested within participants, and because each strategy was dichotomously recorded (i.e., it either occurred [1] or did not [0]), we used *proc glimmix* with a log-link function in SAS to conduct a series of hierarchical linear models (HLM). Study phase, emotion type, and the emotion type  $\times$  emotion intensity product term were each entered as

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predictors of regulation strategies. Emotion intensity was not included as a main effect in any models, as we only wanted to model the relation between intensity of identified emotions and regulation strategies. When investigating the moderating effects of BPD feature severity, we included the main effect of BPD severity and all relevant lower-order product terms. BPD features were grand mean-centered to enhance the interpretability of the results. We included random intercepts in all models. Because responses unfolded over time, an autoregressive lag-1 covariance structure was used for the residuals, and because idiographic associations among variables within participants were assessed in separate analyses, only fixed effects across participants were examined in these models. Based on a power analysis (Lafit et al., 2020), we determined that we had 80% power to detect regression weights as small as  $B = |.07|$ .

**Idiographic data.** We ran person-specific logistic regressions to determine whether specific emotions and the intensity of those emotions were related to regulation strategies at the individual level. We conducted two sets of analyses for each emotion and regulation strategy. In the first analysis, to test if the relations between emotions and behaviors differed by study phase, we regressed each regulation strategy onto emotion type, study phase, emotion type  $\times$  intensity, emotion type  $\times$  study phase, and emotion type  $\times$  intensity  $\times$  study phase. If the emotion type  $\times$  intensity  $\times$  study phase product term was not significant, we then ran a reduced model, regressing regulation strategy onto emotion type and emotion type  $\times$  intensity, to more directly test the relations between emotions and behaviors.

## Results

### Nomothetic Findings

**General frequencies.** On the first day of data collection, participants reported nearly four emotional experiences ( $M = 3.88$ ,  $SD = 2.17$ ). For the rest of the study, participants reported an

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average of 1-2 emotional experiences each day. The most frequently reported emotions across participants and study phases were anxiety (43.6%), followed by sadness (23.4%), anger (22.1%), and guilt/shame (10.9%; Table 3). The frequency with which specific emotions were experienced did not vary by study phase,  $\chi^2(6) = 6.49, p = .37$ . Similarly, the average intensity of emotions did not vary by study phase,  $F(2, 769) = 1.24, p = .29$ .

In regard to proximal factors, interpersonal events preceded emotional experiences 53.8% of the time, often in the form of conflict (22.8%), rejection sensitivity (8.9%), and/or disconnection (11.8%; Table 4). The next most commonly-reported theme was self-evaluation (17.7%). Other distinct proximal factors included acute physiological triggers (1.3%), short-term routine disruptions (6.3%), and physical/material vulnerabilities (5.7%).

Finally, the most frequently reported regulation strategies across study phases were problem-solving (28.7%) and intentional avoidance (27.2%), followed by mindful acceptance (19.9%) and amplification (19.8%), with impulsivity reported least frequently (4.4%; Table 3).

**Are specific regulation strategies related to study phase?** Study phase was negatively associated with impulsivity,  $B = -.66, SE = .24, p < .01, 95\% CI [-1.13, -.18]$ , and positively associated with problem-solving,  $B = .22, SE = .10, p = .03, 95\% CI [.02, .42]$  and mindful acceptance,  $B = .31, SE = .12, p < .01, 95\% CI [.08, .54]$ . Impulsivity decreased from baseline to treatment and follow-up, whereas problem-solving and mindful responding increased across phases. Study phase was unrelated to intentional avoidance and amplification,  $ps > .07$ .

**Are specific regulation strategies related to BPD severity?** Individuals with higher levels of BPD features were more likely to use amplification,  $B = .33, SE = .09, p < .01, 95\% CI [.16, .50]$ , than those with lower levels of BPD features. Those higher in BPD features were also less likely to act impulsively,  $B = -.59, SE = .24, p = .01, 95\% CI [-1.05, -.13]$ .

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**Are specific regulation strategies related to the overall intensity of emotions?** The relation between overall emotion intensity and impulsivity was moderated by study phase,  $B = .37$ ,  $SE = .18$ ,  $p = .04$ , 95% CI [.01, .72]. Specifically, emotion intensity was associated with a greater likelihood of acting impulsively, and this association was stronger across study phases – despite the fact that overall frequency of impulsive behaviors decreased across phases. Emotion intensity was unrelated to all other regulation strategies,  $ps > .09$ .

**Are specific regulation strategies related to certain emotions?** Sadness was associated with a greater likelihood of intentional avoidance,  $B = 1.51$ ,  $SE = .53$ ,  $p < .01$ , 95% CI [.48, 2.55] and a lower likelihood of using problem-solving,  $B = -1.34$ ,  $SE = .63$ ,  $p = .03$ , 95% CI [-2.57, -.10]. The relation between sadness and mindful acceptance,  $B = -.91$ ,  $SE = .31$ ,  $p < .01$ , 95% CI [-1.52, -.30] was moderated by study phase. Sadness was more strongly related to decreased likelihood of using mindful acceptance at each successive study phase. All other relations between sadness and regulation strategies were not moderated by study phase,  $ps > .30$ .

The relation between anxiety and regulation strategy did not differ by study phase,  $ps > .07$ . Regardless of study phase, anxiety was associated with a greater likelihood of using problem-solving,  $B = .96$ ,  $SE = .37$ ,  $p = .01$ , 95% CI [.23, 1.70]. Neither anger nor guilt/shame were associated with any specific behavior, regardless of study phase,  $ps > .30$ .

**Are specific regulation strategies related to the intensity of certain emotions?** Higher intensity sadness was associated with a lower likelihood of intentional avoidance,  $B = -.31$ ,  $SE = .13$ ,  $p = .02$ , 95% CI [-.58, -.05], and a higher likelihood of using problem-solving,  $B = .40$ ,  $SE = .15$ ,  $p < .01$ , 95% CI [.10, .69]. However, the relations between sadness intensity and impulsivity,  $B = .89$ ,  $SE = .44$ ,  $p = .04$ , 95% CI [.03, 1.74], and between sadness intensity and mindful acceptance,  $B = -.91$ ,  $SE = .31$ ,  $p < .01$ , 95% CI [-1.52, -.30] were moderated by study

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phase. During baseline, higher intensity sadness was associated with a lower likelihood of acting impulsively and a greater likelihood of using mindful acceptance. There was no relation between sadness intensity and the likelihood of acting impulsively or mindful acceptance during the intervention, whereas in follow-up, higher intensity sadness was associated with a greater likelihood of acting impulsively and a lower likelihood of using mindful acceptance. Study phase did not moderate the relations between sadness intensity and other strategies,  $ps > .30$ .

The relation between anxiety intensity and impulsivity was moderated by study phase,  $B = .60$ ,  $SE = .30$ ,  $p = .04$ , 95% CI [.01, 1.78]. During baseline, higher intensity anxiety was associated with a lower likelihood of acting impulsively, but during both intervention and follow-up, higher intensity anxiety was associated with a greater likelihood of acting impulsively. Study phase did not moderate the relations between anxiety intensity and other strategies,  $ps > .51$ . Regardless of study phase, higher intensity anxiety was associated with a lower likelihood of using problem-solving,  $B = -.21$ ,  $SE = .10$ ,  $p = .03$ , 95% CI [-.40, -.02].

Regardless of study phase, higher intensity guilt/shame was associated with a greater likelihood of acting impulsively,  $B = .72$ ,  $SE = .33$ ,  $p = .03$ , 95% CI [.06, 1.37]. Anger intensity was unrelated to behavior, regardless of study phase,  $ps > .36$ .

**Are specific regulation strategies related to proximal factors?** Intentional avoidance was more likely to be used in the presence of self-evaluation,  $B = .62$ ,  $SE = .22$ ,  $p < .01$ , 95% CI [.18, 1.06], and less likely to be used in the presence of physical/material vulnerability factors,  $B = -.92$ ,  $SE = .44$ ,  $p = .04$ , 95% CI [-1.78, -.05]. Amplifying was more likely to be used in the presence of interpersonal conflict,  $B = .81$ ,  $SE = .28$ ,  $p < .01$ , 95% CI [.25, 1.36], and less likely to be used in the presence of fears of rejection,  $B = -.94$ ,  $SE = .41$ ,  $p = .02$ , 95% CI [-1.76, -.13]. Impulsivity was more likely to be used in the presence of physical/material vulnerability factors,

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$B = 3.04$ ,  $SE = .74$ ,  $p < .01$ , 95% CI [1.59, 4.48]. Problem-solving was more likely to be used in the presence of fears of rejection,  $B = .98$ ,  $SE = .29$ ,  $p < .01$ , 95% CI [.41, 1.55], while mindful acceptance was less likely to be used in the presence of disconnection/loneliness,  $B = -.83$ ,  $SE = .37$ ,  $p = .03$ , 95% CI [-1.56, -.10]. All findings were significant regardless of study phase.

**Does BPD severity moderate the relation between regulation strategies and study phase?** In general, participants were less likely to act impulsively over the study period.

However, those with lower (compared to higher) levels of BPD features demonstrated a greater decrease in their likelihood of acting impulsively across study phases,  $B = .20$ ,  $SE = .05$ ,  $p < .01$ , 95% CI [.09, .30]. Those with lower levels of BPD features also demonstrated a greater increase in their use of problem-solving across study phases, compared to those with higher levels of BPD features,  $B = -.05$ ,  $SE = .02$ ,  $p = .02$ , 95% CI [-.09, -.01]. BPD features did not moderate the relation between other strategies and study phase,  $ps > .11$ .

**Does BPD severity moderate the relation between regulation strategies and intensity**

**of specific emotions?** Individuals with higher BPD features were more likely than those with lower BPD features to use amplification in response to high intensity anger,

$B = .05$ ,  $SE = .02$ ,  $p = .03$ , 95% CI [.00, .09]. Participants with higher BPD features were also less likely to use mindful acceptance in response to higher intensity anger,  $B = -.07$ ,  $SE = .02$ ,  $p < .01$ , 95% CI [-.11, -.03], and sadness,  $B = -.06$ ,  $SE = .02$ ,  $p = .01$ , 95% CI [-.11, -.02].

## Idiographic Findings

**Participant 1.** The relation between sadness and intentional avoidance varied by study phase,  $B = -2.08$ ,  $SE = .86$ ,  $p = .02$ , 95% CI [-3.76, -.39]. During baseline, more intense sadness was associated with a greater likelihood of intentional avoidance. Sadness intensity was unrelated to intentional avoidance during the intervention, while more intense sadness was



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associated with a lower likelihood of intentional avoidance during follow-up. Regardless of study phase, anxiety was associated with a greater likelihood of using intentional avoidance than other emotions,  $B = 3.74$ ,  $SE = 1.67$ ,  $p = .02$ , 95% CI [.48, 7.01]. However, more intense levels of anxiety were associated with a lower likelihood of intentional avoidance,  $B = -1.17$ ,  $SE = .42$ ,  $p < .01$ , 95% CI [-2.00, -.35]. Intentional avoidance was not significantly associated with anger or guilt/shame,  $ps > .95$ , in any study phase. Similarly, there were no significant relations between impulsivity and specific emotions,  $ps > .95$ , amplification and specific emotions,  $ps > .07$ , problem-solving and specific emotions,  $ps > .05$ , or mindful awareness and specific emotions,  $ps > .86$ , during any study phase.

**Participant 2.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . Similarly, there were no significant relations between emotions and regulation strategies across study phases,  $ps > .05$ .

**Participant 3.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . Similarly, there were no significant relations between emotions and regulation strategies across study phases,  $ps > .05$ .

**Participant 4.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . However, more intense levels of anxiety were associated with a greater likelihood of intentional avoidance,  $B = .79$ ,  $SE = .39$ ,  $p = .046$ , 95% CI [.02, 1.56], and amplification,  $B = .83$ ,  $SE = .41$ ,  $p = .045$ , 95% CI [.02, 1.64]. Regardless of intensity, experiencing anxiety was associated with a greater likelihood of using mindful acceptance,  $B = 2.90$ ,  $SE = 1.12$ ,  $p = .01$ , 95% CI [.68, 5.12].

**Participant 5.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . However, less intense levels of sadness were associated with a greater

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likelihood of intentional avoidance,  $B = -1.02$ ,  $SE = .51$ ,  $p = .049$ , 95% CI [-2.03, -.004].

Regardless of intensity, experiencing guilt/shame was associated with a greater likelihood of amplification,  $B = 5.03$ ,  $SE = 2.47$ ,  $p = .04$ , 95% CI [.12, 9.93].

**Participant 6.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . Regardless of intensity, experiencing sadness was associated with a greater likelihood of intentional avoidance,  $B = 3.56$ ,  $SE = 1.66$ ,  $p = .03$ , 95% CI [.26, 6.86].

**Participant 7.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . Similarly, there were no significant relations between emotions and regulation strategies across study phases,  $ps > .05$ .

**Participant 8.** The relations between emotions and regulation strategies did not vary by study phase,  $ps > .05$ . Regardless of intensity, experiencing anxiety was associated with a greater likelihood of using problem-solving,  $B = 2.38$ ,  $SE = 1.17$ ,  $p = .04$ , 95% CI [.06, 4.71], and experiencing sadness was associated with a greater likelihood of using mindful acceptance,  $B = 4.87$ ,  $SE = 2.20$ ,  $p = .03$ , 95% CI [.52, 9.22].

## Discussion

In this exploratory study, we examined the daily relations among emotions, emotion intensity, proximal factors, and specific emotion regulation strategies among eight participants with BPD who, following an assessment-only baseline phase, completed four weeks of treatment and an assessment-only follow-up phase. We also tested whether the relations among these variables differed as a function of study phase and BPD severity. Finally, we conducted person-specific (idiographic) analyses to determine unique patterns of associations among our variables of interest for each participant.

### **Aim 1: Nomothetic Frequencies**

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Participants reported experiencing anxiety more often than any other emotion, in line with previous EMA research with undergraduate students (Heiy & Cheavens, 2014). However, participants in the current study reported experiencing anxiety more frequently than these undergraduate students (Heiy & Cheavens, 2014), as would be expected in a clinical sample. In further contrast to that undergraduate sample, whose most frequently-reported prompting events were achievement-oriented, interpersonal interactions were the most frequently reported prompt for emotional experiences in the current sample. This finding is unsurprising, given that interpersonal dysfunction is considered a core component of BPD (Gunderson, 2007).

Problem-solving and intentional avoidance were the most frequently used strategies across participants overall. Both of these behaviors are “change-based” approaches to managing emotions, rather than “acceptance-based” strategies, suggesting that people with BPD may be more likely to attempt to change their emotions—again, in contrast to previous research with healthy controls (Heiy & Cheavens, 2014). Although BPD is often associated with impulsivity (Southward & Cheavens, 2018), participants reported impulsive responding least frequently. This may be a result of the inclusion/exclusion criteria, which selected against individuals with more severe behavioral dysregulation (i.e., acute suicidality, co-occurring substance use disorder). Future researchers should assess the frequency with which people with the full range of BPD features use impulsive and otherwise maladaptive behaviors to more accurately characterize the emotion regulation profiles of the disorder (e.g., Southward & Cheavens, 2020).

### **Aims 2 & 3: Nomothetic Predictors and Moderators**

Over the course of the study, participants reported acting impulsively less frequently and using problem-solving and mindful acceptance more frequently. These findings suggest the intervention was effective and that the UP Countering Emotional Behaviors module may

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contribute to these changes in emotion regulation strategy selection (Sauer-Zavala et al., 2019). Interestingly, BPD severity moderated these relations, such that participants with less severe BPD features reported a greater decrease acting impulsively and a greater increase in problem-solving across the study than those with more severe BPD features. Future researchers are encouraged to use full treatment studies to explicitly test the hypothesis that less severe presentations of BPD are more amenable to briefer interventions.

Surprisingly, higher BPD severity was associated with *less* frequent impulsive action, and may suggest that, among individuals with BPD, impulsivity is negatively associated with BPD features. Alternatively, this result may be an example of Berkson's bias (Berkson, 1946). Berkson's bias occurs when two between-person variables are associated in one direction (e.g., a positive association) in a population but demonstrate a directionally opposite association (e.g., a negative association) within certain subgroups. By only including those with a BPD diagnosis, we restricted the variability of BPD features while not correspondingly restricting the variability in impulsive behaviors, potentially leading to artificial negative associations between these variables. Therefore, this result should be cautiously interpreted and replicated in future research.

Higher emotion intensity, overall, was most strongly associated with impulsive behavior, in line with previous findings (Chapman et al., 2010). We also found unique relations between regulation strategies and specific emotions, and between regulation strategies and the *intensity* of specific emotions. For example, sadness (regardless of intensity) was associated with increased likelihood of avoidance, decreased likelihood of problem-solving, and, over the course of the study, decreased likelihood of mindful acceptance. This finding is consistent with Taylor and Rachman's (1991) theory that sadness can be such an uncomfortable emotion—perhaps especially for those with high emotion sensitivity—that sadness itself can be a source of

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disengagement, fear, and avoidance. In addition, anxiety, regardless of intensity, was associated with increased likelihood of problem-solving, perhaps reflecting attempts to pre-emptively modify situations and mitigate them as sources of threat.

However, combining these two factors (emotion type and emotion intensity) resulted in more nuanced relations among emotions and regulation strategies. For example, more intense guilt/shame across study phases and more intense sadness and anxiety in later study phases, were associated with a greater likelihood of impulsivity. In addition, more intense sadness was associated with a lower likelihood of avoidance but a greater likelihood of problem-solving, whereas more intense anxiety was associated with a lower likelihood of problem-solving. These findings suggest that the use of emotion regulation behaviors by those with BPD depends in part on level of arousal. For instance, when the intensity of sadness (a generally low-arousal emotion) is extreme, it may actually become activating, whereas when the intensity of anxiety (a generally high-arousal emotion) is extreme, it ceases to be adaptively activating in line with the Yerkes-Dodson model of arousal and performance.

BPD severity moderated relations between anger and emotion regulation strategies. Participants with greater BPD features tended to amplify their anger, and when anger was more intense, they were less likely to approach it with mindful acceptance. One explanation for this unique relation between anger and amplification—which involves staying engaged with and digging into the emotion—is that the subjective experience of anger can often feel energizing and satisfying in the moment (Linehan, 2014). For those with more severe BPD, amplifying anger may even function as self-validation or interpersonal communication (Linehan, 2014).

Finally, we found associations between regulation strategies and specific proximal factors. Physical/material vulnerabilities (e.g., being hungover), were associated with acting

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impulsively, highlighting the importance of physiological homeostasis in BPD. Participants engaging in self-evaluation tended to push emotions away; however, in interpersonal conflicts, often characterized by negative evaluations of others, they tended to amplify emotions, potentially illustrating a tendency in BPD toward “being right over being effective” (Linehan, 2014). In contrast, rejection sensitivity was associated with a lower likelihood of amplifying and a higher likelihood of problem-solving. This suggests that people with BPD do not perceive subjective benefit to “leaning into” rejection-related emotions; rather, fears of rejection prompt them to approach and repair interpersonal situations. Although this result conflicts with laboratory studies of rejection sensitivity in BPD (e.g., Lazarus et al., 2014), one explanation for this difference is that individuals with BPD respond differently to feared rejection from important others than from strangers (Cheavens et al., 2014). Lastly, participants were less likely to use mindful acceptance when experiencing loneliness and disconnection, though there was no one emotion regulation strategy they tended to use instead. This finding suggests that loneliness and disconnection may be particularly difficult experiences for individuals with BPD to tolerate mindfully. Given the novelty of this finding, future studies should replicate this result and test the utility of different emotion regulation strategies for these particular experiences.

### **Aim 4: Idiographic Results**

The final aim of this study was to determine whether there were idiographic patterns in the way people with BPD responded to emotional provocations. We examined whether changes in these relations following the brief skill intervention could be detected at the individual level, and whether these relations would coincide or contrast with nomothetic patterns.

We found individual differences in how specific emotions predicted regulation strategies. Although there were no significant patterns of regulation strategy selection by emotion type for

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participants 2, 3, and 7, participants 1, 4, 5, 6, and 8 each demonstrated idiosyncratic patterns. For example, higher intensity sadness during baseline was associated with greater odds of participant 1 engaging in intentional avoidance. However, by follow-up, higher intensity sadness was associated with a lower likelihood of intentional avoidance, consistent with the nomothetic trend. This finding illustrates how one individual with BPD demonstrated decreased maladaptive responding over time. The same individual also tended to respond to anxiety with avoidance, unless it was extreme anxiety (which reduced the likelihood of avoidance) in contrast to the nomothetic trend. Whereas participant 6 also demonstrated a pattern that was consistent with the nomothetic findings (increased likelihood of avoidance associated with sadness), participants 4, 5, and 6 all demonstrated unique patterns that not only differed from one another, but were not found at the group-level; for example, intentional avoidance was related to more intense anxiety for participant 4, less intense sadness for participant 5, and any level of sadness for participant 6. The finding that there were both similarities and differences between idiographic and nomothetic patterns highlights the importance of integrating person-specific emotional-behavioral assessment (and, when possible, tailored skills training) into interventions for BPD.

Finally, these findings provide information about participants who did not respond to the intervention. Participant 8 (a non-responder according to the main outcomes assessed; see Sauer-Zavala et al., 2020) was more likely to use problem-solving in response to anxiety and mindful acceptance in response to sadness, regardless of treatment phase or emotional intensity. These findings suggest that rigid strategy use, rather than maladaptive regulation strategy selection may have contributed to poorer outcomes for this individual. Characterizing these idiographic patterns may be an important way to identify off-track patients more quickly in future treatments.

### **Limitations**

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There are a few limitations that must be considered in interpreting the results of this study. First, our sample ( $n = 8$ ) was small and composed of young adult participants with relatively mild levels of behavioral dysregulation, so the results may not generalize well to older people with BPD or those with more severe behavioral dysregulation. Second, although many qualitative descriptions of proximal factors contained sufficient detail, others contained only a few words. Thus, it is possible that differences in description length and quality made it more difficult to consistently rate proximal factors. Further, because we did not give participants specific instructions on what to include in their descriptions, these variables may most accurately represent the factors that were most salient to each participant. The novelty of our coding scheme may be a related limitation, and we encourage future researchers to replicate these categories. We also encourage future researchers to examine longer study periods, as our study duration was relatively short. However, given that much of the existing literature has relied on even shorter data collection windows (i.e., one week), and the lack of participant attrition in the current study, the duration of this study also represents a strength.

At times throughout the study, some participants appeared to rely on the evening reminders to complete study prompts, potentially introducing recall bias against events occurring earlier in the day. In addition, participants were asked to identify the single most intense emotion and response to that emotion. Although participants could, and did, provide multiple responses describing different emotions at each occasion, this design choice may have limited the variability in participants' reported emotions and/or behaviors. Similarly, using dichotomous ratings of emotions and regulatory behaviors may have limited the statistical power to detect effects with these variables. The similarity in the descriptions of intentional avoidance and impulsive responding may have led to more mixed effects for these behaviors, as participants



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may have used idiosyncratic and inconsistent criteria to distinguish these options. Because we grouped avoidant, suppressive, and distracting behaviors all within our intentional avoidance category, future research in this area may benefit from more precisely distinguishing between these regulation strategies. Similarly, we collapsed guilt and shame into one category to account for participants at baseline not having the psychoeducation to clearly and consistently distinguish between the two emotions; we encourage future researchers to categorize them separately, given evidence that they are separate emotions with distinct functions (Linehan, 2014). Finally, our idiographic analyses may have been underpowered to detect significant relations among certain emotions and behaviors, depending on how frequently participants reported them.

### **Conclusions**

Despite these limitations, we identified both nomothetic and idiographic patterns in the way people with BPD regulate specific emotions in the context of specific proximal factors. Nomothetically, these individuals most frequently experienced anxiety, were most prone to intentional avoidance at baseline, and increased their use of adaptive strategies following brief skills intervention. Idiographically, we found unique relations among each participant's specific emotions, triggers, and response tendencies. Clinically, these results highlight the value of collecting information at baseline about individuals' specific behavioral patterns—whether via intake assessment, behavioral analyses, or EMA—because this information can help clinicians personalize interventions (particularly brief interventions) for maximum efficiency and effectiveness. Characterizing both group-level commonalities and idiographic patterns of emotion regulation can ultimately provide a more thorough understanding of the full process of emotion regulation for each person with BPD.

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**Table 1**  
*Participant Demographic Information*

Participant	Age	Gender	Race	Ethnicity	Baseline ZAN-BPD Self-Report Score	Baseline ZAN-BPD Clinician-Rated Score	Psychotropic Medications
1	21	Female	Asian	Non-Hispanic	8	13	Antidepressant
2	-	Male	Asian	Non-Hispanic	5	15	None
3	19	Transgender	Asian	Hispanic	18	20	None
4	22	Female	White	Non-Hispanic	6	6	None
5	19	Female	Asian	Non-Hispanic	14	15	None
6	24	Female	Asian	Non-Hispanic	12	15	None
7	27	Male	Black	Non-Hispanic	5	12	None
8	19	Female	White	Non-Hispanic	18	19	None

*Note.* ZAN-BPD = Zanarini Rating Scale for Borderline Personality Disorder.

## RESPONSES TO EMOTION IN BPD

**Table 2***Daily Diary Prompts*

Prompt Number	Prompt Text	Prompt Response Type/Response Options
1	Since the last time you made an entry, how many times have you had a strong emotional experience?	Enter an integer
2	Which of the following best describes the strong emotion you experienced since your last entry?	Select one of the following: (1) Anger, (2) Sadness, (3) Anxiety, or (4) Guilt/Shame
3	What made you feel [selected emotion]?	Free response
4	Rate the intensity of your [selected emotion] (1 being none at all, 5 being the greatest intensity)	Enter an integer from 1-5
5	When you felt [selected emotion], what did you do?	Free response
6	Based on your previous response, which of the following best describes what you did when you were feeling [selected emotion]? Note: your behavior may fit into more than one category – choose the option that best fits what you did.	Select one of the following: (1) Purposefully tried to push the feeling away (e.g., distracted myself, used substances/alcohol, engaged in self-injury); (2) "Dug in" to the feeling (e.g., listened to angry music, vented, paced); (3) Engaged in impulsive behavior (e.g., shopped, ate, used substances/alcohol, lashed out, engaged in self-injury); (4) Engaged in problem-solving (e.g., assertive behavior, set a limit, asked for something you needed); or (5) Allowed the feeling to be there and waited to react (e.g., focused on present tasks that need to get done, collected all the facts about the situation before responding)

## RESPONSES TO EMOTION IN BPD

**Table 3**

*Frequencies of Reported Emotion Type, Emotion Intensity, and Regulation Strategies Across Participants by Study Phase*

Variable	<u>Baseline</u>		<u>Intervention</u>		<u>Follow-Up</u>	
	<i>n / M</i>	<i>% / SD</i>	<i>n / M</i>	<i>% / SD</i>	<i>n / M</i>	<i>% / SD</i>
Emotion Type						
Anger	63	24.2%	61	21.7%	47	20.3%
Sadness	63	24.2%	65	23.1%	53	22.8%
Anxiety	99	38.1%	127	45.2%	111	47.8%
Guilt/Shame	35	13.5%	28	10.0%	21	9.0%
Emotion Intensity	3.67	1.26	3.67	1.49	3.50	1.33
Regulation Strategies						
Intentional Avoidance	80	30.8%	79	28.1%	51	22%
Amplification	58	22.3%	57	20.3%	38	16.4%
Impulsivity	19	7.3%	9	3.2%	6	2.6%
Problem-Solving	60	23.1%	87	31%	75	32.3%
Mindful Acceptance	43	16.5%	49	17.4%	62	26.7%

*Note.* See Table 2 for complete descriptions of regulation strategies.

## RESPONSES TO EMOTION IN BPD

**Table 4**  
*Coding Structure for Proximal Factors*

Theme	Description	Example	Frequency (%)
<i>Interpersonal (general)</i>	Any kind of interpersonal interaction; anything related to relationship(s)	"Accidentally made eye contact with someone on the bus"	416 (53.7)
<i>Interpersonal (conflict)</i>	Judgment and/or hostility directed at another person or explicit conflict	"My brother was being a jerk to me"	176 (22.7)
<i>Interpersonal (fear of judgment, abandonment, or rejection)</i>	Actual, perceived, or feared judgment, abandonment, or rejection by another person or group	"I had to give a presentation in front of my whole class"	69 (8.9)
<i>Interpersonal (feelings of disconnection or loneliness)</i>	Feeling lonely, disconnected, or isolated in general or regarding a specific person/group	"I really miss him tonight"	91 (11.8)
<i>Self-evaluation or self-judgment</i>	Negative self-appraisal or a feeling of not meeting one's own expectations	"Got a bad grade, should've studied more"	137 (17.7)
<i>Acute physiological trigger</i>	An acute sensation or physiological state	"I had a panic attack"	10 (1.3)
<i>Routine disruption or short-term inconvenience</i>	An unanticipated event that requires the participant to adjust	"I left my keys at home and was locked out of my apartment"	49 (6.3)
<i>Physical or material vulnerability</i>	Factors that reduce a person's resources to cope with emotions	"I was hungover"	44 (5.7)