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Weekly fluctuations in nonjudging predict borderline personality disorder feature expression in women

Tory Eisenlohr-Moul, Ph.D.,
University of Kentucky, University of North Carolina at Chapel Hill

Jessica R. Peters, Ph.D.,
University of Kentucky, Warren Alpert Medical School of Brown University

Kaitlyn D. Chamberlain, B.A., and
University of Kentucky

Marcus Rodriguez, M.A.
Duke University

Abstract

Objectives—Borderline personality disorder (BPD) features have been linked to deficits in mindfulness, or nonjudgmental attention to present-moment stimuli. However, no previous work has examined the role of fluctuations in mindfulness over time in predicting BPD features. The present study examines the impact of both *between-person differences* and *within-person changes* in mindfulness.

Design—40 women recruited to achieve a flat distribution of BPD features completed 4 weekly assessments of mindfulness (Five Facet Mindfulness Questionnaire; FFMQ) and BPD features. Multilevel models predicted each outcome from both 1) a person's average levels of each facet and 2) weekly deviations from a person's average for each facet.

Results—Average acting with awareness, nonjudging, and nonreactivity predicted lower BPD features at the between-person level, and weekly deviations above one's average (i.e., higher-than-usual) nonjudging predicted lower BPD feature expression at the within-person level.

Conclusions—Within-person fluctuations in the nonjudging facet of mindfulness may be relevant to the daily expression of BPD features over and above dispositional mindfulness.

Keywords

mindfulness; borderline personality disorder; within-person methods; multilevel modeling; nonjudging

Correspondence to: Tory Eisenlohr-Moul.

Tory Eisenlohr-Moul, Ph.D., Department of Psychiatry, University of North Carolina at Chapel Hill, Medical School Wing D, Chapel Hill, NC 27599. t.eisenlohr.moul@gmail.com. Phone: 859-317-0503. Jessica R. Peters, M.S., Warren Alpert Medical School of Brown University Department of Psychiatry, Providence, RI, 02903. Kaitlyn Chamberlain, B.A., University of Kentucky Department of Psychology, 115 Kastle Hall, Lexington, KY, 40506. Marcus Rodriguez, M.A., Duke University Medical Center Department of Psychiatry and Duke University Department of Psychology, 2213 Elba St., Durham, NC, 27705

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Borderline personality disorder (BPD) is characterized by extreme affective instability, difficulty maintaining interpersonal relationships, identity disturbances, intense anger and aggression, and self-destructive impulsivity (American Psychiatric Association, 2013). Epidemiological studies suggest that roughly 6% of the U.S. population will meet criteria for BPD at some point in their lives (DSM-5, 2013; Grant et al., 2008), and a greater number of individuals will show clinically significant BPD "features that" interfere with daily functioning even though they may not meet the five out of nine criteria required to receive an official DSM-5 diagnosis of BPD (Trull, Useda, Conforti, & Doan, 1997). Although BPD symptoms and features are characterized generally by intensity of negative affect and behavior, BPD is also characterized by marked fluctuations in symptoms (Sanislow et al., 2002).

Recent conceptualizations of BPD focus on how deficits in *mindfulness*—a present-centered, nonjudgmental form of attention to internal and external stimuli—underlie the emotional and behavioral problems characteristic of BPD (Wupperman, Neumann, & Axelrod, 2008). Current approaches to conceptualizing and measuring mindfulness emphasize two broad areas: (1) attentional components, such as present-centered attention and awareness of actions, and (2) attitudinal components, such as a nonjudgmental and accepting approach to cognitions, emotions, sensations, and environmental stimuli (Kabat-Zinn, 1990; Miller, Fletcher, & Kabat-Zinn, 1995). Individual differences in both the attentional and attitudinal components of mindfulness have been linked to lower levels of BPD features (Wupperman, Neumann, Whitman, & Axelrod, 2009; Wupperman, Fickling, Klemanski, Berking, & Whitman, 2013). Furthermore, Dialectical Behavior Therapy (DBT; Linehan, 1993), a prominent empirically supported treatment for BPD, emphasizes mindfulness skills training as an approach to managing symptoms, and the intentional use of mindfulness skills in the context of DBT reduces BPD symptoms over time (Perroud et al., 2012). Despite this evidence that mindfulness may play a role in BPD symptom expression, little is known about how *naturally occurring, within-person changes* in mindfulness relate to the expression of BPD features.

Mindfulness can be conceptualized in several ways that may be relevant to BPD. First, it is possible to conceptualize mindfulness as a disposition, in which some individuals demonstrate greater trait-level tendencies to engage in mindful behavior or to use skills that facilitate mindfulness. This is usually assessed through questionnaires asking participants to describe their typical experiences and behavior. For example, treatment-seeking individuals with BPD report lower levels of dispositional mindfulness than controls (Baer, Smith, & Allen, 2004). Low levels of dispositional mindfulness have also been shown to predict BPD features in nonclinical samples (Wupperman et al., 2009; Wupperman, Fickling, Klemanski, Berking, & Whitman, 2013; Peters, Eisenlohr-Moul, Upton, & Baer, 2013).

Second, other methods for studying mindfulness focus on the momentary state or process of purposefully bringing attention to the present in a nonjudgmental, nonreactive way (Bishop et al., 2004; Baer, 2003). Laboratory studies explore between-person differences in the effects of state mindfulness by asking participants to engage in mindfulness exercises. For example, following an anger induction, individuals diagnosed with BPD who were prompted to be mindful demonstrated greater ability to tolerate distress than those who were prompted

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to ruminate (Sauer & Baer, 2011). Therefore, it is possible to understand mindfulness as having both between-person (dispositional) variability and within-person (state) variability, and both may be relevant to BPD feature expression at any given moment.

Despite the bodies of research on dispositional mindfulness and intentional mindfulness skills use following training, little is known about how naturally occurring within-person variability in mindfulness uniquely impacts daily functioning. Many behavioral clinical interventions capitalize on within-person variation in mindfulness, encouraging individuals to increase nonjudgmental awareness of behaviors (e.g. Lewinsohn, Biglan, & Zeiss, 1976; Lejuez, Hopko, & Hopko, 2001; Linehan, 1993). Even if an individual has low overall trait mindfulness, small changes in the degree of state mindful behavior may result in long-term shifts in their functioning. One previous study used self-report measures of state mindfulness to examine the effects of naturally occurring within-person variation in mindfulness on autonomy and affect; however, this study used a measure of mindfulness limited to the present-centered awareness component of mindfulness (Brown and Ryan, 2003). Within-person increases in present-centered awareness predicted positive concurrent outcomes, including greater autonomy, more intense and frequent positive affect, and less intense and frequent negative affect.

Understanding which components of mindfulness fluctuate and predict positive outcomes in this within-person manner may provide inroads for intervention development. For BPD features, fluctuations in acting with awareness and a nonjudgmental orientation to experience may be of particular relevance to symptom expression (Peters et al., 2013). Transient difficulties in maintaining awareness of daily life activities (i.e., lower-than-usual acting with awareness) may be associated with poorer ability to regulate emotions and behaviors, increasing BPD feature expression. In contrast, maintenance of awareness in daily life may facilitate effective emotional and behavioral regulation. Similarly, transient increases in judging one's experience (i.e., lower-than-usual nonjudging) might result in increased efforts to suppress or quickly alter distressing experiences, also increasing BPD feature expression. In the face of problems or emotions resistant to change or deficits in adaptive coping skills, this may lead to increased rumination, conflict, or self-destructive behaviors (Linehan, 1993). In contrast, a nonjudging, accepting approach may facilitate more reflective and less emotion-driven responses. No research to date has examined the impact of within-person fluctuations in mindfulness facets on BPD feature expression.

The Present Study

The present study examined the influence of both trait mindfulness and weekly fluctuations in mindfulness on concurrent borderline feature expression in a sample of undergraduate women across 4 weeks. A multifaceted measure of mindfulness was utilized to enable the exploration of independent contributions from specific components of mindfulness to weekly borderline features. *Multiple measures of borderline features were utilized in order to test the consistency of our effects* Intraclass correlations and indices of both between- and within-person reliability were examined as preliminary information regarding the appropriateness of using the FFMQ as a measure of within-person change in mindfulness. Based on previous research highlighting acting with awareness and a nonjudgmental

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orientation to experience as components of mindfulness with particularly strong associations with BPD features, we hypothesize that higher-than-usual acting with awareness and higher-than-usual nonjudging at a given weekly assessment will each be associated with lower BPD features at that same week, over and above trait-level mindfulness and weekly deviations in other mindfulness facets.

Hypotheses

The study presented is based on the following hypotheses:

1. Consistent with previous work, higher trait levels of acting with awareness, nonjudging, and nonreactivity will predict lower BPD features at the between-person level.
2. At the within-person level, higher-than-usual levels of acting with awareness and higher-than-usual levels of nonjudging will each predict lower-than-usual BPD feature expression at the same time point.

Method

Participants

Participants were 40 undergraduate women (mean age = 18.66, SD = 1.38) fulfilling research participation requirements for an introductory undergraduate psychology course. Given that the majority of studies examining the association of mindfulness and borderline features have studied women, the present study recruited women only. The racial composition of the sample was as follows: 73.2% Caucasian/White, 9.8% African American, 9.8% Hispanic, 14.6% Asian American, and 2.4% “Other”. In order to increase the range of borderline features in the present sample, we recruited equal numbers of women across four broad ranges of BPD features based on their responses to the screening administration of the Personality Assessment Inventory - Borderline Subscale (PAI-BOR; see below for measure information); 10 participants had average-low PAI-BOR scores ($T<50$), 10 had average-high scores ($50<T<60$), 10 had above average scores ($60<T<70$), and 10 had high scores ($T>70$). These cut scores were selected based on norms published in the professional manual for the Personality Assessment Inventory (Morey, 2007). Women were excluded if they were taking hormonal birth control or reported current use of “as needed” psychiatric medication (e.g., benzodiazepines) due to concerns that these substances may impact within-person variability in mindfulness and BPD feature expression (see Eisenlohr-Moul et al., 2015). Individuals were compensated with course credit for their participation in the study.

Procedure

During a department-wide participant screening session, women completed the PAI-BOR (measure information below). Following these screening sessions, we generated lists of women in each of the four symptom ranges described above. Ten eligible women from each of the four symptom ranges were recruited via telephone for a total of 40 women. Reminder

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emails were sent two days in advance of each session, reminding the participant of the location, date, and time of their next session.

Participants came to the lab individually once a week for 4 weeks at the same day and time—Nearly all missed sessions were rescheduled and completed within 3 days of the missed appointments; in the few cases where this was not possible (n = 6 sessions from 6 different women), the participant returned to the lab for the next scheduled session (i.e., skipped a week) and added an additional week to their participation to compensate for the missed session. All women therefore completed 4 weekly sessions, with the majority of women (34 out of 40 women) completing their assessments across 4 consecutive weeks, and a minority of women (6 out of 40) completing their assessments across 5 weeks, with one skipped week.[1] Upon arrival, the participant was met by a research assistant and taken to a private room where they completed the consent form (first session only). Then participants completed self-report measures on a computer in randomized order. Weekly laboratory visits lasted 30–50 minutes. At a fifth, follow-up session participants were debriefed and compensated.

Measures

The following measures were administered in randomized order at each of the four weekly sessions. Reliability information (described in more detail later) is presented in Table 1 in a manner appropriate to the multilevel design of this study.

Five Facet Mindfulness Questionnaire- Short Form (FFMQ-SF; Bohlmeijer et al., 2011)—The FFMQ-SF is a recently developed shortened form (24 items) of the FFMQ (39 items; Baer et al., 2006). The FFMQ-SF measures five facets of mindfulness: *observing* (sample item: “I pay attention to physical experiences, such as the wind in my hair or sun on my face”), *describing* (sample item: “I can easily put my beliefs, opinions, and expectations into words”), *acting with awareness* (sample item: “I find it difficult to stay focused on what’s happening in the present moment” – reverse scored), *nonjudging* (sample item: “I tell myself I shouldn’t be thinking the way I’m thinking”-reverse scored), and *nonreactivity* (sample item: “When I have distressing thoughts or images, I don’t let myself get carried away by them”). Participants were asked to indicate the extent to which each item describes them *in the past week* using a 5-point Likert scale from 1 (Never or very rarely true) to 5 (Almost always or always true). The subscales of the FFMQ-SF retain the excellent predictive validity of the FFMQ (Bohlmeijer et al., 2011). In the present study, reliability analyses based on Cranford et al. (2006) demonstrated that the FFMQ-SF facets had adequate-to-excellent between-person reliabilities (R_{1F} between .75–.94) and reliably captured within-person changes (R_C between .70–.87).

Personality Assessment Inventory - Borderline Subscale (PAI-BOR; Morey, 1991)—The PAI-BOR is a 24-item measure of BPD features, including a total score (BOR-TOT) as well as 4 subscales measuring affective instability (BOR-AI; sample item: “my

[1]Covarying for the interval between assessments (i.e., 1 week vs. 2 weeks) at the within-person level did not change any outcome of the present study.

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mood could shift quite suddenly"), identity problems (BOR-ID; sample item: "my attitude about myself changed a lot"), negative relationships (BOR-NR; sample item: "my relationships have been stormy"), and self-harm (BOR-SH; sample item: "I was a reckless person"). Participants were asked to rate the extent to which each statement described them *in the past week* on a scale from 0 (False, not true at all) to 4 (Very true). Elevated scores differentiate BPD patients from those with other diagnoses, including anxiety, mood, and psychotic disorders, antisocial personality disorder, and substance abuse disorders (Morey, 1991). PAI-BOR scores also predicted academic and interpersonal functioning in student samples after controlling for Axis I pathology and neuroticism (Trull, 1995, 1997). These findings suggest that high scores on the PAI-BOR are likely to reflect BPD-specific pathology rather than general distress or other disorders. In the present study, reliability analyses based on Cranford et al. (2006) demonstrated that the PAI-BOR subscales had adequate-to-excellent between-person reliabilities (R_{1F} between .81–.90) and reliably captured within-person changes (R_C between .74–.87).

Borderline Symptom List - 23 (BSL-23; Bohus et al., 2008)—The BSL-23 is a 23-item shortened version of a 95-item measure of BPD features based on the SCID-II DSM-5 diagnosis of BPD. Example items include "I felt helpless", "my mood rapidly cycled in terms of anxiety, anger, and depression", "I was afraid of losing control", and "I didn't believe in my right to live." Participants were asked to rate the extent to which each statement described them *in the past week* on a scale from 0 (Not at all) to 4 (Very much). In the initial validation sample, scores on both the full and shortened versions of the BSL were significantly greater among individuals with a SCID-II diagnosis of BPD than among those with Axis I diagnosis (e.g., mood or anxiety disorders) and among healthy controls. In another validation sample of individuals with a diagnosis of BPD, scores the BSL reduced significantly in response to Dialectical Behavior Therapy, indicating sensitivity to change. In the present study, reliability analyses based on Cranford et al. (2006) demonstrated that the BSL-23 had good between-person reliability (R_{1F} = .87) and captured within-person changes with a reasonable degree of reliability (R_C = .67).

McLean Screening Instrument for BPD (MSI-BPD; Zanarini et al., 2003)—The MSI-BPD uses 10 dichotomous (yes or no) items to measure the nine DSM-IV BPD criteria. Example items include, "Have you been distrustful of other people?", "Have you been extremely moody?", and "Have you deliberately hurt yourself physically (e.g., punched yourself, cut yourself, burned yourself)? How about made a suicide attempt?" Patients were asked to answer yes or no for each item to indicate the presence or absence of each symptom *in the past week*. In several studies, scores on the MSI-BPD were positively associated with other measures of BPD features (Gardner & Qualter, 2009), and predicted actual SCID-II diagnosis of BPD (Zanarini et al., 2003). In the present study, reliability analyses based on Cranford et al. (2006) demonstrated that the MSI-BPD had good between-person reliability (R_{1F} = .89) and reliably captured within-person changes (R_C = .80).

Statistical Analyses

Data were analyzed using multilevel regression models in SAS PROC MIXED with laboratory visits (weekly assessments) at Level 1 and women at Level 2. Multilevel models

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utilize all available data with no listwise deletion. Each mindfulness facet was person-centered to isolate two separate components of the variable: (1) the between-person component of the variable that represents stable individual differences in each variable (calculated by averaging a woman's scores on a particular facet across all four assessments), and (2) the within-person component of the variable (calculated as follows: [This Week's Score] – [Person's Average Score Across All Weeks]) such that weekly scores on these variables reflect weekly deviations in the mindfulness facet from one's own person mean for that facet, with positive values reflecting *higher-than-usual* levels of mindfulness for that individual and negative values reflecting *lower-than-usual* levels of mindfulness for that individual (Singer and Willett, 2003). These within-person, weekly variables are also referred to in this paper as "deviations" (i.e., weekly deviations from one's person mean). To review, there are two predictor variables for each mindfulness facet: (1) the person's mean score on that particular mindfulness facet across all assessments (the same across all assessments within an individual), and (2) the person's deviation from their mean score at the current weekly assessment. All between-person predictors (i.e., person means) were standardized. Seven models were fit, predicting each measure of BPD from 1) average levels of each of the five subscales of the FFMQ, and 2) weekly deviation scores for each of the five subscales of the FFMQ.

Results

Data Screening

Prior to conducting analyses, all variables were screened for distributional normality and outliers (Tabachnick & Fidell, 2000); all distributions of BPD features were positively skewed (BOR-TOT: *Skew* = 1.05, *SE* = .19; BOR-AI: *Skew* = .95, *SE* = .19; BOR-ID: Skew = 1.22, *SE* = .19; BOR-NR: Skew = .79, *SE* = .19; BOR-SH: Skew = 1.00, *SE* = .19; MSI-BPD: Skew = .90, *SE* = .19; BSL-23: Skew = 1.35, *SE* = .20). In all cases, a square root transformation was applied to the data to correct the skew (BOR-TOT: Skew = .46, *SE* = .19; BOR-AI: Skew = −.07, *SE* = .18; BOR-ID: Skew = .21, *SE* = .19; BOR-NR: Skew = −.33, *SE* = .19; BOR-SH: Skew = −.20, *SE* = .19; MSI-BPD: Skew = .09, *SE* = .19; BSL-23: Skew = .24, *SE* = .19). Following analyses, coefficients were squared to improve interpretability on the response scale.

Descriptive Information and Reliability of Within-Person Mindfulness Variables

No participants withdrew from the study, and all missed laboratory sessions were rescheduled; therefore, the maximum number of 160 data points was collected for each measure. For level 1 variables, intercepts from null models (i.e., models with no predictors) were used to estimate the sample means of model variables. Given the dependencies present in our data, the null model intercept is a more valid estimate of sample mean (see Singer & Willett, 2003). Table 1 lists null model intercepts for each week-level variable in the study, as well as intraclass correlation coefficients (ICCs) for each measure. *The ICCs allow us to examine the proportion of variance in each measure that is attributable to stable individual differences between participants vs. within-person fluctuations across weeks*. Although the ICCs in Table 1 suggest that all weekly measures showed a significant amount of between-person clustering, the measures also differed widely in the degree to which they varied

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within participants across weeks. Among the mindfulness facets, Observing showed a particularly high degree of stability (ICC = .75), while variance in the other facets were more equally split between within- and between-person variance (ICCs = .51–.63). Variance in the MSI-BPD was relatively equally split (ICC = .63), whereas the variability in the BSL-23 was largely at the within-person level (ICC = .31). With the exception of the self-harm subscale (ICC = .30), which varied mostly at the within-person level, the subscales of the PAI-BOR as well as the total score showed a higher degree of stability (ICCs = .70–.74).

In addition, Table 1 lists two reliabilities for each measure estimated using PROC VARCOMP in SAS 9.3 and equations given by Cranford and colleagues (2006). The first measure (R_{1F}) estimates reliability between participants at a given wave, and the second measure (R_C) estimates reliability of measure change within a given participant. All reliabilities were adequate to excellent in the present study, indicating that all variables provided reliable measures of both stability and change in each construct in the present study. In general, the low ICCs and adequate levels of both within- and between-person reliabilities found here suggest that the FFMQ-SF can be used as a repeated measure to capture both between- and within-person variance in mindfulness.

Multilevel Regression Models Predicting BPD Features from Average Levels of and Weekly Fluctuations in Mindfulness

Results for each outcome are presented in Table 2. For three of the PAI-BOR scales (affective instability, identity disturbance, and negative relationships), the total PAI-BOR score, the BSL-23, and the MSI-BPD, a similar pattern emerged: average levels of acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience each predicted lower levels of BPD features, and higher-than-usual levels of nonjudging also uniquely predicted lower weekly symptom expression. The self-harm subscale of the PAI-BOR showed a less robust pattern of associations. Only weekly changes in nonjudging significantly predicted weekly self-harm scores, with higher-than-usual levels of nonjudging predicting lower self-harm scores on a given week.

Discussion

Borderline features have been conceptualized as and empirically associated with deficits in dispositional mindfulness—particularly the acting with awareness and nonjudging aspects of mindfulness — and leading interventions for BPD train patients in mindfulness skills to address these difficulties. However, little is known about how naturally occurring fluctuations in mindful behavior impact borderline feature expression. The present study examined the acceptability of using the FFMQ in a novel repeated-measures measurement design in order to measure both between- and within-person variance in mindfulness facets and to examine within-person links between mindfulness facets and borderline features.

In the literature to date, fluctuations around one’s mean levels of dispositional mindfulness are simply regarded as error variance in the measurement of a presumed stable individual difference variable; however, the present study demonstrates the feasibility of measuring these fluctuations as reliable substantive variables that are associated with psychological outcomes—in this case, BPD features. Examination of both ICCs and within-/between-

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person reliabilities supported the use of repeated administrations of the FFMQ and within-person centering to capture both dispositional mindfulness and naturally occurring fluctuations in mindfulness facets. In the present sample, attitudinal aspects of mindfulness indicating the quality of attention (nonjudging, nonreactivity) demonstrated a greater percentage of within-person variability (45% and 49%, respectively) than the attentional aspects of mindfulness (cf. acting with awareness, 26%). This suggests that one's capacity for paying attention may be more stable, whereas the capacity for nonjudgment of and nonreactivity to what was observed may change more from week to week. Replication of these properties in future studies may contribute to the development of theory regarding stability and change in mindfulness.

Corroborating previous findings (Peters et al., 2013), dispositional levels of acting with awareness, nonjudging, and nonreactivity were strongly associated with lower symptom expression on nearly every measure of BPD features. However, naturally occurring changes in the ability to take a nonjudgmental stance toward one's experience were also important; over and above the between-person effects of mindfulness, naturally-occurring fluctuations in nonjudging were associated with lower scores on every measure of borderline features such that *higher-than-usual levels of nonjudging were linked to lower BPD feature expression in the same week*. The effect sizes in the present study (see Table 2) were generally conventionally small-to-medium in size, and the effect sizes for within-person changes in nonjudgment were similar to the between-person effects of acting with awareness, nonjudging, and nonreactivity. These results suggest that fluctuations in the attitudinal qualities of mindful attention may be equally or more strongly linked to borderline features and related psychopathology as trait or dispositional levels of either attentional or attitudinal aspects of mindfulness. It is not likely that these associations are limited to BPD features; fluctuations in nonjudging may also be related to transdiagnostic processes such as rumination that are broadly relevant to various problems in psychological functioning.

Peters and colleagues (2013) demonstrated that attentional aspects of mindfulness (specifically acting with awareness) interact with attitudinal aspects of mindfulness (specifically nonjudging) to predict BPD features at a dispositional level such that greater attention was protective only if nonjudging was also high. Combining those findings with the present ones would suggest that the protective nature of dispositional acting with awareness may also fluctuate with changes in the capacity to be nonjudging over time. Although the present study is not adequately powered to test such interactions, this is an important question for future research.

Clinical Implications

Consistent with previous findings (Peters et al., 2013), the present study suggests that while several components of mindfulness may be protective against BPD symptoms, a nonjudgmental attitude may be particularly important. Accordingly, interventions using mindfulness skills to treat BPD may be most effective when emphasizing both the attentional and attitudinal aspects of mindfulness, such as in DBT (Linehan, 1993). Standard, full-model DBT includes daily tracking of skills use using a diary card; a focus on

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the consistent daily use of nonjudging skills on the diary card may prove especially beneficial in this context. Using this information, therapists can help patients with BPD features to be mindful of the relationship between their target behaviors and fluctuations in the quality of their attention, as well as within-person factors that interfere with non-judgment and non-reactivity.

Limitations and Future Directions

Several limitations of the present study suggest areas for improvement and growth in future studies. First, the present study does not allow for the determination of a causal association between within-person changes in mindfulness and borderline features—mindfulness changes may lead to borderline feature change, borderline feature change may lead to mindfulness change, or both may be true. Unfortunately, the low frequency of samples in the present study precludes a test of lagged effects at the appropriate time scale. In the future, ambulatory assessment with multiple assessments per day paired with the use of lagged within-person models would allow exploration of causal directions for these relationships (e.g., relative increases or decreases in nonjudging at the previous assessment predicting current levels of borderline features, and vice versa).

Second, although the sample size at the weekly assessment level (160 weekly visits) results in sufficient (> 80%) statistical power for the analyses presented here, the sample size at the person level (40 women) is small. Furthermore, although the distribution of BPD features in the present sample was flat (i.e., provided adequate coverage of the high and low ends of the distribution), the women included in this study were not drawn from a clinical population, limiting generalizability to clinical populations. Further limitations on generalizability include the fact that women in this study were not taking hormonal birth control or as-needed psychotropic mediations (e.g., benzodiazipenes). On the other hand, this sample may actually overestimate associations in nonclinical samples due to oversampling at high and low levels of BPD features. In addition, although BPD is more commonly diagnosed in women, BPD is certainly diagnosed in men as well. Therefore, these effects should be interpreted with caution until replicated in a larger, more diverse sample.

Future work may focus on testing the within-person effect of variability in nonjudging on psychological functioning in clinical groups of individuals with BPD during treatment with a mindfulness-based intervention. Mindfulness training may contribute to both greater absolute levels of mindfulness as well as increased stability in mindfulness. Intentional use of mindfulness skills as a result of mindfulness- based interventions may be mediate treatment effects on self-reported BPD features by both increasing average levels of mindfulness and increasing stability of mindfulness over time.

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Table 1

Null Model Intercepts, Intraclass Correlation Coefficients, and Indices of Between- and Within-Person Reliability for Weekly Measures

Variable	Null Model Intercept	ICC (Person-Level)	Reliability of Change Within Person (R_C)	Reliability Between People (R_{1F})
FFMQ Observing	3.08	.75	.75	.94
FFMQ Describing	3.67	.63	.71	.88
FFMQ Acting with Awareness	3.55	.71	.72	.75
FFMQ Nonjudging	3.62	.55	.70	.78
FFMQ Nonreactivity to Inner Experience	3.07	.51	.87	.83
PAI-BOR Total Score	.71	.72	.74	.90
PAI-BOR - Affective Instability	.77	.70	.87	.79
PAI-BOR - Identity Disturbance	.90	.74	.75	.75
PAI-BOR - Negative Relations	.81	.70	.74	.83
PAI-BOR - Self-Harm	.40	.30	.80	.81
MSI-BPD	2.13	.62	.89	.80
BSL-23	2.05	.31	.87	.67

Note. Scores are presented as mean item responses. ICC = Intraclass Correlation Coefficient. FFMQ = Five-Facet Mindfulness Questionnaire. PAI – BOR = Personality Assessment Inventory – Borderline subscale. MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder. BSL-23 = Borderline Symptom Checklist- 23-item Version.

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Table 2

Multilevel Regression Models Predicting BPD Features from Person Averages (Across 4 Weekly Assessments) and Weekly Deviations (from Person Averages) in Mindfulness Facets

Parameter	Outcome						
	PAI-BOR Total Score	PAI-BOR Affective Instability	PAI-BOR Identity Instability	PAI-BOR Negative Relationships	PAI-BOR Self-Harm	MSI-BPD	BSL-23
	Fixed Effects						
Intercept	.70*** (.05)	.73*** (.07)	.88*** (.06)	.83*** (.06)	.40*** (.03)	2.09* (.21)	.83*** (.04)
Level 2 (Between-Person Effects)							
Observing$_{MEAN}$	−.01 (.05)	−.06 (.08)	−.02 (.07)	.01 (.08)	.004 (.03)	−.13 (.24)	.10 (.12)
Describing$_{MEAN}$	.01 (.07)	.02 (.10)	.08 (.08)	.03 (.08)	−.07 (.05)	.10 (.24)	−.07 (.04)
Acting with Awareness$_{MEAN}$	***−.15** (.06)*** **[−.10]**	***−.21** (.07)*** **[−.18]**	***−.19* (.09)*** **[−.17]**	***−.14** (.06)*** **[−.12]**	−.06 (.05)	***−.50* (.23)*** **[−.15]**	***−.13** (.03)*** **[−.19]**
Nonjudging$_{MEAN}$	***−.15** (.06)*** **[−.22]**	***−.17* (.07)*** **[−.19]**	***−.28** (.09)*** **[−.29]**	***−.18** (.08)*** **[−.21]**	.01 (.05)	***−.90*** (.24)*** **[−.30]**	***−.13** (.03)*** **[−.10]**
Nonreactivity$_{MEAN}$	***−.14** (.05)*** **[−.18]**	***−.16* (.06)*** **[−.15]**	***−.22** (.07)*** **[−.21]**	***−.17** (.06)*** **[−.18]**	−.02 (.03)	***−.72*** (.19)*** **[−.21]**	***−.17** (.05)*** **[−.10]**
Level 1 (Within-Person Effects)							
Observing$_{DEV}$	.06 (.04)	.05 (.03)	.08 (.06)	−.004 (.0)	.12 (.10)	.15 (.16)	.01 (.02)
Describing$_{DEV}$	−.06 (.05)	−.09 (.07)	−.03 (.08)	−.03 (.07)	−.07 (.06)	−.42 (.31)	−.04 (.05)
Acting with Awareness$_{DEV}$	−.06 (.04)	−.09 (.06)	−.09 (.05)	−.009 (.06)	−.02 (.04)	−.18 (.21)	−.02 (.03)
Nonjudging$_{DEV}$	***−.19*** (.04)*** **[−.20]**	***−.19** (.07)*** **[−.15]**	***−.18*** (.04)*** **[−.14]**	***−.23*** (.05)*** **[−.20]**	***−.12** (.05)*** **[−.18]**	***−.72** (.26)*** **[−.17]**	***−.07** (.02)*** **[−.04]**
Nonreactivity$_{DEV}$	−.04 (.03)	−.07 (.05)	−.04 (.04)	−.07 (.05)	.04 (.05)	−.19 (.16)	−.01 (.03)
	Random Parameters						
Intercept	.09*** (.02)	.18*** (.04)	.16*** (.04)	.17*** (.04)	.03** (.01)	1.53* (.41)	.06*** (.01)
Residual	.04*** (.005)	.09*** (.01)	.09*** (.01)	.09*** (.01)	.07*** (.009)	1.19* (.15)	.03*** (.004)
-2 Log Likelihood	44.4†	161.9†	167.5†	163.2†	76.5†	558.8†	894.7†

Note. MEAN subscript = Person mean for the predictor across 4 weekly assessments. DEV subscript = Weekly deviation from person average. Standard errors are in parentheses.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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A square root transformation was applied to all outcome variables; however, coefficients reported here have been squared to improve interpretability. Standardized effects [coefficient * (SD of predictor/SD of outcome)] appear in brackets next to significant coefficients to aid in comparison across outcomes. Significant fixed effects are bolded and italicized.

†Change in -2 Log likelihood over a null model (a model with no predictors) is significant at $p < .001$. PAI – BOR = Personality Assessment Inventory–Borderline subscale. MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder. BSL-23 = Borderline Symptom Checklist- 23-item Version.