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The Relationship between Emptiness and Suicide and Self-Injury Urges in Borderline Personality Disorder

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Abstract

Introduction: Suicide and self-injury (SSI) are pervasive among individuals with borderline personality disorder (BPD), yet little research has examined factors that increase SSI urges among those with BPD. Emptiness is a diagnostic criterion of BPD that is associated with SSI behaviours, but its impact on SSI urges in BPD is poorly understood. This study investigates the association between emptiness and SSI urges at baseline and in response to a stressor (i.e., reactivity) among individuals with BPD.

Methods: Forty individuals with BPD participated in an experimental procedure where they rated their degree of emptiness and SSI urges at baseline and in response to an interpersonal stressor. Generalized estimating equations tested whether emptiness predicts baseline SSI urges and SSI urge reactivity.

Results: Higher emptiness predicted higher baseline suicide urges (B = .006, *SE* = .002, $p < 0.001$), but not baseline self-injury urges ($p = 0.081$). Emptiness did not significantly predict suicide urge reactivity ($p = 0.731$) nor self-injury urge reactivity ($p = 0.446$).

Conclusion: Assessing and targeting emptiness may facilitate the reduction of suicide urges in BPD. Future research should investigate treatment strategies for reducing SSI risk among individuals with BPD via targeting emptiness.

Keywords: Borderline personality disorder; emptiness; suicide; self-injury

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The Relationship between Emptiness and Suicide and Self-Injury Urges in Borderline Personality Disorder

Borderline personality disorder (BPD) is a complex and severe mental disorder that affects approximately 1.4%-5.9% of the general American population (Grant et al., 2008; Lenzenweger et al., 2007), 10.6%-11.8% of people in outpatient settings (Ellison et al., 2018; Zimmerman et al., 2017), and 20%-22.4% of people in inpatient settings (Chapman et al., 2022; Ellison et al., 2018). BPD involves an inflexible and pervasive pattern of impulsivity, self-destructive behaviour, and instability in emotion, interpersonal relationships, and identity (American Psychiatric Association; APA, 2022). Of particular concern is the elevated risk that BPD poses for suicide and self-injury (SSI; suicide, suicidal self-injury, and non-suicidal self-injury (NSSI), and BPD is uniquely distinguished from other mental disorders by its emphasis on SSI acts as a diagnostic criterion (APA, 2022). Indeed, up to approximately 63%-80.7% of individuals with BPD have been reported to engage in NSSI (Soloff et al., 1994a; Zanarini et al., 2003). Moreover, among those with BPD, 22.7%-79.3% have a history of previous suicide attempts (Goodman et al., 2017; Grilo & Udo, 2021) with an estimated average of 2.5-3.39 lifetime suicide attempts (Soloff et al., 1994b; Soloff et al., 2000), and 8%-10% die by suicide (Black et al., 2004; Gunderson, 2011). The association between BPD and suicide is further underscored by studies showing that suicidal behaviors within BPD may occur independently from comorbidities with other specific mental health disorders, suggesting that BPD itself poses a significant risk for suicidal behavior (Yen et al., 2021).

Given its harmful and potentially lethal nature, SSI represents a critical target for BPD interventions. Research shows that SSI behaviors are typically preceded by urges to engage in them among individuals with BPD (Ammerman et al., 2017). One possible strategy to prevent

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SSI behaviours among those with BPD would consist of identifying factors that increase SSI *urges* and target them in treatment. In theory, reducing these factors should indirectly lower the probability that individuals with BPD will engage in SSI behaviours.

Emptiness in BPD

One symptom that is particularly linked to SSI in BPD is chronic feelings of emptiness (Miller et al., 2020). While chronic emptiness is a diagnostic symptom of BPD (APA, 2022), research suggests that emptiness represents a transdiagnostic construct involving a feeling of absence and detachment that is experienced on an intrapersonal, interpersonal, and existential level (Price et al., 2022). Among those with BPD, emptiness is one of the slowest symptoms to remit compared to other BPD symptoms and is often experienced as severe and chronic (Zanarini et al., 2016). Despite the small body of research on this experience, findings on the negative impact of emptiness among people with BPD suggest that the phenomenon is clinically relevant. Indeed, chronic feelings of emptiness within the context of BPD has been linked to depression and loneliness (Miller et al., 2021; Gunderson et al., 2004) as well as vocational and social dysfunction (Ellison et al., 2016; Miller et al., 2020).

Emptiness and SSI. Accumulating evidence suggests that chronic feelings of emptiness are associated with SSI among individuals with BPD, individuals endorsing BPD-criteria, and in student samples (e.g., Brickman et al., 2014; Ellison et al., 2016; Klonsky, 2008; Kleindienst et al., 2008; Yen et al., 2021). For example, recent research links chronic emptiness with an elevated risk of suicide attempts among individuals with BPD (Ellison et al., 2016; Grilo & Udo, 2021; Yen et al., 2021). Notably, Yen et al. (2021) reported that chronic emptiness, abandonment avoidance, and identity disturbance were all independently associated with an increased risk of suicide attempts over a 10-year follow-up among individuals with personality disorders. Other

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research with BPD samples indicates that emptiness, when compared against impulsivity, affective instability, and anger, was the only BPD symptom predictive of *all* eight indices of psychosocial morbidity that were examined, including suicidality and history of suicide attempts (Ellison et al., 2016). Likewise, recent research by Grilo & Udo (2021) on BPD symptoms and suicidality shows that only chronic feelings of emptiness (with the exception of self-injury) was significantly associated with both an increased probability of lifetime and past-year suicide attempts in those with BPD, which remained significant after controlling for other BPD symptoms. Although multiple BPD symptoms have been implicated as risk factors for suicidal behaviours across these studies, chronic feelings of emptiness emerge as a *consistent* risk factor, suggesting that it may be a particularly important BPD symptom to focus on.

Although there is less research on how BPD symptoms independently confer risk for NSSI, a study by Brickman et al. (2014) shows positive associations with NSSI and chronic feelings of emptiness, impulsivity, and identity disturbance in a college sample. Another study indicates that feelings of emptiness precede NSSI among women with BPD and that NSSI represents an attempt to reduce negative feelings, including emptiness (Kleindienst et al., 2008). In a sample of college students who engaged in NSSI, 67% reported that emptiness sometimes preceded NSSI (Klonsky, 2008). Additionally, recent hypotheses propose that SSI (Miller et al., 2020) and NSSI (Kleindienst et al., 2008) may be motivated by a desire to reduce the discomfort of emptiness. As such, it is possible that, among all the BPD symptoms, feelings of emptiness may be particularly associated with increases in SSI *urges* in those with BPD given its consistent link to suicidal behaviours and its speculative unique influence on NSSI, but this has not yet been investigated.

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In sum, literature and theory suggest that chronic feelings of emptiness may be especially predictive of SSI behaviors, and hence SSI urges, in BPD. However, while SSI behaviours are often conceptualized as means of downregulating or escaping distress in BPD (e.g., Brown et al., 2002; Chapman et al., 2006) and individuals with BPD may engage in SSI to reduce the distress associated with emptiness (Kleindienst et al., 2008; Miller et al., 2020), it remains unknown whether emptiness is related to SSI urges in general, and moreover, which forms of SSI urges it relates to. Specifically, it is unclear whether emptiness is associated with *baseline* SSI urges (i.e., an individual's resting level of SSI urges) or SSI urge *reactivity* (i.e., rises in SSI urges in response to a stressor). Indeed, as emptiness is often experienced as chronic and persistent rather than labile among individuals with BPD (Zanarini et al., 2016), emptiness in BPD may be best captured by assessing one's typical, baseline levels of it. Such baseline emptiness may be predictive of both baseline SSI urges and increased vulnerability to rises in SSI urges in response to stress. Examining the relationship between emptiness and SSI urges both at baseline and in response to stress would therefore provide crucial information regarding if and when targeting emptiness may be most useful to reducing SSI urges (i.e., for those with high SSI urges at rest versus increases in SSI urges in response to stressors). Finally, given that interpersonal stress predicts SSI in BPD (Allen et al., 2022; Hepp et al., 2021), and that emptiness characterizes the social encounters of people with BPD (Stepp et al., 2009), an interpersonal stressor (e.g., social rejection) may particularly elicit SSI urges that may be influenced by emptiness, but this has not been tested. Thus, a more nuanced understanding of the relationship between emptiness and SSI requires an investigation into the relationship between emptiness and SSI urges at baseline and SSI urges in response to interpersonal stress.

The Present Study

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The present study aimed to examine two key research questions. First, it aimed to examine whether emptiness is associated with increased baseline SSI urges in BPD. In addition, this study aimed to examine whether emptiness is associated with increased SSI urge reactivity in BPD in response to an interpersonal stressor. Ultimately, this study sought to add nuance and clarity to the relationship between emptiness and SSI. We hypothesized that higher emptiness would predict higher baseline SSI urges and higher SSI urge reactivity in those with BPD.

Method

Participants

The present study is a secondary analysis of a parent study investigating whether BPD, GAD, and HC groups differ on various emotion dysregulation components across self-report and physiological indices (i.e., Fitzpatrick et al., 2020). Given the lack of variability in suicidal and self-injury urges across GAD and HC groups, only the BPD group was examined for the purpose of this study. Participants were 40 individuals with BPD who were recruited online and through the distribution of fliers. Exclusion criteria included having health conditions or taking several medications that would likely affect psychophysiology and task completion, along with several comorbid medical (e.g., heart conditions) and psychiatric conditions (i.e., alcohol or substance use dependence, bipolar I disorder, and severe psychotic disorder). The majority of the sample was female (82.5%) and identified as White/European origin (40.0%), with a mean age of 25.35 (*SD* = 6.77). In addition, the majority of participants identified themselves as heterosexual (65%), and currently had a partner (i.e., married, common law/life partner, dating; 57.5%).

Measures

BPD Diagnoses. The International Personality Disorders Examination-BPD (IPDE-BPD; Loranger et al., 1994) Module was administered to assess for the presence of BPD. The IPDE-

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BPD is a 15-item semi-structured interview that assesses BPD symptoms per the Diagnostic and Statistical Manual of Mental Disorders-5 Text Revision (DSM-5 TR; APA, 2022). The IPDE-BPD has good to excellent levels of interrater reliability for both categorical and dimensional diagnoses of BPD and IPDE-BPD dimensional diagnoses of BPD are moderately correlated with self-report inventories of BPD, demonstrating its convergent validity (Carcone et al., 2015). In the parent study, the average prevalence-adjusted kappa (PABAK; Byrt et al., 1993) value across assessors with the gold standard assessor was .95 (Fitzpatrick et al., 2020).

Emptiness and SSI Urges. A Visual Analogue Scale (VAS) was implemented to assess emptiness and SSI urges. A VAS is a self-report scale whereby participants rate the extent to which they agree to various statements by indicating a point along a continuous line between two points (McCormack et al., 1988). For emptiness, participants rated the extent to which they agreed with the statement "I feel empty" in the current moment from 0 (not at all empty) to 100 (very empty). For SSI urges, participants rated the extent to which they agreed with the statements "I have urges to attempt suicide" and "I have urges to attempt self-harm" in the current moment from 0 (no urges) to 100 (very strong urges). Research suggests that the emotion VAS has high test-retest reliability (r = .98) (Fähndrich & Linden, 1982) and convergent validity with relevant measures such as the Profile of Mood States (POMS; Stern et al., 1997).

Emotion Induction

Previous research suggests that individuals with BPD experience particularly elevated emotion reactivity in response to rejection-themed stimuli (Limberg et al., 2011). Three two-minute scripts describing rejection scenarios from a 1) mother, 2) friend, and 3) romantic partner were developed in Fitzpatrick et al. (2020) to induce emotion. The scripts were standardized on number of thoughts, physiological sensations, and number of emotion words, consistent with

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other procedures for developing emotion inductions (Pitman et al., 1987). The intensity of the emotion words was also standardized by selecting the most intensely rated emotion words from the categorization system developed by Strauss and Allen (2008), and six emotion words were randomly assigned to each script (e.g., "nervousness", "mad", "terror"). Participants were asked to imagine the story described in the script occurring to them as vividly as possible. In a pilot sample of undergraduate students ($N = 55$), these scripts yielded equivalent amounts of pre- to post-self-reported general negative emotion (Fitzpatrick et al., 2020).

Procedures

In Fitzpatrick et al. (2020), participants were invited to complete in-person eligibility assessments using the IPDE-BPD. Once deemed eligible, participants returned on a separate day for the experiment comprising of multiple phases. Only phases relevant to the present study will be discussed here: in the *baseline phase*, participants sat quietly for five minutes. This was followed by the *induction phase*, wherein participants were played the recorded emotion induction script and instructed to imagine themselves in the scenario as vividly as possible for its duration (i.e., two minutes). Emptiness and SSI urges were measured using the VAS after each baseline and emotion induction phase. Participants repeated each trial three times (i.e., three baseline phases followed by three induction phases), with different rejection-themed scripts used in each trial. The order of scripts was counterbalanced across participants.

Data Analytic Strategy

A series of Generalized Estimating Equation analyses (GEE; Liang & Zegler, 1986) were conducted using SPSS Version 27. GEE is a semi-parametric approach often used to analyze correlated response data such as longitudinal data (Liang & Zegler, 1986). Specifically, GEE controls for within-subject covariance in non-Gaussian correlated response data and optimizes

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power by analyzing outcome variables collected within participants over time while controlling for missing data (Liang & Zegler, 1986). In each analysis, autoregressive, exchangeable, and unstructured covariance structures were tested and the model with the lowest Quasilikelihood under the Independence Model Criterion (QIC) was selected.

To address the first hypothesis, two GEE analyses were conducted to examine whether emptiness at baseline predicted higher SSI urges at baseline. Given that research on the construct of emptiness and how it can be most accurately measured is still in its early stages (Miller et al., 2020; Price et al., 2022), it is currently unknown whether the construct of emptiness has a meaningful zero point, like many psychological constructs (Blanton & Jaccard, 2006). Thus, to increase the interpretability of the results, the emptiness variable was centered by subtracting the grand mean from all observations (Enders & Tofighi, 2007). In these analyses, Emptiness (centered) was entered as the predictor variable and suicide urges as the outcome variable for the first analysis and self-injury urges as the outcome variable for the second analysis.

To address the second hypothesis, two GEE analyses were conducted to examine whether baseline emptiness predicted rises in SSI urges from the baseline to the induction phase (i.e., suicide and self-injury urge reactivity). In these analyses, Emptiness (centered) and Phase (i.e., baseline, induction) were entered as predictor variables and suicide urges as the outcome variable for the first analysis and self-injury urges as the outcome variable for the second analysis. A Phase × Emptiness (centered) interaction was also entered as a predictor variable in each analysis to examine whether changes in SSI urges differ across phases and levels of emptiness.

Results

Descriptive Statistics

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See Table 1 for a summary of the means and standard deviations for emptiness (centered), suicide urges, and self-injury urges across the baseline and induction phases (and across different induction scripts). In addition, see Table 2 for the sample size, means, and standard deviations of emptiness, suicide urges, and self-injury urges across demographic variables. GEE analyses indicated that suicide urges and self-injury urges both significantly increased from the baseline to after the induction phase of the study, χ^2 (1) = 15.096, $p < .001$ (B = .280, *SE* = .072) and χ^2 (1) = 27.017, $p < .001$ (B = .438, *SE* = .084), respectively.

Baseline Emptiness Predicting Baseline SSI Urges

Table 3 presents the GEE analyses examining whether baseline emptiness predicts baseline SSI urges. There was a main effect of baseline emptiness in predicting baseline suicide urges, χ^2 (1) = 13.274, $p < .001$. Inspection of parameter estimates revealed that higher baseline emptiness was associated with higher baseline suicide urges (B = .006, *SE* = .002). However, baseline emptiness did not significantly predict baseline self-injury urges, χ^2 (1) = 3.051, p = .081.

Baseline Emptiness Predicting SSI Urge Reactivity

Table 4 displays the GEE analyses examining whether baseline emptiness predicts SSI urge reactivity. There was a significant main effect of emptiness predicting suicide urges across the baseline and induction phases, χ^2 (1) = 16.873, $p < .001$. Examination of parameter estimates revealed that higher baseline emptiness was associated with higher suicide urges across the baseline and induction phases (B = .008, *SE* = .002). There was also a significant main effect of phase in predicting suicide urges across the baseline and induction phases, χ^2 (1) = 10.925, $p <$ .001, such that suicide urges were higher at the induction phase compared to the baseline phase (B = .266, *SE* = .081). There was no significant interaction between baseline emptiness and

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phase in predicting suicide urges from baseline to induction, χ^2 (1) = .118, p = .731, suggesting that baseline emptiness does not significantly predict suicide urge reactivity.

There was a significant main effect of emptiness predicting self-injury urges across the baseline and induction phases, χ^2 (1) = 17.427, p < .001. Examination of parameter estimates revealed that higher baseline emptiness was associated with higher self-injury urges across the baseline and induction phases (B = .407, *SE* = .098). There was also a significant main effect of phase in predicting self-injury urges across the baseline and induction phases, χ^2 (1) = 5.522, p = .019, such that self-injury urges were higher at the induction phase compared to the baseline phase (B = .006, *SE* = .003). There was no significant interaction between baseline emptiness and phase in predicting self-injury urges from baseline to induction, χ^2 (1) = .580, p = .446, indicating that baseline emptiness does not significantly predict self-injury urge reactivity.

Discussion

The purpose of the present study was to examine whether emptiness predicts SSI urges at baseline and in response to an interpersonal stressor among individuals with BPD. Emptiness predicted baseline suicide urges, but not self-injury urges, nor SSI urge reactivity.

The association between emptiness and baseline suicide urges is consistent with previous research linking chronic emptiness to suicide attempts in BPD (Grilo & Udo, 2021; Yen et al., 2021). Emptiness is a multifaceted construct that includes factors known to escalate suicidal thoughts and behaviors such as meaninglessness and disconnection (Price et al., 2022), which may account for its association with elevated suicide urges at baseline. Alternatively, emptiness may lead individuals with BPD to engage in suicidal behaviours to relieve the tension of feeling empty (Miller et al., 2020). Hence, the association between emptiness and baseline suicide urges may reflect an attempt to escape or downregulate the former through the latter.

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Conversely, it is possible that higher baseline suicide urges cause higher emptiness. For example, emptiness has been conceptualized as serving an emotion regulatory function in BPD, such that emptiness becomes activated when emotions rise in intensity to downregulate it (Linehan, 1993). Thus, when emotional distress associated with suicidal urges increases, emptiness may *subsequently* become activated in order to downregulate it. Furthermore, the association between emptiness and baseline suicide urges may be simultaneously caused by a third variable that is related to both (e.g., depression). However, given that emptiness and suicide urges were assessed concurrently, the causal relationship between these variables cannot be determined.

The finding that emptiness did not predict baseline self-injury urges conflicts with evidence suggesting an association between emptiness and NSSI (e.g., Kleindienst et al., 2008; Klonsky et al., 2008). For example, emptiness was reported to precede NSSI among adults who have a history of these behaviours (Klonsky, 2008). One reason for our discrepant findings may be that the present study did not measure *chronic* emptiness, which may be related to self-injury urges. Perhaps chronically experiencing emptiness depletes self-regulatory resources required to mitigate self-injury urges over time. Therefore, the chronicity of emptiness (i.e., *how long* emptiness lasts), rather than emptiness intensity (i.e., *how intense* emptiness is at a specific moment), may predict self-injury urges in BPD.

Given the overlap between emptiness and constructs such as social disconnection, emptiness may be conceptually closer to suicidal behaviors than self-injury per se. According to Joiner's Interpersonal Theory of Suicide (Joiner et al., 2009), perceived burdensomeness (i.e., the belief that one's existence is a burden to others) and thwarted belongingness (i.e., the unmet need for social connection and support) are considered key mechanisms of suicide, which may be

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especially relevant to emptiness given that it is often described as a sense of disconnection from self and others (Miller et al., 2020; Price et al. 2022). In contrast, NSSI is purported to function largely as an emotion regulatory strategy to downregulate intense negative emotions in BPD and in general (Reichl & Kaess, 2021). While emptiness is considered a distressing emotion (Miller et al., 2020), it may not be the type of emotion that triggers NSSI urges to regulate emotions in BPD (e.g., sadness).

While an interpersonal stressor (i.e., social rejection) was associated with rises in SSI urges in BPD, emptiness did not predict SSI urge reactivity. One possibility for this finding is that emptiness at rest reflects chronic emptiness in BPD, which does not substantially impact labile states such as SSI urge reactivity. Instead, chronic emptiness may impact other pervasive emotions such as chronic suicide urges. Moreover, SSI urge reactivity may be influenced by more labile emotions such as interpersonally mediated ones (e.g., guilt, shame) that acutely impact SSI urges in contrast to chronic emotions.

This is the first study to examine the relationship between emptiness and SSI urges. Given its purported relation to SSI behaviours, it is important to examine whether emptiness is predictive of SSI urges both at rest and in response to stress. This study also adds more clarity on the complex relationship between emptiness and SSI urges at baseline and SSI reactivity using an experimental design. Future studies should consider the different impact of emptiness on baseline SSI urges versus SSI urge reactivity when examining these constructs in BPD.

Despite the strengths of this research, this study is not without limitations. Given the small sample size, it is possible that this study had inadequate power to detect the relationship between emptiness and baseline self-injury urges or SSI urge reactivity. Relatedly, given that different clinical populations who struggle with SSI (e.g., major depressive disorder) were not

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included, it is unknown whether the results of the present study are unique to BPD or generalizable across other groups that engage in SSI. Therefore, future research should attempt to recruit larger populations across different clinical groups. In addition, emptiness and baseline SSI urges were measured concurrently, and hence, their causal relationship cannot be established. Future research should attempt to replicate the findings of the present study using experience sampling and longitudinal research methods to determine the causal relationship between emptiness and baseline suicide urges. Additionally, while previous research suggests that emptiness is independently related to SSI outcomes (e.g., Yen et al., 2021), future research should also measure and covary for other symptoms of BPD to identify the impact of emptiness on SSI urges over and above other symptoms of BPD. Moreover, the use of single-item measures to assess emptiness, suicide urges, and self-injury urges also limits study findings. Research suggests that emptiness is multifaceted (Price et al., 2022), and therefore, multi-item measures may be a more valid and reliable assessment of emptiness in BPD. Similarly, a more comprehensive assessment of suicide urges (e.g., suicide ideation, intent) and self-injury urges (e.g., NSSI vs suicidal self-injury) should be used in future research to assess these constructs with greater accuracy, especially given the high variability in SSI urges found in this study. Indeed, given that our measure of self-injury did not assess NSSI specifically, it is possible that suicide urges were conflated with self-injury urges as measured in the present study.

Despite these limitations, our study nevertheless offers key clinical implications. Given that suicide urges are an early sign of suicide risk, emptiness may be an important factor to assess and target to prevent suicide among individuals with BPD. Though not assessed in routine suicide risk measures, clinicians should assess emptiness when examining the antecedents, consequences, and function of suicidal behaviours in clients with BPD. Future research should

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also investigate effective treatment strategies for reducing emptiness, and consequently, baseline suicide urges in individuals with BPD.

In summary, our findings reveal that emptiness predicts baseline suicide urges among individuals with BPD but not baseline self-injury urges nor SSI urge reactivity. This study underscores the importance of assessing and targeting emptiness in treatment to mitigate suicidal urges and, potentially, behaviors among individuals with BPD. Future studies should investigate the effects of emptiness on baseline SSI urges and SSI urge reactivity using more comprehensive assessments of emptiness and SSI urges, different clinical populations, and experience sampling and longitudinal research designs to examine the temporal relationship between these variables. Given the reported robust relationship between emptiness and SSI behaviors in BPD, future research examining strategies for reducing SSI risk via targeting emptiness is needed.

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Table 1

Means (standard deviations) of variables across phases

	Baseline M (*SD*)	Induction M (*SD*)		
		Romantic partner	Mother	Friends
Emptiness	39.19 (32.68)	63.95 (32.40)	51.67 (35.60)	59.05 (34.10)
Suicide Urges	6.38 (13.72)	22.97 (29.72)	13.69 (22.34)	13.13 (24.77)
Self-injury Urges	8.21 (17.61)	26.79 (31.28)	20.13 (28.83)	19.90 (27.89)

Note. Means and standard deviations for baseline variables (emptiness, suicide urges, and self-injury urges) were calculated across the baseline phases. Means and standard deviations for induction variables were calculated across each of the three induction scripts (focusing on rejection from a romantic partner, mother, and friends). Multivariate analyses of variance indicated no significant differences between any of these variables across the three induction scripts.

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Table 2

Sample size, correlations, and means (standard deviations) of emptiness, suicide urges, and self-injury urges across demographic variables

	n	Emptiness	Suicide Urges	Self-injury Urges
Age	40	*r* = -.067	*r* = .095	*r* = .066
Gender				
Woman	31	43.00 (32.84)[a,b]	7.68 (18.16)[c]	12.92 (24.15)[d]
Man	7	66.85 (30.91)[a]	23.51 (27.04)[c]	23.02 (26.05)[d]
Gender queer/questioning	2	66.61 (25.89)[b]	12.33 (14.32)	11.72 (13.87)
Sexual Orientation				
Heterosexual	26	48.17 (33.30)[e]	12.31 (21.85)	16.63 (25.20)
Bisexual	10	37.66 (32.32)[e]	7.50 (17.77)	12.41 (23.53)
Gay/lesbian/fluid	4	75.08 (22.60)[e]	7.58 (18.02)	7.06 (18.60)
Race				
Caucasian	16	35.26 (30.94)	6.15 (16.60)[f]	12.4124.56)
Asian	15	50.59 (33.35)	10.40 (20.03)[f]	14.8624.44)
Black	2	63.21 (12.17)	13.00 (17.13)	11.7113.69)
Other	7	56.97 (33.45)	17.50 (22.83)	18.29 (25.42)
Relationship status				
Married/common law partner/life partner/dating	23	46.67 (31.45)[g]	11.10 (20.52)	17.69 (26.52)[h]
Single/divorced/ separated	17	50.50 (36.49)[g]	9.85 (20.71)	10.03 (19.96)[h]

Note. Pearson correlation coefficients between age, emptiness, suicide urges, and self-injury urges were calculated and none of these correlations were statistically significant. Across all other demographic variables, means and standard deviations for each outcome variable (emptiness, suicide urges, and self-injury urges) were calculated.

Differences in emptiness, suicide urges, and self-injury urges across demographic variables were tested using independent samples t-tests for demographic variables with two categories and one-way analysis of variance tests (ANOVAs) for demographic variables with more than two

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categories. For one-way ANOVAs, post-hoc Tukey honestly significant difference (HSD) tests were conducted. Superscripts were inserted to indicate which groups significantly differed from each other such that groups with the same superscript had significant differences from each other.

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Table 3

Generalized estimating equations analyses examining the effects of baseline emptiness in predicting baseline SSI

		B	SE	χ^2	*df*	*p*-value
Suicide Urges						
	Intercept	0.316	0.067	21.15	1	< 0.001
	Emptiness[a]	**0.006**	**0.002**	**13.274**	**1**	**< 0.001**
Self-injury Urges						
	Intercept	0.380	0.086	18.707	1	< 0.001
	Emptiness	0.003	0.001	3.051	1	0.081

Note. Generalized estimating equations were conducted with emptiness predicting SSI urges at baseline.

[a]Emptiness was centered by subtracting the mean from all observations.

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Table 4

Generalized estimating equations analyses examining the effects of baseline emptiness in predicting SSI urge reactivity

		B	SE	χ^2	*df*	*p*-value
Suicide Urges						
	Intercept	0.186	0.049	14.444	1	< 0.001
	Phase	0.266	0.081	10.925	1	< 0.001
	Emptiness[a]	0.008	0.002	16.873	1	< 0.001
	Phase × emptiness	0.001	0.002	0.118	1	0.731
Self-injury Urges						
	Intercept	0.271	0.081	11.077	1	< 0.001
	Emptiness	0.407	0.098	17.427	1	< 0.001
	Phase	0.006	0.003	5.522	1	0.019
	Phase × emptiness	0.002	0.002	0.580	1	0.446

Note. Generalized estimating equations were conducted with phase and emptiness predicting SSI urge reactivity (i.e., difference in SSI urges between the baseline and induction phases).

[a]Emptiness was centered by subtracting the mean from all observations.

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