




## ORIGINAL ARTICLE

# Shame, suicidal ideation, and urges for non-suicidal self-injury among individuals with borderline personality disorder receiving dialectical behavior therapy: The mediating role of anger

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## Abstract

**Introduction:** Borderline personality disorder (BPD) is a disorder of pervasive emotion dysregulation associated with high rates of self-injurious thoughts and behaviors (SITB). Understanding specific emotion states in relation to SITB is important for effective intervention.

**Methods:** The current study examined whether, and how, the specific emotion of shame contributes to suicide ideation and urges to engage in non-suicidal self-injury (NSSI) both directly, and indirectly via anger, among individuals with BPD. Participants ( $N=100$ ) were enrolled in a 6-month comprehensive dialectical behavior therapy (DBT) program and provided daily ratings of shame, anger, suicide ideation, and urges for NSSI.

**Results:** We found that higher daily ratings of shame and anger were directly associated with higher same-day ratings of both suicidal ideation and urges for NSSI. Furthermore, anger partially mediated the relationships between shame and both suicidal ideation and urges for NSSI.

**Conclusion:** These findings highlight shame and anger as potential antecedents of SITB among individuals with BPD. Clinical approaches, such as DBT, that include personalized, ongoing, clinical assessment of these specific affective states may be particularly important for treatment of SITB.

## KEYWORDS

anger, borderline personality disorder, dialectical behavior therapy, self-injury urges, shame, suicide ideation

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Borderline personality disorder (BPD) is a severe psychological disorder characterized by dysregulation across behavior, emotion, relationship, and identity (American Psychiatric Association, 2013; Linehan, 1993). BPD is associated with high rates of self-injurious thoughts and behaviors (SITB). Specifically, studies have indicated that up to 84% individuals with BPD endorse SITB (Black et al., 2004; Pompili et al., 2005). As compared to the general population, individuals with BPD are more likely to experience suicidal ideation (e.g., Mou et al., 2018) and engage in non-suicidal self-injury (NSSI) (e.g., Turner et al., 2015). Risk of suicide is also particularly high among individuals with BPD (Temes et al., 2019).

Given the prevalence of SITB among individuals with BPD, it is not surprising that many evidence based treatments that have been developed for the disorder focus on treating SITB. The most widely known psychosocial treatment for BPD is dialectical behavior therapy (DBT; Linehan, 1993). Dozens of randomized controlled trials have evaluated DBT for the treatment of SITB (see DeCou et al., 2019 for a recent review) and generally indicate that DBT is effective at reducing self-injurious behaviors and use of psychiatric crisis services. Based on the biosocial model (Crowell et al., 2009) that guides the treatment of DBT, pervasive emotion dysregulation is considered to be at the core of BPD, and BPD criterion behaviors (including SITBs) are presumed to function to regulate emotions. Indeed, in a study of self-reported reasons for self-injury, regulating one's internal state was the most frequently endorsed function of NSSI (Taylor et al., 2018). A recent meta-analysis found that a higher level of emotion dysregulation was associated with greater rates of NSSI, regardless of age or sex (Wolff et al., 2019). Furthermore, evidence suggests the presence of a BPD diagnosis moderates the relationship between negative affect states and suicidal ideation (Mou et al., 2018), providing further support for the premise that SITBs are strongly related to emotion dysregulation within BPD. Nevertheless, there is still much to learn about the role specific emotion states play with regard to SITB. If specific emotion states are more closely related to the occurrence of SITB, this has implications for further treatment development and refinement.

Based on prior research, two affective states that merit closer attention are shame and anger. In psychological research, shame is often defined as a painful emotion that involves scrutiny of one's behaviors combined with a negative evaluation of the entire self (Tangney, 1996). Shame has consistently been found to be experienced more frequently by individuals with BPD, compared to other disorders and healthy controls (e.g., Buchman-Wildbaum et al., 2021; Rizvi, 2010). Moreover, there is a growing body of evidence supporting a positive

relationship between the experience of shame and SITBs. A recent meta-analysis on the relationship between shame, guilt, and self-harm behavior concluded that shame is positively associated with self-harm, in contrast to guilt (Sheehy et al., 2019). Within individuals with BPD, shame experienced while describing a recent self-injurious behavior episode was found to prospectively predict future self-harm behavior, even after controlling for past self-harm behavior and other emotions (Brown et al., 2009). In a study of women diagnosed with BPD, shame-proneness was found to predict NSSI, suicidal ideation, and suicidal behavior over and above BPD symptoms (Cameron et al., 2020), highlighting a pervasive and direct relationship between shame and SITB.

Anger is often considered a negative emotion that consists of feelings ranging from mild irritation to intense rage. Anger is the only specific emotion included as a criterion for BPD (i.e., "inappropriate, intense anger or difficulty controlling anger," such as "frequent displays of temper, constant anger, recurrent physical fights"; American Psychiatric Association, 2013). Individuals with BPD take significantly longer to downregulate anger as compared to individuals without BPD (Jacob et al., 2008) and are more likely to react to perceived rejection with greater amounts of anger and hostility than other populations (Berenson et al., 2011; Hepp et al., 2018; Scott et al., 2017). Research also supports a positive association between anger and SITBs. Studies suggest that trait anger (Ammerman et al., 2015) and higher levels of internally oriented hostility (Brittlebank et al., 1990) increase the risk for suicide attempts and NSSI, respectively. An anger state was also found to increase the risk of NSSI and precede suicide ideation (Nock et al., 2009).

In addition to studies on each specific emotion, research has examined the relationship between shame and anger broadly (e.g., Peters et al., 2014; Tangney et al., 1992) as well as in relation to SITB specifically (e.g., Milligan & Andrews, 2005). Because shame is often experienced as acutely distressing or intolerable, some have suggested that individuals may exhibit anger toward self or others as a means of reducing shame (Schoenleber & Berenbaum, 2012). Indeed, proneness to experience shame has been found to be associated with a higher frequency of both self-directed and outwardly directed anger, such as suspiciousness, resentment, and irritability (Tangney, 1996; Tangney et al., 1992). Given the role that emotion dysregulation plays in BPD-related problem behaviors, the relationship between shame and anger to SITB may be particularly salient among individuals with BPD. However, few studies have examined this constellation of factors in a clinical BPD sample who engage in SITB. Briones-Buixassa et al. (2021) recently used ecological momentary assessment (EMA) to examine whether

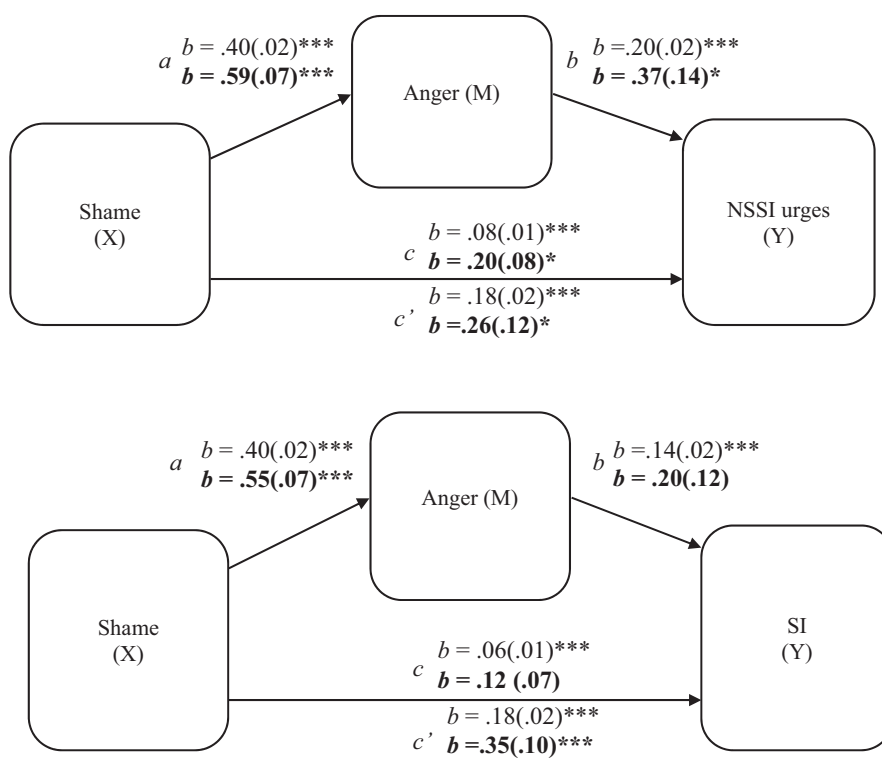
anger, frustration, sadness, and guilt act as protective or risk factors for NSSI. While frustration predicted an increased likelihood of engaging in NSSI, anger surprisingly predicted a lower likelihood. This study, however, did not include the experience of shame. To the best of our knowledge, Peters et al. (2014) have conducted the only study examining the factors of shame, anger, BPD features, and SITB together. Using a college student sample, they found that rumination on an anger experience mediated the relationship between shame and all BPD features studied except self-harm. These findings, contradictory to other literature linking shame and SITB directly, may be due to a lower mean value and potential subscale range restriction of the BPD symptom measure in this nonclinical student sample (Peters et al., 2014). Thus, further research is necessary to clarify whether, and how, shame contributes to SITB, both directly and indirectly through anger, among individuals with BPD. Such understanding could facilitate the development of additional targeted intervention and prevention approaches for SITB in this population.

Another limitation of prior research on the relationship between shame, anger, and SITB in the context of BPD is that much of the prior research involved cross-sectional data, gathered either during a single assessment or at a few major assessment points (e.g., Cameron et al., 2020), which limited the ability to identify mediational pathways. Emerging research also suggests great variability in affective states and SITB on a daily basis (Kleiman et al., 2017; Nock et al., 2009), which means

that major assessment timepoints, although common in psychological research, may not capture day-to-day fluctuations in these variables. Intensive longitudinal methods, which involve the use of repeated measurements over time, enable a close look at the temporal unfolding of a within-subject process, in combination with a comparison of between-subjects differences. These methods also afford an opportunity to examine affective states (such as shame and anger) and associated behaviors within an individual's daily life.

## THE CURRENT STUDY

The goal of this study was to examine the granular relationships between daily ratings of shame, anger, suicidal ideation, and NSSI urges among a sample of individuals with BPD receiving a 6-month DBT program. All participants completed a daily diary card assessment as a part of their treatment. The current study examined the effects of shame and anger on suicidal ideation and NSSI urges, as well as the potential mediating role of anger on the relationship between shame and suicidal ideation, and NSSI urges (see Figure 1). It was hypothesized that (1) daily levels of shame and anger would be significantly associated with daily ratings of suicidal ideation and urges for NSSI and (2) ratings of anger would mediate the relationship between shame and suicidal ideation and urges for NSSI.



**FIGURE 1** Multilevel mediation model: Both between and within person modeling of the impact of shame on NSSI urges and suicide ideation ratings, mediated by anger. NSSI, non-suicidal self-injury; SI, suicidal ideation. Bold, between person level. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

## METHOD

### Participants

Participants were drawn from 113 adult clients receiving DBT treatment for BPD at a research and training clinic at a large university in northeastern United States with an enrollment date between October 2010 and October 2020. Inclusion criteria were: (1)  $\geq 18$  years of age, (2) meeting diagnostic criteria for BPD as established in the Diagnostic and Statistical Manual of Mental Disorders (5th edition; American Psychiatric Association, 2013), (3) willingness to participate in all assessment protocols, (4) available to participate in 6 months of treatment, (5) consent to video record treatment sessions, (6) agreement to cease all other psychotherapy during DBT treatment, and (7) live within a 45-min driving radius of the clinic. Exclusion criteria included: (1) a DSM 5 diagnosis that requires services not provided by DBT-RU (e.g., schizophrenia, substance use that requires medical intervention), (2) non-English speaking, (3) an estimated IQ of 70 or below, and (4) an inability to understand or to sign consent forms.

For the purposes of this secondary analysis study, we excluded individuals ( $n = 13$ ) who did not report any urges for suicide or NSSI over the entire course of treatment (i.e., participants who had all zeros for these variables on the diary card; see below). This exclusion left us with a total sample of 100 participants, who reported urges for suicide and/or NSSI on the diary card at least once over the course of treatment. The final sample was predominantly White (77%), female (75%), and with income below \$30,000 (54%). The average age was 28.69 (SD = 8.79). For additional sample characteristics, see Table 1.

### Procedure

This study utilized data collected from an ongoing larger study. See Rizvi et al. (2017) for additional procedural details on assessments, training of therapists, treatment structure, and delivery. This ongoing study has yielded findings on DBT processes, trainee treatment effectiveness, and predictors of treatment outcomes (e.g., Oliveira & Rizvi, 2018; Rizvi & Fitzpatrick, 2021; Yin et al., 2023). The present study is the first to use DBT diary card data from this sample to examine the relationships between daily-reported emotion states and suicidal ideation and urges for NSSI. All procedures were approved by the university's institutional review board. Participants were recruited through self-referral or referral by other mental health professionals and agencies for DBT. All potential

TABLE 1 Descriptive characteristics of sample ( $N = 100$ ).

Demographics	
Age (mean $\pm$ SD)	28.69 $\pm$ 8.790
Race, % ( $n$ )	
White	77% (77)
More than one race	12% (12)
Asian	7% (7)
Black or African American	4% (4)
Ethnicity % ( $n$ )	
Not hispanic	92% (92)
Hispanic	8% (8)
Gender identity % ( $n$ )	
Female	75% (75)
Male	22% (22)
Other	3% (3)
Income per year % ( $n$ )	
\$0	4% (4)
\$0–\$9999	30% (30)
\$10,000–\$19,999	14% (14)
\$20,000–\$29,999	6% (6)
\$30,000–\$39,999	7% (7)
\$40,000–\$49,999	5% (5)
\$50,000–\$59,999	4% (4)
\$60,000–\$69,999	1% (1)
\$70,000–\$79,999	2% (2)
\$80,000–\$89,999	4% (4)
\$90,000–\$99,999	8% (8)
\$100,000+	6% (6)

participants completed a phone interview to preliminarily screen for eligibility, and then took part in an intake assessment. During the intake assessment, trained doctoral student assessors obtained informed consent, completed diagnostic interviews, further assessed for eligibility for study participation, and completed baseline self-report measures. The Structured Clinical Interview for DSM-IV Axis II Disorder (SCID-II; First et al., 1997) was used to determine whether the BPD diagnosis criteria were met. Upon determination of eligibility, clients were then assigned a therapist for 6 months of comprehensive DBT treatment, that included weekly individual therapy, weekly group skills training, and between-session phone coaching. Therapists were doctoral students in clinical psychology or postdoctoral fellows, all receiving ongoing supervision by the last author. As a part of DBT treatment, participants were instructed to provide daily emotion and SITB ratings using the DBT diary card (see below).

## Measures

### DBT diary cards

DBT diary cards are a clinical tool designed to track clients' emotions and behaviors in between therapy sessions for the purpose of informing clinical case and treatment targets (Linehan, 1993). Previous research has demonstrated the utility of DBT diary cards in collecting intensive longitudinal data (e.g., Southward et al., 2022). Diary cards cover a 1-week period and are assigned to complete at every weekly individual therapy session. Of relevance for this study were four diary card variables: shame, anger, suicide ideation, and urges to engage in NSSI. Participants were asked to provide peak daily ratings (i.e., ratings at the worst point) on these variables using a six-point scale (0—none to 5—strong). The mean intra-class correlation coefficient (ICC) across variables was 0.41 (for comparison, the mean ICC of momentary measures in other studies has been found to be 0.45; Kleiman et al., 2017; Nock et al., 2009).

### Data analysis

Participants were removed from each model analysis if they reported no urges for the relevant behavior over the course of treatment (e.g., participant was removed from NSSI analysis if they had either missing data or ratings of 0 for NSSI urges on all days of all collected diary cards). Ultimately, eight participants (8.0%) were excluded from the suicidal ideation (SI) analysis due to no reported SI over the course of treatment. Similarly, 11 participants (11.0%) were excluded from the NSSI analysis due to ratings of 0 NSSI urges across all reported treatment days. This left a total of 102 participants in all analyses with NSSI urges as an outcome and a total of 10,681 daily diary card observations. For SI analyses, we had 105 participants and a total of 11,313 observations.

Multilevel mediation was used to examine the direct effects of anger and shame on suicidal ideation or NSSI urges and whether there was an indirect pathway from shame to suicidal ideation or NSSI urges through anger, while accounting for the effect of time in treatment. The MLMed macro (Hayes & Rockwood, 2020) for SPSS Version 28 (IBM Corp., 2021) was utilized for analysis. Variables were both person- and grand-mean centered to examine the unique contributions of within-individual and between-individual variabilities. Both models estimated random intercept and slopes of predictors, with the exception of time (i.e., days in treatment), which we did not allow to randomly fluctuate. Wald *Z* statistics were calculated for all random effects. Indirect effects were

tested using a Monte Carlo 95% confidence interval (CI) using 10,000 resamples.

Relationships between study variables were examined contemporaneously (i.e., ratings collected on the same day). This decision was based on the increasing evidence suggesting, that suicide ideation varies widely over short periods of time and that affective predictors are best characterized as short-term predictors (see Sedano-Capdevila et al., 2021). Because the structure of the current data could ostensibly include affective peaks and suicide ideation >24 h apart (e.g., peak in shame at 9 am and suicide ideation the next day at 10 pm) as well as the relative low frequency of SITBs (e.g., modal rating in this sample was 0, despite clinical presentation), our analyses were limited to contemporaneous relationships.

### Power analysis

Power analysis was conducted using the Power Curves for Multilevel Studies applet (Kleiman, 2021). Based on  $N = 113$  (full sample size prior to determining what participants met exclusion criteria), desired power = 0.80, slightly less than 6 months of daily ratings (i.e., 165 days), and a moderate ICC, results suggested that there was adequate power to detect large effects even with less than 50% compliance as well as power to detect medium effects with greater than 50% compliance. It should be noted, however, that this power adjustment does not incorporate mediation models. Therefore, to be conservative, only within-person effects and primary hypotheses (i.e., between-person impact of global shame) were interpreted, as they were likely to be adequately powered with the constrained sample.

## RESULTS

The 100 included participants were in treatment for an average of 163.07 days ( $SD = 48.09$ , range = 48–397) and attended an average of 23.14 sessions ( $SD = 8.25$ , range = 7–69). Participants endorsed SI on an average of 33.27 days ( $SD = 41.87$ , range = 0–204), and urges for NSSI on an average of 31.32 days ( $SD = 45.73$ , range = 0–249).

### Data screening and assumptions

Visual inspection of scatterplots suggested linear associations between predictors (i.e., shame, anger) and outcome variables (i.e., suicide ideation, NSSI urges), and did not suggest any outliers. Although the variables were non-normally distributed based on skew and kurtosis statistics,

analyses proceeded as planned given the normal distribution of standardized residuals of models. See Table 2 for study variable descriptives.

Approximately 12% of data from the diary cards was missing. Missingness was not associated with any demographic characteristics or dropout status except for lower income. However, because the majority of the sample had low income (54% made under \$30,000 per year), analyses proceeded without including income as a covariate. Restricted maximum likelihood estimation was used to account for missingness including an unequal number of observations analyzed for each participant.

### Multilevel mediation examining direct and indirect relationships between shame, anger, and SITB

Results of multilevel mediation models provided support for all hypotheses (see Figure 1). Model ICCs were 0.47 for the NSSI model and 0.42 for the SI model. Shame was significantly associated with anger in both models (SI model:  $b = 0.40$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.35, 0.44]; NSSI Model:  $b = 0.39$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.35, 0.43]). Additionally, daily ratings of shame, net the effect of time, were significantly associated with daily ratings of suicidal ideation ( $b = 0.18$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.15, 0.22]) and urges for NSSI ( $b = 0.18$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.16, 0.22]), respectively. For every one point of increase from the individual's average rating of shame on a 0–5 scale, there exists a 0.18 increase in suicidal ideation and a 0.18 increase in urges for NSSI.

Similarly, daily ratings of anger, net the effects of time, were significantly associated with daily ratings of suicidal ideation ( $b = 0.14$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.11, 0.18]) and daily urges for NSSI ( $b = 0.20$ ,  $SE = 0.02$ ,  $p < 0.001$ , 95% CI [0.16, 0.24]) at the within-person level. For every one point of increase from the individual's average rating of anger on a 0–5 scale, there are corresponding increases in suicidal ideation (0.14 points) and urges for NSSI (0.20 points).

Furthermore, the indirect effects of shame on both suicidal ideation ( $b = 0.06$ ,  $s = 0.01$ ,  $p < 0.001$ , 95% CI [0.04,

0.07]) and NSSI urges ( $b = 0.08$ ,  $SE = 0.01$ ,  $p < 0.001$ , 95% CI [0.06, 0.10]) via a mediational pathway through anger were significant at the within-person level. These findings suggest that small fluctuations in both SI and NSSI are accounted for by the indirect pathway.

All random effects tested, including the residual estimates, slopes, and intercepts significantly varied across participants (all  $p < 0.01$ ) suggesting a high degree of between-person variability in the relationships between study variables, as well as individual average variable ratings. This confirmed that analyzing within-person processes was an effective approach. However, the within-person level residual estimates (i.e., deviations in observed scores compared to model-predicted scores) suggest that there is within-person variation not accounted for by the model. See Table 3 for fixed effects and Table 4 for the random effects for both models.

## DISCUSSION

This study examined the relationship between daily experiences of shame, anger, and SITB urges. Using data from DBT diary cards, a sample of individuals with BPD receiving comprehensive DBT reported daily ratings of shame, anger, SI, and urges for NSSI during 6 months of treatment. We found that daily ratings of both shame and anger were directly associated with same-day ratings of both suicidal ideation, and urges for NSSI. Furthermore, daily variation from average ratings of anger partially explained the relationship between daily ratings of shame and SITB urges. These relationships were significant even when time in treatment was accounted for in the model. This study was the first to provide empirical evidence for the indirect impact of shame on SI and NSSI urges through anger in the context of a BPD diagnosis. Given the role that these specific emotion states seem to play in the occurrence of high-risk urges, results from this study have implications for treatment development work.

Results indicated that for every point increase of an individual's rating of shame there was an associated small, but significant increase in ratings of suicide ideation and urges to engage in NSSI. This finding adds to the literature

TABLE 2 Descriptives of key variables.

	Observations	Mean (SD)	Skewness Z-score	Kurtosis Z-score
Daily suicidal ideation intensity	12,184	0.60 (1.16)	91.09	72.86
Daily urges for NSSI	12,144	0.66 (1.31)	90.59	66.27
Daily shame	12,315	1.99 (1.55)	11.68	22.00
Daily anger	12,110	1.86 (1.54)	18.73	19.02

Abbreviation: NSSI, non-suicidal self-injury.

**TABLE 3** Multilevel mediation—Fixed effects of anger and shame on suicidal ideation (*N*, observations) and urges for NSSI (*N*, observations).

Within-person predictors		Anger		NSSI urges		Suicide ideation	
		<i>B</i> (SE)	95% CI	<i>B</i> (SE)	95% CI	<i>B</i> (SE)	95% CI
Shame	SI model	0.40 (0.02) <sup>***</sup>	0.35, 0.44	0.18 (0.02) <sup>***</sup>	0.14, 0.22	0.18 (0.02) <sup>***</sup>	0.15, 0.22
	NSSI model	0.40 (0.02) <sup>***</sup>	0.35, 0.43				
Anger				0.20 (0.02) <sup>***</sup>	0.16, 0.24	0.14 (0.02) <sup>***</sup>	0.11, 0.18
Days in treatment	SI model	−0.00 (00) <sup>**</sup>	−0.00, −0.00	−0.00 (00) <sup>***</sup>	−0.00, −0.00	−0.00 (0.00) <sup>***</sup>	−0.002, −0.001
	NSSI model	−0.00 (00) <sup>*</sup>	−0.00, −0.00				
Indirect effect: anger				0.08 (0.01) <sup>***</sup>	0.06, 0.010	0.06 (0.01) <sup>***</sup>	0.04, 0.07
Between-person predictors		Anger		NSSI urges		Suicide ideation	
		<i>B</i> (SE)	95% CI	<i>B</i> (SE)	95% CI	<i>s</i> (SE)	95% CI
Shame	SI model	0.59 (0.07) <sup>***</sup>	0.45, 0.73	0.26 (0.12) <sup>*</sup>	0.02, 0.50	0.35 (0.10) <sup>***</sup>	0.14, 0.55
	NSSI model	0.55 (0.07) <sup>***</sup>	0.40, 0.69				
Anger				0.37 (0.14) <sup>*</sup>	0.08, 0.66	0.20 (0.12)	−0.03, 0.43
Days in treatment	SI model	−0.00 (00)	−0.01, 0.00	0.17 (0.02)	−0.00, 0.01	−0.00 (0.00)	−0.01, 0.00
	NSSI model	−0.00 (00)	−0.01, 0.00				
Indirect effect: anger				0.20 (0.08) <sup>*</sup>	0.05, 0.38	0.12 (0.07)	−0.01, 0.26

Abbreviation: NSSI, non-suicidal self-injury.

\**p* ≤ 0.05; \*\**p* ≤ 0.01; \*\*\**p* ≤ 0.001.**TABLE 4** Multilevel mediation—residuals, random effects of intercepts and slopes.

	<i>B</i> (SE)	Wald <i>Z</i>	95% CI
Residual estimates			
Anger (SI model)	1.41 (0.02)	74.59 <sup>***</sup>	1.37, 1.45
Anger (NSSI model)	1.39 (0.02)	72.47 <sup>***</sup>	1.36, 1.43
Suicidal ideation	0.58 (0.01)	73.51 <sup>***</sup>	0.56, 0.59
NSSI urges	0.72 (0.01)	71.31 <sup>***</sup>	0.70, 0.74
Anger intercept (SI model)	0.41 (0.06)	6.43 <sup>***</sup>	0.30, 0.55
Anger intercept (NSSI model)	0.38 (0.06)	6.23 <sup>***</sup>	0.28, 0.52
SI intercept	0.49 (0.08)	6.53 <sup>***</sup>	0.37, 0.67
NSSI urge intercept	0.67 (0.11)	6.37 <sup>***</sup>	0.50, 0.92
A Slope: shame to anger (SI model)	0.03 (0.00)	5.00 <sup>***</sup>	0.02, 0.04
A Slope: shame to anger (NSSI model)	0.03 (0.01)	4.75 <sup>***</sup>	0.02, 0.04
B slope: anger to SI	0.02 (0.00)	5.69 <sup>***</sup>	0.02, 0.04
B slope: anger to NSSI	0.03 (0.01)	5.65 <sup>***</sup>	0.02, 0.04
C slope: shame to SI	0.03 (0.00)	5.76 <sup>***</sup>	0.02, 0.04
C slope: shame to NSSI	0.03 (0.01)	5.09 <sup>***</sup>	0.02, 0.14

Abbreviations: NSSI, non-suicidal self-injury; SI, suicidal ideation.

\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001.

documenting a specific association between the emotion of shame and SITB (e.g., Brown et al., 2009; Sheehy et al., 2019), including within the BPD population specifically (Cameron et al., 2020). Among individuals with BPD, feelings of shame may prompt suicide ideation and

NSSI urges given that suicidal and self-harm behaviors may function to escape from aversive emotional responses (Linehan, 1993). Spitz et al. (2020) found that higher levels of BPD symptoms are associated with greater frequency of post-NSSI self-conscious emotions, which is

then further associated with a greater likelihood of NSSI in the following 12 months. These findings highlight not only the short-term function of self-harm behaviors, but also the potential long-term effects of increased frequency of aversive emotions and therefore increased frequency of self-harm cues. Adding further support, a recent meta-analysis of the reported functions of NSSI reveal emotion regulation to be, in fact, the most common, with some indication that escape from painful states is more prevalent than induction of an enjoyable one (Taylor et al., 2018). Similarly, we found that increases in an individual's ratings of anger were associated with small, but significant increases in suicide ideation and urges to engage in NSSI, providing further support for the literature on the association between anger and SITB (Ammerman et al., 2015; Nock et al., 2009). This association is particularly important to note among those with BPD because both SITB and difficulty with expressing and modulating anger are criteria for BPD. Due to our focus on the day-to-day experience of shame, anger, SITB among a clinical sample with BPD, the current study provided a more granular view of these relationships than previous literature.

Our hypothesis that ratings of anger would mediate the relationship between shame and suicidal ideation and urges for NSSI was supported by this study. On days when shame ratings were higher than a person's average level, ratings of suicidal ideation and urges for NSSI were also higher, and this is partially explained by associated higher anger ratings. This suggests that, among individuals with BPD, feelings of shame may increase the severity of suicide ideation and urges for NSSI indirectly through experience of anger. These findings are consistent with a growing body of literature highlighting the salience of shame and anger in BPD broadly, and with regard to risk for engaging in SITBs more specifically (e.g., Cameron et al., 2020; Schoenleber & Berenbaum, 2012). Because shame and anger may be two interrelated antecedents for SI and NSSI urges, a clinical approach that includes personalized, ongoing, clinical assessment of these specific affective states may be particularly important for treatment of SITB. Given the role that these emotions play in the experience of SITB urges, our findings also illustrate the potential value of treatments, such as DBT, that focus on the regulation of painful emotion states.

The current study uses novel methods for better understanding specific affective states, namely, daily assessment methodology that captures individuals' emotions longitudinally. Given the significant random effects, our study also illustrates the value of analyzing within-person fluctuations in emotion states, SI, and NSSI urges; rather than relying solely on major assessments points that only capture one specific moment in time. Although DBT diary cards are typically viewed as a clinical tool and rarely

incorporated into research (with few exceptions, e.g., Lindenboim et al., 2007; Southward et al., 2022), our study suggests that diary cards can capture day-to-day variability of emotion state intensity and relationship to SITB and is a viable method of data collection in real-world clinical settings. Additionally, this study points to the need for additional empirical examination of common clusters of contributing factors (e.g., BPD, shame, anger) leading up to SITBs in order to identify targeted assessment, prevention, and intervention strategies. For example, more work is needed to better understand the common temporal relationships between shame, anger, and SITB. However, in the current study, temporal relationships between study variables cannot be inferred as all variables were rated one time on a daily basis. Evaluation of the nuances of these relationships, in real-time, is needed and would be well-suited for methodological approaches such as EMA.

As with any study, there were several limitations of this research to consider when interpreting the findings. First, diary cards were designed as a clinical tool. Therefore, the ratings of peak emotions, suicidal ideation, and urges for self-harm are based on the individual's own perception and scale of experience. Thus, there may exist significant between-subject variability in how emotions are rated. Second, while this study used a statistical mediation approach, true mediation requires temporal relationships between variables. A lagged approach was considered; but due to the evidence for large degrees of variation in suicidal ideation within days (Kleiman et al., 2017; Sedano-Capdevila et al., 2021) and that diary card ratings represent peak experiences, that may be temporally distant from one another, it was ultimately discarded. Third, it is well known that negative affective states tend to be correlated (Berenbaum et al., 1995; Ng et al., 2019). Assessment of mediational relationships, including rival mediators (i.e., other affective variables), would clarify these relationships and their relative importance. Moreover, analytic approaches like moderated mediation or network analyses might help identify for whom particular affective sequences are most salient (e.g., it may be for those who are more shame prone, the shame → anger sequence might be more clinically relevant than shame → sadness sequence), which could support tailored assessment of risk and intervention efforts. More frequent sampling with larger samples would support these types of analyses compared to the current sample and data structure. Fourth, the data were analyzed for systematic missingness through analysis of demographic and study variables, and the only variable found to be associated with systematic missingness was income. It is possible that other clinical factors are directly related to missing data and are not accounted for in this study. Finally, this study relied on data collected from a clinical sample. Although we adjusted for the effect of



time in treatment, the treatment context potentially limits the generalizability of results to individuals, who are not actively receiving treatment. Future studies would also benefit from larger samples that could ensure both that within- and between-person analyses are adequately powered, as well as supporting the inclusion of additional relevant variables. For instance, baseline emotion regulation ability could potentially moderate the relationships between study variables.

This study represents an important step in understanding the role of affective states in the prediction of SITB. Overall, these findings highlight the important roles that shame and anger play for individuals with BPD who engage in SITB. One of the strongest implications of this work is that clinical assessment of affective SITB antecedents (particularly within a BPD population) is crucial for applying targeted and personalized interventions more effectively. Building on this study, further research on additional, transdiagnostic, processes that contribute to SITB will increase our ability to predict and effectively intervene with suicidal behaviors.

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## CONFLICT OF INTEREST STATEMENT

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## DATA AVAILABILITY STATEMENT

Data may be available by contacting the authors.

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