

## **THE ROLE OF NEGATIVE AFFECT AND SELF-CONCEPT CLARITY IN PREDICTING SELF-INJURIOUS URGES IN BORDERLINE PERSONALITY DISORDER USING ECOLOGICAL MOMENTARY ASSESSMENT**

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Deficits in identity as well as negative affect have been shown to predict self-injurious and suicidal behaviors in individuals with borderline personality disorder (BPD). However, less is known about the interactive effects of these two predictors. We examined the moderating effect of a particular component of identity, self-concept, on the relationship between negative affect and self-injurious urges utilizing ecological momentary assessments. Outpatients diagnosed with either BPD ( $n = 36$ ) or any anxiety disorder but no BPD ( $n = 18$ ) completed surveys throughout the day over a 21-day period. Higher levels of momentary negative affect predicted greater subsequent urges to self-injure, but only when self-concept clarity was low ( $z = -3.60, p < .01$ ). This effect did not differ between diagnostic groups. The results suggest that self-concept clarity has a protective effect against self-injurious urges in light of high negative affect, and that this effect may be transdiagnostic.

Borderline personality disorder (BPD) is a highly prevalent, chronic, debilitating, and deadly disorder characterized by chaotic, self-defeating interpersonal relationships, emotional lability, identity disturbance, poor impulse control,

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and angry outbursts (American Psychiatric Association [APA], 2013). Prevalence rates for BPD are approximately 1%–6% in the general population, 14%–25% among psychiatric outpatients, and 20%–40% among inpatients (Lenzenweger, Lane, Loranger, & Kessler, 2007; Trull, Jahng, Tomko, Wood, & Sher, 2010; Zimmerman & Mattia, 1999; Zimmerman, Rothschild, & Chelminski, 2005). BPD is also associated with self-injury, which occurs in 69%–75% of BPD patients (Kjellander, Bongard, & King, 1998), and a high risk of suicide (Black, Blum, Pfohl, & Hale, 2004; McGlashan, 1986; Paris & Zweig-Frank, 2001; Pompili, Girardi, Ruberto, & Tatarelli, 2005; Stone, 1983), with suicide completion rates ranging from 3%–9.5%. Furthermore, BPD is commonly comorbid with other disorders that carry a suicide risk, such as major depression and substance use disorders (Zanarini et al., 1998), further increasing the risk of suicide (Kelly, Soloff, Lynch, Haas, & Mann, 2000), and the impulsive nature of self-injurious behavior presents a risk for accidental suicide (Yen et al., 2004). In fact, suicide completion rates among BPD patients with a history of self-injury are twice that of those without such a history (Stone, 1989).

The purpose of the present study was to examine psychological processes that may serve as mechanisms involved in self-injurious behavior in BPD. More specifically, we were interested in the interplay of two specific features of BPD, (a) distressing or negative affect and (b) identity disturbance, as they related to self-injury. Much of the research on suicide and self-injury has focused on identifying risk factors and correlates of these behaviors (e.g., family history of suicide, access to firearms). Although this is valuable research for identifying factors that may be associated with suicide and self-injurious behaviors and may indirectly help to reduce the prevalence or lethality of a suicide attempt or self-injury, it does not tell us much about the actual psychological mechanisms that are involved in such behavior. Understanding the psychological mechanisms involved in self-injury in BPD is important because they can serve as direct targets in therapy that, when addressed, may result in longer term change.

## NONSUICIDAL SELF-INJURY

Nonsuicidal self-injury (NSSI; Klonsky, May, & Glenn, 2013) involves direct, deliberate destruction of body tissue in the absence of lethal intent (Nock & Favazza, 2009; Nock, Wedig, Janis, & Deliberto, 2008) and can include such behaviors as cutting, burning, or damaging the skin or body in some other way. Although the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013)* combines suicidal behaviors and NSSI into a single criterion for BPD and the behaviors frequently co-occur (Klonsky & Muehlenkamp, 2007; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Whitlock, Eckenrode, & Silverman, 2006), there is evidence to suggest that they have important differences. Specifically, NSSI is more prevalent than suicide attempts, with prevalence rates in the general population around 4% for NSSI and 2.7% for suicide attempts (Briere & Gil, 1998; Nock & Kessler, 2006); and NSSI tends to occur at a higher frequency than suicide attempts

(Favazza & Conterio, 1989; Soloff, Lis, Kelly, Cornelius, & Ulrich, 1994). Additionally, NSSI and suicide attempts often differ in terms of the methods used (cutting/burning with self-injury vs. self-poisoning/overdose with suicide attempts; Centers for Disease Control and Prevention, 2015; Favazza, 1998) and severity (NSSI is not usually as medically severe as a suicide attempt). Finally, NSSI and suicide attempts differ in terms of their function. Whereas the function of a suicide attempt is typically to end one's life, the function of NSSI varies widely and is thought to serve as a way to regulate affect, end dissociative episodes, and create interpersonal boundaries and influence, as well as punish oneself or avoid an actual suicide attempt (Klonsky, 2007). In an attempt to better understand and predict NSSI in BPD, a number of studies have sought to identify factors that may predict such behaviors.

In a sample of 101 women with BPD and a history of NSSI, Kleindienst et al. (2008) found that the primary motives for NSSI were to reduce aversive tension and unpleasant feelings or to punish oneself. Examining patients' reported emotional states before and after NSSI revealed a typical pattern that involved increased tension and feelings of emptiness, loneliness, guilt, depression, sadness, anger, disgust, and numbness prior to NSSI episodes and a decrease in these symptoms following NSSI episodes. Similar findings have been replicated in a laboratory setting among non-BPD self-injurers (Weinberg & Klonsky, 2012). Other studies with BPD patients also point to a reduction in aversive feeling states, such as anger, as a motive for NSSI (M. Z. Brown, Comtois, & Linehan, 2002; Hulbert & Thomas, 2010; Sadeh et al., 2014). In addition to reducing aversive feeling states, there is some evidence that NSSI may also be used as a way of expressing negative emotions, such as shame and self-punishment (M. Z. Brown, Linehan, Comtois, Murray, & Chapman, 2009; Kleindienst et al., 2008). Together, these findings suggest that there is an important relationship between the regulation and expression of heightened levels of unpleasant negative affect and NSSI.

Although the relationship between negative affect and NSSI is fairly well established, a number of questions remain. For example, other disorders, such as anxiety and depressive disorders, are associated with high levels of negative affect (Watson, Clark, & Carey, 1988) but are not necessarily associated with self-injurious behaviors (Distel, Smit, Spinhoven, & Penninx, 2016). Additionally, negative affect is not uncommon to experience in the absence of psychopathology and has not been shown to be associated with self-injury. Thus, other factors, in addition to negative affect, may contribute to NSSI in BPD. Another important, but less studied, component of BPD that may be important in predicting NSSI is identity disturbance, a core feature of BPD.

## IDENTITY DISTURBANCE

The concept of identity disturbance is defined in the *DSM-5* as a markedly and persistently unstable self-image or sense of self (APA, 2013). Similarly, Kernberg (1984) defines identity disturbance as the lack of a well-integrated sense of self and of others, and it often manifests in chronic feelings of emptiness, contradictory and unstable self-perceptions, and impoverished perceptions of

others. Identity disturbance in BPD is characterized as a lack of a consistent view of self and others across time, difficulty making differentiations between self and other representations, and having more complex but unintegrated negative representations of oneself and others (Beeney, Hallquist, Ellison, & Levy, 2016). The presence of identity disturbance in BPD is predictive of self-injurious and suicidal behavior in general (Yen et al., 2004) and self-injury in particular (Lear & Pepper, 2016). However, most of the research in this area has focused on views of others with much less attention to views of self. Specifically, studies with BPD patients have shown that those who are more likely to engage in NSSI or attempt suicide have more impaired views of relationships and less emotional investments in others (Kaslow et al., 1998), expect others to behave malevolently, and express less investment in interpersonal relationships and more hostility and aggression toward others (Macewan, 2011; Whipple & Fowler, 2011).

Clinical theory suggests that deficits in both aspects of identity, views of self *and* views of others, are central features of BPD (Kernberg, 1984), and therefore both should be considered when studying identity. The construct of self-concept clarity, which is conceptualized as the “extent to which self-beliefs are clearly and confidently defined, internally consistent, and stable” (Campbell et al., 1996, p. 141), is thought to tap into the self-aspect of identity. There is some evidence to suggest that deficits in self-concept are related to a greater frequency of suicidal and self-injurious behavior in general (Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999; Santos, Saraiva, & De Sousa, 2009), although these studies did not assess for BPD in their samples.

In discussing identity disturbance, Kernberg (1984) also posits that one’s views of self and others are inherently linked to one’s emotional experience. Because representations of self and others develop in the context of emotional experience and thus have an affective component, identity disturbance may moderate the relationship between negative affect and NSSI. For example, in the context of a stable and integrated identity, negative affect can be experienced while at the same time one is able to maintain a consistent sense of self and others and to draw on knowledge about the self and others that can be soothing and adaptive. In contrast, when one’s identity is unstable and unintegrated, as in the case of individuals with BPD, negative affect is thought to be experienced very differently, the ability to draw on information about oneself and others that may be soothing is limited, and individuals may resort to less adaptive ways of soothing or regulating oneself, such as self-injury.

Given the research and theory described above, negative affect and components of identity such as self-concept may play an important role in predicting NSSI such that NSSI would be most likely to occur during times when individuals have particularly impoverished views of themselves and others as well as high levels of negative affect. Additionally, NSSI may occur because interpersonal sensitivity is so central to BPD, and there is evidence that the perception of certain types of behaviors in others may elicit heightened levels of negative affect in response (Sadikaj, Moskowitz, Russell, Zuroff, & Paris, 2013). However, the interplay between these factors, although central to theories of BPD, has yet to be demonstrated empirically, and the present study aims to fill this gap in the literature. Before the hypotheses of the present

study are discussed, it would be wise to consider an important methodological concern in the literature that informs the approach to studying BPD that will be used in this study.

## INSTABILITY IN BPD

An important consideration when studying BPD is being able to capture the unstable nature of the characteristics associated with the disorder (i.e., interpersonal relationships, self-image, affect). Despite these characteristics, nearly all of the previously discussed research on factors associated with NSSI in BPD have utilized retrospective self-report and/or interview instruments that ask participants to recall episodes of self-injury and associated thoughts, behaviors, and motives, sometimes over the course of the past 6 months, 1 year, or beyond. This is problematic because retrospective reports aimed at addressing how individuals with BPD *typically* feel and behave might not be capturing the moment-to-moment fluctuations that define the disorder (Hopwood & Morey, 2007). In fact, there is recent evidence to suggest that when providing retrospective reports, individuals with BPD may not recall even their most drastic mood changes (Solhan, Trull, Jahng, & Wood, 2009), calling into question the validity of the use of retrospective measurement in this population. Furthermore, previous studies have typically examined factors associated with NSSI in BPD cross-sectionally by looking at thoughts, feelings, behaviors, and motives around discrete episodes of self-injury, ignoring the temporal instability that is central to the definition of the disorder. In order to address these issues, the present study utilizes an ecological momentary assessment (EMA) approach, which is well suited for capturing the interpersonal and affective dynamics of BPD (see Santangelo, Bohus, & Ebner-Priemer, 2014, for an overview of EMA as well as limitations and challenges associated with the approach). Previous studies using an EMA approach have examined suicidality (Links et al., 2007; Nisenbaum, Links, Eynan, & Heisel, 2010) and found that the intensity of negative mood was predictive of suicidal ideation, but these studies did not examine self-injurious behaviors.

One final challenge associated with the study of self-injurious behaviors is that such behaviors typically occur at a low base rate, making it difficult to study on a momentary level (e.g., across a 21-day period). Thus, rather than examining the presence of *engagement* in self-injurious behavior across the study period, the present study examined self-injurious *urges*, in a similar vein as previous researchers have studied suicidal ideation. Furthermore, just as suicidal ideation precedes a suicide attempt, the urge to engage in self-injurious behaviors precedes engagement in such behaviors and therefore is meaningful and may inform our understanding of the psychological processes involved in self-injury.

## HYPOTHESES

With the above considerations in mind, the present study made several predictions. We predicted that patients with BPD will report higher rates of low

self-concept clarity and self-injurious urges, but similar levels of negative affect, compared to patients with anxiety disorders. With regard to the study's main aims, we first predicted that high levels of momentary negative affect would predict stronger subsequent urges to engage in self-injurious behavior. Second, we predicted that lower momentary self-concept clarity would predict stronger subsequent urges to engage in self-injurious behavior. Third, we predicted that the relationship between momentary negative affect and self-injurious urges would be moderated by self-concept clarity. Specifically, we expected that negative affect would be more strongly related to self-injurious urges when self-concept clarity was low. We also explored whether this relationship would be further moderated by diagnostic group (BPD vs. Anxiety disorder). One possibility is that the interplay between negative affect and self-concept clarity in predicting self-injurious urges is specific to BPD. On the other hand, it is possible that self-concept clarity is a protective factor that cuts across different disorders and may interact with negative affect to predict self-injurious urges regardless of diagnostic status.

## METHOD

### PARTICIPANTS

Fifty-four outpatients (7 men and 47 women) with a diagnosis of either BPD ( $n = 36$ ) or any anxiety disorder but not a diagnosis of BPD (ANX;  $n = 18$ ) were recruited from a large university-affiliated community mental health center (CMHC). As shown in Table 1, the overall sample was predominantly female (87%), heterosexual (69%), White (85%), and single (50%), and the average age was 31.43 years (range 18–60;  $SD = 11.59$ ). Both groups had other Axis I and II comorbidities (see Table 2 for details).

All scheduled intake assessments conducted as part of the standard procedures at the CMHC were eligible for screening for participation. To be eligible for the study, patients had to have a diagnosis of either BPD or any anxiety disorder. Exclusion criteria included a history of schizophrenia, schizoaffective disorder, bipolar I disorder, delusional disorder, delirium, dementia, amnesic disorder, cognitive disorder, or active substance dependence. Following eligibility screening of 173 participants, 57 initially met eligibility criteria, were scheduled for an initial appointment (described below), and were enrolled in the study. An additional three patients were excluded from the present study after being enrolled because it was determined that they did not actually meet diagnostic criteria (e.g., had a cognitive impairment disorder) for the study, resulting in a final sample of 54 patients.

### MEASURES

#### Diagnostic Instruments

The Anxiety Disorders Interview Schedule for *DSM-IV-PSU* Version (ADIS-IV-PSU; T. A. Brown, Di Nardo, & Barlow, 1994), Structured Clinical Interview for *DSM-IV* (SCID-I; First, Gibbon, Spitzer, & Williams, 1997), and

**TABLE 1. Demographic Characteristics as a Function of Study Group**

	BPD ( <i>n</i> = 36)		ANX ( <i>n</i> = 18)		<i>t</i> value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age	34.20	12.39	26.06	7.60	2.96**
	<i>n</i>	%	<i>n</i>	%	$\chi^2$
Sex					
Women	33	92	14	78	1.01
Men	3	8	4	22	
Sexual Orientation					
Heterosexual	24	67	13	72	3.28
Homosexual	3	8	3	17	
Bisexual	9	25	1	6	
Ethnicity					
White	33	92	13	72	2.22
Other	3	8	5	28	
Relationship Status					
Single	15	42	12	67	4.90
Dating	8	22	1	6	
Married	7	19	4	22	
Divorced	5	14	1	6	
Separated	1	3	0	0	

Note. This table compares demographic variables between participants in the Borderline Personality Disorder group (BPD; *n* = 36) and the Anxiety group (ANX; *n* = 18). \*\**p* < .01.

the International Personality Disorders Examination (IPDE; Loranger, 1999) are semistructured clinical interviews designed to assess for the presence of *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, text revision (*DSM-IV-TR*; APA, 2000) Axis I and II pathology, respectively. All patients were given either the ADIS-IV-PSU or SCID-I and the IPDE during the initial intake assessment conducted during the recruitment phase. Based on these interviews, clinicians assigned a Global Assessment of Functioning (GAF) rating. GAF scores range from 0 to 100, with higher scores representing better overall functioning.

*ADIS-IV-PSU*. The ADIS-IV-PSU is a semistructured clinical interview based on the original ADIS-IV, which is designed to assess for the presence and severity of *DSM-IV-TR* anxiety disorders, but was modified to more thoroughly assess for current and lifetime *DSM-IV-TR* mood, psychotic, substance use, eating, and somatoform disorders. Responses from the ADIS-IV-PSU are coded to determine the presence/absence of each diagnosis as well as a severity rating made by the clinician. The ADIS-IV has been shown to be a reliable and valid interview for assessing *DSM-IV-TR* Axis I pathology (T. A. Brown, Di Nardo, Lehman, & Campbell, 2001).

*SCID-I*. The SCID-I is a semistructured clinical interview designed to assess for the presence and severity of *DSM-IV-TR* mood, psychotic, substance use, eating, and somatoform disorders. The SCID-I is a well-validated and widely used instrument for assessing *DSM-IV* Axis I pathology (First et al., 1997).

*IPDE*. The IPDE is a semistructured clinical interview designed to assess for the presence of *DSM-IV* personality pathology. Responses from the IPDE are coded to provide a criterion score, from which a personality disorder diagnosis can be determined as well as a dimensional score for each personality disorder. The IPDE has been shown to be a reliable and valid interview for assessing *DSM-IV* Axis II pathology (Loranger et al., 1994).

### Baseline Laboratory Assessment

Baseline laboratory assessments consisted of a battery of self-report surveys, including a number of measures relevant to the broader study but not used in the present study. For the present study, relevant baseline assessments included the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini, Vujanovic, Parachini, & Boulange, 2003), Self-Concept Clarity Scale (SCCS; Campbell et al., 1996), and the Affective Lability Scale (ALS; Harvey, Greenberg, & Serper, 1989). Baseline assessments were used for characterizing the samples but were not used as part of the analyses of theoretical interest.

### Field Assessments

Electronic surveys were installed on a smartphone device (more details described later). The entire electronic survey battery consisted of series of questions aimed at assessing constructs relevant for the larger study but not the current set of analyses (e.g., substance use, anxiety, stress, physical symptoms). For the current study, items assessing negative affect, self-concept clarity, and self-injurious urges were used. The presentation and order of items were the same for each completed survey. Negative affect items were presented before self-concept clarity items, which were presented before self-injurious urge ratings.

Negative affect (NA) was assessed by asking participants to rate the degree to which they felt *irritable*, *sad*, *frightened*, and *angry* at the time of the rating. Responses were recorded using a touch-point continuum, visual analog scales on which participants slide a marker to a point on the scale that corresponds with their ratings. This answering format is thought to reduce anchoring from repeated completion of the same items. The touch-point continuums were quantified by a 0 to 100 scale with anchors for negative affect items at *not at all* and *extremely*. Responses were averaged to compute an overall NA score such that higher scores represent greater levels of negative affect and lower scores represent lower levels of negative affect.

Self-concept clarity (SCC) was assessed by asking a single item from the Self-Concept Clarity Scale (SCCS; Campbell et al., 1996). The SCCS is



a 12-item self-report measure used to assess the extent to which self-beliefs are clearly and confidently defined, internally consistent, and stable. The item used in the current study was: *Right now, I have a clear sense of who I am and what I am*. Responses were recorded using a touch-point continuum with anchors at *strongly disagree* and *strongly agree*. Higher scores represent greater momentary SCC and lower scores represent less SCC.

Self-injury urges (SIU) were assessed with a single item asking participants whether they thought of engaging in direct self-harm since the last prompt or following a recent social interaction. If participants answered yes to this item, they were asked to rate how strong or intense was their urge to self-harm. Responses were given using touch-point continuums with anchor points at *not at all* and *very intense*, with higher scores representing a greater urge to engage in self-injurious behaviors and lower scores representing less of an urge to engage in self-injurious behaviors.

## PROCEDURES

Following an initial session in which participants provided informed consent, completed baseline assessments, and were trained in the use of the smartphones, participants were issued a Motorola Razr with an Android operating system, which they carried with them over the next 21 days. The smartphone devices were programmed specifically for the purposes of the study by programmers at the Dynamic-Real-time Ecological Ambulatory Methodologies (DREAM) program at the Pennsylvania State University Survey Research Center. The software was programmed to provide random prompts to participants during their waking hours (a 12-hour period between the hours of 6 am–6 pm, 8 am–8 pm, or 10 am–10 pm, selected by the participants during the initial training session). The software stratified this 12-hour period into six equal intervals and randomly selected a time within this interval to provide the prompt to the participant. When a prompt occurred, a sound was emitted alerting participants that they needed to complete a prompted survey. Participants could then initiate the survey and answer the survey questions directly on the phone. All data were time-stamped to determine actual completion times for the surveys. Participants also completed event-contingent surveys that are not included in the present study.

Participants carried the smartphone with them over a 21-day study period and had the opportunity to respond to randomly prompted surveys six times per day. Participants started the 21-day period on different days of the week depending on their availability to attend the initial training session described earlier. All data were submitted electronically over a secure network, allowing researchers to check data daily for compliance to ensure that participants were completing surveys consistently and to monitor for the presence of self-harm or suicidal thoughts or behaviors. If participants had four or fewer prompted surveys for 2 days in a row, they were contacted by a member of the research team and reminded about compliance standards. On average, participants completed 93.72 of the 126 possible prompted surveys over the course of 21 days, resulting in an acceptable compliance rate (74%) that did not differ

between diagnostic groups and is consistent with other EMA studies using similar procedures and samples (Solhan et al., 2009; Tomko et al., 2014). These compliance rates for prompted surveys resulted in 5,061 observations on 54 patients. Given our interest in predicting subsequent self-injurious urges, we only included surveys that had data on negative affect, self-concept clarity, and self-injurious urges in the preceding survey. Thus, the final dataset included data from 3,768 completed surveys.

## DATA ANALYTIC PLAN

Multilevel modeling (MLM) was used to account for dependencies in the data due to repeated measurements taken across time and within individuals. Self-injurious urges, self-concept clarity, and negative affect ratings on each survey (Level 1) are nested within days (Level 2), which are nested within patients (Level 3). However, some of the models that included all three levels failed to reach convergence, so we removed the day level from analyses, resulting in two-level models (surveys nested within patients).

Self-injurious urges were reported in only 84 of the 3,768 surveys (2%). Therefore, we could not reliably analyze data regarding the intensity of the urges, but rather only focused on predicting the existence versus absence of an urge. Furthermore, negative affect and self-concept clarity data were somewhat trimodally distributed, with clusters of responses around 0, 50, and 100. Because of this, and because SIU data did not appear to fit any known distribution for analysis (e.g., negative binomial), we chose to dichotomize all variables of interest for the present analysis. SIU was dichotomized based on presence/absence of an urge. Predictor variables were simplified via a median split, such that each observation was rated high or low in comparison to the median level for each individual. This centering strategy removes any between-person variance in NA and SCC, which enabled us to examine the within-person effects that are of interest in the present study (Wang & Maxwell, 2015). All analyses were conducted using R version 3.3.2 (R Core Team, 2016). In order to isolate the predictive effect of NA and SCC on subsequent SIU, we lagged predictor variables by one timepoint within the same day. Thus, we tested the effect of predictor variables at a given moment on SIU at the subsequent moment. A lagged SIU variable was also included in all time-contingent models in order to control for autoregressive effects of SIU on later SIU.

Generalized linear multilevel modeling (R package lme4; Bates, 2010) was used to conduct logistic regression in a multilevel framework. We regressed the dichotomized urge variable onto dichotomized negative affect and self-concept clarity individually and then included their interaction, controlling for previous SIU in all analyses. Next, we included diagnostic group as a Level 2 predictor to examine the three-way interaction among negative affect, self-concept clarity, and diagnosis. Models with random effects for the predictors did not fit the data significantly better than fixed-effects-only models in predicting SIU, so only fixed-effects models are reported. All models utilized a binomial logit link function to model the binary outcome, with bound optimization by quadratic approximation.

## RESULTS

### SAMPLE CHARACTERISTICS

Comparisons of demographic characteristics between the BPD and ANX groups are shown in Table 1. Individuals in the BPD and ANX groups did not differ on any demographic characteristics except for age. The BPD group ( $M = 34.20$ ,  $SD = 12.39$ ) was significantly older than the ANX group ( $M = 26.06$ ,  $SD = 7.60$ ),  $t(51.69) = 3.00$ ,  $p = .004$ . Clinical characteristics are shown in Table 2. The average GAF score was 55.92 ( $SD = 9.60$ ). As shown in Table 2, as would be expected, the BPD group had significantly lower GAF scores,  $t(49) = -3.79$ ,  $p < .001$ , met more IPDE criteria,  $t(48) = 5.82$ ,  $p < .001$ , and had higher IPDE dimensional scores,  $t(48) = 6.12$ ,  $p < .001$ , than the ANX group. Likewise, the ANX group consisted of a greater proportion of individuals with generalized anxiety disorder (GAD),  $\chi^2(1, n = 53) = 11.91$ ,  $p = .001$ , and social phobia,  $\chi^2(1, n = 53) = 7.14$ ,  $p = .008$ , than the BPD group. On average, participants in the BPD group had fewer Axis I disorders,  $t(46) = -3.10$ ,  $p = .003$ , and more Axis II disorders,  $t(52) = 4.95$ ,  $p < .001$ . Finally, as shown in Table 3, retrospective self-report baseline assessments indicated that the BPD group had higher MSI-BPD scores,  $t(41.64) = 3.02$ ,  $p = .004$ , lower self-concept clarity,  $t(31.97) = -2.23$ ,  $p = .033$ , and more affective lability,  $t(37.68) = 2.91$ ,  $p = .006$ , than the ANX group. These differences in clinical characteristics were expected, given the sampling procedures described earlier.

On 78 out of 2,587 occasions (3.02%), individuals with BPD reported a self-harm urge. On only 6 out of 1,181 occasions (0.51%) did anxiety group individuals report an urge. In terms of the predictor variables, prior to median centering and dichotomization, individuals in the BPD group ( $M_{NA} = 22.84$ ,  $SD_{NA} = 21.13$ ;  $M_{SCC} = 63.42$ ,  $SD_{SCC} = 27.31$ ) on average reported significantly greater momentary negative affect,  $t(4,913) = 14.57$ ,  $p < .001$ ,  $d = .46$ , and significantly lower self-concept clarity,  $t(4,836) = 5.26$ ,  $p < .001$ ,  $d = .17$ , than the ANX group ( $M_{NA} = 14.03$ ,  $SD_{NA} = 16.77$ ;  $M_{SCC} = 67.64$ ,  $SD_{SCC} = 23.20$ ), although the effect size of the SCC difference was trivial, suggesting that the significant difference was driven solely by the large number of observations.

### MULTILEVEL MODELS

#### Groups Differences in Study Variables

As a preliminary step, we examined the main effect of diagnostic group on SIU, NA, and SCC. As we predicted, there was no difference between groups in terms of NA ( $b = .50$ ,  $z = 1.46$ ,  $p = .14$ ). The 84 surveys that included reports of SIU came from 17 participants (BPD:  $n = 14$ ; ANX:  $n = 3$ ). The percent of surveys that included urges per participant ranged from 0% to 86% in the BPD group, and 0% to 3% in the ANX group. Three participants in the BPD group had an especially high percent of urges: 37%, 43%, and 86% (accounting together for 48 out of the 84 urges). However, in contrast to our hypothesis, results of the multilevel models showed that the difference between the two

**TABLE 2. Clinical Characteristics From Initial Intake Assessments as a Function of Study Group**

	BPD ( <i>n</i> = 36)		ANX ( <i>n</i> = 18)		$\chi^2$
	<i>n</i>	%	<i>n</i>	%	
<b>Current Axis I Diagnoses</b>					
Any Axis I Disorder	28	78	19	100	4.37*
Mood Disorders	19	53	12	63	0.40
MDD	14	39	11	58	1.59
Other Mood Disorders	5	14	1	5	1.02
Anxiety Disorder	18	50	19	100	9.34**
GAD	4	11	10	53	10.89**
PTSD	5	14	4	21	0.41
Social Phobia	3	8	7	37	6.52*
Other Anxiety Disorders	8	22	3	16	0.54
Alcohol & Substance Use	3	8	1	5	0.20
Eating Disorders	3	8	1	5	0.20
Somatoform Disorders	4	11	1	5	0.56
<b>Current Axis II Diagnoses</b>					
Any PD	36	100	1	5	49.62***
Cluster A	1	3	0	0	0.51
Paranoid	1	3	0	0	0.51
Cluster B	36	100	0	0	54.00***
Antisocial	2	6	0	0	1.07
Borderline	36	100	0	0	54.00***
Histrionic	2	6	0	0	1.04
Narcissistic	0	0	0	0	—
Cluster C	5	14	1	5	0.85
Avoidant	5	14	0	0	2.77
Obsessive-Compulsive	0	0	1	5	2.04
PD NOS	2	6	3	16	1.77
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> value
No. of Axis I diagnoses	1.43	1.01	2.11	0.74	-2.82**
No. of Axis II diagnoses	1.25	0.50	0.21	0.42	9.58***
No. of IPDE Criteria Met	13.53	6.42	3.47	3.63	7.14***
IPDE Dimensional Score	40.21	15.77	14.18	10.16	7.12***
GAF	52.58	8.02	62.21	9.16	-3.96***

*Note.* This table compares clinical characteristics between the BPD (*n* = 36) and ANX (*n* = 18) groups. MDD = major depressive disorder; PD NOS = personality disorder not otherwise specified; GAD = generalized anxiety disorder; IPDE = International Personality Disorder Examination; GAF = Global Assessment of Functioning. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

**TABLE 3. Baseline Self-Report Scores of Borderline Personality Disorder Criteria, Self-Concept Clarity, and Affective Liability as a Function of Study Group**

	BPD ( <i>n</i> = 36)		ANX ( <i>n</i> = 18)		<i>t</i> statistic	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
MSI-BPD	5.69	2.89	3.50	2.31	3.02**	.84
SCCS	2.68	.84	3.24	.90	-2.23*	.64
ALS	1.77	.59	1.31	.52	2.91*	.83

Note. This table compares the baseline characteristics, collected during the baseline and training session, between the BPD (*n* = 36) and ANX (*n* = 18) groups.

MSI-BPD = McLean Screening Instrument for Borderline Personality Disorders;

SCCS = Self-Concept Clarity Scale; ALS = Affect Liability Scale; \**p* < .05. \*\**p* < .01.

\*\*\**p* < .001.

groups failed to reach significance ( $b = 1.99$ ,  $z = .16$ ,  $p = .11$ ), possibly due to the low base rate of urges in the data. In addition, there was no significant difference between the groups in the number of individuals reporting any SIU (Fisher's exact  $p = .13$ ).

Finally, in contrast to our hypothesis, there was no difference between groups in terms of SCC ( $b = -.08$ ,  $z = -.32$ ,  $p = .75$ ). Although there was no difference between diagnostic groups in terms of number of moments characterized by high self-concept clarity (i.e.,  $\geq 80$  on the 0–100 scale;  $n = 846$ ) after adjusting for group size, individuals with BPD were 5.66 times more likely to report momentary  $SCC \leq 20$  ( $n = 234$ ), and 5.17 times more likely to report  $SCC \leq 10$  ( $n = 102$ ). In terms of negative affect, BPD participants were 2.31 times as likely to report  $NA \geq 50$  ( $n = 2,365$ ), while ANX participants were 1.45 times more likely to report the lowest levels of NA (i.e.,  $NA \leq 10$ ;  $n = 1,678$ ).

### Prediction of Self-Injurious Urges

To examine whether momentary self-concept clarity predicts subsequent self-injurious urges, regardless of momentary negative affect, we fitted a generalized multilevel model with momentary self-concept as the sole predictor of subsequent self-injurious urges, while controlling for self-injurious urges in the previous survey. As we predicted, the results showed that lower momentary self-clarity concept predicted greater likelihood of having subsequent self-injurious urges ( $b = -.95$ ,  $z = -3.21$ ,  $p < .01$ ), even after controlling for previous self-injurious urges.

Similarly, to examine whether momentary negative affect predicts subsequent self-injurious urges, regardless of momentary self-concept clarity, we fitted a multilevel model with momentary negative affect as the sole predictor of subsequent self-injurious urges, while controlling for self-injurious urges in the previous survey. In contrast to our hypothesis, momentary negative affect did not predict the likelihood of having subsequent self-injurious urges ( $b = -.16$ ,  $z = .53$ ,  $p = .60$ ), controlling for previous self-injurious urges.

Next, we examined the interactive effect of momentary self-concept clarity and momentary negative affect in the prediction of subsequent self-injurious urges. We fitted a multilevel model with momentary self-concept clarity, momentary negative affect, and their interaction as predictors of subsequent self-injurious urges, while controlling for self-injurious urges in the previous survey. As we hypothesized, the interaction between momentary self-concept clarity and momentary negative affect was significant ( $b = -1.27, z = -2.04, p = .04$ ), controlling for previous self-injurious urges. In moments when negative affect was low, the effect of momentary self-concept clarity in predicting subsequent self-injurious urges was not significant ( $b = -.83, z = -1.70, p = .09$ ). However, in moments when the negative affect was high, low momentary self-concept clarity predicted a higher likelihood of having subsequent self-injurious urges ( $b = -1.56, z = -3.60, p < .01$ ). To further understand this interaction, follow-up analyses examined differences in the likelihood of having subsequent self-injurious urges between moments with all possible combinations of high and low momentary self-concept clarity and negative affect. Table 4 presents the estimated likelihood (percent) of subsequent self-injurious urges in these analyses, controlling for previous self-injurious urges. As the table shows, when self-concept clarity was low and negative affect was high, the likelihood of having subsequent self-injurious urges was higher than when momentary self-concept clarity was high and negative affect was either high ( $b = -1.56, z = -3.60, p < .01$ ) or low ( $b = -.73, z = -1.96, p = .05$ ). Furthermore, when self-concept clarity was low, there were no differences in the likelihood of having subsequent self-injurious urges between moments when negative affect was low and moments when negative affect was high ( $b = -.57, z = -1.28, p = .20$ ). In addition, there were no differences in the likelihood of having subsequent self-injurious urges between moments when negative affect was low and self-concept clarity was low, moments when negative affect was low and self-concept clarity was high, and moments when negative affect was high and self-concept clarity was high ( $ps = .06-.72$ ). Thus, the likelihood of having self-injurious urges was specifically elevated in moments that self-concept clarity was low and negative affect was high.

Finally, to examine whether the above-mentioned findings are moderated by diagnostic group, we fitted another multilevel model with momentary self-concept clarity, momentary negative affect, diagnostic group, and their interactions as predictors of subsequent self-injurious urges, while controlling for self-injurious urges in the previous survey. The three-way interaction among self-concept clarity, momentary negative affect, and diagnostic group

**TABLE 4. Estimated Likelihood (Percent) of Subsequent Self-Injurious Urges, Predicted by the Interaction Between Momentary Self-Concept Clarity and Momentary Negative Affect**

	Low negative affect	High negative affect
Low self-concept clarity	.16 [.03, .96] <sup>a,b</sup>	.27 [.05, 1.45] <sup>b</sup>
High self-concept clarity	.13 [.02, .75] <sup>a</sup>	.06 [.01, .35] <sup>a</sup>

Note. Controlling for self-injurious urges in the previous survey. Numbers in brackets represent 95% confidence intervals. Cells with different superscripts are different from one another at the  $p < .05$  level.

was not significant ( $b = -16.83$ ,  $z = -1.04$ ,  $p = .30$ ), and the two-way interaction between self-concept clarity and momentary negative affect did not differ by group.

## DISCUSSION

The present study sought to examine psychological processes or mechanisms involved in self-injurious behavior in BPD through intensive repeated measurement using EMAs. Specifically, we examined the role of negative affect and self-concept clarity in predicting the urge to engage in self-injurious behavior in BPD. Self-concept clarity was conceptualized as a proxy for identity, with low levels of self-concept clarity akin to identity disturbance. Consistent with previous research, it was hypothesized that higher levels of momentary negative affect and lower levels of self-concept clarity would be associated with self-injurious urges. However, based on clinical theory (Kernberg, 1984; Levy et al., 2006) as well as other studies (Bender & Skodol, 2007; Meares, Gerull, Stevenson, & Korner, 2011; Wilkinson-Ryan & Westen, 2000), we hypothesized that negative affect and self-concept clarity would interact to predict self-injurious urges, such that the positive relationship between negative affect and self-injurious urges would be greater when self-concept was low. We examined these relations on surveys that were completed at random times throughout the day over a 3-week period.

When examining the pattern of results, we found that self-concept clarity, but not negative affect, predicted self-injurious urges on their own. This finding is consistent with recent findings from Lear and Pepper (2016) in a cross-sectional sample of college undergraduates. They found that self-concept clarity fully accounted for the relation between emotion dysregulation and self-injury. Furthermore, we found that the interaction between negative affect and self-concept clarity predicted self-injurious urges. Specifically, in moments when individuals experienced high negative affect in the context of low self-concept clarity, self-injurious urges increased. Negative affect was not related to self-injurious urges when self-concept clarity was high. In contrast, Houben et al. (2017) found that negative affect predicted self-injury in an inpatient sample; however, they did not assess self-concept. The interaction between negative affect and self-concept clarity is consistent with Kernberg's (1984) contention that a healthy and consolidated identity is important for regulating intense affects and metabolizing them in behaviorally adaptive ways. Kernberg and colleagues (Kernberg, 1984; Levy et al., 2006; Yeomans, Clarkin, & Kernberg, 2015) described the importance of mental representations of self and other as the arena for identity formation and consolidation. Our findings corroborate this supposition, indicating that negative affect experienced in day-to-day life may be processed and regulated effectively if one possesses a strong and stable sense of self, therefore reducing one's likelihood of engaging in maladaptive behaviors such as self-harm.

Interestingly, although suicidal urges, negative affect, and self-concept clarity deficits occurred more frequently among the BPD patients, all three of these constructs occurred in those with anxiety disorders. Of note, the

interaction between self-concept clarity and negative affect in predicting self-injurious urges was consistent across BPD and anxiety disorder diagnostic groups. This finding is consistent with the NIMH Research Domain Criteria initiative (RDoC; Insel et al., 2010; Sanislow et al., 2010), which focuses on a set of core transdiagnostic constructs that are the basis of both typical and pathological functioning. One of the goals of the RDoC approach is to facilitate the translation of basic research for clinical diagnosis and treatment and to identify homogenous treatment targets (Casey et al., 2013). Among the domains articulated in the RDoC approach are self-representations, which are seen as important to systems related to social processes (Sanislow, Quinn, & Sypher, 2015). Our findings suggest that self-concept clarity may be relevant across a variety of disorders for buffering against the effects of negative affect on risk for self-injury. Although among psychiatric diagnoses BPD is most linked with self-harm, our results suggest that self-harm that occurs outside of the context of BPD may also be driven by negative affect in the context of low self-concept clarity, revealing the importance of an integrated sense of oneself as a homogenous treatment target even in disorders other than BPD.

Kazdin (2007) has argued for a developmental psychopathological perspective regarding mechanisms of change, with a focus on understanding the nature or processes underlying the clinical dysfunction of interest. Kazdin argues that therapists' interventions ought to be connected to our understanding of the nature of the clinical dysfunction. Building on these ideas, Levy and colleagues (Levy et al., 2006; Levy & Scott, 2007) suggest that mechanisms of change in psychotherapy can be defined at two levels: (a) targeting the mechanism or psychological process in the patient that results in the difficulties observed and that changes in the patient as the individual moves to psychological health, and (b) the specific interventions and behaviors of the therapist (including the use of common factors) that lead to change in the patient. In order to know what process to target, one needs to know what processes underlie the dysfunction. Our study focused on understanding mechanisms that lead to suicidal urges. By understanding the processes by which problems with identity may lead to NSSI, our findings help identify targets and processes central in the treatment of BPD.

Our findings also have implications for the conceptualization of BPD. Popular conceptualizations of BPD have focused on problems with emotion regulation or the concept of emotion dysregulation (Linehan, 1993). From a transference-focused perspective, Kernberg and colleagues (Clarkin, Yeomans, & Kernberg, 2006; Levy et al., 2006) have stressed the importance of disturbances in identity in the expression of BPD symptoms. Our findings are consistent with this contention. High levels of negative affect were related to self-injurious urges, but only in the context of an unclear sense of self, or an identity-disturbed mental state. Furthermore, self-concept clarity on its own, but not negative affect, predicted subsequent self-injurious urges. These findings suggest the importance of treatment processes geared toward helping BPD patients develop an integrated, realistic, and stable sense of identity. A consolidated identity appears to help those with BPD withstand and grapple with dysregulated emotion and thus reduce the urge to self-injure.



Levy (2014, 2016) noted that although differing in the explicit emphasis, most efficacious treatments for BPD focus on identity or self-concept processes, noting vacillations in mental states about the self and working to help patients achieve an integrated experience of themselves and others. In transference-focused psychotherapy (TFP), identity consolidation and integration is a central goal. Identity problems are noted in the vacillations between representations of self, others, and self in relation to others (i.e., object relation dyads). These representations are conceptualized in dyads to note that representations of the self and of others are intrinsically linked and go hand in hand with one another. For example, the view of oneself as a victim is intrinsically tied to the view of the other as a victimizer. Likewise, the view of oneself as helpless and dependent is intrinsically tied to the view of the other as omnipotent and withholding. The lack of integration in these representational states leads to vacillations between them, often with a lack of awareness of the former state and of the overall process, and this is thought to result in the erratic behavior seen in BPD. Similarly, from a schema-focused perspective, a lack of integration in representations is noted in the concepts of schema modes (a temporary or momentary schema state) and schema flipping. Similar to TFP, common schema modes have been identified, such as “vulnerable child.” Attention to these schema modes is a central aspect of schema-focused cognitive therapy. In dialectical behavior therapy, the integration of representations is thought to occur through the process of dialectical thinking and the achievement of the synthesis of the thesis and the antithesis. Finally, in mentalization-based therapy (MBT) these processes are addressed through the conceptualization of mental states the focus on awareness of varied perspectives or mental states. Thus, identity disturbance appears to be a central component of BPD that is incorporated to varying degrees in treatments for BPD. Additionally, the findings from our study highlight the importance of identity as a potential mechanism of change and a moderator of the relationship between more commonly studied aspects of BPD, negative affect, and self-injury.

The present study has several strengths. First, our study was conducted in the context of a practice-research network (PRN; Castonguay, Pincus, & McAleavey, 2013). Because our study was carried out in a PRN, it combines the external validity of a community sample with the internal validity of research controls. Participants in our study were patients presenting for treatment in a community outpatient clinic. As such, our participants are highly relevant to those in clinical practice. However, our participants were reliably assessed and diagnosed using structured interviews, providing the precision necessary in research. Second, in comparing our BPD patients with those with anxiety disorders, we utilized a highly relevant control condition. Rather than compare those with BPD to a healthy control, we identified a control based on similarities and differences in psychopathology. Those with anxiety disorders often suffer from negative self-concepts, but not necessarily unstable ones. By comparing our BPD patients to those with anxiety, we control for the negativity of self-concept. Third, and most central to our study, we utilized an EMA approach to studying self-injury in BPD. This is particularly important because of the temporal dynamics in variables such as negative affect,

self-concept clarity, and self-injury in BPD, and the problems associated with retrospective recall. The present study's use of an EMA approach allowed for the opportunity to model negative affect, self-concept clarity, and self-injury at a momentary level through collected data at several time points throughout the day across 3 weeks. This allows for the examination and modeling of psychological processes as they occur at a much more fine-grained level. Another strength of the current study is the use of multilevel modeling in the analysis of data. Finally, the nested nature of the data demands such analytic techniques; these also allowed us to decompose variance in self-injurious urges that occurs between people, and within people between surveys.

Limitations of the current study include the challenges associated with the low base rates of momentary self-injurious urges. The rare occurrence of self-injurious urges across the 21-day sampling period resulted in highly skewed, nonnormal, zero-inflated distribution. This limited our analyses to dichotomous outcomes, which did not allow us to examine the effects of negative affect and self-concept clarity on the *intensity* of self-harm urge. Previous EMA studies that examined suicidal ideation/behavior have specifically recruited samples of individuals who had a history of suicide, and thus those studies may have been able to capture such behavior at higher rates than we were able to in the current study. One possible solution would be to recruit samples that are more likely to have self-injurious urges. The sampling approach of the larger study was designed to recruit individuals based on BPD diagnostic status rather than self-injury, limiting our ability to maximize reports of self-injurious activity. Nevertheless, our findings emphasize the importance of looking at potential moderating variables, such as self-concept clarity, that may unmask the effects of variables that would be missed when looking only at main effects.

Future directions for research may include examination of additional factors that may be involved in self-injurious behaviors, such as impulsivity, which has been shown to play a role in suicidal behavior in combination with other features of BPD (McGirr, Paris, Lesage, Renaud, & Turecki, 2007). Another aspect that is important to consider in future research, given that we were unable to examine the predictors of urges reported on event-contingent surveys, is the context in which self-injurious behaviors occur. The use of the EMA approach is ideal for assessing contextual factors, daily stress, and interpersonal interactions that are likely to affect one's emotional state and mood, individuals' views about themselves and other people, and the occurrence of self-injurious behaviors. Thus, future EMA research with a sample selected for higher levels of self-injury may be able to examine the importance of context in these relationships.

In conclusion, findings from this study indicate that factors such as negative affect and self-concept may play a role in predicting self-injurious urges in the daily lives of individuals with BPD. This study also makes a unique contribution to the current literature by studying self-injurious urges at a momentary level through the use of an EMA approach and informs future research in this area to further build knowledge of the underlying pathology that characterizes BPD.

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