

Dating Violence Victimization, Nonsuicidal Self-Injury, and the Moderating Effect of Borderline Personality Disorder Features in Adolescent Inpatients

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Abstract

The aim of the study was to examine whether Borderline Personality Disorder (BPD) features moderate the relation between dating violence victimization (DVV) experiences and nonsuicidal self-injury (NSSI) in adolescent inpatients. A total of 184 adolescent inpatients completed measures on DVV, BPD features, and NSSI at admission to treatment. Bivariate analyses revealed significant relations between DVV, BPD features, and NSSI. Hierarchical multiple regression analyses demonstrated a moderating effect of BPD features such that in the low BPD features group, more severe DVV was associated with greater NSSI frequency; adolescents in the high BPD group endorsed elevated, though stable, levels of NSSI at all levels of DVV. BPD features differentially affect the relationship between DVV and NSSI. Low

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BPD adolescents exposed to high DVV appear to self-injure more frequently and at rates similar to high BPD adolescents when faced with more severe DVV, while DVV appears neither necessary nor sufficient to be the cause of NSSI in high BPD adolescents. Our results indicate that DVV may be a particularly important focal point for treating adolescents who self-injure and have been victimized by a dating partner. As such, Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) and Dialectical Behavior Therapy (DBT) may serve as valuable clinical interventions.

Keywords

youth violence, self abuse/mutilation, mental health and violence, dating violence, domestic violence, nonsuicidal self-injury

Nonsuicidal self-injury (NSSI) is a worldwide phenomenon involving purposeful, bodily self-harm without intent to die (Nock, 2010). Characterized by cutting, burning, extreme picking, and many other behaviors that directly destroy bodily tissue, NSSI is a harmful, self-inflicted act, which is costly to both the individual and society (Klonsky, 2011; You, Lin, & Leung, 2013). Based on nationally representative data, costs of self-inflicted injuries (including intentional self-injurious behavior [suicide, NSSI]) in the United States are estimated to be around US\$33 billion (Corso, Mercy, Simon, Finkelstein, & Miller, 2007). Conceptually, NSSI is recognized as an independent construct from other suicide-related behaviors, with discernable differences in terms of etiology, correlates, functions, and intent (Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010; Muehlenkamp & Gutierrez, 2004; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Nock & Kazdin, 2002; Nock & Kessler, 2006). In general, NSSI stands as a prevalent, problematic behavior that is associated with marked impairment in emotional, psychological, and physical domains, as well as self-inflicted unintentional death (Dyer, Hennrich, Borgmann, White, & Alpers, 2013; Glenn & Klonsky, 2013; O'Carroll et al., 1996; M. M. Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). In adolescent populations, NSSI has become alarmingly prevalent, with estimates ranging between 5.7% and 37.2% for community samples (Hankin & Abela, 2011; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Madge et al., 2008; Yates, Tracy, & Luthar, 2008). Within psychiatric and emergency room settings, an estimated 40% to 82% of adolescents have engaged in NSSI (Darche, 1990; DiClemente, Ponton, & Hartley, 1991; Nock & Prinstein, 2004). Given the prevalence, consequences, and estimated costs of NSSI, further research is needed to understand processes underlying NSSI in adolescent populations.

A strong relation has been demonstrated between adolescent psychopathology and NSSI. Clinical studies show that psychiatric adolescents frequently engage in NSSI (Jacobson, Muehlenkamp, Miller, & Turner, 2008; Nock et al., 2006). Among the psychiatric disorders linked to NSSI, Borderline Personality Disorder (BPD) has emerged as a strong diagnostic correlate (Dulit, Fyer, Leon, Brodsky, & Frances, 1994; Muehlenkamp, Ertelt, Miller, & Claes, 2011; Shearer, 1994). Affecting 1.8% of the population and predominantly females (70%), BPD is characterized by volatile interpersonal relationships, affective instability, and impulsivity in multiple domains (American Psychiatric Association, 2013; Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004). Among individuals diagnosed with BPD, 73% report self-harm behavior, which greatly exceeds the prevalence estimates for this behavior in the general population (Chapman, Specht, & Cellucci, 2005).

In studies of adolescent self-injurers, the link between BPD and NSSI has been demonstrated (Jacobson et al., 2008; Muehlenkamp et al., 2011; Nock et al., 2006; You, Leung, Lai, & Fu, 2012). In fact, 51.7% of adolescent inpatients engaging in NSSI meet the diagnostic threshold for BPD (Nock et al., 2006). Elevated subsyndromal BPD symptoms are also commonly reported by adolescent self-injurers. Jacobson et al. (2008) found that, relative to a nondeliberate self-harm group, adolescent outpatients engaging in NSSI were significantly more likely to report core BPD features (affective instability, confusion about the self, impulsivity, and interpersonal instability). For instance, You et al. (2012) found that, interpersonal instability was highly correlated with current NSSI and significantly predicted future NSSI engagement. Cumulatively, such work suggests that BPD features act as prominent risk factors for adolescent NSSI.

Given the increasing importance of interpersonal relationships in the transition to adolescence (Buhrmester, 1990), another focus of adolescent NSSI research has been on dating violence victimization (DVV). DVV is broadly defined as verbal, emotional, physical, and/or sexual abuse that occurs within the context of romantic relationships and is thought to fall on a continuum of control or coercion (Mulford & Giordano, 2008; Wekerle & Wolfe, 1999). Prevalence rates vary considerably depending on how “violence” is operationalized. When defined exclusively as physical and sexual abuse (e.g., hitting, punching, and forced sex), an estimated 8.3% to 20% of adolescents report DVV from a romantic partner (Eaton, Davis, Barrios, Brener, & Noonan, 2007; Halpern, Spriggs, Martin, & Kupper, 2009; Shorey, Cornelius, & Bell, 2008). When broadened to include nonphysical forms of abuse (e.g., isolating, ridicule, verbal threats, provoking jealousy), DVV rates escalate significantly (Orpinas, Nahapetyan, Song, McNicholas, & Reeves, 2012; Wolfe, Scott, Wekerle et al., 2001). In addition to being highly prevalent, DVV is associated

with a variety of serious physical and mental health outcomes including depression, anxiety, bodily injury, sexually transmitted disease, risky sexual behaviors, pregnancy, substance use problems, and suicidal symptoms (Exner-Cortens, Eckenrode, & Rothman, 2013; Malik, Sorenson, & Aneshensel, 1997; J. G. Silverman, Raj, Mucci, & Hathaway, 2001; Temple & Freeman, 2011).

In recent literature, DVV has emerged as a possible predictor of NSSI. Dating violence has been found to predict NSSI among undergraduates, such that greater numbers of violent experiences with intimate partners were associated with higher levels of self-reported NSSI (Levesque, Lafontaine, Bureau, Cloutier, & Dandurand, 2010). Other empirical research has substantiated this finding, with significant relations between DVV and self-injury in young adult populations (Murray, Wester, & Paladino, 2008; Rizzo et al., 2014). Less is known, however, about the relation between these variables among adolescents. Rizzo et al. (2014) found that personality traits (elevated trait anger, dispositional aggression) moderated the DVV-NSSI relation, but failed to consider the overlap of BPD psychopathology. To the best of our knowledge, no adolescent study has examined how personality psychopathology may confer risk for greater rates of NSSI in the presence of DVV.

Furthermore, research has examined the independent relations of victimization and BPD features. Focused on more general forms of interpersonal violence, work by Stepp, Smith, Morse, Hallquist, and Pilkonis (2012) revealed that in a sample of adult outpatients, BPD symptoms significantly associated with being a victim of both physical and psychological aggression. More specifically, interpersonal aggression and sensitivity both mediated the pathway between BPD symptoms and physical victimization. Such work indicates that BPD symptoms and forms of interpersonal conflict uniquely predict why some individuals experience physical victimization. Importantly, the relation between DVV and BPD features has yet to be studied in relation to NSSI behaviors in any age group. To our knowledge, empirical studies have not yet investigated whether BPD features heighten a victimized individual's risk for NSSI, such that, in the presence of greater BPD features, victimized individuals are more likely to engage in NSSI.

Although we know that BPD confers risk for NSSI (Nock et al., 2006), the degree to which this relation extends to individuals exposed to DVV is less understood. More specifically, no studies have investigated whether BPD features interact with DVV to confer risk for NSSI in adolescents. Previous work on DVV, BPD characteristics, and NSSI has predominantly been conducted with young adults from undergraduate samples and outpatient services (Murray et al., 2008; Stepp et al., 2012). To our knowledge, integrative work on these topics has yet to be downwardly extended and investigating

the relation between DVV, BPD features, and NSSI could reveal underlying processes at play in why adolescents exposed to DVV engage in NSSI. Evidence for such a relation could serve to inform what psychopathological processes (e.g., affective instability, impulsivity) are necessary to target with clinical interventions for adolescents who self-harm.

Against this background, the purpose of the current study was to examine whether BPD features moderate the relation between DVV experiences and NSSI in a sample of adolescent inpatients. Prior research by You et al. (2012) indicates a predictive effect of BPD features on NSSI frequency in adolescent samples, such that greater behavioral impulsivity and unstable self-image significantly predict greater NSSI frequency. Based on this work, we hypothesized that BPD features would moderate the relation between DVV and NSSI, such that (a) an enhancing effect would occur between DVV and NSSI for those with high levels of BPD features, and (b) no effect would occur between DVV and NSSI for those with low levels of BPD features. To further elucidate potential findings, independent samples *t* tests will be conducted to examine differences in NSSI evident between BPD status groups in low DVV and high DVV adolescents, respectively.

Method

Participants

The sample included $N = 184$ consecutive admissions to a private inpatient facility for adolescents ($M_{\text{age}} = 15.37$ years, $SD = 1.42$). Participants were 66% female ($n = 122$), and the ethnic breakdown for the full sample was 81.5% Caucasian ($n = 150$), 4.3% Asian ($n = 8$), 3.3% African American ($n = 6$), and 6.5% Multiracial/Other specified ($n = 12$); eight participants chose not to identify. Sixteen participants did not meet the inclusion criteria (i.e., between 12 and 17 years of age, IQ ≥ 70 , fluent in English, and no diagnostic history of schizophrenia, mental retardation, or any other psychotic disorders).

The full sample was divided into two groups (low BPD features, high BPD features) based on an established clinical cutoff of 66 (Chang, Sharp, & Ha, 2011) for the Borderline Personality Features Scale for Children (BPFS-C; Crick, Murray-Close, & Woods, 2005): (a) high BPD features group ($n = 113$), comprised of individuals with a BPFS-C score equal to, or above, clinical cutoff; and (b) low BPD features group ($n = 71$), comprised of individuals with a BPFS-C score below cutoff.

Measures

BPD features. The BPFS-C (Crick et al., 2005) is a 24-item self-report, developed from the Personality Assessment Inventory Borderline (PAI

BOR) scale, to capture borderline traits in children and adolescents. Participants respond to all items (e.g., "I feel very lonely"; "I want to let some people know how much they've hurt me"; "I worry that people I care about will leave and not come back") on a 5-point Likert scale ($1 = \text{not at all true}$, $5 = \text{always true}$). A dimensional total score (range: 24-120) is computed for each participant by summing all item responses, with higher scores indicating greater symptoms of borderline features. Categorical group status of low-high BPD features was determined using an established cutoff score of 66 on the BPFS-C (Chang et al., 2011); Chang et al. (2011) developed this cutoff in a sample of adolescent inpatients who were also assessed for BPD using a semistructured clinical interview, the Childhood Interview for *DSM-IV* Borderline Personality Disorder (CI-BPD; Zanarini, 2003). Receiver operating characteristic (ROC) curves and area under the curve (AUC) values revealed that the optimal cutoff score for accurate detection of a positive BPD diagnosis using the CI-BPD was a score of 66 on the BPFS-C. Therefore, in the current study, participants with a total BPFS-C score equal to or above the cutoff of 66 were labeled as having high BPD features (coded as a 1), whereas participants below cutoff were labeled as having low BPD features (coded as a 0).

In this particular sample, a significant portion of adolescents are psychiatrically diagnosed with severe forms of personality pathology, especially emerging BPD. To this end, the current sample is likely represented by two clinically distinct subsets, including those who experience high BPD features (i.e., reflective of a potential positive BPD diagnosis) and low BPD individuals (i.e., those experiencing subthreshold or no BPD symptoms). Categorical use of the BPFS-C to differentiate the high/low BPD groups is indicated, as it is sensitive and well-fitted to the psychopathology differences that may be inherent to our sample. Categorical use of the BPFS-C has also been utilized by other previous studies (e.g., Ha, Sharp, Ensink, Fonagy, & Cirino, 2013; Reuter, Sharp, Kalpakci, Choi, & Temple, 2015). Furthermore, participants in the current sample are sufficiently similar in base rate and demography to the sample utilized by the original cutoff validation study; in the initial study by Chang et al. (2011), participants were aged between 12 and 18 years ($M = 16$ years), 54.7% female, and 86.8% White; similarly, participants in the full sample were aged between 12 and 18 years ($M = 15.36$ years), 66% female, and 81% White/Caucasian. Regarding BPD, Chang et al. (2011) found that adolescent inpatient participants with a positive BPD diagnosis on the CI-BPD received an average of $M = 79.45$ on the BPFS-C, whereas a no-BPD diagnosis group scored $M = 59.45$. In parallel, the high-BPD feature group from the current study received an average of $M = 80.62$ on the BPFS-C, and the low BPD feature group received an average of $M = 52.49$.

In the current study, both the dimensional BPFS-C total scores and categorical low-high BPD features classifications were used, although the dimensional score was only examined for descriptive purposes. Adequate psychometric properties have been established for this measure, with Crick et al. (2005) reporting a Cronbach's alpha of .76, and the present study reporting a Cronbach's alpha of .90.

DVV. The Conflict in Adolescent Dating and Relationships Inventory (CADRI; Wolfe, Scott, Reitzel-Jaffe et al., 2001) is a 50-item self-report that measures DVV and perpetration (e.g., physical, psychological, sexual, and relational). Each question contains two parts, with one item assessing victimization (e.g., he or she threw something at me) and one item assessing perpetration (e.g., I threw something at him or her). Participants indicated whether or not they were victimized and/or perpetrated an act during a conflict or argument with their boyfriend/girlfriend (ex-boyfriend/ex-girlfriend) in the past year using binary responses (i.e., yes = 1, no = 0). For the current study, both the victimization and perpetration subscales were utilized; the perpetration subscale was used for descriptive purposes, and the victimization subscale was utilized as the independent variable in our regression analyses. Adequate psychometric properties have been established for this measure, with Wolfe, Scott, Reitzel-Jaffe et al. (2001) reporting a Cronbach's alpha of .83, and the current study reporting a Cronbach's alpha of .92.

NSSI. The Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) is a 17-item self-report which captures the frequency, methodology, age of onset, and severity of NSSI. In previous research, a continuous variable of lifetime NSSI frequency has been computed with the 17 subitems on NSSI frequencies for each method of self-harm (i.e., cutting, burning, scratching, etc.); to this end, all frequency items have been summed into a total score (DSHI total frequency), which represents a lifetime frequency count of how many times an individual has engaged in NSSI. In this study, DSHI total frequency was used to capture NSSI behavior and was the dependent variable in regression analyses. Adequate psychometric properties have been established for this measure, with Gratz (2001) reporting a Cronbach's alpha of .82.

Procedures

The relevant Institutional Review Board approved this study. Protocol for participant recruitment was as follows: Upon admission, parents of adolescents were approached for informed consent. Consented adolescents who then provided assent completed study measures within 3 to 4 days of

admission. All study measures were completed in a private setting and administered by trained doctoral level students and research coordinators.

Data Analytic Approach

Descriptive statistics and bivariate correlations (Pearson correlation coefficients, point biserial correlations) were used to examine relations between main study variables. Raw, nonstandardized data were used in descriptive analyses to foster interpretation of the data, consistent with the scaling of the original measures. Independent samples *t* tests and chi-square analyses were conducted to explore relations between BPD features groups (low BPD features, high BPD features) on sociodemographic variables (gender, age, ethnicity) and other main study variables (i.e., CADRI dating victimization, dating perpetration, DSHI total frequency). Standardized values for the CADRI and DSHI (i.e., *z* score of square root transformation for CADRI DVV and perpetration, winsorized DSHI outliers [described next]) were utilized in all nondescriptive analyses, given nonnormality among these variables. Normality testing (i.e., numerical means, stem and leaf plots) revealed skewness above +2 for DSHI total frequency, which indicates nonnormality, and stem and leaf plots were used to identify extreme outliers. Identified DSHI outliers (i.e., 13 values above a frequency count of 285) were not excluded from the regression analyses, rather outliers were winsorized to the next lowest nonoutlier value (i.e., 285 on the DSHI). Normality testing afterwards revealed this approach normalized DSHI frequency data, as skewness and kurtosis values were within acceptable ranges (skewness = 1.657, kurtosis = 1.482). The approach of winsorizing extreme NSSI outliers is consistent with empirical NSSI research (Rallis, Deming, Glenn, & Nock, 2012). For our primary study aim, hierarchical multiple regression analyses were performed to determine whether BPD group status moderates the relation between CADRI DVV and DSHI total frequency, while including gender as a covariate. Based on significant zero-order correlations with other primary study variables, gender was included as a covariate. Use of BPD status as a categorical moderator was determined based on sample characteristics, and supported by categorical moderation in existing BPD research (Gratz, Breetz, & Tull, 2010).

Results

Preliminary Analyses

Descriptive statistics for the full sample and individual groups (high BPD features, low BPD features) are depicted for all demographic and main study

Table I. Participant Characteristics.

| | Full Sample (n = 184) | High BPD Features Group (n = 113) | Low BPD Features Group (n = 71) | p |
|----------------------|--------------------------|---|---------------------------------------|------------------|
| Patient Age | 15.37 (1.42) | 15.26 (1.37) | 15.55 (1.49) | .175 |
| CADRI Dating Vict. | 3.99 (5.25) | 4.96 (5.52) | 2.45 (4.42) | .000 |
| CADRI Dating Perp. | 2.93 (3.81) | 3.83 (4.30) | 1.49 (2.24) | .000 |
| DSHI total frequency | 63.72 (115.72) | 74.64 (121.88) | 46.43 (104.08) | .085 |
| BPFS-C total score | 69.77 (16.81) | 80.62 (9.04) | 52.49 (10.75) | .000 |
| Race | | | | |
| African American | 6 | 5 | 1 | $\chi^2 = 2.590$ |
| Caucasian | 150 | 88 | 62 | $p = .459$ |
| Asian | 8 | 5 | 3 | |
| Multiracial or other | 12 | 9 | 3 | |
| Gender | | | | |
| Male | 62 | 30 | 32 | $\chi^2 = 6.695$ |
| Female | 122 | 83 | 39 | $p = .010$ |

Note. Raw data for each measure are depicted for interpretation, consistent with the original scaling of the measure. Data depicted in the rightmost column are bivariate relations, which were tabulated off of all raw data except for the use of standardized CADRI variables and DSHI total frequency data with outliers winsorized; BPD = Borderline Personality Disorder; CADRI Dating Vict. = Conflict in Adolescent Dating Relationships Inventory Dating Victimization subscale; CADRI Dating Perp. = Conflict in Adolescent Dating Relationships Inventory Dating Perpetration subscale; DSHI = Deliberate Self-Harm Inventory; BPFS-C = Borderline Personality Features Scale for Children.

The *p* value of chi-square tests and *t* tests is depicted in the rightmost column.

variables in Table 1. On the DSHI, 32.6% (*N* = 60) of the sample reported no self-harm behavior. On the CADRI, 60.3% (*N* = 111) endorsed at least one DVV item and 57.1% (*N* = 105) endorsed at least one dating perpetration item. Group differences were tested for all main variables (BPFS-C, DSHI, and CADRI) and sociodemographic variables (age, gender, and ethnicity) using independent samples *t* tests and chi-square analyses. Analyses revealed significant group differences between adolescents based on BPD status (low BPD features, high BPD features) on the standardized CADRI DVV and perpetration subscales, such that the high BPD features group reported significantly more DVV ($t = -3.60$, $p = .000$) and perpetration experiences ($t = -4.29$, $p = .000$), than the low BPD features group. For our dependent variable, DSHI total frequency, no significant group differences were found on the DSHI when outliers were winsorized ($t = -1.73$, $p = .085$). For

Table 2. Bivariate Correlation Matrix.

| | BPD-f. Group | DSHI Frequency | CADRI DVV | CADRI DVP | Gender | Age |
|----------------|-----------------|-------------------|--------------|--------------|--------|-----|
| BPD-f. Group | — | | | | | |
| DSHI Frequency | .127 | — | | | | |
| CADRI DVV | .249** | .091 | — | | | |
| CADRI DVP | .285** | .070 | .853** | — | | |
| Gender | -.191** | -.181* | -.138 | -.173* | — | |
| Age | -.100 | -.113 | .118 | .156* | .017 | — |

Note. Data are bivariate correlations. CADRI DVV and DVP are standardized with z scores and square root transformations. BPD-f. group = Borderline Personality Disorder features group (0 = low BPD features, 1 = high BPD features); DSHI = Deliberate Self-Harm Inventory; DSHI frequency with winsorized outliers; CADRI DVV = Conflict in Adolescent Dating Relationships Inventory Dating Victimization subscale; CADRI DVP = Conflict in Adolescent Dating Relationships Inventory Dating Perpetration subscale.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

demographic variables, findings revealed that groups did not differ with regard to age ($t = 1.36$; $p = .175$) or ethnicity ($\chi^2 = 2.59$, $p = .459$); however, chi-square analyses revealed that gender differed between the two groups, such that the high BPD features group contained significantly more females ($n = 83$) than the low BPD features group ($n = 39$; $\chi^2 = 6.69$, $p = .010$).

Independent samples t tests were then conducted to examine differences on DSHI total frequency between BPD status groups among low DVV individuals only and then separately among high DVV individuals. A median split on the CADRI DVV was first used to distinguish low DVV individuals ($n = 89$) and high DVV individuals ($n = 95$). For low DVV individuals only, significant differences for DSHI total frequency were revealed between low and high BPD features groups ($t = -3.65$, $p = .000$), such that those in the high BPD features group had significantly greater DSHI total frequency than those in the low BPD features group. In contrast, no significant differences were found for DSHI in BPD status groups of high DVV individuals ($t = 1.08$, $p = .284$), which suggest that the low BPD features group engages in DSHI at higher frequencies when faced with more severe DVV.

Bivariate correlations revealed multiple significant relations between primary study and demographic variables (see Table 2). BPD features group status was significantly correlated with DVV (CADRI; $r = .249$, $p = .001$), dating violence perpetration (CADRI; $r = .285$, $p = .000$), and gender ($r = -.191$, $p = .009$), thus indicating that assignment to the high BPD features group is associated with greater DVV and perpetration, and being of the

female gender. Significant correlations also emerged for DSHI total frequency and gender ($r = -.181, p = .014$), such that greater DSHI frequency is associated with being female. In contrast, age was not significantly related to any of the main study variables to be included in the primary regression analyses (i.e., CADRI DVV, DSHI total frequency, and BPD group status).

Moderation Analyses

To test our moderation model, hierarchical multiple regression analyses were conducted. In the first block, gender and a standardized CADRI DVV variable (i.e., z score of square root transformation of CADRI DVV) were entered as predictors of DSHI total frequency. Gender was included as a covariate to account for potential confounding effects in subsequent analyses. The model fit in Block 1 was significant, $R^2 = .037, F(2, 181) = 3.479, p = .033$, such that 3.7% of the variance in DSHI total frequency was accounted for. In Block 2, BPD features group status was added as a predictor of DSHI total frequency; significant findings were yielded for this model fit, $R^2 = .044, F(3, 180) = 2.740, p = .045$, accounting for an additional .7% of the variance in DSHI total frequency. In Block 2, only gender was a significant predictor ($\beta = -.158; SE = 13.77; t = -2.11, p = .036$), both CADRI DVV ($\beta = .048; SE = 6.61; t = .630, p = .530$) and BPD features group status ($\beta = .085; SE = 13.68; t = 1.12, p = .264$) were not significant. In Block 3, the interaction variable, standardized CADRI DVV \times BPD features group status, was added as a final predictor of DSHI total frequency; the final model exhibited significant model fit, $R^2 = .113, F(4, 179) = 5.714, p = .000$, accounting for an additional 7% of the variance in DSHI total frequency. Analyses for Block 3 revealed a significant interaction between standardized CADRI DVV and BPD features group status in predicting DSHI total frequency ($\beta = -.477; SE = 13.75; t = -3.74, p = .000$). In the high BPD features group, DSHI total frequency remained elevated, though relatively stable across all levels of DVV (see Figure 1). In the low BPD features group, as levels of DVV increased, DSHI total frequency also increased. Thus, there was a differential effect of DVV in the prediction of DSHI total frequency, such that there is an enhancing effect of DVV on DSHI total frequency in the low BPD features group, and no effect in the high BPD features group.

Discussion

The overall aim of this study was to investigate the potential moderating effect of BPD features on the relation between DVV and NSSI in a sample of adolescent inpatients. Specifically, we found a significant interaction

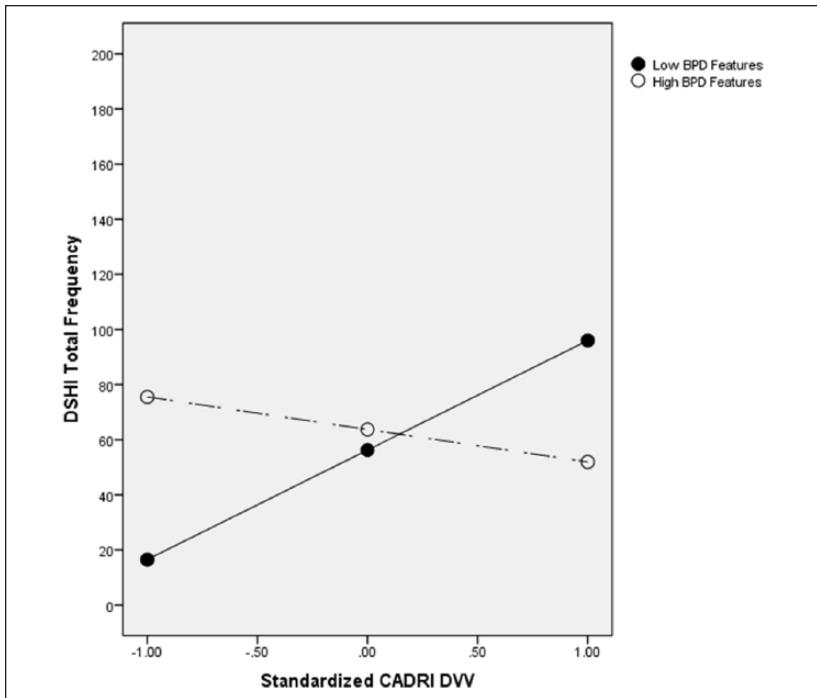


Figure 1. Interaction between DVV and BPD features group status (low, high) in predicting DSHI total frequency for adolescent inpatients.

Note. CADRI Dating Victimization (DVV) scores are standardized. DVV = dating violence victimization; BPD = Borderline Personality Disorder; DSHI = Deliberate Self-Harm Inventory; CADRI = Conflict in Adolescent Dating and Relationships Inventory.

effect between BPD features (low, high) and DVV in the prediction of NSSI frequency, such that the low BPD features group reported greater NSSI frequency with higher DVV while the high BPD features group reported elevated NSSI frequency regardless of DVV. BPD status groups (low versus high features) were compared among low DVV individuals and high DVV individuals only using independent samples *t* tests. Among low DVV adolescents, those with high BPD features reported significantly greater NSSI than adolescents with low BPD features. In contrast, among high DVV adolescents there were no significant differences between low and high BPD feature groups. This suggests that adolescents with low BPD features engage in NSSI at higher frequencies when faced with more severe DVV. Significant differences were also evident between BPD features groups (low versus

high) on a multitude of study variables including DVV, dating perpetration, and gender.

In general, our correlation and bivariate findings provide mixed support for existing literature on DVV, BPD features, and NSSI in adolescence. First, the present study revealed a significant positive relation between DVV and BPD features. Given the central features of BPD (e.g., impulsive behavior, conflictual relationships, intense affect dysregulation), this finding is not entirely surprising. Indeed, previous literature has also demonstrated a link between personality pathology and partner violence across adults (Bouchard, Sabourin, Lussier, & Villeneuve, 2009) and adolescents (Reuter, Sharp, Temple et al., 2015). Second, the current study yielded support for the relation between DVV and NSSI frequency in adolescents with low levels of BPD features, revealing that adolescents with subclinical BPD features engaged in NSSI more frequently when faced with greater dating victimization. Results corroborated existing work on the relation between DVV and NSSI in both psychiatric adolescent populations (Rizzo et al., 2014) and young adults in university settings (Levesque et al., 2010). Last, and in contrast with previous research on borderline personality pathology and NSSI (You et al., 2012), a significant relation was not evidenced between BPD and NSSI at the bivariate level. Given the presence of extreme NSSI outliers in the high BPD group (i.e., total frequency greater than 1000), identified outliers were winsorized, consistent with methods utilized in existing NSSI research (Rallis et al., 2012). This methodological approach may have subsequently weakened our ability to detect this bivariate level relation. Overall, current study analyses yielded partial evidence for relations between DVV, BPD features, and NSSI in adolescent inpatients.

Preliminary and highly tentative interaction analyses revealed BPD feature group status moderated the relation between DVV and NSSI. Contrary to initial hypotheses proposed based on existing literature (Stepp et al., 2012; You et al., 2012), interaction effects for BPD feature groups (low, high) were observed to be opposite of those expected. The low BPD features group escalated in NSSI frequency as levels of DVV increased, whereas no such effect was found among the high BPD features group, who exhibited elevated, though stable rates of NSSI at all levels of DVV. This finding was consistent with independent samples *t* test analyses examining low DVV and high DVV individuals separately, which indicated significant differences in NSSI for BPD status (low, high) groups in low DVV individuals, and no significant differences for high DVV individuals. In other words, adolescents with high BPD features engaged in elevated levels of NSSI across all levels of DVV, whereas adolescents with low BPD features engaged in similarly high levels of NSSI, but only when exposed to increasing and more severe DVV. As the

first known study to examine this moderating effect, interaction findings from the present study are clearly preliminary and in need of further replication before tentative conclusions may be drawn.

One possible explanation for the unexpected moderating effect is that DVV is neither necessary nor sufficient to be the cause or consequence of NSSI in adolescents with high BPD features. In other words, the effects of DVV on NSSI may be less salient in adolescents with high levels of borderline personality pathology. Perhaps this is because NSSI is a central characteristic of BPD phenomenology and serves multiple emotional, behavioral, and experiential functions (e.g., as a means of affect regulation, punishing the self, and fostering sensation; Kleindienst et al., 2008; Sadeh et al., 2014). Work by Kleindienst et al. (2008) reveals that NSSI multifunctionality has an additive, reinforcing effect in BPD-specific populations, such that motives for NSSI tend to compound one another. Therefore, as a singular factor, DVV may have a less salient effect on NSSI behavior in this population. Individuals with high BPD features may self-harm at similarly elevated rates regardless of DVV, due to other mutually reinforcing functions of this behavior keeping it in place.

Another process potentially relevant to this relation is that high levels of emotion dysregulation may be one factor contributing to elevated baseline frequencies of NSSI in adolescents with high BPD features. Characteristic of BPD, individuals reporting elevated BPD features tend to experience long-standing issues with affective instability and dysregulation (Glenn & Klonsky, 2009; Tragesser, Solhan, Schwartz-Mette, & Trull, 2007; Yen, Zlotnick, & Costello, 2002), and these emotional impairments have been consistently linked to adolescent NSSI (Adrian, Zeman, Erdley, Lisa, & Sim, 2011). Furthermore, research indicates that individuals with BPD report engaging in NSSI as a way to manage intense negative emotions, such as emptiness, depression, sadness, loneliness, and feeling unreal (Brown, Comtois, & Linehan, 2002; Kleindienst et al., 2008). Therefore, it is plausible that the elevated, unvarying levels of NSSI found in adolescents with high BPD features may reflect both baseline deficits with emotional functioning and the chronic use of NSSI as an emotion regulation strategy. Due to these evidenced baseline deficits with emotion regulation (Sharp et al., 2011), DVV may not as significantly impact the frequency of NSSI in individuals with high BPD features.

Present findings likewise provide impetus for one potential coping strategy adolescent inpatients with high BPD features may employ when experiencing DVV—this particular group may respond back and engage in reciprocally violent acts against their romantic partner. Relative to those with low levels of BPD features, the high BPD feature adolescent subset reported

significantly greater levels of violence perpetrated against their romantic partner. Consistent with current findings, previous literature indicates that dating perpetration is a common response among individuals with elevated BPD features. Drapeau and Perry (2009) found that individuals diagnosed with BPD are more likely to be hurt and also hurt others, therefore suggesting that BPD individuals are more prone to bidirectional intimate partner violence, and inhabiting the role of dual victim-perpetrators. A dyadic study of intimate partner couples by Maneta, Cohen, Schulz, and Waldinger (2013) provided support for this and documented a link between borderline personality organization and perpetrating violence against a partner. Beyond this, Maneta et al. (2013) suggested that deficits in self-regulation may contribute to the association between BPD and violent dating behaviors. In conjunction with the current study, previous work points to a bidirectional, cyclical nature of dating violence in adolescent romantic couples comprised of at least one individual with elevated BPD features (Drapeau & Perry, 2009; Maneta et al., 2013). However, it is crucial to note that our findings cannot speak to the causal or temporal relations between DVV and perpetration for youth included in the present study, and therefore, this explanation remains speculative in nature.

In addition, findings suggest adolescent inpatients with low BPD features may more frequently use NSSI as a trauma-related coping response to more severe DVV and associated distress. Dating violence has been identified as one particularly salient, traumatic experience underlying both internalizing symptoms (e.g., depression, anxiety; Callahan, Tolman, & Saunders, 2003; Foshee, Reyes, Gottfredson, Chang, & Ennett, 2013) and NSSI behavior (Rizzo et al., 2014), especially for youth experiencing more severe forms of sexual and physical violence. One way that adolescents cope with events they perceive as traumatic and marked psychological distress is by engaging in NSSI. For example, Weierich and Nock (2008) found that sexual trauma and reexperiencing symptoms (e.g., flashbacks, physiological reactivity) were prominent factors in adolescent NSSI behavior. Other studies examining the functions of NSSI also indicate that self-injury often serves as a way to manage emotions and alleviate affect dysregulation associated with trauma and abuse (Muehlenkamp, Kerr, Bradley, & Larsen, 2010). Our findings suggest that clinical adolescents with low levels of BPD features may more frequently engage in NSSI when exposed to more severe DVV, and we believe this may be a trauma-related coping method. One potential explanation is that adolescents with low levels of BPD features who typically display regulated affect and behavior in normal circumstances are more adversely affected by the dysregulation accompanying trauma, and, in turn, engage in NSSI as a means to cope. It is important to highlight that adolescents with high BPD features may

also use NSSI as a means to cope with intense negative affect surrounding trauma. This is indeed, consistent with existing literature on BPD, trauma, and NSSI. However, findings from the current study draw attention to the observed finding that adolescents with low BPD features engage in similarly high rates of NSSI *only* when exposed to more severe DVV, suggesting that increased NSSI may be particularly trauma-linked in this subset of adolescents.

The present study has several limitations. First, to conceptualize NSSI, the current study assessed the frequency of this behavior, a known correlate of both adolescent DVV (Rizzo et al., 2014) and borderline personality features (You et al., 2012). Despite this, the current study failed to consider how other behavioral aspects of NSSI, such as onset and medical severity, are impacted by the moderating effect of DVV and BPD features. Future work on these relations would serve to shed light on the extent to which adolescents engage in earlier and more medically severe NSSI (e.g., “injuries [requiring] multiple stitches . . . [that are] potentially disfiguring or life threatening”; Andover, Primack, Gibb, & Pepper, 2010, p. 82; Rosen & Heard, 1995), when exposed to DVV and greater BPD features. Second, the present study was cross-sectional in nature, and therefore does not permit us to speak to whether the effect of BPD features and DVV differentially predicts NSSI frequency over time. Third, trauma history went unmeasured in the current study, which precludes us from including this as a covariate in analyses, and speaking to the effects of preexisting trauma history on main findings between DVV, BPD features group status, and NSSI. Fourth, the current study utilized a categorical moderator, low/high BPD features group, which may have diminished statistical power and ability to detect true effects in moderation analyses. Utilizing a continuous variable in a categorical fashion has particular limitations (e.g., loss in power), which have been recognized in statistical and assessment literature (Frazier, Tix, & Barron, 2004; Royston, Altman, & Sauerbrei, 2006). Replication of the current study findings is therefore needed in another high-risk adolescent inpatient sample and in which BPD features is examined as a dichotomous moderator. Last, the psychiatric sample utilized for the current study is notably severe, and adolescents presenting at this particular treatment program may represent an especially acute portion of inpatient populations. As such, present findings may not generalize to adolescents presenting to other outpatient settings, community clinics, or the general population. Likewise, a homogeneous ethnic makeup threatens the external validity of the current study and impedes our ability to extend present findings to adolescents not identifying as Caucasian.

Despite these limitations, the present study had a number of notable strengths. First, the current study utilized the CADRI to capture adolescent dating violence. Much extant work has assessed teen dating violence with one or two

items, or failed to discriminate between various forms of violent dating encounters (e.g., victimization, perpetration). The use of the CADRI allowed the present study to capture multiple types (physical, sexual, emotional/verbal) of bidirectional intimate partner violence, with a comprehensive 50-item measure that taps into a wide spectrum of severity. The current study also afforded us a significant sample-related strength—adolescents presenting at this inpatient facility were notably severe and therefore allowed for the examination of DVV, BPD features, and NSSI in a particularly acute adolescent sample.

The present study, albeit highly preliminary, also yielded multiple clinically relevant implications for adolescents engaging in self-harm behavior. Prominently, our findings indicate that DVV may be an especially important treatment target for adolescent self-injurers who have been victimized by a romantic partner. Sexual trauma has been identified as a strikingly salient experience underlying NSSI behavior (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Weierich & Nock, 2008), especially when it occurs in the context of a dating relationship (Swahn, Alemdar, & Whitaker, 2010). Treatments focused on processing such traumatic events (e.g., Trauma-Focused Cognitive Behavioral Therapy [TF-CBT]) have shown particular promise in reducing posttraumatic stress disorder (PTSD) symptoms related to intimate partner violence in child populations (Cohen, Mannarino, & Iyengar, 2011). Against this background, TF-CBT may be a valuable treatment for trauma symptoms evident in adolescent inpatients who self-injure and have also experienced dating victimization.

Concomitantly, current findings suggest that interpersonal functioning may be a potential treatment target for adolescents who self-injure. Empirically supported treatments which highlight interpersonal skill development in the context of BPD pathology (e.g., Dialectical Behavioral Therapy for Adolescents [DBT-A]) may be especially effective at promoting healthy social interactions and reducing violent dating behaviors. Multiple clinical and community-based studies have demonstrated the efficacy of DBT-A in BPD-specific (Fleischhaker et al., 2011) and more general populations of adolescent self-injurers (James, Taylor, Winmill, & Alfoadari, 2008; Mehlum et al., 2014). Future research should seek to investigate the extension of this treatment to adolescents who self-injure and have experienced DVV. Such work would serve to inform our treatment of victimized youth presenting at acute-care settings for issues with self-harm.

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Author Biographies

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Jeff R. Temple is an associate professor, licensed psychologist, and director of Behavioral Health and Research in the department of Ob/Gyn at the University of Texas Medical Branch. His research, which has been funded through the National Institute of Justice, National Institutes of Health, and Centers for Disease Control and Prevention, focuses on the etiology, course, consequences, prevention, and treatment of teen dating and intimate partner violence. He recently served as the vice chair of the Texas state Task Force on Domestic Violence.

Carla Sharp is a professor in clinical psychology at the University of Houston. She received her doctorate in Developmental Psychopathology at Cambridge University. Her research interests broadly focus on the area of social cognition, psychiatric problems, and emerging personality pathology in adolescent populations, where she has published over 160 peer-reviewed publications, chapters, and books. Representative publications include: “The Diagnosis of Borderline Personality Disorder in Adolescents: Evidence in Support of the Ci-Bpd in a Sample of Adolescent Inpatients,” “Neuroeconomics: A Bridge for Translational Research,” and “An Item Response Theory Analysis of the Problem Gambling Severity Index.”