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Does Comorbid Substance Use Disorder Exacerbate Borderline Personality Features?: A Comparison of Borderline Personality Disorder Individuals with vs. without Current Substance Dependence

Han-Joo Lee, M.A.^{1,2}, Courtney L. Bagge, M.A.^{1,2}, Julie A. Schumacher, Ph.D.¹, and Scott F. Coffey, Ph.D.¹

¹The University of Mississippi Medical Center, Mississippi

²Jackson G.V. (Sonny) Montgomery VA Medical Center, Mississippi

Abstract

There is compelling evidence that comorbid borderline personality disorder (BPD) negatively impact the clinical courses and outcomes of substance use disorders (SUD). Conversely, there is little evidence that concurrent SUD exacerbates the clinical characteristics of BPD. Thus, this study sought to examine whether the presence of current substance dependence among BPD patients would be associated with stronger BPD-relevant personality traits and behavioral characteristics. Female BPD patients without (BOR; $n = 37$) or with current substance dependence (BSUD; $n = 19$), and female non-BPD/SUD controls (CON; $n = 48$) were compared with respect to impulsivity, affective lability, affective intensity, externalizing behaviors, and self-harming/suicidal tendencies, taking into consideration their comorbid mood disorders, anxiety disorders, and antisocial personality disorder. Results indicated that both BOR and BSUD groups scored higher than CON in most of the measures, but BOR and BSUD failed to reveal significant group differences especially when the influence of comorbid psychopathology was removed. The overall pattern of findings remained identical even when comparing BPD patients with vs. without the diagnosis of lifetime substance dependence. Our results do not support the notion that BPD individuals with SUD display more severe BPD features than individuals with BPD alone.

Keywords

Borderline personality disorder; Substance abuse; Impulsiveness; Affective lability; Axis II

Borderline personality disorder (BPD) is a severe psychological condition characterized by marked impulsivity, affective dysregulation, identity disturbance, anger dyscontrol, and life-

Correspondence concerning this article should be addressed to Scott F. Coffey, Department of Psychiatry and Human Behavior, The University of Mississippi Medical Center, 2500 North State St. Jackson, MS 39211. scoffey@psychiatry.umsmed.edu.
Han-Joo Lee and Courtney L. Bagge, Department of Psychiatry and Human Behavior, The University of Mississippi Medical Center and the G. V. (Sonny) Veterans Administration Medical Center. Julie A. Schumacher and Scott F. Coffey, Department of Psychiatry and Human Behavior, The University of Mississippi Medical Center.

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Han-Joo Lee is now at the Department of Psychology, University of Wisconsin, Milwaukee.

threatening/self-damaging behaviors (American Psychiatric Association, 2000). BPD often occurs with other psychiatric conditions, including mood disorders, anxiety disorders, and other Axis-II personality disorders (Widiger & Trull, 1993). Substance use disorders (SUDs) have been highlighted as a common comorbid condition of BPD (Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). In stark contrast with the relatively low prevalence of BPD in the general population (approximately 2%), the prevalence of BPD among substance users is estimated as 5 to 32% (Bornoalova & Daughters, 2007). Likewise, almost up to 60% of individuals with BPD present with a comorbid SUD (Trull et al., 2000).

This comorbidity is attributable at least in part to the partial overlap in the diagnostic criteria for these two disorders; substance abuse is a type of self-damaging impulsivity when diagnosing BPD according to DSM-IV criteria. It is doubtful, however, that the striking co-occurrence of BPD and SUD can be fully explained by criteria overlap. Several authors have suggested that some important personality traits (e.g., affective instability and impulsivity) underlie the development of both conditions and thus explain the large portion of their comorbidity (Bornoalova, Lejuez, Daughters, Rosenthal, & Lynch, 2005; Trull et al., 2000). Furthermore, both BPD and SUD are often associated with early adverse life experiences (e.g., childhood physical/sexual abuse and a dysfunctional family), which may also contribute to the development of disinhibitory psychopathology (Brown & Anderson, 1991; Trull et al., 2000).

The literature has extensively documented the deleterious impact of comorbid BPD among substance users on various clinical outcomes, including more severe drug use, higher rates of needle sharing, a higher likelihood of suicide attempt, poorer global psychological health, and poorer treatment outcomes for SUD (e.g., Kruegelbach, McCormick, Schulz, & Grueneich, 1993; Nace, Saxon, & Shore, 1986). Furthermore, the presence of BPD is associated with an earlier onset age of SUD, which has been shown to be linked to more severe physical, emotional, and social consequences (e.g., Linehan et al., 1999; Links, Heslegrave, Mitton, van Reekum, & Patrick 1995). Taken together, the literature provides compelling evidence that comorbid BPD renders the psychopathology and clinical outcomes of SUD more serious.

Although not as robust, there are a few studies suggesting that comorbid SUD may render the psychopathology and clinical outcomes of BPD more serious. Links et al (1995) found that individuals with both BPD and SUD exhibited more severe BPD psychopathology, including self-destructive and suicidal tendencies at 7-year follow-up, relative to those whose initial diagnosis was BPD or SUD only. Relatedly, Zanarini et al. (2004) also reported that compared to mood disorders or anxiety disorders, SUDs were more strongly associated with the failure to attain symptomatic remission among BPD patients at 6-year follow-up. Another study reported that young BPD patients (age 30 years or younger) with comorbid alcohol use disorder (AUD) were more impulsive than BPD patients without any history of SUD (Wilson, Fertuck, Kwitel, Stanley, & Stanley, 2006). Moreover, the current literature suggests that some of the core personality traits of BPD such as affective dysregulation and impulsivity also underlie the psychopathology of SUD (e.g., Cooper, Frone, Russell, & Mudar, 1995; Kruegelbach et al., 1993). Thus, it is conceivable that SUD added to BPD may exacerbate BPD-relevant personality features and behavioral characteristics. However, overall, there is a paucity of evidence as to whether comorbid SUD exacerbates BPD features.

Thus, the principal aim of the current study was to compare BPD patients with current substance dependence, BPD patients without current substance dependence, and controls without these diagnoses, with respect to BPD-relevant personality traits and behavioral characteristics, including (a) impulsivity, (b) affective lability, (c) affective intensity, (d)

self-harming/suicidal tendencies, and (e) externalizing behaviors. This study focused on the more severe form of SUD, substance dependence as opposed to substance abuse, in order to enhance the likelihood of detecting the negative impact of comorbid SUD among BPD patients. We tested the following specific hypotheses that, on these BPD-relevant personality traits and related behavioral characteristics, (a) BPD patients would score higher than non-BPD/SUD comparison controls, and (b) BPD patients with current substance dependence would score higher than BPD patients without current substance dependence due to the potential additive/interactive effect of comorbidity.

Method

Participants

Study participants included 104 females¹: (a) BPD patients without current substance dependence (BOR; $n = 37$), (b) BPD patients with current substance dependence (BSUD; $n = 19$), and (c) a comparison control group that did not meet lifetime diagnostic criteria for BPD or SUD (CON; $n = 48$). Participants ranged in age from 18 to 60 years ($M = 35.85$, $SD = 11.37$). Demographic details are presented in Table 1. Of 19 BSUD patients, 58% reported current dependence on one drug and 42% reported current dependence on two drugs. Drugs used by these patients included cocaine/crack (42.1%), alcohol (36.8%), sedatives (21.1%), opiates (21.1%), marijuana (5.3%), amphetamine (5.3%), and PCP (5.3%).

Measures

Structured Interview for DSM-IV Personality Disorders (SIDP-IV; Pfohl, Blum, & Zimmerman, 1995)—The SIDP-IV is a semi-structured diagnostic interview for assessing all personality disorders included in DSM-IV. Each question is rated on the 4-point scale: 0 = *not present or limited to rare isolated examples*, 1 = *subthreshold*, 2 = *present*, 3 = *strongly present*. The SIDP-IV generates both categorical and dimensional outcomes and was used as the diagnostic instrument for Axis II Cluster B personality disorders in this study.

Personality Assessment Inventory-Borderline Features Scale (PAI-BOR; Morey, 1991)—The PAI-BOR is a 24-item self-report scale that assesses BPD features with four subscales: (a) Affective Instability, (b) Identity Problems, (c) Negative Relationships, and (d) Self-harm. Sound reliability and validity have been demonstrated for the PAI-BOR total scores (Morey, 1991; Trull, 1995, 2001). This scale was used to assess the overall severity of BPD symptoms in this study.

Computerized Diagnostic Interview Schedule (C-DIS IV; Robins et al., 2000)—The C-DIS IV is a computerized version of the Diagnostic Interview Schedule, a fully structured diagnostic interview for major psychiatric disorders in DSM-IV. Its psychometric properties have been extensively studied and good reliability and validity have been demonstrated for diagnoses of substance abuse and dependence (e.g., Vandiver & Sher, 1991). The current study used the C-DIS to establish SUD diagnostic status.

Mini-International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998)—The M.I.N.I. is a widely used structured diagnostic interview. The M.I.N.I.'s validity has been established in multiple languages against well-validated diagnostic instruments such as

¹Our original project assessed both males and females with BPD. The present study examines only females because the small number of males in the larger project does not allow us to properly analyze the influence of gender. Considering some meaningful gender differences in BPD documented in the current literature (e.g., Zlotnick, Rothschild, & Zimmerman, 2002), we decided to confine the current data analyses to females to reduce interpretative ambiguity.

the Structure Clinical Interview for DSM -Patient Version and the Composite International Diagnostic Interview for ICD-10 (Sheehan et al., 1997). The current study used the M.I.N.I to establish current Axis I psychiatric diagnostic status for all conditions except SUD status.

Barratt Impulsiveness Scale-11 (BIS-11; Patton, Stanford, & Barratt, 1995)—

The BIS-11 is a widely used 30-item questionnaire of impulsive personality traits with three subscales (Patton et al., 1995): (a) Attentional Impulsiveness, (b) Motor Impulsiveness, and (c) Nonplanning Impulsiveness. The BIS-11 has shown good internal consistency across several independent samples, including SUD patients, general psychiatric patients, and prison inmates (Patton et al.). The total score was computed by summing the entire BIS-11 items and the subscale scores were generated by averaging their item ratings.

Affective Lability Scale (ALS; Harvey et al., 1989)—The ALS is a 54-item questionnaire that assesses unstable emotional shifts from normal to various affective states (i.e., anger, depression, elation, and anxiety) and the tendency for one's mood to oscillate between depressive and elated states, and between anxious and depressive states. Items are rated on a 4-point scale (0: *very unresponsive* to 3: *very responsive*). The ALS has demonstrated internal consistency ranging from 0.72 to 0.89 across two different samples (Harvey et al., 1989).

Affective Intensity Measure (AIM; Larsen & Diener, & Emmons, 1986)—The AIM is a 40-item scale that assesses emotional reactivity and variability on a 6-point scale (1: *never* to 6: *always*). Three subscales assess the intensity of emotional reactions to positive, negative, and neutral emotional stimuli, respectively. The AIM has shown good internal consistency, temporal stability, and construct validity (Larsen et al., 1986).

Self-Harming/Suicidal Tendency and Externalizing Behaviors—In order to assess self-harm, suicidal tendencies, and externalizing impulsive behaviors in the past year, we asked the following 8 questions as part of the demographic measure. Self-harming/suicidal questions included: (a) How many times have you harmed yourself while upset in the past 12 months, (b) How many times have you harmed yourself while not upset in the past 12 months, (c) How many times have you thought about suicide in the past 12 months, and (d) How many times have you made a suicide attempt in the past 12 months. Four questions tapped externalizing behaviors: (a) how many times have you engaged in a physical fight in the past 12 months, (b) how many times have you committed a planned crime in the past 12 months, (c) how many times have you committed an unplanned crime in the past 12 months, and (d) how many times you have had sex with someone without knowing his/her sexual history in the past 12 months.

Recruitment

A broad range of recruitment approaches were employed in this study. Prospective participants with BPD were generally recruited from inpatient units at The University of Mississippi Medical Center (although study participation did not begin until the participant was discharged from the inpatient unit) or from local community mental health centers. In addition, some BPD participants (BOR and BSUD) and all CON participants were recruited through advertisements placed in local newspapers and fliers posted in the community. Individuals responding to recruitment materials were scheduled for a diagnostic and psychosocial assessment at which time they provided informed consent and were administered the C-DIS and self-report measures by experienced Bachelor or Masters-level research assistants. The SIDP-IV and M.I.N.I. were administered by Masters- or Doctoral-level research staff. Individuals meeting diagnostic criteria for a psychotic disorder or experiencing an active manic episode were excluded from the study. Participants meeting

criteria for a lifetime substance abuse or dependence diagnosis (other than nicotine or caffeine dependence), but not meeting criteria for BPD, were excluded from the study. Nicotine and/or caffeine use disorders did not constitute exclusion criteria for any of the three study groups. All participants were compensated for their involvement in this study.

Data Analyses

Group differences were examined utilizing univariate/multivariate analyses of variance (ANOVAs) or non-parametric tests such as Pearson's Chi-square test, Fisher's exact test or Mann-Whitney U test depending on the parametric/non-parametric properties of the data in question. When multiple comparisons were needed, family-wise Type I error was controlled by conducting multivariate analyses of variance (MANOVAs) or using a Bonferroni correction.

Covariate Variables—We included the diagnostic status of mood disorders, anxiety disorders, and antisocial personality disorder (ASPD) as covariates in the main analyses for a few reasons. First, these covariates were significantly correlated with most of our dependent measures in the current study (see Table 2). Second, the current literature provides ample evidence that both BPD and SUD are highly comorbid with other Axis-I conditions, particularly mood disorders and anxiety disorders (e.g., Merikangas et al., 1998; Zanarini et al., 1998). Third, numerous authors have also documented the strong linkage between SUD and ASPD (e.g., Alterman & Cacciola, 1991; Regier et al., 1990; Mueser et al., 1999). Thus, in the current study, it was critical to examine whether any BOR-BSUD group differences might merely reflect the influence of varying ASPD features between the two groups. To better understand these potential group differences, analyses with and without covariates are presented. Demographic characteristics (e.g., income, education, etc.) were not used as covariates because it is reasonable to assume that potential group differences on these variables might be the direct result of our diagnostic grouping variables (e.g., the downward social spiral associated with substance dependence) and, therefore, removal of this variance would be inappropriate (Miller & Chapman, 2001). Taken together, our analytic approach that included the diagnostic status of mood disorders, anxiety disorders, and ASPD as covariates was expected to enhance the probability of observing the group differences attributable to the presence of comorbid SUD in BPD after statistically removing the impact of other highly comorbid psychopathology.

Results

Demographic Characteristics

No group differences emerged for age, ethnicity, or race. Chi-square analyses revealed significant group differences in marital status ($X^2 = 17.24, p < .01$) and current employment status ($X^2 = 48.85, p < .01$). Significant chi-square results were further analyzed by inspecting standardized residuals (see Hinkle, Wiersma, & Jurs, 1994; absolute values of 2.0 or greater are considered major contributors to significant chi-square statistics). The BSUD group had fewer married/cohabiting individuals (5.3%) and more divorced individuals (42.1%) than would have been expected by chance. The CON group had more individuals employed full-time (47.9%) and less unemployed individuals (2.1%), whereas there were more unemployed individuals in both the BOR (45.9%) and BSUD (84.2%) groups beyond chance level. Education was not equally distributed across groups ($X^2 = 28.27, p < .01$). In the CON group, 31.9% attained a 4-year college or higher level degree, whereas, only 8.1% and 5.3% reached the same educational level in the BOR and BSUD groups, respectively. The CON participants also reported higher gross income in the past year than BOR or BSUD participants, $F(2, 101) = 5.72, p < .01$.

Group Differences on Covariate Variables (Diagnostic Status of Axis-I and ASPD Features)

In the preliminary analyses, we compared the three groups on diagnostic status of various Axis-I conditions and ASPD that constituted the covariates in the main analyses. First, significant group differences were shown for several mood and anxiety disorders: major depressive disorder (MDD), dysthymia, panic disorder, social phobia, generalized anxiety disorder (GAD), obsessive-compulsive disorder (OCD), and post-traumatic stress disorder (PTSD). For MDD, panic disorder, GAD, OCD, and PTSD, the BOR group satisfied diagnostic criteria to a greater degree compared to the CON group. For dysthymia, the BSUD group met diagnostic criteria to a greater degree compared to the CON group. For social phobia, both BOR and BSUD groups met diagnostic criteria to a greater degree compared to the CON group. Follow-up Fisher's exact test comparing the BOR and BSUD groups on Axis-I comorbidity revealed no significant group difference. Second, we examined ASPD features using both continuous scores and binary diagnostic outcomes. An ANOVA using continuous ASPD scores obtained from the SIDP-IV showed a significant main effect for group, $F(2,101) = 79.28, p < .001, \eta_p^2 = .61$. Follow-up post-hoc tests showed that both the BOR and BSUD groups scored higher than the CON group. The BSUD group also scored higher than BOR group [means and SDs: BSUD = 11.84 (5.18), BOR = 6.78 (4.16), CON = .58 (1.66)]. With respect to the diagnostic status of ASPD, a significant group difference was observed, $X^2(2, n = 104) = 26.22, p < .001$ (BSUD = 47.4%, BOR = 13.5%, and CON = 0%). The ASPD diagnostic rate was more than three times higher among the BSUD group relative to the BOR group, $X^2(1, n = 56) = 7.67, p < .01$.

Overall Borderline Personality Features

With respect to overall borderline personality features (as indexed by the PAI-BOR), an ANOVA revealed a significant group difference, $F(2,89) = 126.87, p < .001, \eta_p^2 = .74$. As expected, Bonferroni post-hoc tests showed that both the BOR and BSUD groups scored higher than the CON group on the PAI-BOR [Mean (SD): BOR = 51.82 (10.80), BSUD = 55.68 (9.36), CON = 18.28 (10.67)], but the two BPD groups did not differ from one another. After statistically removing the influence of the three covariate variables (i.e., diagnostic status of mood disorders, anxiety disorders, and ASPD), the overall group difference was still significant, $F(2,86) = 31.63, p < .001, \eta_p^2 = .42$. Additional analyses on the PAI-BOR subscales revealed the same pattern of group differences: the two BPD groups scored higher than the CON group on all PAI-BOR subscales, but the BOR and BSUD groups did not differ.

Impulsivity

A MANOVA with three subscales of the BIS-11 revealed a significant main effect for group [Wilks' Lambda = .35, $F(6, 192) = 21.82, p < .001, \eta_p^2 = .41$]. Follow-up univariate and Bonferroni post-hoc tests revealed that on the BIS-Attentional Impulsiveness [$F(2, 98) = 68.84, p < .001, \eta_p^2 = .58$] and BIS-Motor Impulsiveness [$F(2, 98) = 48.93, p < .001, \eta_p^2 = .50$] subscales, both BPD groups scored higher than CON, and BSUD also scored higher than BOR (see Table 3 for group means and standard deviations). On the BIS-Nonplanning Impulsiveness [$F(2, 98) = 43.83, p < .001, \eta_p^2 = .47$], both BPD groups scored higher than CON, but BOR did not differ from BSUD.

When the Axis-I and ASPD diagnostic status covariates were included in the model, the overall group difference still remained significant, Wilks' Lambda = .71, $F(6, 186) = 5.92, p < .001, \eta_p^2 = .16$. However, the BOR-BSUD group differences on BIS-Attentional Impulsiveness and BIS-Motor Impulsiveness were rendered non-significant following the inclusion of these covariates. Only the CON group remained significantly different from the two BPD groups in all BIS-11 subscales. Follow-up analyses, in which each covariate was

entered separately, revealed that it was the inclusion of ASPD diagnostic status (not mood disorders or anxiety disorders diagnostic status) that attenuated the BOR-BSUD group differences.

Affective Lability

A MANOVA using the six subscales of the ALS as dependent variables revealed a significant main effect for group, Wilks' Lambda = .21, $F(12,192) = 19.21$, $p < .001$, $\eta_p^2 = .55$. Follow-up analyses showed that both BPD groups scored higher than the CON group, and the BSUD group also scored significantly higher than the BOR group on ALS-DEP [$F(2,101) = 85.16$, $p < .001$, $\eta_p^2 = .63$] and ALS-ANX [$F(2,101) = 103.32$, $p < .001$, $\eta_p^2 = .67$]. On the other four subscales of the ALS, both BPD groups scored higher than the CON group, but the BOR and BSUD groups did not differ.

When the influence of diagnostic status of mood and anxiety disorders and ASPD were removed as covariates, the multivariate effect of group remained still significant, Wilks' Lambda = .54, $F(12,184) = 5.89$, $p < .001$, $\eta_p^2 = .26$. However, the BOR-BSUD group differences on ALS-DEP and ALS-ANX were rendered non-significant following the inclusion of these covariates. Follow-up analyses, in which each covariate was entered separately, revealed that it was the inclusion of ASPD diagnostic status (not mood disorders or anxiety disorders diagnostic status) that attenuated the BOR-BSUD group differences.

Affective Intensity and Reaction

There was a main effect for group in a MANOVA using the three subscales of the AIM as dependent measures, Wilks' Lambda = .55, $F(6,240) = 13.75$, $p < .001$, $\eta_p^2 = .26$. Follow-up univariate and post-hoc tests revealed that both BOR and BSUD groups scored higher than the CON group on AIM-Negative, $F(2,122) = 22.52$, $p < .001$, $\eta_p^2 = .27$, and AIM-Neutral, $F(2,122) = 44.49$, $p < .001$, $\eta_p^2 = .42$. However, these group differences were not significant after removing the influence of the three covariate variables, Wilks' Lambda = .92, $F(6,190) = 1.40$, $p = .22$, $\eta_p^2 = .04$.

Self-Harming and Suicidal Tendencies

To control for the risk of family-wise type 1 error, a Bonferroni correction was applied to the following analyses ($\alpha = .01$). Twelve-month prevalence of self-harm and suicidal tendencies was examined only for the BOR and BSUD groups because the CON participants reported no occurrence of self-harming/suicidal behaviors. Due to the highly skewed nonparametric nature of the frequency data, Mann-Whitney U tests were conducted. Results showed that the BOR and BSUD groups did not differ on any of these items: (a) self-harming while upset, mean (median) frequencies⁴: BOR = 4.03 (.50) vs. BSUD = 1.00 (0), $p = .14$, (b) self-harming while not upset: BOR = .61 (0) vs. BSUD = .58 (0), $p = .51$, (c) suicide attempt: BOR = .84 (0) vs. BSUD = .89 (0), $p = .64$, and (d) suicidal ideation: BOR = 4.42 (4.00) vs. BSUD = 4.12 (4.00), $p = .55$ (both means and medians were inspected as central tendency indices because most of the median values were zero due to highly skewed frequencies of self-harming and suicidal behavior). Additionally, we compared the BOR and BSUD groups on the binary status of these self-harming/suicidal variables (i.e., presence vs. absence during the past 12 months). However, Fisher's Exact tests indicated no group difference on these comparisons.

Externalizing Behaviors

To control for the risk of family-wise type 1 error, a Bonferroni correction was applied to the following analyses ($\alpha = .01$). Kruskal-Wallis tests indicated significant group differences ($p < .001$ for all comparisons) on all four externalizing behavior indices (i.e.,

physical fight, planned crime, unplanned crime, and risky sexual behavior). Further analyses were performed using Mann-Whitney tests to compare only the BOR and BSUD groups because 96% of CON participants reported no occurrence of these behaviors during the past 12 month. Results showed that the BSUD group reported higher frequencies of unplanned crime [mean (median) frequencies: BOR = 1.46 (0) vs. BSUD = 3.32 (2.00), $p = .013$] and risky sexual behavior [BOR = .70 (0) vs. BSUD = 3.11 (1.0), $p = .039$] than the BOR group, but these differences were not significant after applying a Bonferroni correction.

BPD without a History of Substance Dependence vs. BPD with Lifetime Substance Dependence

Finally, we considered the possibility that the current grouping schemes (BPD with or without *current* substance dependence) might have obscured potential group differences on several key variables (i.e., impulsivity, affective lability, affective intensity and reaction, self-harming and suicidal features, as well as overall BPD symptoms). Thus, we repeated the same analytic procedures using the same covariates after regrouping our BPD patients into those without a history of substance dependence ($n = 18$) vs. those with a lifetime substance dependence diagnosis ($n = 38$). Results indicated the same pattern of findings: the two BPD patient groups classified based on the presence/absence of a *lifetime* substance dependence diagnosis did not significantly differ in any of the studied domains, including impulsivity, affective lability, affective intensity, self-harming and suicidal features, externalizing behaviors, and overall BPD symptoms.

Discussion

The current literature indicates escalated impulsivity, affective dysregulation, externalizing, and self-harming/suicidal behaviors in both BPD and SUD (e.g., Coffey, Gudleski, Saladin, & Brady, 2003; Cooper et al., 1995; Kruegelbach et al., 1993). This study hypothesized that these personality traits and behavioral characteristics would be reported to a greater degree in BPD individuals if a current substance dependence diagnosis was present. Overall, the current data provided only partial support for our study hypotheses. As expected, relative to non-BPD/SUD controls, both BPD groups with and without substance dependence scored higher on impulsivity, affective lability, externalizing behaviors, self-harming/suicidality, and overall BPD symptoms. However, contrary to prediction, BPD patients did not differ on most of these variables as a function of the presence/absence of current or lifetime comorbid substance dependence. Although impulsivity and affective dysregulation have been considered as core pathogenic processes underlying both BPD and SUD (Bornovaalova et al., 2005; Trull et al., 2000), the presence of current/lifetime substance dependence was not associated with a further escalation in these personality traits in our sample of BPD individuals. Nor did self-harming/suicidal attempt and ideation or externalizing behaviors during the past 12 months significantly differ among BPD participants as a function of comorbid substance dependence status. Moreover, the overall severity of borderline personality symptoms did not differ between the two BPD groups. Taken together, our findings are at odds with the common notion that individuals with both BPD and SUD present much worse clinical cases compared to individuals with BPD only. It may be that the serious consequences of the comorbidity between BPD and SUD are primarily driven by the presence of BPD as opposed to SUD such that the negative impact of comorbidity is much greater when BPD is added upon SUD compared to the reverse.

The two BPD groups showed differences in some domains of impulsivity (i.e., attentional and motor impulsiveness) and affective lability (i.e., shift from normal to depressed or anxious moods), but these differences disappeared once the ASPD diagnostic status was taken into consideration. In the current study, the only significant difference observed between the BOR and BSUD groups was ASPD features and diagnostic status. The

comorbidity rate of ASPD was more than twice as high in BSUD participants as in BOR participants (47.4% vs. 13.5% for classification based on the current substance dependence, 31.6% vs. 11.1% for classification based on the lifetime substance dependence). These findings add to the literature showing a close linkage between ASPD and SUD (Mueser et al., 1999; Regier et al., 1990). Moreover, these data suggest the possibility that if increased impulsivity and affective lability are observed with the additional diagnosis of SUD among BPD patients, it may be better accounted for by comorbid ASPD features rather than by the presence of comorbid SUD.

Some limitations of the present study should be noted. First, the exclusion of males limits the generalizability of the current findings. According to DSM-IV-TR (APA, 2000), BPD is characterized by a preponderance of females. However, considering the gender differences observed in BPD (e.g., Zlotnick, Rothschild, & Zimmerman, 2002), it is yet to be shown whether current findings would be replicated among BPD males. Second, this study relied on cross-sectional data obtained via self-report measures and structured diagnostic interviews. Our data may not reflect how comorbid SUD would affect emotional regulation and related behavioral characteristics among BPD patients in their natural environment over time. Third, this study did not assess self-harming and externalizing behaviors thoroughly, but instead relied on 8 self-report items, thus leaving some important aspects of these variables uncovered (e.g., emotional states and intention). Fourth, this study is underpowered to examine the potential impact of various recruitment sources on the current findings. A possibility is that inpatient units may present overall more severe psychiatric cases than local community sources. However, it seems unlikely that the two BPD groups were unequally affected by specific recruitment strategies for a few reasons: (a) on additional study questions, the two BPD groups showed no differences in frequencies of previous hospitalization and the utilization of outpatient clinics for psychiatric problems, and (b) all BPD patients in this study were assessed in our laboratory after being discharged from hospital or stabilized. Finally, this study did not include a patient group presenting with SUD only because the principal aim of our study was to understand the impact of substance dependence on BPD. However, given the absence of differences between the BOR and BSUD groups, the SUD only group would have enhanced the interpretation of the current findings.

In summary, despite these limitations, the current study suggests that BPD-relevant personality traits and behavioral characteristics may not vary among BPD patients as a direct function of comorbid substance dependence. Rather, it appears that the negative consequences of comorbidity on personality traits and behavioral characteristics primarily may be driven by BPD and, perhaps, features frequently associated with SUD, such as ASPD.

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Table 1

Demographic Characteristics of the Entire Study Sample and their Breakdown across the Three Participant Groups: Borderline Personality Disorder without Current Substance Dependence (BOR), Borderline Personality Disorder with Current Substance Dependence (BSUD), and Comparison Controls (CON)

	Mean (SD)	Total (n=104)	BOR (n=37)	BSUD (n=19)	CON (n=48)	F or χ^2	P
Age		35.85 (11.37)	36.08 (10.64)	39.42 (9.65)	34.25 (12.37)	$F(2,101)=1.43$	.24
Race (%)							
White		70.2	75.7	68.4	66.7		
Black		24.0	18.9	26.3	27.1	$\chi^2=5.85$	.66
Asian		1.9	0.0	0.0	4.2		
American Indian		1.9	2.7	5.3	0.0		
Other		1.9	2.7	0.0	2.1		
Marital status (%)						$\chi^2=17.24$	.008
Married/Cohabiting		27.9	32.4	5.3	33.3		
Divorced		24.0	24.3	42.1	16.7		
Separated/widowed		10.6	18.9	15.8	2.1		
Never Married		37.5	24.3	36.8	47.9		
Employment status							
Full-time		30.8	18.9	10.5	47.9	$\chi^2=48.85$	.000
Part-time		14.4	16.2	5.3	16.7		
Student/homemaker		20.2	16.2	0.0	31.3		
Unemployed		32.7	45.9	84.2	2.1		
Retired		1.9	2.7	0.0	2.1		
Education (%)						$\chi^2=28.27$	.000
≤ 12 th		7.8	18.9	5.3	0.0		
H.S. diploma		17.5	27.0	31.6	4.3		
Post H.S.		56.3	45.9	57.9	63.8		
> 4 year degree		18.4	8.1	5.3	31.9		
Gross Income(\$)	Mean (SD)	28,333 (27,592)	21,012 (20,106)	18,276 (19,587)	37,652 (32,049)	$F(2,101)=5.72$	.004

Table 2

Associations between Covariate Variables and Dependent Measures (Point-biserial Correlation Coefficients)

	Mood Disorders	Anxiety Disorders	Antisocial Personality Disorder
PAI-BOR Total	.66**	.66**	.33**
BIS-11 Total	.58**	.57**	.46**
AIM Total	.30**	.41**	.16
ALS Total	.57**	.67**	.40**
Externalizing Behavior ^a	.46**	.52**	.52**
Suicidal/Self-harming ^a	.64**	.64**	.29**

Note:

** $p < .01$. PAI-BOR = Personality Assessment Inventory-Borderline Features Scale; BIS-11 = Barratt Impulsiveness Scale-11; ALS = Affective Lability Scale; AIM = Affective Intensity Measure.

^a Square-root transformed total frequencies of external behavior and suicidal/self-harming behavior

Table 3

Comparisons on the Measures of Impulsivity and Affective Lability and Intensity across the Three Groups: Borderline Personality Disorder without Current Substance Dependence (BOR), Borderline Personality Disorder with Current Substance Dependence (BSUD), and Comparison Controls (CON)

	BOR (n=37)		BSUD (n=19)		CON (n=48)		Univariate F Statistics	Bonferroni Post-hoc Tests
	M	(SD)	M	(SD)	M	(SD)		
BIS-11 Total	78.34	(11.68)	87.11	(11.36)	55.28	(10.02)	17.07**	BOR, BSUD > CON
AI	2.58	(0.48)	2.90	(0.41)	1.73	(0.37)	10.69**	BOR, BSUD > CON
MI	2.42	(0.50)	2.83	(0.49)	1.78	(0.33)	14.73**	BOR, BSUD > CON
NI	2.80	(0.50)	2.98	(0.47)	1.98	(0.49)	9.93**	BOR, BSUD > CON
ALS Overall	1.87	(0.54)	2.18	(0.45)	0.52	(0.53)	25.93**	BOR, BSUD > CON
DEP	1.93	(0.56)	2.35	(0.41)	0.68	(0.59)	19.89**	BOR, BSUD > CON
ELAT	1.69	(0.61)	1.90	(0.62)	0.61	(0.60)	17.08**	BOR, BSUD > CON
ANXDEP	2.19	(0.61)	2.53	(0.40)	0.42	(0.57)	27.11**	BOR, BSUD > CON
ANX	1.91	(0.68)	2.35	(0.55)	0.40	(0.54)	22.80**	BOR, BSUD > CON
BIPHAS	1.85	(0.69)	2.05	(0.54)	0.54	(0.64)	18.81**	BOR, BSUD > CON
ANG	1.80	(0.76)	2.13	(0.69)	0.31	(0.49)	19.78**	BOR, BSUD > CON
AIM Overall	4.04	(.64)	3.97	(.61)	3.53	(.45)	1.46	
Positive	3.76	(0.86)	3.56	(0.76)	3.59	(0.52)	0.70	
Negative	4.52	(0.74)	4.63	(0.76)	3.61	(0.59)	1.70	
Neutral	4.20	(0.96)	4.44	(1.29)	2.75	(0.84)	3.62*	BSUD = (BOR > CON)

Note:

* $p < .05$

**

$p < .01$ (p values of univariate F statistics after removing the influence of the diagnostic status of mood disorders, anxiety disorders, and antisocial personality disorder). BIS-11 = Barratt Impulsiveness Scale-11 (AI = Attentional impulsiveness; MI = Motor impulsiveness; NI = Nonplanning impulsiveness); ALS = Affective Lability Scale (DEP = lability in depression; ELAT = lability in hypomania; ANXDEP = lability shifts between anxiety and depression; ANX = lability in anxiety; BIPHAS = lability shifts between hypomania and depression; ANG = lability in anger); AIM = Affective Intensity Measure (Positive = affective intensity in response to positive emotional stimuli; Negative = affective intensity in response to negative emotional stimuli; Neutral = affective intensity in response to neutral emotional stimuli).