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Refining Behavioral Dysregulation in Borderline Personality Disorder Using a Sample of Women With Anorexia Nervosa

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One of the primary facets of borderline personality disorder (BPD) is behavioral dysregulation, a wide array of behaviors that are difficult to control and harmful to the individual. The purpose of this study was to explore the association between BPD and a variety of dysregulated behaviors, some of which have received little empirical attention. Using a large sample of individuals diagnosed with anorexia nervosa, 41 individuals diagnosed with BPD were compared to the rest of the sample on the presence of dysregulated behaviors using logistic regression analyses. Anorexia nervosa subtypes, age, and other Cluster B personality disorders were used as covariates. Results support an association between BPD and alcohol misuse, hitting someone/breaking things, provoking fights/arguments, self-injury, overdosing, street drug use, binge-eating, impulsive spending, shoplifting/stealing, and risky sexual behaviors. Differences between dichotomous and continuous measures of BPD yielded somewhat different results. Information on co-occurring anorexia nervosa and BPD was generated.

Keywords: borderline personality disorder, anorexia nervosa, behavioral dysregulation, substance abuse

Dysregulated behaviors are, by definition, difficult to control, and often result in functional impairment for the affected individual (Selby & Joiner, 2009). Individuals with borderline personality disorder (BPD) are generally thought to engage in various dysregulated behaviors ranging from nonsuicidal self-injury (NSSI) to physical fights, and the diagnostic criteria for BPD reflect this (American Psychiatric Association [APA], 1994). However, many of the behaviors that individuals with BPD are generally thought to engage in have insufficient empirical support linking them to an actual BPD diagnosis. One such example is impulsive spending, which can contribute to one criterion for a diagnosis of BPD (APA, 1994), yet, to our knowledge, there are no empirical studies actually linking BPD to impulsive spending. The purpose of this study was to explore the relation between BPD and a variety of potentially dysregulated behaviors in a large sample of women diagnosed with anorexia nervosa (AN), with the goal of providing empirical support for using these behaviors as criteria in BPD diagnosis. Although this sample is not ideal for refining behavioral dysregulation in BPD, the current sample still allows for a test of these behaviors in BPD and may provide important information about co-occurring BPD and AN, an area that is currently understudied.

Although there are some dysregulated behaviors that have an unclear relation to BPD, there are a few behaviors that have a well established association: NSSI (Brown, Comtois, & Linehan, 2002; Selby, Anestis, Bender, & Joiner, 2009), binge-eating (Marino & Zanarini, 2001; Sansone, Wiederman, & Sanson, 2000; Selby et al., 2009), substance abuse (Bornovalova et al., 2005), and suicide attempts (Duberstein & Conwell, 1997). Reductions in some of these behaviors are often considered as signs of successful treatment (Linehan, 1993). However, as has previously been mentioned, some behaviors have minimal or no empirical evidence supporting a relation to BPD. As with impulsive spending, there are, to our knowledge, no studies that have found a relation between reckless driving and BPD. Only one study found evidence for a relation between shoplifting/stealing and BPD (Grant, 2004).

Some of the behaviors anecdotally linked with BPD appear to have mixed supporting evidence. Take, for example, the *DSM–IV–TR* indication that individuals with BPD engage in risky or sexually promiscuous behaviors (APA, 1994). Few studies have actually examined this association, and the results have been equivocal (Daley, Burge, & Hammen, 2000; Hull & Clarkin, 1993; Lavan & Johnson, 2002; Zanarini et al., 2003). Physical fights and arguments are also behaviors that are considered a part of BPD, yet the empirical evidence on the link between aggressive behaviors and BPD is also mixed, with some studies finding support for a link between BPD and physical aggression (Critchfield, Levy, Clarkin, & Kernberg, 2008; Raine, 1993) and others failing to find this relation (Fossati et al., 2004). A general conclusion can be drawn from this discussion of dysregulated behaviors and BPD: individuals with BPD engage in a number of dysregulated behaviors that are well established (NSSI, binge-eating, etc.), but more empirical evidence is needed to support the relation of other, less well established dysregulated behaviors in relation to BPD.

The current study aimed to address some of these lacunae in the empirical data linking some dysregulated behaviors to BPD with a large sample of individuals with AN. BPD has often been studied as a co-occurring disorder with bulimia nervosa (Chen et al., 2008; Godt, 2008), but to our knowledge, few previous studies have explored BPD in individuals with AN. Although individuals with AN, particularly those with restricting subtype (ANR), tend to demonstrate more compulsive behavior (e.g., hoarding food, excessive exercising), those with purging (ANP) and binging-purging (ANBP) subtypes tend to display elevated levels of behavioral dysregulation beyond the scope of dysregulated eating behaviors (Tozzi et al., 2006; Wonderlich, Connolly, & Stice, 2004). In fact, those with ANBP often engage in NSSI, drug use, and shoplifting, and they frequently engage in suicide attempts (Bulik et al., 2008), behaviors that are often associated with BPD. Individuals with ANR also experience dysregulated behaviors, however, such as suicide attempts (Bulik et al., 2008), although dysregulated behaviors in ANR may be less common than ANBP. It is also important to note that one problem with exploring BPD and behavioral dysregulation in individuals diagnosed with AN is that co-occurring AN and BPD diagnoses may generate synergistic effects, where both diagnoses increase problems with behavioral dysregulation more so than either disorder alone.

This study evaluated a variety of dysregulated behaviors in a large sample of individuals with different subtypes of AN, many also diagnosed with BPD. We hypothesized that BPD diagnosis would significantly predict endorsement of the following behaviors, even after controlling for co-occurring psychopathology: NSSI, binge-eating, shoplifting/stealing, alcohol misuse, hitting someone/breaking things, provoking fights or arguments, overdosing, street drug use, impulsive spending, and risky sexual behaviors. These same behaviors were also predicted using a continuous measure of BPD symptoms to determine if measurement differences arose.

Method

Participants

Participants consisted of 718 women of primarily European ancestry (97.4%) enrolled in a National Institutes of Health funded Genetics of Anorexia Nervosa (GAN) Collaborative Study. As a part of this study, all participants were assessed for a diagnosis of BPD, with 41 participants meeting diagnostic criteria for BPD. This study took place at multiple sites in various research and clinical settings across North America and Europe. The full methods for this investigation can be found in Kaye et al. (2008). To be included in this study all participants had to be over age 16 and the majority had a lifetime diagnosis of AN according to *DSM–IV* criteria, minus criterion D (amenorrhea), at least 3 years before entry into the study and by age 45. To participate in the study, probands were required to have at least one first through third degree relative with AN who was willing to participate in the study. Exclusion criteria for potential probands included: a history of severe CNS trauma, psychotic disorders, developmental disability, or any other medical, neurological, or substance use disorder that could confound a diagnosis of AN or interfere with the proband's responding to assessments. Individuals with a lifetime Body Mass Index exceeding 30 kg/m^2, and individuals who did not speak either English or German were excluded from the study. The age of participants ranged from 16 to 81, with an average age of 30.6 (SD = 12.1). Males were excluded from the current study because dysregulated behaviors can vary between genders, and there were not enough men in the current sample to make meaningful comparisons. There were also no males with BPD in the present sample.[1]

BPD and Other Axis II Psychopathology

Although the primary focus of the GAN study was on eating disorders, specifically AN, Cluster B, and Cluster C personality disorders were also assessed. The primary focus of the current study was on BPD, although other Cluster B personality disorders were used as covariates in the analyses. All Axis II personality disorders were assessed using the Structured Clinical Interview for *DSM–IV* Personality Disorders (SCID-II; First et al., 1997). The impulsivity criterion for BPD was modified such that individuals who reported binge-eating were re-

[1] The analyses were also conducted with both genders included to explore whether the inclusion of male participants modified the results, and all analyses were essentially the same, suggesting that the exclusion of males from the analyses had little influence on the results presented.

quired to endorse three (instead of two) dysregulated behaviors because this was an eating disordered sample. In this sample 41 (5.7%) individuals met diagnostic criteria for BPD, 10 (1.8%) met criteria for narcissistic personality disorder (NPD), 3 (0.4%) met criteria for antisocial personality disorder (ASPD), and no individuals met criteria for histrionic personality disorder (HPD). The interrater reliability of Participant Axis I and II diagnoses in the GAN study ranged from .80 to 1.0, as calculated using an algorithm which scored the diagnoses for a random sample of participants and as checked against the primary reviewer (Kaye et al., 2008). Because of the interrater reliability algorithm used, specific interrater reliability for BPD was not available in the current sample. Interrater reliabilities for AN diagnoses were all over .95.

Because of recent movement in the field of personality disorders to examine dimensional versions of the personality disorders (Widiger & Trull, 2007), and in doing so to account for subthreshold symptoms of personality disorders, we also generated a continuous measure of BPD. Each symptom of BPD on the SCID-II is rated as follows: (1) for absence of the symptom, (2) for subthreshold level of a symptom, and (3) for threshold presence of symptom. The continuous measure of BPD was created by summing the threshold ratings of all BPD symptoms except criteria four and five, which involve behavioral dysregulation. This measure demonstrated adequate internal consistency ($\alpha = .79$) and in the current sample the continuous BPD measure had a mean of 9.40 ($SD = 3.06$), and was normally distributed.

Assessment of Eating Disorder Pathology

To assess for a diagnosis of AN the Extended Screening Instrument was used (see Kaye et al., 2008). This is an expanded, modified version of Module H of the Structured Clinical Interview for Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997). Participants were primarily diagnosed with a lifetime history of AN, specified with subtypes of ANR, ANP, or ANBP. Some individuals had a lifetime history of both AN and BN at different points of their illness, and these participants were classified as ANBN.

Dysregulated Behaviors

The Eatatelife Phenotype (EATATE), Version 2.1, January 19, 2001 (Project EHE, 2001), is a semistructured interview that was administered to gather information on the following behaviors: excessive alcohol consumption (defined as drinking more than was sensible or more than 38 drinks each week), shoplifting or stealing, hitting someone or breaking things, provoking fights or arguments, NSSI (including cutting, hitting, burning, or biting oneself), overdosing, using street drugs (defined as LSD, heroine, amphetamines, or other illicit substances), excessive/impulsive spending, and involvement in sexual activities that could be defined as reckless or disinhibited. Gambling and setting fires were also assessed as dysregulated behaviors on the EATATE, but interestingly no participants with BPD reported engaging in either of these behaviors, and less than one percent of the other participants reported engaging in these behaviors. Because of the power issues that arise with the low rates of these behaviors in this sample, they were not included in any of the subsequent analyses.

The behaviors on the EATATE interview were coded as (1) if the participant (a) reported engaging in the behavior, and (b) reported at least ONE of the following qualities of the behavior: indication that the participant felt that this behavior was out of control, the participant indicated concerns about the behavior, the participant regretted engaging in the behavior, or the participant felt that the behavior caused suffering or distress. Interviewers were instructed to ask follow-up questions for each behavior endorsed to determine if the second criterion (b) for the behaviors was met. If the participant did not endorse that behavior or did not endorse at least one aspect of criterion (b), then the behavior was coded (0) for that participant. The EATATE interview was conducted in addition to the SCID-II.

Data Analytic Strategy

We used multiple logistic regression analyses to predict each behavior on the EATATE using BPD diagnosis as the predictor variable. Although using BPD diagnoses assessed by the SCID-II to predict dysregulated behaviors may seem circular, as some of these behaviors can be

used to satisfy diagnostic criteria for BPD using the SCID-II, the purpose of these analyses was to determine if those individuals diagnosed with BPD actually endorsed these behaviors at higher rates than the comparison group. Accordingly, some behaviors may satisfy criteria for a BPD diagnosis (i.e., risky sexual behavior or substance abuse), but that does not necessarily mean that individuals diagnosed with BPD endorsed these behavior more frequently than the AN comparison sample. This method also has the strength of identifying some dysregulated behaviors that may not have been accounted for by the SCID-II, as only two impulsive behaviors (or three in the case of binge eating in this sample) are required for the impulsivity criterion, yet more (or less) may be endorsed.

A continuous measure of BPD symptoms was also used to predict each behavior. This continuous measure had the added benefit of capturing subthreshold symptoms, and the two main behavioral criteria for BPD (criteria four and five) were not included in the measure, removing potential overlap problems with the dysregulated behaviors. The following diagnoses were also used as covariates: AN subtype, ASPD, and NPD. AN subtypes were used as covariates because all individuals in this sample were required to have an AN diagnosis to participate. It was important to control for AN subtypes, as some may influence the associations between BPD and certain dysregulated behaviors, especially because individuals with ANP and ANBP have also been found to engage in dysregulated behaviors (Bulik et al., 2008). Differences in behavioral dysregulation among AN subtypes were not explored in the current study, because of sample size concerns; thus, AN diagnoses were only used as covariates. Binge-eating was the only behavior analyzed without AN subtype included as a covariate, as doing so would overcorrect the analysis because binge-eating is a defining characteristic of AN subtype. The other Cluster B personality disorders (except HPD, as no one in the sample met criteria for this disorder) were also used as covariates because these other disorders also involve behavioral dysregulation to some extent (APA, 1994). Participant age was also used as a covariate because of the wide age range in the sample and the potential relevance of age to some behaviors, such as shoplifting/stealing. To correct for multiple comparisons, we used a cutoff based on Tukey's HSD such that a value of $Wald > 3.84$ was required for significance at $\alpha = .05$.

Results

Because these data were intended to study the genetics of AN, data consisted of all participants being related to one or more other participants in the study. This resulted in a potential problem with nonindependence of observations. To ensure that this issue of nonindependence was not influencing the results of this study, all analyses were run a second time using a modified dataset that included only one, randomly selected member from each family. This ensured that all participants in this second dataset were independent from each other. The results remained essentially the same, with no changes in significant findings, indicating that the pattern of findings is unlikely to be influenced by nonindependence of observations.

Among those diagnosed with BPD, 24% were diagnosed with ANR, 26% were diagnosed with ANP, 32% were diagnosed with ANBP, and 18% were diagnosed with ANBN. Individuals with BPD were diagnosed with significantly higher frequencies of ANBP than ANBN ($\chi^2(1) = 12.70$, $p < .05$). On the continuous measure of BPD symptoms, the ANBN group scored significantly higher than the ANR group, $F = 14.32$, $df = 3$, $p < .001$, while there were no significant differences between the other AN subtypes on this measure. Regarding individual symptoms of BPD, regardless of BPD diagnosis, a number of differences were found. The ANP group had the highest percentage of endorsement of all subtypes for the following symptoms: fears of abandonment ($\chi^2(6) = 16.32$, $p < .05$), impulsive behaviors ($\chi^2(6) = 30.23$, $p < .01$), suicidal behaviors ($\chi^2(6) = 41.70$, $p < .01$), difficulties controlling anger ($\chi^2(6) = 15.58$, $p < .05$), and dissociation/paranoia under stress ($\chi^2(6) = 16.64$, $p < .05$). The ANR group had the highest endorsement of identity diffusion ($\chi^2(6) = 13.94$, $p < .05$), and both ANR and ANP had higher percentages endorsing feelings of emptiness than the other two subtypes ($\chi^2(6) = 27.10$, $p < .01$). There were no significant differences among the AN subtypes for endorsement of erratic interpersonal relationships or affective liability.

BPD and Dysregulated Behaviors

The percentages of participants in the BPD and AN comparison groups who reported engaging in each of the dysregulated behaviors are presented in Table 1. Overall, the BPD group had much higher percentages of engaging in these behaviors than the overall sample, with the exception of shoplifting/stealing, for which there was not a significant group difference. These initial chi-square analyses indicated that there was an overall pattern of more dysregulated behavior in the BPD group as compared to the no BPD group, yet these group differences may have been confounded by co-occurring disorders.

The results of the logistic regression analyses are displayed in Table 2. First, the results of the analyses using BPD diagnosis as a predictor indicated that most, but not all, of the dysregulated behaviors examined were significantly predicted by a BPD diagnosis. BPD significantly predicted the presence of alcohol misuse (*Wald* = 29.09, $p < .001$, odds ratio [OR] = 7.10), street drug use (*Wald* = 22.46, $p < .001$, OR = 5.60), NSSI (*Wald* = 18.07, $p < .001$, OR = 4.56), hitting someone or breaking things (*Wald* = 10.13, $p < .001$, OR = 4.01), provoking fights or getting into arguments (*Wald* = 11.13, $p < .001$, OR = 3.72), overdosing (*Wald* = 9.47, $p < .001$, OR = 3.43), impulsive spending (*Wald* = 6.56, $p < .05$, OR = 2.78), and binge-eating (*Wald* = 6.19, $p < .05$, OR = 2.33). BPD diagnosis did not predict shoplifting/stealing or risky sexual behaviors.

Table 1
Percent of Each Group Endorsing Dysregulated Behaviors

Patient experience	BPD ($N = 41$) *n* (%)	No BPD ($N = 677$) *n* (%)	χ^2 (1)
Binge-eating	19 (46)	190 (28)	7.56*
Alcohol misuse	27 (66)	142 (21)	47.33*
Shoplifting/stealing	7 (17)	66 (10)	2.71
Hitting/breaking things	9 (22)	49 (7)	12.42*
Provoking fights/arguments	11 (27)	63 (9)	20.06*
Nonsuicidal self-injury (NSSI)	23 (56)	150 (22)	27.11*
Overdosing	11 (27)	63 (9)	14.20*
Street drug use	18 (44)	71 (10)	43.00*
Impulsive spending	12 (29)	73 (11)	14.02*
Risky sexual behaviors	6 (15)	45 (7)	4.24*

* Significant group difference at $p < .05$.

The logistic regression analyses using the continuous measure of BPD symptoms are also displayed in Table 2. The continuous measure of BPD was a significant predictor for all dysregulated behaviors: risky sexual behaviors (*Wald* = 11.85, $p < .01$, OR = 1.51), provoking fights/arguments (*Wald* = 40.63, $p < .001$, OR = 1.26), hitting/breaking things (*Wald* = 28.27, $p < .001$, OR = 1.23), NSSI (*Wald* = 42.77, $p < .001$, OR = 1.22), alcohol misuse (*Wald* = 32.99, $p < .001$, OR = 1.18), street drug use (*Wald* = 18.10, $p < .001$, OR = 1.16), overdosing (*Wald* = 16.36, $p < .001$, OR = 1.16), impulsive spending (*Wald* = 11.79, $p < .001$, OR = 1.15), binge-eating (*Wald* = 13.28, $p < .001$, OR = 1.10), and shoplifting/stealing (*Wald* = 5.30, $p < .001$, OR = 1.09). Although the odds-ratios of the continuous measure were smaller than for BPD diagnosis, this is because ORs reflect an increase in the odds of a behavior for one unit of the scale. It is also important to note the inclusion of important covariates (gender, AN subtype, NPD, and ASPD) in all of these analyses, suggesting a unique relation between BPD and these behaviors.

Discussion

The results of this study indicated that there was a relation between BPD and alcohol misuse, hitting someone/breaking things, provoking fights/arguments, NSSI, overdosing, street drug use, binge-eating, impulsive spending, shoplifting/stealing, and risky sexual behaviors. Novel evidence was found to support impulsive spending, provoking fights/arguments, hitting someone/breaking things, shoplifting/stealing, and risky sexual behaviors as part of a BPD diagnosis. This study also provides information about an understudied yet common diagnostic co-occurrence pattern: AN and BPD. The results indicate that those with both AN and BPD may experience behavioral dysregulation beyond the different AN subtypes alone.

One important finding of this study was that dichotomous BPD diagnosis did not significantly predict shoplifting or risky sexual behaviors, yet a continuous measure of BPD did.

Table 2
Series of Logistic Regressions Using BPD Diagnosis or Continuous BPD Symptoms To Predict Dysregulated Behaviors

Behavior	BPD diagnosis				Continuous BPD symptoms			
	B	*SE*	*Wald* (*df* = 1)	Odds ratio	*B*	*SE*	*Wald* (*df* = 1)	Odds ratio
Binge-eating	.845	.34	6.19*	2.33	.098	.027	13.28*	1.10
Alcohol misuse	1.96	.36	29.09*	7.10	.168	.029	32.99*	1.18
Shoplifting/stealing	.48	.47	1.04	—	.088	.038	5.30*	1.09
Hitting/breaking things	1.39	.44	10.13*	4.01	.208	.039	28.27*	1.23
Provoking fights/arguments	1.31	.39	11.13*	3.72	.234	.037	40.63*	1.26
Nonsuicidal self-injury (NSSI)	1.52	.36	18.07*	4.56	.197	.030	42.77*	1.22
Overdosing	1.23	.40	9.47*	3.43	.147	.036	16.36*	1.16
Street drug use	1.72	.36	22.46*	5.60	.149	.035	18.10*	1.16
Impulsive spending	1.02	.40	6.56*	2.78	.142	.041	11.79*	1.15
Risky sexual Behaviors	.58	.52	1.28	—	.141	.041	11.85*	1.51

* Significant at Tukey HSD corrected $p < .05$, results displayed for BPD as the predictor variable. All analyses used the following diagnoses as covariates: age, ED diagnoses, ASPD, and NPD.

These findings suggest that these behaviors may lie on the spectrum of BPD symptoms, yet they may not be as strongly associated with more severe levels of BPD. Future studies should continue to explore the relative weight that BPD diagnosis may have on certain dysregulated behaviors. Some behaviors, such as NSSI, may be better indicators of severe BPD than other behaviors, such as shoplifting. These differences in assessment also highlight the importance of the current debate over the dimensional versus categorical nature of personality disorders.

The co-occurring diagnostic nature of this sample is an important limitation to consider with these findings, however, because the sample may not be representative of BPD individuals as a whole. The same pattern of results may not be found in BPD individuals without co-occurring eating disorders. Furthermore, there may also be synergistic effects of co-occurring BPD and AN, which may result in elevated levels of behavioral dysregulation. However, results were found linking BPD to various dysregulated behaviors when controlling for the various AN subtypes, providing some additional support for the validity of the findings to BPD. Future studies should use case control methodology to compare individuals with both AN and BPD to matched groups of individuals with BPD and other controls to further explore potential differences. Future studies should also attempt to tease apart the synergistic effects that these two disorders may have on dysregulated behaviors when combined.

Another limitation to this study is that the sample is almost entirely of European ancestry. Because of this limitation, the results may not generalize to members of other racial and ethnic groups. One final limitation of the study is that the way behaviors were coded with the EATATE required that each behavior endorsed had to be viewed as distressing, out of control, or a cause for regret by the patient. This may have resulted in underreporting of dysregulated behaviors, as some patients may have endorsed the behavior but not felt that it was distressing.

Conclusions

The results of this study provide additional evidence for the role of some behaviors in BPD that have previously been established, and it also serves to provide novel evidence supporting the role of shoplifting/stealing, impulsive spending, risky sexual behaviors, and aggressive behaviors in BPD. Differences were found in predicting dysregulated behaviors using dichotomous BPD diagnoses and a continuous measure of BPD, highlighting the importance of refining assessment procedures for BPD. Information on co-occurring BPD and AN was also generated by this study. Future studies should attempt to replicate these results in a general sample of individuals with BPD, and potentially extend the findings to other dysregulated behaviors that have yet to be explored, such as reckless driving.

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