



Published in final edited form as:

*Eur Eat Disord Rev.* 2015 November ; 23(6): 537–544. doi:10.1002/erv.2401.

## Depression and personality traits associated with emotion dysregulation: correlates of suicide attempts in women with bulimia nervosa

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### Abstract

**Objective**—The objective of this study was to identify personality traits and psychiatric comorbidities associated with a lifetime history of a suicide attempt in women with bulimia nervosa (BN).

**Method**—Data from two samples of women with BN ( $n = 204$  and  $n = 133$ ) were examined. Participants in both samples completed the Dimensional Assessment of Personality Pathology – Basic Questionnaire (DAPP-BQ) and reported whether they had ever had a lifetime suicide attempt. Comorbid psychopathology was based on self-reported questionnaire and interview data. Univariate and multivariate logistic regression analyses were run predicting a lifetime suicide attempt.

**Results**—Based on the DAPP-BQ, identity problems were associated with lifetime suicide attempt in both samples; cognitive dysregulation, anxiousness and insecure attachment were associated with lifetime suicide attempt in one but not both samples. Lifetime anxiety disorder was associated with lifetime suicide attempt in one sample and depression was associated with a lifetime suicide attempt in both samples. Multivariate analyses revealed that only depression was uniquely associated with a lifetime suicide attempt in both samples.

**Discussion**—Although personality traits associated with aspects of emotion dysregulation were associated with a lifetime suicide attempt, depression was found to have the strongest association with a lifetime suicide attempt in two samples of women with BN. These findings suggest that depression severity may be the most important target of treatment and suicide prevention efforts in women with BN.

### Keywords

Suicide; eating disorders; bulimia nervosa

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Eating disorders are associated with increased risk of mortality (Arcelus, Mitchell, Wales, & Nielsen, 2011; Crow et al., 2009). Although much of the literature has focused on the elevated mortality associated with anorexia nervosa, bulimia nervosa (BN) also carries an elevated mortality compared to the general population (Arcelus, et al., 2011; Crow, et al., 2009). A meta-analysis of mortality in eating disorders reported a standardized mortality ratio (SMR) of 1.93 (95% CI [1.44, 2.59]) for BN (Arcelus, et al., 2011), suggesting that individuals with BN are at increased risk of death compared with their age- and gender-matched peers. Suicide is a common cause of this elevated mortality in BN (Preti, Rocchi, Sisti, Camboni, & Miotto, 2011). A meta-analysis of 16 studies of suicide in BN comprising 1768 participants, with a mean follow-up of 7.5 years, yielded an SMR of 7.5, indicating that individuals with BN are at a higher risk of death by suicide than age- and gender-matched peers (Preti, et al., 2011).

Suicide attempts are also common in BN, with 11% to 45% of individuals with BN endorsing a lifetime history of at least one suicide attempt (Bodell, Joiner, & Keel, 2013; Bulik, Sullivan, & Joyce, 1999; Corcos et al., 2002; Favaro & Santonastaso, 1997; Forcano et al., 2009; Franko & Keel, 2006; Milos, Spindler, Hepp, & Schnyder, 2004; Pisetsky, Thornton, Lichtenstein, Pedersen, & Bulik, 2013). These suicide attempts are frequently assessed as “serious” or “extreme” and often result in hospitalization (Corcos, et al., 2002). The elevated rate of suicide attempts in individuals with BN is particularly notable given that a previous suicide attempt is a strong predictor of death by suicide (Jenkins, Hale, Papanastassiou, Crawford, & Tyrer, 2002). Given the high risk of suicide in this population, identifying factors associated with suicide attempts may provide valuable information to identify those at substantial risk for death by suicide in order to inform treatment and prevention efforts.

Psychiatric comorbidity is often present in individuals with BN, with over 90% of individuals with BN having a lifetime diagnosis of another psychiatric disorder (Hudson, Hiripi, Pope, & Kessler, 2007). The presence of additional psychiatric symptoms may contribute to the severity of the psychological distress and contribute to increased suicidal behaviors. Current evidence suggests that lifetime mood disorders, substance use disorders, and anxiety disorders are associated with suicide attempts in BN (Anderson, Carter, McIntosh, Joyce, & Bulik, 2002; Corcos, et al., 2002; Franko et al., 2004; Milos, et al., 2004).

Previous research seeking to identify factors associated with suicide attempts among individuals with BN has examined personality, temperament, and psychopathological

correlates. A systematic review of personality traits as correlates of suicide attempts found that high aggression, anxiety, neuroticism, extroversion, and impulsivity are associated with suicide attempters versus non-attempters across a variety of non-eating disorder samples (Brezo, Paris, & Turecki, 2006). These findings are particularly relevant to our understanding of the high prevalence of suicide attempts in BN, as BN is characterized by high impulsivity (Fernandez-Aranda et al., 2006; Fernandez-Aranda et al., 2008), high harm avoidance, and low self-directedness (Alvarez-Moya et al., 2007). A small literature examining personality traits associated with suicide attempts in BN samples has revealed a similar pattern of findings, with high levels of harm avoidance and low levels of self-directedness, reward dependence, and cooperativeness being associated with suicide attempts (Bulik, et al., 1999; Forcano, et al., 2009). However, these findings have not always been replicated (Pisetsky, et al., 2013) and have not controlled for other psychiatric comorbidities, which may serve as a confounder (Brezo, et al., 2006). Thus, further research is needed to elucidate personality traits associated with suicide attempts in individuals with BN, above and beyond psychiatric comorbidity.

Several studies have investigated the association between personality and suicide attempts and psychiatric comorbidities and suicide attempts separately in BN samples. However, a major criticism that has emerged in the personality literature has been the examination of personality traits without controlling for psychiatric disorders as covariates (Brezo, et al., 2006). Personality traits may be related to suicidal behaviors directly as they may increase the likelihood of maladaptive responses, but personality traits may also predispose individuals to psychiatric disorders that increase risk for suicidal behaviors. Therefore, the aims of the current study were to: (a) determine the extent to which personality characteristics are associated with a lifetime history of a suicide attempt; (b) examine which psychiatric comorbidities, including mood, substance use, and anxiety disorders, are associated with a lifetime history of a suicide attempt; and (c) identify the unique effects of both personality and psychiatric comorbidity on a lifetime history of a suicide attempt among individuals with BN. To achieve these aims, statistical analyses were conducted in two independent samples of women with BN. We chose to examine these aims in a second sample to determine if our findings were robust to methodological differences. Based on previous research, we expected that the personality traits affective lability, anxiousness, insecure attachment, identity problems, and stimulus seeking, as well as mood disorders, substance use disorders, and anxiety disorders would be associated with lifetime suicide attempts in univariate models. Given the lack of previous research, we had no a priori hypotheses about which personality and psychiatric comorbidities would uniquely be associated with lifetime suicide attempts.

## **Method: Study 1**

### **Participants and Procedures**

Adult women were recruited through advertisements at local eating disorder clinics and throughout the community at five Midwestern sites in the USA (Madison, WI; Minneapolis, MN; Fargo, ND; Chicago, IL; Columbia, MO). Advertisements stated the study was seeking women “with symptoms of BN (i.e., binge eating and purging).” Inclusion criteria were

female gender, age range of 18–65 years, and the presence of binge eating and purging behavior. Exclusion criteria included current psychotic disturbances, organic brain syndromes, and the inability to read English.

Potential participants interested in the study contacted research personnel by telephone. After the study was described, if the participant was still interested, verbal consent was obtained. A brief diagnostic phone screen was completed by trained interviewers including questions from the eating disorder module of the *Structured Clinical Interview for DSM-IV, Patient Edition* (SCID-I/P; (First, Spitzer, Gibbon, & Williams, 2002). The SCID-I/P has been shown to have excellent reliability when diagnosing BN (Crosby et al., 2009). The criteria for binge eating established in the Eating Disorder Examination (Fairburn & Cooper, 1993) were used to differentiate objectively large portions of food from smaller portions of food in order to further establish that binge eating episodes met full DSM-IV criteria. Participants who met current DSM-IV diagnostic criteria of BN or subclinical criteria (for a description, see (Wonderlich et al., 2005) based on the phone screen were invited to take part in the study. Of the 204 participants enrolled in the study, 144 (70.6%) met full DSM-IV criteria for BN in the past month. The remaining 60 (29.4%) subjects reported substantial symptoms of BN but did not meet diagnostic threshold, either due to reduced symptom frequency or binge eating episodes that did not meet DSM-IV criteria. Given the contradictory findings about the distinction between subclinical and full threshold BN (Thomas, Vartanian, & Brownell, 2009) and in light of the reduced symptom frequency criteria for BN in DSM 5 (American Psychiatric Association, 2013), we elected to include subclinical cases in the analyses. The subclinical BN group ( $n = 60$ ; 29.4%) did not differ from the full threshold group in age, BMI, or prevalence of a lifetime suicide attempt (all  $p$  values  $> 0.05$ ).

Eligible participants were scheduled to attend an in-person assessment at which they provided written informed consent and completed a set of questionnaires. Study participants were paid \$50 for their time. This study was approved by the institutional review boards at each of the participating sites.

## Measures

**Dimensional Assessment of Personality Pathology – Basic Questionnaire (DAPP-BQ)**—The DAPP is a 290-item self-report questionnaire with 18 subscales (i.e. Submissiveness, Cognitive Dysregulation, Identity Problems, Affective Lability, Stimulus Seeking, Compulsivity, Restricted Expression, Callousness, Passive-Aggressiveness, Intimacy Problems, Rejection, Anxiousness, Conduct Problems, Suspiciousness, Social Avoidance, Narcissism, Insecure Attachment, and Self Harm; (Livesley, Jang, & Vernon, 1998). Coefficient alphas in the present study were all in the high acceptable range (all alphas  $> 0.81$ ). Due to the conceptually overlapping construct of the self-harm scale with the outcome variable, this scale was excluded from the analyses.

**Inventory for Depressive Symptomatology – Self Report (IDS-SR)**—The IDS-SR is a 30-item depression symptom rating scale (Rush et al., 1986). Previous studies have

supported the validity of the IDS-SR (Rush, et al., 1986). The coefficient alpha in the present study was 0.90.

**Michigan Assessment Screening Test/Alcohol-Drug (MAST/AD)**—The MAST/AD (Westermeyer, Yargic, & Thuras, 2004) is a 25-item self-report questionnaire that assesses the severity of drug and alcohol problems. Coefficient alpha in the present study was 0.90.

**Maudsley Obsessive-Compulsive Inventory (MOCI)**—The MOCI is a 30-item true-false self-report questionnaire that assesses overt rituals and their related obsessions (Hodgson & Rachman, 1977). Coefficient alpha was 0.85 in the present study.

**Impulsive Behavior Scale (IBS)**—Lifetime history of a suicide attempt was assessed with the IBS (Rossotto, Yager, & Rorty, 1994), a 25-item self-report questionnaire examining the frequency with which individuals have engaged in maladaptive behaviors throughout their lives. In this study, Item 12 (“Have you made any suicide attempts?”) was used to assess the lifetime presence of a suicide attempt. The item was dichotomized, with any lifetime suicide attempt coded as 1 and no lifetime suicide attempt coded as 0.

## Statistical Analyses

All data management and analyses were conducted using IBM SPSS Version 21. Groups (with and without history of suicide attempts) were compared on demographic variables using *t*-tests for continuous measures and Fisher’s exact test for dichotomous categorical measures.

Associations between suicide attempts and the personality and psychopathology measures were first assessed using univariate logistic regression analyses. To correct for the use of multiple group comparisons,  $p < .01$  was used as the significance threshold for the univariate and multivariate analyses, given that the Bonferroni correction has been criticized for being too conservative (e.g., Perneger, 1998). The variables that were significantly associated with suicide attempts in the univariate logistic regression analyses were then simultaneously included in one multivariate logistic regression analysis to determine the unique contribution of these factors on suicide attempts.

## Results: Study 1

### Descriptive and Diagnostic Statistics

The majority of participants were Caucasian ( $n = 185$ , 90.7%), and had a mean age of 25.67 ( $SD = 8.85$ ) and a mean BMI of 22.99 ( $SD = 5.28$ ). Of the 204 women enrolled in the study, 27.5% ( $n = 56$ ) reported a lifetime suicide attempt. Participants with a lifetime suicide attempt had a higher mean current BMI ( $M = 24.28$ ,  $SD = 6.87$ ) than participants with no lifetime suicide attempt ( $M = 22.50$ ,  $SD = 4.48$ ;  $p < 0.04$ ). There were no differences in ethnicity or age by suicide attempt status.

### Personality Features Associated with Suicide Attempts

The mean and standard deviations of each of the subscales of the DAPP-BQ by suicide attempt status are presented in Table 1. Univariate logistic regression analyses were used to determine whether the subscales were associated with suicide attempt status. The results of these models are presented in Table 1. Cognitive dysregulation ( $p < 0.002$ ), identity problems ( $p < 0.001$ ), and anxiousness ( $p < 0.005$ ) were each associated with a lifetime history of a suicide attempt. None of the other DAPP-BQ subscales were associated with lifetime history of a suicide attempt.

### Comorbid Psychopathology Associated with Suicide Attempts

The mean and standard deviations from the IDS-SR, MAST/AD and MOCI by suicide attempt status are presented in Table 1. Depression symptoms ( $p < 0.001$ ) but not obsessive-compulsive symptoms or drug or alcohol use severity were associated with lifetime history of a suicide attempt.

### Multivariate Analysis

The variables that were significantly associated with suicide attempts in the univariate logistic regression analyses (cognitive dysregulation, identity problems, anxiousness, and IDS-SR total score) were all included in one binary logistic regression analysis. Table 2 presents the final model. This model was statistically significant,  $\chi^2(4) = 37.848$ ,  $p < .001$ , and explained 24.8% of the variance (Nagelkerke's  $R^2 = 0.248$ ). Only IDS-SR total score was uniquely associated with suicide attempts ( $p < 0.001$ ).

## Method: Study 2

### Participants and Procedures

Female participants ( $n = 133$ ) who met DSM-IV criteria for BN were recruited from community and campus populations to participate in the present study. Doctoral-level researchers screened potentially eligible women via telephone for inclusion (i.e., met DSM-IV criteria for BN, as assessed by the eating disorder module of the SCID-I/P) and exclusion (e.g., excluded if male, younger than 18 years, having a current psychotic disorder, or unable to read) criteria. Participants who met DSM-IV diagnostic criteria of current, full syndrome BN were invited to take part in the study. Eligible participants were scheduled to attend an in-person assessment at which they provided written informed consent and completed a set of questionnaires. Participants also completed a two week ecological momentary assessment protocol, data from which are not included in the current study (Smyth et al., 2007). This study was approved by the Institutional Review Boards of the University of North Dakota and MeritCare Health System (Fargo, ND).

### Measures

**Dimensional Assessment of Personality Pathology – Basic Questionnaire (DAPP-BQ)**—As described above, the DAPP is a 290-item self-report questionnaire with 18 subscales (Livesley, et al., 1998). All subscales aside from the self-harm were included in



the present study. Coefficient alphas in the present study were all in the high acceptable range (all alphas > 0.81).

**Beck Depression Inventory (BDI)**—The BDI is a 21-item self-report questionnaire that assesses the severity of current depressive symptoms. The reliability and validity of the BDI have been well documented (Beck, Epstein, Brown, & Steer, 1988). Coefficient alpha in the present study was 0.90.

**Axis I Comorbid Psychopathology**—The SCID-I/P is a semi-structured diagnostic interview used to assess DSM-IV-TR Axis I psychopathology with good validity (First, et al., 2002). Based on a random selection of 25 (17.29%) interviews, kappa ratings of inter-rater reliability for this sample were 1.00. The lifetime comorbid psychopathology diagnoses included in the present study are substance dependence and a composite measure of “any anxiety disorder.” We decided a priori to use a composite any anxiety disorder variable to preserve power and to be consistent with previous studies that have used a composite anxiety disorder variable (Bulik et al., 2008; Milos, et al., 2004).

**Revised Diagnostic Interview for Borderlines (DIB-R)**—Lifetime history of a suicide attempt was assessed using the DIB-R (Zanarini, Frankenburg, & Vujanovic, 2002). The DIB-R is a semi-structured diagnostic interview that measures borderline personality disorder symptoms. In the current study, an item assessing the number of “suicidal gestures or attempts” participants had experienced during their lifetimes was used. The item was dichotomized, with any lifetime suicidal gesture or attempt coded as 1 and no lifetime suicidal gesture or attempt coded as 0.

## Statistical Analyses

All analytic procedures were identical to Study 1. Groups (with and without history of suicide attempts) were compared on demographic variables using *t*-tests for continuous measures and Fisher’s exact test for dichotomous categorical measures.

Associations between suicide attempts or gestures and the personality and psychopathology measures were first assessed using univariate logistic regression analyses. To correct for the use of multiple group comparisons,  $p < .01$  was used as the significance threshold. The variables that were significantly associated with suicide attempts or gestures in the univariate logistic regression analyses were then simultaneously included in one multivariate logistic regression analysis to determine the unique contribution of these factors on suicide attempts.

## Results: Study 2

### Descriptive Statistics

The majority of the participants were Caucasian ( $n = 129$ , 97.0%), with a mean age of 25.32 ( $SD = 7.56$ ), and a mean BMI of 23.09 ( $SD = 4.94$ ). Of the 133 women enrolled in the study, 20.3% ( $n = 27$ ) reported a lifetime suicide attempt or gesture. Percentage of participants who were Caucasian significantly differed by suicide attempt status, as 100% ( $n = 106$ ) of those without a suicide attempt or gesture were Caucasian vs. 85.2% ( $n = 23$ ) of those with a

lifetime suicide attempt or gesture (Fisher's exact,  $p < .001$ ). There were no differences in age or BMI by suicide attempt status.

### Personality Features Associated with Suicide Attempts

The mean and standard deviations of each of the subscales of the DAPP-BQ by suicide attempt or gesture status are presented in Table 3. Univariate logistic regression analyses were used to determine whether the subscales were associated with suicide attempt or gesture status. The results of these models are presented in Table 3. Identity problems ( $p < 0.008$ ) and insecure attachment ( $p < 0.002$ ) were each associated with a lifetime history of a suicide attempt or gesture. None of the other DAPP-BQ subscales were associated with lifetime history of a suicide attempt or gesture.

### Comorbid Psychopathology Associated with Suicide Attempts

Comorbid psychopathology by suicide attempt status is presented in Table 3. Depression symptoms ( $p < 0.001$ ) and lifetime anxiety disorder ( $p < 0.004$ ) were associated with a lifetime suicide attempt or gesture but lifetime substance dependence was not.

### Multivariate Analysis

The variables that were significantly associated with lifetime suicide attempts or gestures in the univariate logistic regression analyses (identity problems, insecure attachment, BDI, and lifetime anxiety disorder) were all included in one binary logistic regression analysis. Table 4 presents the final model. The overall model was statistically significant,  $\chi^2(4) = 26.35$ ,  $p < .001$ , and explained 28.3% of the variance (Nagelkerke's  $R^2 = 0.283$ ). Only BDI total score was uniquely associated with suicide attempts or gestures ( $p < 0.008$ ).

## Discussion

These two studies examined factors associated with lifetime suicide attempts in two large samples of individuals with BN. The lifetime prevalence estimates of self-reported suicide attempts in our two samples of women with BN (27.5% in Study 1 with a lifetime suicide attempt and 20.3% with a lifetime suicide attempt or gesture in Study 2) were comparable to several previous studies (Bulik, et al., 1999; Corcos, et al., 2002; Forcano, et al., 2009; Milos, et al., 2004) although higher than others (Favaro & Santonastaso, 1997; Pisetsky, et al., 2013; Runfola, Thornton, Pisetsky, Bulik, & Birgegard, 2014). The relatively high prevalence estimate in Study 1 is particularly notable as this was a sample which assessed only suicide attempts and included individuals with sub-threshold BN. Previous research has shown that individuals with a DSM-IV diagnosis of eating disorder not otherwise specified, which included sub-threshold BN, have suicide related mortality estimates comparable to full syndrome anorexia nervosa and BN (Crow, et al., 2009). That study in conjunction with the current one indicates that a sub-threshold eating disorder diagnosis does not necessarily indicate less severe pathology in terms of mortality and suicide attempts.

Although not a main aim of the study, there were demographic differences between those with a lifetime suicide attempt and those without. In Study 1, participants with a lifetime suicide attempt had a higher mean current BMI than participants without a suicide attempt.



There is some preliminary evidence that obesity is associated with suicide in non-psychiatric, population-based samples (Schneider et al., 2014; Stack & Lester, 2007). Having a higher BMI may be particularly distressing in a BN sample, as a central feature of the disorder is overvaluation of weight and shape. Individuals with BN who are overweight do report higher body uneasiness (Rotella et al., 2013). Thus, individuals with BN with a higher BMI may be at increased risk of emotion distress and a suicide attempt. However, this finding did not replicate in Study 2 and thus warrants further study.

A higher percentage of the lifetime suicide attempt or gesture group were non-Caucasian than those without a suicide attempt in Study 2. This finding was particularly surprising, as previous research has found either that Caucasians have a significantly higher risk of a suicide attempt than other ethnic groups, or failed to find any associations between race/ethnicity and suicide attempts (Perez-Rodriguez, Baca-Garcia, Oquendo, & Blanco, 2008). Given that eating disorders have long been stereotyped as “white” disorders, non-Caucasian individuals with BN may be at higher risk for experiencing stigma associated with their disorder. However, as this association was not observed in Study 1, further research is needed.

Consistent with our hypothesis, high scores on the identity problems scales were associated with suicide attempts in both samples. The personality trait identity problems, which is marked by anhedonia, labile self-concept, and pessimism, has previously been associated with suicidal ideation (Brezo, et al., 2006) and suicide attempts (Brezo et al., 2008) in non-eating disorder samples. Specific facets of identity problems have also been associated with suicide attempts, including anhedonia (Nock & Kazdin, 2002) and pessimism (Oquendo et al., 2004). Although identity problems were significantly associated with suicide attempts in both of our samples of women with BN, this personality trait was not uniquely associated with suicide attempts in either of the multivariate analyses. Identity problems may be a particularly relevant personality trait for increased risk of suicidal behaviors in this population. However, it is important to note that the findings from the multivariate analyses indicate that depression is a stronger correlate of suicide attempts than identity problems. One possibility is that anhedonia, a trait associated with both identity problems and depression, may be driving this association. Thus, future research is needed to disentangle identity problems from other correlates of suicide attempts such as anhedonia or other depressive symptoms.

Cognitive dysregulation, anxiousness, and insecure attachment were each associated with suicide attempts in one but not both of the samples. Each of the four personality traits that were associated with suicide attempts in one or both of our samples are narrow traits that fall under the broad personality trait emotion dysregulation (Livesley, et al., 1998). A systematic review of personality traits and suicide attempts found substantial evidence for the association between emotion dysregulation and its related traits with a lifetime suicide attempt history (Brezo, et al., 2006). Further, our results are in line with previous research which has found harm avoidance to be related to suicide attempts in individuals with BN (Forcano, et al., 2009).

Current depression symptoms were associated with suicide attempt history in both studies. These findings are consistent with results from studies using scaled indicators of depression symptoms in eating disorder samples (Corcos, et al., 2002; Favaro & Santonastaso, 1997; Franko, et al., 2004). Neither current substance use severity nor lifetime substance dependence was associated with lifetime suicide attempts in either sample. These findings are surprising given the literature which supports an association between substance use and suicide attempts in BN (Anderson, et al., 2002; Favaro & Santonastaso, 1997; Franko, et al., 2004; Milos, et al., 2004). Lifetime anxiety disorder in Study 2 but not current symptoms of obsessive-compulsive disorder in Study 1 was associated with lifetime suicide attempt. Of note, the anxiousness personality scale was associated with suicide attempts in Study 1. Previous research supports our finding that anxious personality traits (Bulik, et al., 1999; Corcos, et al., 2002) and anxiety disorders (Anderson, et al., 2002; Milos, et al., 2004) are associated with suicide attempts in BN.

The third aim of the current study was to assess the unique effects of both personality and psychiatric comorbidity on suicide attempts. Although four personality traits were significantly associated with lifetime history of a suicide attempt across the two studies in the univariate models, the multivariate models for both of the two studies revealed that none of these traits were uniquely associated with suicide attempts. In both Study 1 and Study 2, depressive symptoms were significantly associated with suicide attempts in the multivariate model. Therefore, while both personality traits and comorbid psychopathology were associated with suicide attempts, depression was the most salient factor. These results indicate that the association between the personality traits and suicide attempt history may be due to an underlying association with depressive symptoms. Since a previous suicide attempt is a strong predictor of death by suicide and individuals with a lifetime suicide attempt continue to have elevated levels of depression, depressive symptoms should be monitored particularly carefully in individuals with BN with a history of a suicide attempt.

### **Strengths and Limitations**

The present study contributes to the developing literature on factors associated with suicide attempts in women with BN. Strengths of this study include the use of two non-overlapping samples, community recruitment, and the assessment of personality and psychiatric comorbidities with reliable instruments. However, several limitations should be noted. The methodology of the two studies differed, thus limiting direct comparison of results between the two. The study could be strengthened by the use of a diagnostic tool specifically derived to assess eating disorder diagnoses. The assessment of a lifetime history of a suicide attempt differed across the two studies. In Study 2, as the question used to identify suicide attempters included “suicide gestures;” we were unable to tease apart suicide attempts from gestures, which are distinct pathologies. The cross-sectional nature of the studies precludes conclusions of causality and temporal precedence. Variables in this study were measured using different timeframes (e.g., lifetime history of suicide attempts versus current ratings of personality and comorbid psychopathology). Thus, the eating disorder or comorbid psychopathology may not have been present at the time of the suicide attempt.

## Conclusions

The lifetime prevalence of suicide attempts in women with BN is high, with more than 1 out of 5 individuals with BN attempting suicide throughout their life. Lifetime suicide attempts are associated with personality factors relating to emotion dysregulation and comorbid depression and anxiety. Prospective studies are needed to identify predictors of suicide attempts. Future studies should continue to disentangle the effect of personality and comorbid psychopathology on risk for suicide in order to inform treatment and prevention efforts.

## Acknowledgments

Dr. Pisetsky is supported by Grant T32 MH 082761 (P.I.: S.J. Crow) from the National Institute of Mental Health. Study 1 was supported in part by the following grants: John Simon Guggenheim Foundation; NIH 1 R01-MH/DK58820; NIH 1 R01-DK61973; NIH 1 R01-MH59100; NIH 1 R01-MH66287; NIH P30-DK50456; K02 MH65919; R01 MH 59234; Walden W. and Jean Young Shaw Foundation, NIMH Career Development Award; University of Missouri Research Council. Study 2 was supported by NIH R01 MH 59674.

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**Table 1**

Mean Personality Scores and Comorbid Psychopathology by Lifetime Suicide Attempt Status in Study 1 and Results from Univariate Logistic Regression Analyses

	No SA (n = 148)	Lifetime SA (n = 55)	B (S.E.)	Wald ( $\chi^2$ )	OR (95% CI)	p
DAPP-BQ (mean, SD)						
Submissiveness	44.59 (11.69)	48.45 (11.83)	0.03 (0.02)	3.61	1.04 (1.00–1.07)	0.06
Cognitive Dysregulation	36.88 (12.66)	43.53 (12.59)	0.06 (0.02)	10.02	1.06 (1.02–1.10)	0.002
Identity Problems	44.74 (14.72)	54.29 (12.64)	0.08 (0.02)	15.37	1.09 (1.04–1.14)	<.001
Affective Liability	49.87 (13.37)	55.11 (12.91)	0.04 (0.02)	5.30	1.04 (1.01–1.08)	0.03
Stimulus Seeking	42.32 (12.10)	43.24 (12.48)	0.01 (0.02)	0.31	1.01 (0.98–1.04)	0.58
Compulsivity	53.34 (11.99)	56.02 (11.44)	0.02 (0.02)	2.06	1.02 (0.99–1.05)	0.16
Restricted Expression	46.55 (13.53)	51.16 (11.20)	0.04 (0.02)	4.93	1.03 (1.00–1.07)	0.03
Callousness	31.56 (9.82)	31.71 (9.39)	0.00 (0.02)	0.03	1.00 (0.97–1.04)	0.86
Passive Aggressiveness	41.72 (10.99)	45.42 (11.32)	0.04 (0.02)	4.05	1.04 (1.00–1.08)	0.05
Intimacy Problems	35.45 (12.46)	41.56 (14.87)	0.04 (0.02)	6.52	1.04 (1.01–1.07)	0.02
Rejection	41.00 (11.19)	39.78 (11.62)	-0.01 (0.01)	0.67	0.99 (0.96–1.02)	0.42
Anxiousness	53.28 (13.37)	59.65 (12.38)	0.06 (0.02)	7.87	1.06 (1.02–1.11)	0.005
Conduct Problems	29.84 (8.99)	30.04 (9.10)	0.01 (0.02)	0.11	1.01 (0.97–1.04)	0.75
Suspiciousness	30.41 (11.35)	35.33 (13.65)	0.04 (0.02)	6.13	1.04 (1.01–1.07)	0.02
Social Avoidance	46.29 (13.77)	52.44 (13.87)	0.04 (0.02)	6.25	1.05 (1.01–1.08)	0.02
Narcissism	53.19 (11.07)	53.91 (11.11)	0.01 (0.02)	0.21	1.01 (0.97–1.05)	0.65
Insecure Attachment	40.69 (14.11)	42.56 (15.28)	0.01 (0.02)	0.41	1.01 (0.98–1.04)	0.53
Comorbid Psychopathology (mean, SD)						
IDS-SR	26.25 (11.55)	38.46 (12.00)	0.09 (0.02)	29.96	1.09 (1.06–1.12)	<.001
MAST/AD	8.89 (10.37)	11.91 (15.95)	0.02 (0.01)	2.29	1.02 (1.00–1.04)	0.13
MOCI	7.56 (5.46)	9.35 (5.11)	0.06 (0.03)	4.23	1.06 (1.00–1.12)	0.04

Note: SA = Suicide Attempt; DAPP-BQ = Dimensional Assessment of Personality Pathology – Basic Questionnaire; IDS-SR = Inventory for Depressive Symptomatology – Self Report (IDS-SR); MMDAST = Michigan Assessment Screening Test/Alcohol-Drug; MOCI = Maudsley Obsessive-Compulsive Inventory

Significance level set at  $p < .01$



**Table 2**

Results from the logistic regression predicting suicide attempt status from factors significantly associated with suicide attempt status in univariate models in Study 1.

	<b>B (S.E.)</b>	<b>Wald (<math>\chi^2</math>)</b>	<b>OR (95% CI)</b>	<b>p</b>
Cognitive Dysregulation	0.01 (0.03)	0.14	1.01 (0.96–1.07)	0.72
Identity Problems	0.02 (0.04)	0.23	1.02 (0.95–1.09)	0.64
Anxiousness	–0.04 (0.04)	1.34	0.96 (0.90–1.03)	0.25
IDS-SR	0.09 (0.02)	16.75	1.09 (1.05–1.14)	<.001
Constant	–2.97 (1.61)	3.40	0.05	0.07

Note: Cognitive Dysregulation, Identity Problems, and Anxiousness from the Dimensional Assessment of Personality Pathology – Basic Questionnaire; IDS-SR = Inventory for Depressive Symptomatology – Self Report (IDS-SR)

Significance level set at  $p < .01$

**Table 3**

Mean Personality Scores and Comorbid Psychopathology by Lifetime Suicide Attempt Status in Study 2 and Results from Univariate Logistic Regression Analyses

	No SA (n = 106)	Lifetime SA (n = 27)	B (S.E.)	Wald ( $\chi^2$ )	OR (95% CI)	P
DAPP-BQ (mean, SD)						
Submissiveness	45.85 (12.00)	49.96 (13.35)	0.04 (0.02)	2.18	1.04 (0.99–1.09)	0.14
Cognitive Dysregulation	34.76 (11.76)	41.85 (12.36)	0.07 (0.03)	6.68	1.07 (1.02–1.13)	0.01
Identity Problems	45.58 (14.51)	53.81 (13.02)	0.08 (0.03)	7.14	1.08 (1.02–1.15)	0.008
Affective Lability	48.35 (12.45)	54.93 (11.41)	0.07 (0.03)	6.50	1.07 (1.02–1.13)	0.02
Stimulus Seeking	43.69 (13.39)	45.48 (16.08)	0.01 (0.02)	0.20	1.01 (0.97–1.05)	0.66
Compulsivity	53.08 (11.22)	52.04 (12.68)	-0.01 (0.02)	0.29	0.99 (0.95–1.03)	0.59
Restricted Expression	49.99 (12.59)	55.30 (13.85)	0.04 (0.02)	2.91	1.04 (0.99–1.09)	0.09
Callousness	30.12 (8.18)	29.41 (7.21)	-0.01 (0.02)	0.12	0.99 (0.95–1.04)	0.74
Passive-Aggressiveness	42.92 (12.04)	47.89 (11.90)	0.05 (0.03)	3.26	1.05 (1.00–1.10)	0.08
Intimacy Problems	38.13 (11.65)	42.15 (13.48)	0.03 (0.02)	1.98	1.03 (0.99–1.09)	0.16
Rejection	38.79 (11.08)	38.63 (13.54)	0.00 (0.02)	0.06	1.00 (0.96–1.03)	0.82
Anxiousness	54.04 (14.35)	60.00 (13.88)	0.05 (0.03)	3.83	1.05 (1.00–1.11)	0.05
Conduct Problems	30.86 (9.52)	33.00 (8.66)	0.04 (0.03)	2.03	1.04 (0.99–1.10)	0.16
Suspiciousness	31.51 (11.91)	37.00 (10.66)	0.05 (0.02)	5.47	1.05 (1.01–1.10)	0.02
Social Avoidance	47.30 (13.45)	54.11 (12.53)	0.06 (0.03)	5.63	1.06 (1.01–1.12)	0.02
Narcissism	50.13 (11.76)	52.04 (13.17)	0.02 (0.02)	0.49	1.02 (0.97–1.06)	0.49
Insecure Attachment	39.89 (14.80)	50.44 (14.40)	0.08 (0.03)	9.76	1.08 (1.03–1.14)	0.002
Beck Depression Inventory (mean, SD)						
BDI	17.46 (9.15)	26.00 (10.16)	0.09 (0.03)	13.74	1.10 (1.04–1.15)	0.001
Lifetime Comorbid Psychopathology (% , n)						
Substance Dependence	33.96 (n = 36)	44.44 (n = 12)	0.44 (0.44)	1.02	1.56 (0.66–3.67)	0.32
Anxiety Disorder	52.83 (n = 56)	85.19 (n = 23)	1.64 (0.58)	8.08	5.13 (1.66–15.86)	0.004

Note: SA = Suicide Attempt; DAPP-BQ = Dimensional Assessment of Personality Pathology – Basic Questionnaire; BDI score derived from the Beck Depression Inventory; Lifetime comorbid psychopathology diagnoses derived from the Structured Clinical Interview for DSM-IV, Patient Edition.

Significance level set at  $p < .01$

**Table 4**

Results from the logistic regression predicting suicide attempt status from factors significantly associated with suicide attempt status in univariate models in Study 2.

	<b>B (S.E)</b>	<b>Wald (<math>\chi^2</math>)</b>	<b>OR (95% CI)</b>	<b>p</b>
Identity Problems	-0.04 (0.5)	0.87	0.97 (0.87–1.05)	0.36
Insecure Attachment	0.07 (0.03)	4.47	1.07 (1.01–1.14)	0.04
BDI	0.10 (0.04)	7.10	1.10 (1.03–1.19)	0.008
Anxiety Disorder	0.96 (0.62)	2.34	2.600 (0.77–8.84)	0.13
Constant	-5.41 (2.21)	6.01	0.00	0.02

Note: Identity Problems and Insecure Attachment derived from the Dimensional Assessment of Personality Pathology – Basic Questionnaire; BDI score derived from the Beck Depression Inventory; Anxiety Disorder diagnosis derived from the Structured Clinical Interview for DSM-IV, Patient Edition

Significance level set at  $p < .01$