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Personality Psychopathology Differentiates Risky Behaviors among Women with Bulimia Nervosa

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Abstract

Objective—Individuals with bulimia nervosa (BN) frequently endorse risky behaviors such as self-harm and substance use. However, no studies of BN to date have examined factors associated with engaging in individual or co-occurring risky behaviors. Given that individuals with BN often have personality psychopathology, which has been linked to symptoms and course of illness, this study sought to examine how personality may differentiate engagement in risky behaviors among BN individuals.

Method—A sample of 133 women with BN completed self-report measures of personality psychopathology at baseline, and then reported on bulimic and risky behaviors (e.g., substance misuse, self-harm) over 2 weeks using ecological momentary assessment (EMA). A series of hierarchical multiple regression analyses were conducted to examine the unique associations between state-level predictor variables (each risky behavior, e.g., substance misuse, and combination of risky behaviors, e.g., substance misuse plus self-harm) and trait-level personality constructs.

Results—Substance misuse behavior, above and beyond all other risky behaviors, was significantly associated with higher scores on trait dissocial behavior ($p = 0.004$).

Discussion—Substance misuse in BN has a unique association with dissocial behavior, a personality trait characterized by hostility, impulsivity, and entitlement. These results suggest that targeting personality variables may help facilitate more effective treatment of risky behaviors, including substance use in BN.

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Individuals with bulimia nervosa (BN), which is characterized by recurrent binge eating and purging behaviors, frequently report engaging in other maladaptive behaviors characterized as risky and impulsive, such as self-harm, substance misuse, high-risk sex, compulsive buying, and reckless driving (1,2,3,4). Depending on the specific risky behavior and assessment methodology used, researchers report that 16 to 44% of women with BN concurrently engage in some other form of risky behavior (5,6,7). Engaging in risky behaviors is associated with significant health problems (8,9,10), greater overall psychopathology, and poorer course of illness than engagement in bulimic behaviors alone (6). However, there is a paucity of research examining factors associated with engaging in specific risky behaviors that occur independently or co-occur among individuals with BN. Since individuals with BN often display personality psychopathology, which is associated with these types of risky behaviors as well as the overall course of illness, dimensions of personality psychopathology may represent important factors that differentiate risky behaviors.

Personality is often identified as important in risk and maintenance models for many forms of psychopathology, including eating disorders (e.g., 11). Individuals with BN show personality psychopathology across multiple dimensions, including emotion dysregulation, social avoidance, compulsivity, and dissocial behavior (e.g., 12). Evidence also suggests that considering dimensions of personality psychopathology in treating BN may have clinical utility. For instance, course of illness (13) and treatment outcomes (14) in BN have been found to be associated with personality constructs, supporting the utility of such constructs in terms of understanding and differentiating clinical symptoms in BN, including risky behaviors.

The majority of research on personality and risky behaviors in BN has focused on examining one specific risky behavior and its association with personality. For example, higher levels of neuroticism were found in individuals with BN who also abused alcohol compared to individuals who engaged in only BN behaviors, only substance use, or neither (15). Other dimensions of personality dysfunction have been implicated as important in the course of BN and engagement in risky behaviors, including dissocial behavior and social avoidance (7,12). However, most studies have focused on emotion dysregulation-related personality traits, which have been found to be associated with risky behaviors in BN, including self-harm (1,16), substance use (7,15,17,18), and reckless behaviors (e.g., behaviors which fall more broadly under impulse control disorders; 5,19,20).

Researchers have also identified a “multi-impulsive” BN group (21,22), categorized by endorsement of three or more risky behaviors (alcohol abuse, drug abuse, self-harm, suicide attempts, stealing, and/or sexual promiscuity; 6). Thus, as opposed to examining one specific risky behavior, numerous behaviors were grouped together into one heterogeneous group and examined under the assumption that they were all indicators of the multi-impulsive construct. Although personality features have not been directly examined in the “multi-impulsive” group, studies of personality-based subtyping suggest that individuals with BN characterized by an impulsive, emotionally dysregulated, and dissocial (e.g., callous, dominant, hostile, fails to follow social norms, attention seeking) personality profile tend to show the highest rates of risky behaviors, including self-harm and substance misuse (12).

This finding, taken together with those examining specific risky behaviors, indicate that individuals with BN who engage in various forms of risky behaviors are likely to be higher on traits related to emotion dysregulation, and possibly social avoidance and dissocial behavior.

Existing findings have thus informed our understanding of risky behaviors and personality in BN. However, there are three primary limitations to these findings. First, the majority of research has focused only on personality traits related to emotion dysregulation, showing evidence of a strong association between such traits and engagement in some form of risky behavior. However, the extent to which emotion dysregulation, as well as other personality dimensions, may differentiate between risky behaviors is unclear. Second, to date, studies have tended to focus on either (a) one concurrent or lifetime risky behavior (e.g., substance misuse) in BN or (b) multiple co-occurring risky behaviors (e.g., “multi-impulsive”). As a result, it is unclear how specific risky behaviors are differentially related to personality traits in individuals with BN. For example, perhaps substance misuse in BN is associated with high scores on dissocial traits while self-harm is associated with high scores on social avoidance traits. Moreover, very little is known about the association of specific combinations of risky behaviors (e.g., self-harm and substance misuse versus substance misuse and reckless behavior) and personality psychopathology in individuals with BN. Therefore, there is a need to understand the complexity of the nature of these relationships. Third, the bulk of research to date has utilized retrospective designs, thus there is a need for studies examining associations between personality and risky behaviors using alternative methodologies with enhanced ecological validity (e.g., real-time, naturalistic approaches to data collection).

The aim of the current study was therefore to examine several empirically relevant dimensions of personality psychopathology in relation to specific risky behaviors, both alone (e.g., substance misuse) and in combination with other (e.g., substance misuse and self-harm), in a sample of women with BN who reported on behaviors in real time in their natural environments. Of note, understanding the associations between traits and specific forms of risky behaviors may have clinical utility through informing treatment selection and intervention development, which may positively impact treatment outcomes for individuals with BN and comorbid risky behaviors. For example, if a certain personality trait (e.g., social avoidance) is found to be uniquely associated with a specific risky behavior in BN (e.g., self-harm), then targeting that trait may be particularly useful in the treatment of individuals with BN who engage in self-harm. In this example, targeting social avoidance (e.g., perhaps through focusing on improving relationships and fostering engagement in social activities) may positively impact both BN symptoms and self-harm behaviors. Likewise, new treatments that focus on specific personality traits (e.g., social avoidance) may be developed for individuals with BN who engage in certain behaviors (e.g., self-harm), thereby potentially enhancing treatment outcome in BN. That is, clinicians who are treating individuals with BN with specific comorbid risky behaviors could select the intervention designed to target relevant traits known to be associated with the risky behaviors. Indeed, the development of interventions that target personality traits associated with both BN symptoms and specific comorbid risky behaviors may have particular clinical utility. Given that the existing empirical literature lacks information regarding which traits might

distinguish between risky behaviors, this study was considered exploratory in nature and there were no a priori hypotheses.

Method

Participants and Procedure

Participants were 133 women with BN who completed an ecological momentary assessment (EMA) study (23). To be included, participants had to be female, between the ages of 18 and 55 ($M = 25.3 \pm 7.6$ years), medically stable with a body mass index (BMI; kg/m^2) of at least 18.5 ($M = 23.9 \pm 5.2 \text{ kg}/\text{m}^2$), and fulfill DSM-IV criteria for BN (24). The sample was predominantly Caucasian ($n = 127$; 95.5%) with at least some college education ($n = 107$; 80.5%), and most had never been married ($n = 85$; 63.9%).

Participants were recruited via targeted advertising throughout the community, including eating disorder and psychiatric clinics. Interested participants were screened by phone to assess BN symptoms over the past month using the eating disorder module from the Structured Clinical Interview for DSM-IV Axis I Disorders/Patient Edition (SCID-I/P; 25).

After preliminary eligibility was determined, participants attended a baseline study visit at the research facility during which they provided written informed consent and were screened for medical stability. Height and weight were measured by trained research staff using calibrated equipment. Participants then completed a baseline assessment battery and received thorough instructions on how to use the handheld computer for the 2-week EMA protocol. Participants were instructed to complete EMA recordings of mood and eating behavior each time they experienced an eating disorder behavior (e.g., binge eating, purging); before bedtime; and in response to 6 semi-random prompts by investigators, which occurred every 2-3 hours between 8:00 am and 10:00 pm. All participants completed a two-day trial period to ensure that they understood EMA procedures; trial data were not included in the analyses.

Measures

Trait-level variables—All trait-level variables were assessed at the baseline study visit. The full-length version of the SCID-I/P (25) was administered by trained, doctoral-level psychologists to confirm preliminary BN diagnoses established during the phone screen. The SCID-I/P has good reliability and validity (25,26). Inter-rater reliability for BN diagnoses was 1.0 in the current study. The Dimensional Assessment of Personality Pathology-Basic Questionnaire (27) was used to assess 18 dimensions of personality psychopathology. Latent profile analysis (LPA) was used to identify four higher order scales comprised of specific subscales: (a) *emotional dysregulation* (affective lability, anxiousness, cognitive dysregulation, identity problems, insecure attachment, oppositionality, and submissiveness); (b) *dissocial behavior* (callousness, conduct problems, narcissism, rejection, and stimulus seeking); (c) *social avoidance* (intimacy problems, low affiliation, and restricted expression); and (d) *compulsiveness* (compulsivity). This is consistent with well-established procedures (12,27,28). The DAPP-BQ has shown good psychometric properties, test–retest reliability ranging from .81 to .93 and internal consistency ranging from .83 to .94 (29).

State-level variables—Binge eating (“I binged”) and purging (“I vomited,” “I used laxatives for weight control”) were assessed via EMA using a behavior checklist, which was designed for the study. During EMA training, participants were instructed to record binge eating episodes characterized by “an amount of food that you consider excessive or an amount of food that other people would consider excessive, with an associated loss of control or the feeling of being driven or compelled to keep eating” at all EMA recordings. Participants were provided with personally-tailored examples of excessive amounts of food based on binge eating episodes described in baseline interviews.

Risky behaviors were rated categorically (yes/no) via EMA using a behavior checklist, which was designed for the study. Participants were instructed to record these behaviors immediately after they occurred in real time and to indicate in response to semirandom prompts whether any behaviors had occurred since the last recording. Risky behaviors included: (a) self-harm (endorsement of one or more of the following four behaviors: intentionally cut, scratched, burned or hit oneself, or banged one’s head); (b) substance misuse (endorsement of one or more of the following two behaviors: got drunk, abused drugs); and (c) reckless behaviors (endorsement of one or more of the following five behaviors: engaged in risky or unprotected sex, broke valued personal items, drove dangerously or recklessly, shoplifted, or went on a spending spree). For this study, a total of seven dichotomous variables were created: three for all single risky behaviors, three for all combinations of two risky behaviors, and one for all three risky behaviors. For single risky behaviors, three variables were created (self-harm, substance misuse, reckless behavior), reflecting engagement in each behavior. An individual was considered as having engaged in that behavior (e.g., self-harm) if she endorsed a behavior (e.g., “intentionally scratched self”) at least one time over the course of the two-week EMA protocol. If so, she was assigned a “1” for that variable (designating “yes” for that risky behavior variable). If she did not endorse the behavior at least one time over the course of the two-week EMA protocol, she was assigned a “0” for that variable (designating “no” for that risky behavior variable). For engagement in two risky behaviors, three variables were created, one for each possible combination: (a) self-harm plus substance misuse; (b) self-harm plus reckless behavior; and (c) substance misuse plus reckless behavior. Individuals were assigned a “1” to the variable if they received a “1” on both corresponding single behaviors, reflecting engagement in both behaviors. For example, if an individual engaged in self-harm (1) and reckless behavior (1), but not substance misuse (0), then she would be assigned a “1” on the self-harm plus reckless behavior variable, but a “0” on self-harm plus substance misuse variable, and a “0” on substance misuse plus reckless behavior variable. Lastly, a variable for engagement in all three types of risky behaviors (self-harm plus reckless behavior plus substance misuse) was created. Individuals who endorsed all three behaviors (e.g., assigned values of “1” for each) were assigned a “1” for this variable; individuals who endorsed none, one, or two risky behaviors received a “0” on this three behavior combination variable.

Statistical Analyses

Hierarchical multiple regression analyses were conducted to examine the unique associations between the state-level predictor variables (each risky behavior and combination of risky behaviors) and trait-level personality constructs. A total of four

hierarchical multiple regressions were conducted, one for each of the four higher-order traits from the DAPP (emotion dysregulation, dissocial behavior, social avoidance, and compulsivity). In Step 1, all single predictor variables were entered (self-harm, substance misuse, reckless behavior). In Step 2, the three predictor variables for engagement in two behaviors were entered: substance misuse plus self-harm; substance misuse plus reckless behavior; reckless behavior plus self-harm. Finally, in Step 3, the predictor variable for engagement in all three types of risky behaviors was entered. This strategy allowed us to identify the unique effects of individual risky behaviors, as well as combinations of two or three risky behaviors together. That is, this model tested for the independent association between each risky behavior (and each combination of behaviors) and personality traits, controlling for all other behaviors. To ensure the findings were not a result of illness severity, the model was also run controlling for BN severity (between-subjects frequency of BN behaviors, i.e., binge eating and purging, over the course of the two-week EMA protocol) and results were virtually unchanged. Thus, we present findings from the original model without controlling for BN severity.

Results

Of the 133 participants, 60 (45.11%) engaged in a reckless behavior during the two-week protocol, 55 (41.35%) engaged in substance misuse, and 19 (14.29%) engaged in self-harm. Forty-four participants (33.08%) engaged in only one type of risky behavior, 33 (24.8%) engaged in two types of risky behaviors, and eight (6.02%) engaged in all three types of risky behaviors.

Results for each of the personality trait-based models are presented in Table I through IV. None of the models were significant except for trait dissocial behavior. As can be seen in Table I, in the analysis with dissocial behavior, the Step 1 model was significant (F change = 3.69, $p = .01$) and the model accounted for 5.8% of the variance. Substance misuse was the only risky behavior significantly associated with dissocial behavior ($p = 0.004$). The Step 2 (F change = 1.08, $p = 0.36$) and Step 3 (F change = 0.02, $p = 0.88$) models were not significant, indicating that adding in the combinations of two or three behaviors did not significantly increase the amount of variance accounted for in the models.

Discussion

Although previous research on risky behaviors and personality psychopathology in BN has identified trait emotion dysregulation as important for engagement in risky behaviors, no study to date has investigated how specific behaviors or combinations of behaviors may be uniquely associated with dimensions of personality pathology. The current study, to our knowledge, is the first to do so. We tested the unique associations of specific risky behaviors and combinations of risky behaviors with higher-order personality traits. Findings suggested that personality is more strongly associated with engagement in substance misuse than other risky behaviors, and evidence did not support the relevance of personality in relation to engagement in combinations of risky behaviors. More specifically, we found that substance misuse in BN is uniquely associated with trait dissocial behavior, above and beyond other risky behaviors and combination of risky behaviors. Further, the similar pattern of findings

when BN behaviors were added into the model suggests that the unique associations of risky behaviors with personality traits are independent of BN behavior frequency and severity. That is, individuals with BN who engage in substance misuse, regardless of the frequency or severity of their binge eating and purging behaviors, are likely to be higher on trait dissocial behavior.

Although a previous study identified associations between multiple risky behaviors and trait dissocial behavior and emotion dysregulation (12), it seems possible that substance misuse, alone, may have accounted for the significant relationship with dissocial behavior. It thus appears that, compared to individuals with BN who engage in other risky behaviors, individuals with BN who engage in substance misuse are more likely to display dissocial traits, such as pursuing their own needs without regard for others, desiring to dominate others, failing to follow social norms, craving admiration, and acting without thinking (27). The current study is the first to document this link in a BN sample, although this cluster of traits has been previously associated with “externalizing disorders,” including substance use disorders (27).

It is important to note that we did not find any other significant associations between personality psychopathology and any individual risky behavior or combinations of risky behaviors. This finding is likely a result of our stringent model, which aimed to identify unique associations, controlling for other associations in the model. Of particular importance, we did not find significant unique associations between any risky behavior and trait emotion dysregulation. Although prior research has linked emotion dysregulation to multiple risky behaviors (1,5,7,12,15-20), it may be that each separate behavior is related to emotion dysregulation, but not independently of the other associations. In other words, emotion dysregulation does not appear to differentiate risky behaviors, but is likely similarly associated with all types of risky behaviors. This implies, at least in terms of personality pathology, the validity of classifying individuals with BN based on multiple risky behaviors, as researchers have done with the multi-impulsive group (6,21,22), with perhaps the exception of substance misuse as it appears to have unique associations with personality.

These findings have important clinical implications. Given that past or current substance abuse predicts poorer response to treatment in eating disorder patients (30,31), it is important to have a better understanding of these co-occurring behaviors to develop more efficacious treatment strategies. The current findings, in combination with prior findings linking substance misuse in BN to trait emotion dysregulation (7,15-18), suggest that these individuals may benefit from treatments focusing on both improving emotion regulation and decreasing dissocial behavior. That is, individuals with BN who engage in substance use may benefit from specific, additional intervention strategies that address hostile interpersonal interactions as well as sensation seeking behavior. Though not directly targeting dissocial traits, dialectical behavior therapy adapted for co-occurring eating disorders and substance use appears to hold promise as an effective treatment option (32) for this population, perhaps because of its focus on behaviors linked to dissocial traits (e.g., impulsive behaviors and hostile interpersonal interactions). More research is needed, however, to understand if its effectiveness is linked to decreases in dissocial traits.

The findings from this study suggest several future avenues of research. First, although there was a significant positive association between substance misuse in BN and trait dissocial behavior, the causal nature of that relationship remains unclear. Thus, high scores on dissocial traits could be a result of engaging in substance misuse, or perhaps possessing a personality-based tendency for dissocial behavior is a risk factor for engagement substance misuse in BN. Longitudinal risk research could clarify this point to determine if personality psychopathology functions as a risk factor, consequence, or both. Second, future research may benefit from examining maintenance mechanisms specific to substance misuse in BN. That is, this unique association with trait dissocial behavior could suggest a novel reinforcing quality of substance use in BN. For example, perhaps substance use functions as a way of acting out and seeking attention, as opposed to other possible reinforcers related to binge-purge behavior, such as reducing negative affect in this population. Third, because personality was not a strong factor for differentiating risky behavior engagement in BN beyond trait dissocial behavior and substance use, future research should examine other relevant variables that may more effectively differentiate risky behaviors in BN. For example, there may be utility in studying specific learned expectancies in BN samples, which have been found to differentiate eating disorder and substance use clinical samples as well as the onset of bingeing and drinking behaviors in early adolescents (33).

Although the present study contributes to the developing literature on risky behaviors in BN, the findings should be understood in the context of certain limitations. First, the current approach focused on the presence versus absence of risky behaviors, and did not take into account the frequency of the behaviors. Second, it is possible that participants engaged in certain risky behaviors, but did not report them in the EMA protocol. However, given that this approach assessed behaviors naturalistically and in real-time, it was likely more accurate than a standard questionnaire or interview that would be more strongly impacted by retrospective recall biases. Similarly, this study only reports on behaviors participants engaged in during the specific two-week study protocol. Therefore, it is possible that participants engaged in risky behaviors outside of the study time period and thus were not captured here. Finally, the number of individuals engaging in each individual risky behavior or combinations of risky behaviors was uneven, and some groups were small (e.g., only eight participants engaged in all three risky behaviors). Though we used appropriate statistical modeling (hierarchical multiple regression) that avoided the problems of comparisons among small groups, there is a possibility that we did not have enough power to detect significant differences among behaviors and combinations of behaviors on dimensions of personality.

In conclusion, studying risky behaviors and personality psychopathology in BN can inform our understanding of the nature of the various types of maladaptive behaviors often found in BN, ultimately aiding in the development or tailoring of effective intervention strategies for particular groups of individuals with BN. The present results suggest that specific dimensions of personality may be important for differentiating risky behaviors among individuals with BN. In particular, substance misuse in BN seems to be uniquely associated with higher scores on trait dissocial behavior. This finding suggests the potential utility of considering personality traits when treating individuals with BN, as well as suggesting

potential directions for future research related to the maintenance mechanisms of substance use in BN.

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References

1. Anestis MD, Silva C, Lavender JM, Crosby RD, Wonderlich SA, Engel SG, Joiner TE. Predicting nonsuicidal self-injury episodes over a discrete period of time in a sample of women diagnosed with bulimia nervosa: an analysis of self-reported trait and ecological momentary assessment based on affective lability and previous suicide attempts. *Int J Eat Disord.* 2012; 45:808–811. [PubMed: 21744378]
2. Fischer S, le Grange D. Comorbidity and high-risk behaviors in treatment-seeking adolescents with bulimia nervosa. *Int J Eat Disord.* 2007; 40:751–753. [PubMed: 17683094]
3. Peñas-Lledó E, Waller G. Bulimic psychopathology and impulsive behaviors among nonclinical women. *Int J Eat Disord.* 2001; 29:71–75. [PubMed: 11135336]
4. Peñas-Lledó E, Vaz FJ, Ramos MI, Waller G. Impulsive behaviors in bulimic patients: relation to general psychopathology. *Int J Eat Disord.* 2002; 32:98–102. [PubMed: 12183951]
5. Fernández-Aranda F, Pinheiro AP, Thornton LM, Berrettini WH, Crow S, Fichter MM, Halmi KA, et al. Impulse control disorders in women with eating disorders. *Psychiatry Res.* 2008; 15:147–157. [PubMed: 17961717]
6. Myers TC, Wonderlich SA, Crosby R, Mitchell JE, Steffen KJ, Smyth J, Miltenberger R. Is multi-impulsive bulimia a distinct type of bulimia nervosa: Psychopathology and EMA findings. *Int J Eat Disord.* 2006; 39:655–661. [PubMed: 16927382]
7. Vaz-Leal FJ, Ramos-Fuentes MI, Rodríguez-Santos L, Flores-Mateos IS, Franco-Zambrano A, Rojo-Moreno L, Beato-Fernández L. Neurobiological and clinical variables associated with alcohol abuse in bulimia nervosa. *Eur Eat Disord Rev.* 2015; 23:185–192. [PubMed: 25766414]
8. Bulik C, Sullivan P, Carter FA, Joyce PR. Lifetime comorbidity of alcohol dependence in women with bulimia nervosa. *Addict Behav.* 1997; 22:437–446. [PubMed: 9290854]
9. Corcos M, Nezelof S, Speranza M, Topa S, Girardon N, Guilbaud O, et al. Psychoactive substance consumption in eating disorders. *Eat Behav.* 2001; 2:27–38. [PubMed: 15001048]
10. Courbasson CM, Smith PD, Cleland PA. Substance use disorders, anorexia, bulimia, and concurrent disorders. *Can J Public Health.* 2005; 96:102–106. [PubMed: 15850027]
11. Pearson CM, Wonderlich SA, Smith GT. A risk and maintenance model for bulimia nervosa: from impulsive action to compulsive behavior. *Psychol Rev.* 2015; 122:516–535. [PubMed: 25961467]
12. Wonderlich SA, Crosby RD, Joiner T, Peterson CB, Bardone-Cone A, Klein M, Vrshek S. Personality subtyping and bulimia nervosa: psychopathological and genetic correlates. *Psychol Med.* 2005; 35:649–657. [PubMed: 15918341]
13. Thompson-Brenner H, Eddy KT, Franko DL, Dorer DJ, Vashchenko M, Kass AE, Herzog DB. A personality classification system for eating disorders: a longitudinal study. *Compr Psychiat.* 2008; 49:551–560. [PubMed: 18970903]
14. Haynos, AF.; Pearson, CM.; Utzinger, LM.; Wonderlich, SA.; Crosby, RD.; Mitchell, JE.; Crow, SJ.; Peterson, CB. Effects of empirically derived personality subtyping on clinical symptoms and treatment response in bulimia nervosa. 2016. Manuscript submitted for publication
15. Rush CC, Becker SJ, Curry JF. Personality factors and styles among college students who binge eat and drink. *Psychol Addict Behav.* 2009; 23:140–150. [PubMed: 19290698]
16. Muehlenkamp JJ, Engel SG, Wadeson A, Crosby RD, Wonderlich SA, Simonich H, Mitchell JE. Emotional states preceding and following acts of non-suicidal self-injury in bulimia nervosa patients. *Beh Res Ther.* 2009; 47:83–87.
17. Dawe S, Laxton NJ. The role of impulsivity in the development of substance use and eating disorders. *Neurosci Biobehav Rev.* 2004; 28:343–351. [PubMed: 15225976]

18. Kane TA, Loxton N, Staiger P, Dawe S. Does the tendency to act impulsively underlie binge eating and binge drinking problems? An empirical investigation. *Pers Individ Dif*. 2004; 36:83–94.
19. Davenport K, Houston J, Griffiths MD. Excessive eating and compulsive buying behavior in women: an empirical pilot study examining reward sensitivity, anxiety, impulsivity, self-esteem, and social desirability. *Int J Ment Health Addict*. 2012; 10:474–489.
20. Fernández-Aranda F, Jiménez-Murcia S, Alvarez-Moya EM, Granero R, Vallejo J, Bulik CM. Impulse control disorders in eating disorders: clinical and therapeutic implications. *Compr Psychiatry*. 2006; 47:482–488. [PubMed: 17067872]
21. Fichter MM, Quadflieg N, Rief W. Course of multi-impulsive bulimia. *Psychol Med*. 1994; 24:591–604. [PubMed: 7991741]
22. Lacey JH, Evans CD. The impulsivist: a multi-impulsive personality disorder. *Br J Addict*. 1986; 81:641–649. [PubMed: 3539167]
23. Smyth JM, Wonderlich SA, Heron KE, Sliwinski MJ, Crosby RD, Mitchell JE, Engel SG. Daily and momentary mood and stress are associated with binge eating and vomiting in bulimia nervosa patients in the natural environment. *J Consult Clin Psych*. 2007; 75:629–638.
24. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Text Revised*. 4th ed. American Psychiatric Association; Washington, DC: 2000.
25. First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Patient Edition with Psychotic Screen*. Biometrics Research, New York State Psychiatric Institute; New York: 1997.
26. Lobbetael J, Leurgans M, Arntz A. Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I) and Axis II Disorders (SCID II). *Clin Psychol Psychot*. 2011; 18:75–79.
27. Livesley, WJ.; Jackson, DN. *Dimensional Assessment of Personality Pathology – Basic Questionnaire: Technical Manual*. Sigma Assessment Systems, Inc.; Port Huron, MI: 2009.
28. Bo S, Abu-Akel A, Kongerslev M, Haahr UH, Simonsen E. The role of comorbid personality pathology in predicting self-reported aggression in patients with schizophrenia. *Compr Psychiat*. 2013; 54:423–431. [PubMed: 23312736]
29. Livesley WJ, Jackson DN, Schroeder ML. Factorial structure of traits delineating personality disorders in clinical and general population samples. *J Abnorm Psychol*. 1992; 101:432–440. 992. [PubMed: 1500600]
30. Keel PK, Mitchell JE, Miller KB, Davis TL, Crow SJ. Long-term outcome of bulimia nervosa. *Arch Gen Psychiat*. 1999; 56:63–69. [PubMed: 9892257]
31. Keel PK, Mitchell JE, Miller KB, Davis TL, Crow SJ. Predictive validity of bulimia nervosa as a diagnostic category. *Am J Psychiat*. 2000; 157:136–138. [PubMed: 10618030]
32. Courbasson C, Nishikawa Y, Dixon L. Outcome of dialectical behavior therapy for concurrent eating and substance use disorders. *Clin Psychol Psychother*. 2012; 19:434–449. [PubMed: 21416557]
33. Fischer S, Settles R, Collins B, Gunn R, Smith GT. The role of negative urgency and expectancies in problem drinking and disordered eating: testing a model of comorbidity in pathological and at-risk samples. *Psychol Addict Behav*. 2012; 26:112–123. [PubMed: 21604832]

Table I

Hierarchical multiple regression models predicting dissocial behavior from engagement in risky behaviors

	Variable	β	p	R ²	R ² Change	F Change	F Change Sig
Step 1				.08	.08	3.69	.01
	Reckless Behavior	.08	.37				
	Substance Use	.25	.004				
	Self-Harm	-.09	.32				
Step 2				.10	.02	1.08	.36
	Reckless Behavior	.24	.06				
	Substance Use	.39	.002				
	Self-Harm	-.02	.92				
	Reckless + Substance	-.27	.09				
	Reckless + Self-Harm	-.59	.56				
	Substance + Self-Harm	0.06	.67				
Step 3				.10	.00	.02	.88
	Reckless Behavior	.24	.06				
	Substance Use	.39	.002				
	Self-Harm	.00	.99				
	Reckless + Substance	-.28	.09				
	Reckless + Self-Harm	-.15	.58				
	Substance + Self-Harm	.01	.97				
	Reckless + Substance + Self-Harm	.05	.88				

Note. Significant findings are in bolded font.

Table II

Hierarchical multiple regression models predicting emotion dysregulation from engagement in risky behaviors

	Variable	β	p	R^2	R^2 Change	F Change	F Change Sig
Step 1				.06	.06	2.47	.07
	Reckless Behavior	.14	.13				
	Substance Use	.10	.25				
	Self-Harm	.10	.30				
Step 2				.11	.06	2.63	.05
	Reckless Behavior	.27	.04				
	Substance Use	.31	.01				
	Self-Harm	-.16	.46				
	Reckless + Substance	-.34	.03				
	Reckless + Self-Harm	.31	.14				
	Substance + Self-Harm	-.04	.78				
Step 3				.11	.00	.34	.56
	Reckless Behavior	.26	.05				
	Substance Use	.29	.02				
	Self-Harm	-.23	.35				
	Reckless + Substance	-.31	.06				
	Reckless + Self-Harm	.41	.19				
	Substance + Self-Harm	.17	.68				
	Reckless + Substance + Self-Harm	-.19	.56				

Table III

Hierarchical multiple regression models predicting social avoidance from engagement in risky behaviors

	Variable	β	p	R^2	R^2 Change	F Change	F Change p
Step 1				.01	.01	.32	.81
	Reckless Behavior	.04	.67				
	Substance Use	-.06	.49				
	Self-Harm	.05	.64				
Step 2				.03	.02	.85	.47
	Reckless Behavior	-.02	.87				
	Substance Use	-.05	.71				
	Self-Harm	-.18	.51				
	Reckless + Substance	.05	.79				
	Reckless + Self-Harm	.34	.19				
	Substance + Self-Harm	-.12	.38				
Step 3				.06	.03	3.80	.05
	Reckless Behavior	.02	.87				
	Substance Use	-.01	.96				
	Self-Harm	.26	.45				
	Reckless + Substance	-.04	.81				
	Reckless + Self-Harm	-.015	-.68				
	Substance + Self-Harm	-.74	.03				
	Reckless + Substance + Self-Harm	.69	.05				

Table IV

Hierarchical multiple regression models predicting compulsivity from engagement in risky behaviors

	Variable	β	p	R^2	R^2 Change	F Change	F Change Sig
Step 1				.04	.04	1.70	.18
	Reckless Behavior	-.10	.28				
	Substance Use	-.11	.23				
	Self-Harm	-.07	.42				
Step 2				.04	.00	.13	.94
	Reckless Behavior	-.15	.27				
	Substance Use	-.15	.25				
	Self-Harm	-.16	.46				
	Reckless + Substance	.06	.71				
	Reckless + Self-Harm	.09	.68				
	Substance + Self-Harm	.01	.92				
Step 3				.04	.00	.09	.77
	Reckless Behavior	-.14	.31				
	Substance Use	-.14	.28				
	Self-Harm	-.12	.64				
	Reckless + Substance	.05	.79				
	Reckless + Self-Harm	.04	.88				
	Substance + Self-Harm	-.07	.82				
	Reckless + Substance + Self-Harm	.10	.77				