

## **FOOD CONSUMPTION AS AFFECT MODULATION IN BORDERLINE PERSONALITY**

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The present study examined relationships among negative affect, borderline personality features, and eating behavior through the experimental manipulation of mood. Undergraduate women ( $N = 307$ ) completed a baseline mood assessment, viewed a 39-minute sad film either with or without concurrent food presentation, then completed a second mood assessment and questionnaires assessing personality and eating attitudes/behaviors. Women reporting more borderline personality features exhibited greater negative affect across time and were more reactive to the sad film. Food presentation appeared to have a small ameliorative effect on sadness and general negative affect. However, quantity of food consumption was associated with improvements in mood only for women reporting higher levels of borderline personality features. These data suggest that women with borderline personality characteristics may be at elevated risk for developing problems with binge eating, because consuming larger quantities of food appeared to have a tempering effect on their negative mood and feelings of sadness.

Borderline personality disorder (BPD) may be one of the most frequently diagnosed Axis II conditions among individuals with eating disorders (EDs; Sansone, Levitt, & Sansone, 2005), and prospective findings suggest that borderline personality symptoms predict the onset of disordered eating behaviors over a 2-year period among college women ( $\beta = .59$ ,  $p < .01$ ; Lilenfeld, Jacobs, Woods, & Picot, 2008). Research also suggests that comorbid BPD may represent a more severe variant of eating pathology; for instance, Zanarini and her colleagues (2010) reported that among women with eating disorders, eating problems generally declined over a 10-year period, but certain types of eating problems remained significantly higher among those with comorbid BPD. Similarly, a study linking BPD and EDs reported that emotionally dysregulated ED clients exhibited the poorest functioning, the most comorbid conditions (i.e., 32.4% BPD; 80.6% any

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Axis II diagnosis), and the worst therapeutic outcome when compared with ED individuals who were classified as emotionally constricted or perfectionistic (Thompson-Brenner & Westen, 2005). Consistent with this notion, results from a prospective study indicated that remission from an ED at 5-year follow-up was associated with a lower prevalence of personality disorder, and that the effect size for changes in borderline personality functioning among individuals with bulimia nervosa was large (Vrabel, Rø, Martinsen, Hoffart, & Rosenvinge, 2009). Although the nature of the relationship between EDs and BPD remains unknown, affective instability appears to be an area of considerable overlap between individuals with EDs and BPD. Whereas for BPD, affective instability is a diagnostic criterion, individuals with eating disorders, particularly bulimia nervosa (BN) and binge-eating disorder (BED), often highlight the role of negative affect in precipitating and maintaining their disordered eating (e.g., Smyth et al., 2007).

### **AFFECT AND BORDERLINE PERSONALITY**

Among its constellation of symptoms, BPD is considered by some to be essentially a disorder of emotion regulation, in particular due to the heightened emotional vulnerability and lack of regulation strategies seen in individuals with BPD. Individuals with BPD exhibit difficulty modulating or regulating affect (e.g., Conklin, Bradley, & Westen, 2006) and increased affective variability relative to nonclinical and clinical samples without BPD (e.g., Russell, Moskowitz, Zuroff, Sookman, & Paris, 2007; Trull et al., 2008). Although some studies suggest that individuals with BPD also exhibit hyperresponsiveness to daily stressors and negative affect (e.g., Tolpin, Gunthert, Cohen, & O'Neill, 2004; Zeigler-Hill & Abraham, 2006), others suggest that affective responses among BPD individuals may be less closely linked with external events (see Nica & Links, 2009, for a review). Research also suggests that there may be some disconnect between self-report and physiological measures of arousal in assessing reactivity among individuals with BPD. For instance, in a study comparing reactivity to visual stimuli among individuals with BPD, those with social anxiety, and nonclinical controls, Kuo and Linehan (2009) reported *decreased* physiological reactivity to a sad film among individuals with BPD. Thus, results comparing BPD and non-BPD individuals on markers of reactivity are somewhat mixed, but suggest there may be differences based on the type of affect elicited by the external stimulus, as well as the assessment method (i.e., self-report or physiological measurement). Notably, recent studies employing ecological momentary assessment (EMA) methods also suggest that individuals with BPD report greater affective instability than those with related clinical conditions (e.g., major depressive disorder/dysthymia; Solhan, Trull, Jahng, & Wood, 2009). In sum, these data highlight the salience of negative affectivity and dysregulation among individuals with BPD, and suggest that BPD may represent a general tendency toward negative affect and hyperreactivity to distressing situations.

**AFFECT AND FOOD CONSUMPTION**

Negative affect theory suggests that binge eating is more likely in the presence of emotional disturbance, and that individuals eat to provide comfort and to distract themselves from the negative stimuli (Stice & Agras, 1999). Several studies support this theory, as negative affect consistently predicts disordered eating among women with BN (Kaye, Gwirtsman, George, Weiss, & Jimerson, 1986; Smyth et al., 2007), is prospectively related to the increase in bulimic symptoms among adolescents (Stice, 2001), and meta-analytic results suggest medium effect sizes for the relationship between lab-induced negative affect and resultant binge eating (Stice, 2002). However, the data are mixed as to whether or not eating is an effective coping strategy for ameliorating negative mood. In one study, obese individuals reported significant decreases in negative affect (i.e., feelings of tension and tiredness) and a trend toward a decline in sadness after eating (Tuomisto, Tuomisto, Hetherington, & Lappalainen, 1998). Among studies with clinical samples, some suggest that BN clients experience a significant worsening of mood following binge eating (e.g., Steiger et al., 2005), whereas others demonstrate an improvement in mood after bingeing (e.g., Stickney & Miltenberger, 1999). Other studies with eating disorder clients suggest variability within mood states, such that BN clients experience a decline in anxiety, but an increase in depression, following binge eating (e.g., Kaye et al., 1986). Research with nonclinical samples, although sparse, seems to suggest that comfort food consumption, particularly consumption of high-calorie sweet foods, is associated with decreases in negative affect, but also increases in feelings of guilt (Dubé, LeBel, & Lu, 2005; Macht & Dettmer, 2006). These mixed findings regarding the influence of food consumption on mood suggest the need for further investigation.

**AFFECT, BORDERLINE PERSONALITY, AND FOOD CONSUMPTION**

Although research assessing mood changes subsequent to binge eating among individuals with and without borderline personality features could provide important insight into the role of negative affect in precipitating and maintaining disordered eating, the literature in this area is particularly scarce. In a study examining mood among BN clients with and without BPD, before and after cycles of binge eating/purging, both groups reported significant reductions in anxiety levels after bingeing and purging (Steinberg, Tobin, & Johnson, 1990). However, this effect was magnified for the BPD group, who reported a greater decrease in anxiety from baseline levels than the non-BPD group. Moreover, purging behavior significantly ameliorated depressed mood for the BPD group but not the non-BPD group, suggesting that bingeing/purging may be particularly reinforcing for individuals with BPD. These findings are consistent with the anxiety-reduction model of BN, but they do not address the emotional consequences of binge-eating prior to engaging in compensatory purging behaviors.

In sum, research suggests high rates of comorbidity for borderline personality and eating pathology, and although psychological disorders do generally tend to co-occur, there seems to be a particularly unique relationship between the EDs and BPD due to the nature of symptom overlap. For instance, EDs and BPD are both associated with tendencies toward impulsive behavior, such as suicidality and deliberate self-harm, difficulty managing emotion, the experiencing of dissociative states, and identity problems (Sansone & Levitt, 2004). In particular, poor affect regulation may be a fundamental link between the disorders, and one possible explanation is that individuals with comorbid BPD and EDs exhibit disordered eating *because of* their borderline personality characteristics; in essence, their inability to appropriately respond to negative affect may lead them to misuse food to manage emotion. An examination of the relationship between borderline personality and maladaptive eating behaviors may serve an important first step toward a better understanding of the relationship between these clinical disorders.

The present study assessed relationships among borderline personality features, negative affect, and food consumption through the experimental manipulation of mood. We predicted that women with more borderline features would report higher levels of negative affect at baseline compared to their lower-borderline counterparts, and would also be more reactive to a sad film. Consistent with negative affect theory, we predicted that food consumption would lead to decreases in negative affect, and thus individuals presented with food would report smaller affective responses to a sad film than those not presented with food. We also expected that the relationship between food consumption and subsequent mood would vary as a function of borderline personality features, as those reporting more borderline personality features would exhibit a greater shift in their affective response through food consumption.

## METHOD

### PARTICIPANTS

Participants were undergraduate women ( $N = 307$ ) enrolled in introductory psychology courses at a large southwestern university. They received course credit in exchange for their participation. Participants registered for the study using Sona Systems, an online experiment management software package. Participants were 18 to 23 years old ( $M = 18.67$ ,  $SD = .93$ ), had a body mass index (BMI) between 14.35 and 46.00 ( $M = 22.86$ ,  $SD = 3.74$ ), and reported the following racial/ethnic background: 67.1% Caucasian/Euro-American, 3.9% Black/African American, 14.3% Hispanic, 2.9% Asian American, 2.3% other, and 9.4% unreported.

### MEASURES AND MATERIALS

*Demographic Information Sheet.* Participants self-reported their age, height, weight, education, and racial/ethnic background.

*Positive and Negative Affect Schedule–Expanded Form (PANAS-X).* The PANAS-X (Watson & Clark, 1994), a 60-item checklist, measures 11 specific positive and negative affect domains, in addition to the general dimensions of positive and negative affect (i.e., PA and NA). The PANAS has previously been used to assess affective responses to viewing video clips (e.g., Sloan, 2004) and has demonstrated sensitivity to the heightened mood vulnerability seen in individuals with borderline personality features (Tolpin et al., 2004).

*Personality Assessment Inventory–Borderline Features scale (PAI-BOR).* The 24-item Borderline Features scale of the PAI (BOR; Morey, 1991), a 344-item self-report clinical inventory, assesses personality pathology characteristic of BPD and has demonstrated predictive utility for later emotional, academic, and functional difficulties among college students (Trull, Useda, Conforti, & Doan, 1997). In the present study, participants were prescreened to ensure selection of individuals with elevated scores on the PAI-BOR scale. Scores on the PAI scales are standardized against a community sample and represented by a mean of 50 $t$  and standard deviation of 10 $t$ . For borderline status, a cut score of 28 was selected, which corresponds to 60 $t$  in the general population and 55 $t$  in college student samples (Morey, 1991). Thus, participants scoring 28 and above were classified as “high borderline” ( $n = 116$ ), whereas those scoring 27 and below were classified as “low borderline” ( $n = 190$ )<sup>1</sup>; one participant was classified as an extreme outlier based on her scores on the PANAS-X and was thus excluded from analyses. Score reliability for the PAI-BOR was  $\alpha = .88$ .

*Food and Beverage Summary Sheet.* Participants reported type and quantity of food/beverages consumed in the 2 hours prior to the experiment. To avoid cuing participants that their food consumption would be measured in this study, no instructions were provided for food consumption prior to the experiment. These responses were coded to estimate caloric intake.

*Video Clip.* Participants viewed a preselected 39-minute video clip from the film *Terms of Endearment*, which has previously been shown to elicit negative affect among nonclinical female participants (Strauss, Doyle, & Kreipe, 1994; Warren, Strauss, Taska, & Sullivan, 2005). In the present study, participants reported an increase in negative affect from baseline ( $M = 14.59$ ,  $SD = 4.34$ ) to postfilm ( $M = 15.83$ ,  $SD = 4.97$ ),  $F(1, 303) = 21.31$ ,  $p < .001$ , partial  $\eta^2 = .07$ . Participants also reported an increase in feelings of sadness from baseline ( $M = 7.24$ ,  $SD = 3.37$ ) to postfilm ( $M = 10.84$ ,  $SD = 4.19$ ),  $F(1, 304) = 290.17$ ,  $p < .001$ , partial  $\eta^2 = .49$ .

*Food Stimulus.* Consistent with past research designs employing chocolate stimuli (e.g., Warren et al., 2005), participants were presented with a

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1. Cut scores for high versus low borderline personality features were selected for convenience and sample size considerations, and an alternative method, such as employing individuals at the 25th percentile as “low scorers” and 75th percentile as “high scorers,” excluding those falling in between, may have led to stronger results. Nonetheless, certain analyses allowed us to use the PAI-BOR scale as a continuous measure, and thus we were able to evaluate responding across the range of this construct.

disposable white bowl containing 300 g of M&M chocolate candies. Participants consumed between 0 and 200 grams ( $M = 41.15$ ,  $SD = 30.34$ ) of M&Ms during the experiment.

## DESIGN AND PROCEDURE

Participants were randomized to control (no-food) or experimental (with-food) conditions, and sessions were run by research assistants blind to study hypotheses. Experimental sessions commenced between 3 and 4 PM and were conducted individually. Participants were instructed that the study assessed relationships among mood, personality, and film viewing, and that they would be asked to view a film clip and complete questionnaires. Individuals in the experimental condition were also informed that the study assessed the “relationship between mood and preferences for different colored foods” and involved a “taste test.” Participants were asked about dietary restrictions and/or allergies to chocolate, and none of the participants reported that they would be unable to participate in the “taste test” due to dietary restrictions/allergies. Participants were requested to sample the M&Ms and to make a mental note of their color preferences because they would be asked to report them subsequently. Participants were also informed that they should “feel free to have as many as [they] would like,” as the M&Ms were discarded between participants for hygiene reasons. To address possible demand characteristics, emphasis was placed on the goal of “understanding individual differences,” and participants were encouraged to respond to the mood measures with how they felt rather than with how someone else might feel under similar circumstances.

After providing informed consent, participants completed a basic demographic questionnaire and baseline mood assessment and were taken to an adjacent room to view the film clip. Those in the experimental condition were concurrently presented with the food stimulus. After viewing the film, participants completed a second mood assessment, and then returned to the laboratory to complete the remaining questionnaires. Participants were thoroughly debriefed at the end of the experiment.

## RESULTS

Analyses of variance (ANOVAs) and a Mann–Whitney nonparametric test comparing experimental and control groups across age, racial/ethnic background, BMI, baseline PANAS negative affect (NA) and sadness scores, and borderline personality features (PAI-BOR) were not statistically significant. A few participants reported that they did not like chocolate ( $n = 13$ ; 8.5%). These individuals ate significantly fewer M&Ms ( $M = 23.54$ ,  $SD = 18.22$ ) than those who reported liking chocolate ( $M = 43.01$ ;  $SD = 30.76$ ),  $t(150) = 2.24$ ,  $p = .03$ , Cohen's  $d = .77$ , and were thus excluded from analyses regarding food consumption. Among those in the experimental condition, participant responses for pre-experiment caloric intake ( $n = 134$ )



**TABLE 1. Correlations Among Borderline Personality Features, Food Consumption, and Mood**

	BOR	M&Ms (g)	NAt1	NAt2	SDt1	SDt2
BOR	—	-.067	.359**	.338**	.392**	.310**
M&Ms (g)		—	.110	-.137	-.002	-.137
NAt1			—	.537**	.638**	.366**
NAt2				—	.448**	.627**
SDt1					—	.544**
SDt2						—

*Note.* BOR refers to PAI-BOR total score; M&Ms (g) refers to quantity of M&Ms consumed; NAt1 and NAt2 and SDt1 and SDt2 refer to PANAS-Negative Affect and Sadness scores at time 1 (baseline) and time 2 (post-movie/food), respectively. \* $p < .05$ , \*\* $p < .01$  (2-tailed).

suggested high variability, ranging from 0 to 2,436 calories ( $M = 211.33$ ,  $SD = 335.56$ ).<sup>2</sup> Results suggest that the association between pre-experiment caloric intake and quantity of M&Ms consumed was not significant ( $r = -.13$ ,  $p = .14$ ). Similarly, the relationship between BMI and quantity of M&Ms consumed was not significant ( $r = .15$ ,  $p = .07$ ), and thus neither pre-experiment caloric intake nor BMI were accounted for in subsequent analyses. Correlations among quantity of M&Ms consumed, borderline personality features, and mood before and after the manipulation are reported in Table 1.

Independent samples  $t$  tests suggested significantly higher reports of negative affect,  $t(304) = 5.25$ ,  $p < .001$ , Cohen's  $d = .59$ , and sadness,  $t(303) = 6.15$ ,  $p < .001$ , Cohen's  $d = .69$ , among the high-BOR groups compared to the low-BOR groups at baseline. A 2 (high BOR/low BOR)  $\times$  2 (Food/No Food) analysis of covariance (ANCOVA), with PANAS NA at time 2 as the dependent variable, and PANAS NA at time 1 as the covariate, assessed whether food consumption and borderline personality features were associated with changes in negative affect from baseline to postmovie. Results suggested a large effect for the covariate (NAt1),  $F(1, 285) = 67.50$ ,  $p < .001$ , partial  $\eta^2 = .19$ . The 2-way interaction (i.e., BOR  $\times$  FOOD) failed to reach statistical significance. However, BOR status exhibited a significant main effect,  $F(1, 285) = 7.60$ ,  $p < .01$ , and an examination of group means suggested that those characterized as high-BOR exhibited significantly higher NA at time 2 compared to their low-BOR counterparts, although with small effect (partial  $\eta^2 = .03$ ). The main effect for FOOD was also significant,  $F(1, 285) = 4.10$ ,  $p < .05$ , partial  $\eta^2 = .01$ , such that individuals in the no-food condition exhibited higher NA at time 2 than their with-food counterparts.

Similar analyses were conducted to assess factors contributing to par-

2. The validity of self-reported food consumption continues to be a matter of some debate, because the ability of participants to recall patterns of food consumption is subject to error (O'Neil, 2001; Schoeller, 1990). Current studies suggest that use of doubly labeled water (DLW) may be the most reliable method to estimate energy intake (de Jonge et al., 2007). However, this was not possible in the current study because it would have cued participants that their eating behavior would be assessed. Due to measurement error, results regarding the relationship between prior food consumption and consumption of M&Ms in the experiment must be interpreted cautiously.

ticipant scores on the PANAS Sadness (PANAS-SD) scale as an alternate index of mood change. An ANCOVA entering PANAS-SD at time 2 as the dependent variable, PANAS-SD at time 1 as the covariate, and BOR status, and FOOD status as independent variables, suggested, once again, a large effect for the covariate (PANAS-SD1),  $F(1, 286) = 91.03$ ,  $p < .001$ ,  $\eta^2 = .24$ . The interaction between FOOD status and BOR status suggested a trend toward significance,  $F(1, 286) = 3.02$ ,  $p = .08$ ,  $\eta^2 = .01$ . Main effects for FOOD status,  $F(1, 286) = 8.91$ ,  $p < .01$ , partial  $\eta^2 = .03$ , and for BOR status,  $F(1, 286) = 3.84$ ,  $p < .05$ , partial  $\eta^2 = .01$ , were also small but significant.

Given these findings regarding presence versus absence of food, multiple regression analyses evaluated whether *quantity* of food consumed and borderline personality features (BOR) predicted changes in mood from baseline to the second mood measurement. Individuals from both the experimental and the control groups were included in these analyses, and those in the control condition were recorded as having consumed “zero” M&Ms. In this manner, individuals in the experimental condition who consumed few or no M&Ms were analyzed as analogous to those in the control condition in order to presumably assess the impact of actual eating on mood. Residualized change scores (Cronbach, 1970) assessed changes in mood, where negative residuals indicated an improvement in mood whereas positive residuals indicated a worsening of mood relative to what was expected based on the total sample. After combining both experimental and control conditions, the distribution of quantity of M&Ms eaten was positively skewed; thus, a square-root transformation was employed and the z-score was used for subsequent analyses.

A multiple regression model predicting residualized change in NA from BOR, square-root transformed M&Ms eaten, and the interaction of BOR  $\times$  M&Ms eaten, was statistically significant,  $F(3, 287) = 6.93$ ,  $p < .001$ ,  $R^2 = .07$ , as were the main effects and the interaction effects (see Table 2). That is, the association between M&Ms eaten and change in NA was significant for the high-BOR ( $r = -.22$ ,  $p = .03$ ) but not the low-BOR ( $r = -.07$ ,  $p = .33$ ) group (see Figure 1). Similar results were obtained for a model predicting residualized change in sadness from the above,  $F(3, 288) = 5.86$ ,  $p = .001$ ,  $R^2 = .06$  (see Table 2).

## DISCUSSION

The present study employed an experimental manipulation to evaluate relationships among food consumption, borderline personality features, and changes in negative affect among women undergraduates. Results from the present study are consistent with earlier studies demonstrating that borderline personality features (BPF) are associated with a propensity toward negative affect: Individuals with high BPF exhibited higher levels of NA across both time measurements than their low-BPF counterparts. Moreover, as is characteristic of borderline personality disorder, individuals with high BPF exhibited more reactivity to the film, reporting higher



TABLE 2. Prediction of Mood Changes From Borderline Personality Features and M&Ms Eaten

Variable	<i>b</i> ( <i>SE</i> )	$\beta$	<i>t</i>	<i>p</i>
Model 1: Residualized Change NA				
BOR	.02 (.01)	.17	3.02	.003
Sq rt M&Ms Eaten	-.04 (.02)	-.15	-2.56	.011
BOR $\times$ Sq rt M&Ms Eaten	-.14 (.06)	-.14	-2.42	.016
Model 2: Residualized Change SD				
BOR	.01 (.01)	.17	2.04	.042
Sq rt M&Ms Eaten	-.05 (.02)	-.18	-3.10	.002
BOR $\times$ Sq rt M&Ms Eaten	-.12 (.06)	-.12	-2.11	.036

Note. Residualized change NA and SD refer to standardized residuals for changes from time 1 to time 2 for PANAS-Negative Affect and Sadness scores, respectively. BOR indicates total scores on the PAI-BOR scale, Sq rt M&Ms Eaten indicates the square root transformation of M&Ms eaten (in grams), and BOR  $\times$  M&Ms Eaten refers to the interaction (z-score) between the above.

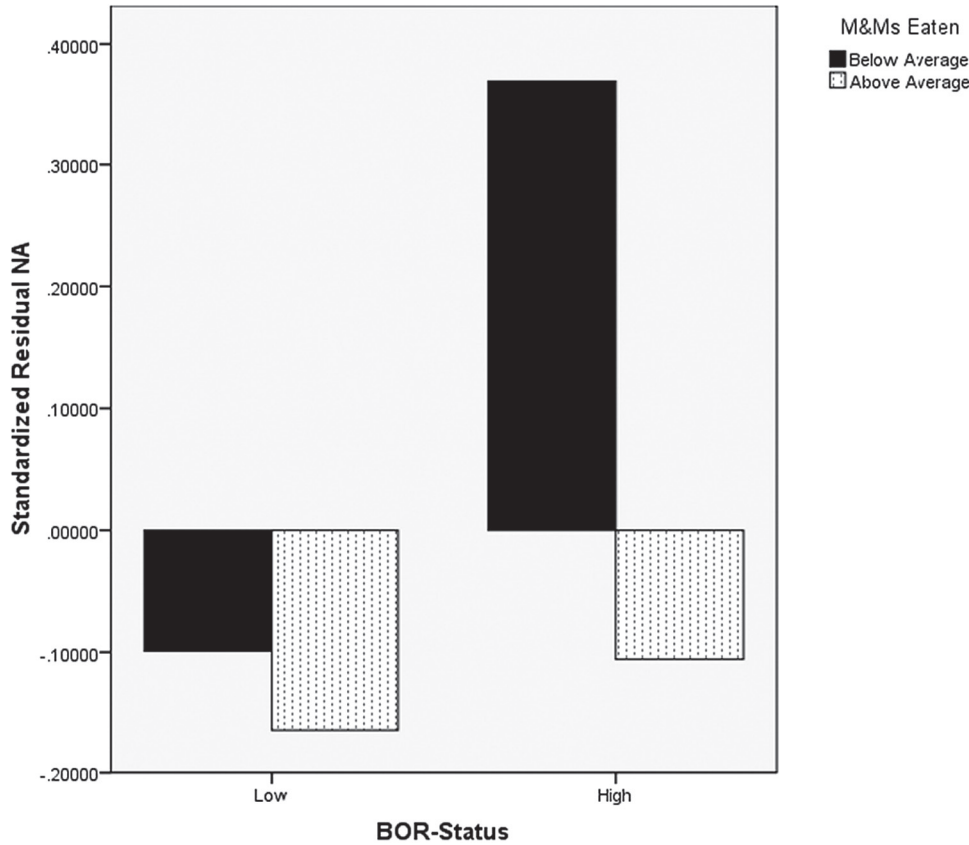


FIGURE 1. Residualized Changes in PANAS Negative Affect by BOR-status and M&Ms Eaten. BOR-status represents the categorization of individuals as low and high scorers on the PAI-BOR scale.

levels of NA after the film than those with low BPF, even after controlling for their relatively higher baseline levels of NA. Notably, this was not the case for the more specific emotion of sadness, as individuals with high and low BPF exhibited similar patterns of sadness in response to the film. One possible interpretation of this finding is that individuals with borderline features may show more generalized problems with affective modulation, such that an emotional stimulus that elicits a rather circumscribed emotional response (e.g., sadness) in most people generalizes to a broader range of negative affect in those with borderline personality.

Results are also consistent with earlier studies demonstrating a positive impact of food presentation on mood states (e.g., Dubé et al., 2005), as women who received food reported significantly less sadness and negative affect following the movie (relative to their baseline mood) than women who did not receive food. Thus, the presentation versus absence of food while viewing the film appeared to ameliorate relative feelings of sadness, but interestingly the association of food presentation with changes in global negative affect was not significant. Previous studies typically do not distinguish between feelings of sadness and negative affect, and improvements in mood following food consumption are often reported in a general sense. For instance, Macht and Mueller (2007) reported that nonclinical men and women who were shown a sad film clip reported "improved self-rated mood" (p. 669) after consuming chocolate versus drinking water. It is possible that, in the current study, chocolate consumption had an influence on feelings of sadness for both study groups because that was the emotion specifically targeted by the mood induction procedure. However, effects on more general negative affect here appeared to be most pronounced among individuals reporting a history of difficulty with modulation of negative affect.

Our data suggest that quantity of food consumption had a tempering effect on NA and sadness, but only for the subset of women reporting higher BPF. This finding is noteworthy for several reasons. Specifically, although studies have reported improvements in mood subsequent to food consumption (e.g., Desmet & Schifferstein, 2008), they have not assessed whether there are individual differences in the degree to which food consumption serves as a protective factor, so to speak, against relative feelings of sadness or more general negative affect. Moreover, the commonly accepted affect-regulation model suggests that binge eating comforts and distracts individuals from aversive emotions; however, this model does not specify certain individuals for whom this may be a more or less effective strategy. Results seem to suggest that consuming larger quantities of M&Ms can ameliorate relative feelings of sadness, but only for those with a propensity for emotional reactivity as characterized by high BPF. Notably, this interaction effect achieved significance only when quantity of food consumption was examined, rather than food status (i.e., whether or not the individual was presented with the opportunity to eat), suggesting that food *presentation* was less salient than actual food *consumption* for changes in mood.

## LIMITATIONS AND FUTURE DIRECTIONS

One limitation of the present study is that the “high borderline” participants, while above average in these personality characteristics, were not a clinical sample, and it is likely that relatively few participants would have been in the diagnosable range of borderline personality. Thus, greater range on this construct might have led to stronger results. Similarly, consuming even a relatively large quantity of M&Ms in the present study does not constitute true binge eating, and it would be interesting to observe whether these results replicate for individuals with a history of engaging in true binge-eating episodes, such as those with BN or BED.

Another limitation of the present study is that the results may have limited ecological validity and may be susceptible to demand characteristics. Experiments employing a variety of food stimuli may better represent eating behaviors in response to everyday emotions. Moreover, in an effort to disguise the true nature of the study, participants were not instructed to abstain from eating for any length of time prior to the experiment. Although efforts were made to account for prior caloric intake, these efforts may have been unduly influenced by error. Finally, as with other studies with predominantly Caucasian college student samples, the generalizability of these findings is limited to similar populations.

The present study offers several new directions for future research, in addition to improving upon the limitations highlighted above. Parker, Parker, and Brotchie (2007) suggested that chocolate consumption may offer enjoyment, but when consumed specifically in response to a dysphoric state (i.e., “emotional eating”), it is less likely to alleviate the negative mood than to prolong it. Results from the present study suggest that BPF may moderate this relationship, such that chocolate consumption may differentially affect mood states for individuals reporting higher and lower levels of borderline personality. Thus, further experimental research should continue to assess relationships among personality factors and other characteristics, such as tendencies towards “emotional eating,” observed eating behavior, and temporal and distal mood states. Finally, the present study focused exclusively on eliciting negative affect. Some data suggest, however, that intensity of emotion, rather than valence per se, may be more closely associated with eating behavior (e.g., Patel & Schlundt, 2001). Consequently, future researchers should investigate relationships among food consumption, personality characteristics, and varied emotional states.

Results from the current study suggest that women with borderline features may be at increased risk for developing problems with binge-eating, because consuming larger quantities of food appeared to have a tempering effect on their negative mood and specific feelings of sadness. If so, these results may explain, in part, the comorbidity and symptom overlap among individuals with BPD and EDs, and can thus have important implications for their treatment. For instance, treatment approaches for women exhib-

iting borderline personality characteristics should continue to provide psychoeducation regarding coping/distraction techniques, but they should also be particularly vigilant for the development of disordered eating. Indeed, a recent study employing dialectical behavior therapy for comorbid borderline personality disorder and BN (or BED) reported significant improvements in borderline features, but also in objective binge eating, subsequent to treatment (Chen, Matthews, Allen, Kuo, & Linehan, 2008). Present findings thus support these efforts to incorporate such techniques in treating women with disordered eating. Moreover, because presentation of nutritional information attenuates the tendency to consume more food in response to negative affect (Garg, Wansink, & Inman, 2007), it may be useful for clinicians to incorporate such information as part of their treatment. Overall, the present study demonstrates the complexity of the relationships among mood, borderline personality features, food consumption, and responses to a sad film, and suggests several areas for further research to replicate and further clarify present findings.

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