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Temperament, mood, dietary restraint, and bulimic symptomatology in college women ★

Rebecca Ringham^{*}, Michele Levine, Melissa Kalarchian, and Marsha Marcus

Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh, School of Medicine; 3811 O'Hara Street; Pittsburgh, PA 15213 USA

Abstract

The current study examined whether biologically-influenced temperamental traits implicated in the pathogenesis of disordered eating behaviors contribute to their development over and above current negative affect and dietary restraint. Participants ($N=276$) were undergraduate psychology women who completed the BULIT-R, BDI-II, STAIS, RS, and the MPQ. Temperamental characteristics, particularly increased Negative Emotionality and decreased Positive Emotionality, were significantly associated with increased levels of bulimic symptomatology. Moreover, these dimensions accounted for small, but statistically significant amounts of the variance of bulimic symptomatology over and above current negative affect and dietary restraint. Contrary to expectations, impulsivity did not predict bulimic symptoms. This study provides evidence that temperamental dimensions related to mood rather than impulsivity are associated with bulimic symptomatology and contribute to bulimic symptoms over and above state mood and dietary restraint. Future empirical studies are needed to clarify relationships between temperament and other risk factors for disordered eating.

Keywords

Bulimic symptomatology; Mood; Dietary restraint; Temperament

1. Introduction

Numerous investigations have focused on dietary restraint and negative affect in the pathogenesis of bulimia nervosa. The dietary restraint model posits that a pattern of disinhibited eating is triggered and maintained by habitual dietary restriction (Herman & Mack, 1975; Polivy & Herman, 1985). The negative affect model proposes that individuals binge eat to distract themselves from aversive emotions such as depression, anxiety, anger, or stress (Heatherton & Baumeister, 1991; Leon, Fulkerson, Perry, & Early-Zadd, 1995). Highlighting the interrelationship among these risk factors, the dual-pathway model posits that both dietary restraint and negative affect contribute to the development of bulimic behaviors, although the complex nature of these relationships requires elucidation (Stice, 1994).

Despite substantial evidence documenting the relationship between eating disorders, dietary restraint and negative affect, available research evidence suggests that the etiology of eating

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^{*}Corresponding author. University of Pittsburgh, School of Medicine, Western Psychiatric Institute and Clinic, 3811 O'Hara Street, Pittsburgh, PA 15213 USA. Tel.: +1 412 246 6381; fax: +1 412 246 6370. ringhamrm@upmc.edu (R. Ringham)..

disorders is multifactorial, and a combination of risk factors likely determines whether an individual develops bulimic symptomatology and whether those symptoms persist (Jimerson, Wolfe, Brotman, Metzger, 1996). Recent work documenting biological risk factors and heritability of eating disorders has suggested that specific temperamental traits also may increase risk for bulimic eating behaviors. A number of conceptualizations of temperament exist, and there is consensus that temperament is multidimensional and biologically-influenced (Tellegen, 1985; Zuckerman, 1991). However, the use of differing assessments of temperament reflecting varying theoretical conceptions has hindered a precise understanding of the relationship between temperament and eating disorders.

In general, cross-sectional and longitudinal studies of temperament in clinical samples of individuals with bulimia nervosa (BN) have suggested that affective dysregulation, stress reactivity, and neuroticism are associated with BN (Casper, Hedeker, & McClough, 1992; Lilenfeld et al; 2000; Pryor & Wiederman, 1996). However, conflicting findings have been reported with regard to BN and other dimensions of temperament. For example, some studies have reported higher levels of impulsive tendencies in individuals with BN than in non-symptomatic control individuals (Brewerton, Hand, & Bishop, 1993; Bulik, Sullivan, Weltzin, & Kaye, 1995; Waller et al., 1993), but others have not replicated this finding (Casper et al., 1992; Lilenfeld et al., 2000; Pryor & Wiederman, 1996). Thus, a complete understanding of the relationship between temperament and BN remains a challenge.

Additionally, most studies of temperament and eating disorders have focused on clinical samples, and less is known about temperament and eating disorder symptoms in nonclinical populations. Research is needed to identify those individuals who may be at increased risk for eating disorders (Smolak, Levine, & Striegel-Moore, 1996), and examining temperamental characteristics in nonclinical samples might contribute to our understanding of similarities and differences between clinical and nonclinical groups. Furthermore, no studies have examined temperament in relation to dietary restraint and negative affect in either a clinical or a nonclinical sample.

Thus, the aim of the current investigation was to examine whether negative affect, dietary restraint, and specific temperamental factors were independently related to bulimic symptoms in a cross-sectional sample of college women. Consistent with previous findings, we predicted that negative affect and dietary restraint would be positively associated with bulimic symptomatology. With regard to temperament, we hypothesized that negative emotionality and characteristics of behavioral disinhibition and impulsivity would be positively related to bulimic symptomatology. Next, we examined whether a model that included restraint, negative affect, and temperament enhanced prediction of bulimic symptoms. Specifically, we hypothesized that temperament would contribute to the prediction of bulimic symptoms over and above restraint and negative affect. Finally, in a series of exploratory analyses, we examined the interactions among negative affect, dietary restraint, and temperament in predicting bulimic symptoms.

2. Materials and methods

2.1. Participants

Participants were undergraduate psychology students from a local university. Two hundred eighty four female undergraduate students elected to participate in the study. No men were recruited because eating disorder symptoms are significantly less common in men (Hoek, 1995), and limiting the recruitment of participants to women increased the likelihood of recruiting individuals with significant eating disorder symptomatology. Eight participants were excluded due to missing data ($n=5$), pregnancy ($n=2$), or age ($n=1$).

Thus, the final sample consisted of 276 female undergraduates who ranged in age from 18 to 25 years ($M=19.21$, $SD=1.30$). Demographic characteristics of the participants are summarized in Table 1. The mean BULIT-R score was 52.59 ± 20.19 , and five of the women (1.8%) had BULIT-R scores consistent with a diagnosis of bulimia nervosa (using the recommended cutoff of 104; Thelen, Farmer, Wonderlich, & Smith, 1991). These women were provided with appropriate referrals for treatment.

2.2. Study procedures

Participants were invited to participate in a study examining the roles of temperament, mood, and dieting style in predicting health-related attitudes and behaviors. All participants signed a consent form approved by the Biomedical IRB of the University of Pittsburgh prior to starting the study. They attended one 2-h session during which they completed self-report questionnaires. After participants completed the assessments, they were weighed, and height was measured.

2.3. Measures

2.3.1. Demographic questionnaire—This investigator-designed measure documented self-reported age, ethnicity, and history of psychological and eating disorder treatment.

2.3.2. Bulimia Test-Revised (BULIT-R; Thelen et al., 1991)—The BULIT-R is a 36-item self-report measure derived from the DSM-III-R (American Psychiatric Association, 1994) criteria for BN. It was developed for use with nonclinical samples and has been shown to differentiate between individuals with BN and asymptomatic controls in a college population (Brelsford, Hummel, & Barrios, 1992; Thelen et al., 1991). It has high internal consistency (.97) and test-retest reliability (.95; Thelen et al., 1991).

2.3.3. The Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982, 1985)—The MPQ is a 300-item true/false, self-report inventory. Eleven lower-order temperamental dimensions (Well-Being, Social Potency, Achievement, Social Closeness, Stress Reaction, Alienation, Aggression, Impulsivity/Control, Danger Seeking/ Harm Avoidance, Traditionalism, and Absorption) combine to form three higher order factors, “Positive Emotionality (PE),” “Negative Emotionality (NE),” and “Constraint (CN),” which describe basic parameters of emotional and behavioral regulation. The MPQ has good internal validity, ranging from .76 to .89 (Tellegen, 1985) and has been shown to discriminate between individuals with BN and control individuals, particularly on the Negative Emotionality, Positive Emotionality, Well-Being, Stress Reaction, and Alienation Scales (Casper et al., 1992; Lilienfeld et al., 2000).

2.3.4. The Restraint Scale (RS; Herman & Polivy, 1980)—The RS is a 10-item, self-report questionnaire that assesses attitudes toward eating, habitual dieting, and weight fluctuations. The RS consists of five 4-point and five 5-point Likert-type items with satisfactory reliability and validity (Blanchard & Frost, 1983).

2.3.5. Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996)—The BDI-II is a 21-item self-report questionnaire that assesses the presence and severity of cognitive, motivational, affective, and somatic symptoms of depression. The BDI-II has been found to have high internal consistency among college students and outpatients (.92), and adequate validity (Beck et al., 1996).

2.3.6. State-Trait Anxiety Inventory-State version (STAI-S; Spielberger, Gorsuch, & Lushene, 1970)—The STAI-S is a 20-item self-report questionnaire designed to assess anxiety. The state version of the STAI assesses how respondents feel “at

this moment.” The STAIS has been found to have high internal consistency among college students (.92), and adequate validity (Oei, Evans, & Crook, 1990).

2.3.7. Medical Outcomes Study 12-item short-form survey (MOS SF-12;Ware, Kosinski, & Keller, 1995)—The MOS SF-12 is a 12-item self-report measure of physical and mental health functioning. This was included in the battery of questionnaires to lend face validity to the description of the study as one that was examining health attitudes; however, data were not analyzed.

2.3.8. Height and weight—Participants were weighed using a digital scale in street clothes without shoes. A stationary stature board was used for height assessment. Body Mass Index (BMI) was calculated [weight (kg) / height (m²)] for each individual.

2.4. Data analyses

Data were examined to ensure normality of distributions, and because of skewness of the BDI and BULIT-R, these data were log transformed. Similar findings were obtained with transformed and untransformed scores, indicating that heteroscedasticity was not problematic. Thus, untransformed scores are reported.

Parametric and nonparametric statistics were used to describe participant characteristics, as appropriate. Multiple regression analyses were used to test the contribution of each of the independent variables in predicting bulimic symptomatology. Hierarchical multiple regression analyses were then used to determine the contribution of temperament over and above negative affect and dietary restraint. Specifically, temperament was added last to the model to determine the contribution of temperament over and above other specified variables (i.e., current negative affect and dietary restraint). Finally, in exploratory analyses, all 2-way interactions between independent variables were examined. Per Aiken and West (1991), each independent variable was centered (i.e., converted to deviation scores so that each variable has a mean of zero) to control for problems of multicollinearity.

3. Results

Bivariate correlation analyses were conducted to assess potential multicollinearity between independent variables and are summarized in Table 2. Results indicated that multicollinearity was not problematic. Previous research has suggested that overweight is strongly associated with bulimic symptomatology (Cooper, 1995). However, in the current data set, BMI was not significantly correlated with bulimic symptomatology ($r=.08$, ns), and therefore was not included as a covariate in analyses.

3.1. Independent predictors of bulimic symptomatology

As expected, current negative affect and dietary restraint were positively associated with bulimic symptomatology. ($R^2=.17$, $R^2=.13$, $R^2=.53$, $p<.001$ for BDI-II, STAIS, and RS, respectively). Negative Emotionality was positively related to bulimic symptomatology ($R^2=.13$, $p<.001$), and Positive Emotionality was negatively associated with bulimic symptomatology ($R^2<.10$, $p<.001$). Contrary to expectations, Constraint was not significantly related to bulimic symptomatology ($R^2=.00$, ns).

Results indicated that those lower-order scales related to the higher order dimensions, Negative Emotionality and Positive Emotionality, were most strongly associated with bulimic symptomatology. Specifically, Well-Being ($R^2=.19$, $p<.001$), Social Closeness ($R^2=.07$, $p<.001$), Alienation ($R^2=.08$, $p<.001$), Stress Reactivity ($R^2=.21$, $p<.001$), and Aggression ($R^2=.02$, $p<.01$) each independently predicted bulimic symptomatology. The

associations between other lower-order scales and bulimic symptomatology were not significant.

3.2. Relative impact of negative affect, dietary restraint, and temperament in predicting bulimic symptoms

To test the hypothesis that temperament would contribute to the prediction of bulimic symptoms over and above negative affect and dietary restraint, hierarchical multiple regression analysis was conducted (Table 3). First, current negative affect was entered into the model with scores on the BDI-II and the STAIS entered simultaneously as predictors (Step 1). Next, scores on the RS were entered into the model (Step 2). Finally, the temperament dimensions, Negative Emotionality and Positive Emotionality were entered simultaneously to the model (Step 3). Constraint was not included because it did not contribute to the prediction of bulimic symptomatology. Results indicated that each of the variables accounted for a statistically significant amount of explained variance in bulimic symptomatology.

3.3. Exploratory analyses

All two-way interactions between the predictor variables were examined to further clarify the relationships between the variables. Results showed that none of the interactions involving current negative affect and temperament were significant. The interactions involving restraint and temperament and restraint and current anxiety approached significance, $p=.06$ and $p=.10$, respectively. Finally, the interaction between restraint and current depression was not significant.

4. Discussion

The present investigation documents that the biologically-influenced temperamental dimensions of Positive and Negative Emotionality, but not Constraint, contribute to the prediction of bulimic symptomatology in college women. Moreover, temperament is related to bulimic symptoms after controlling for both restraint and negative affect. Current negative affect, dietary restraint, and temperament together explain a substantial amount (61%) of variance in bulimic symptomatology in the sample. However, restraint explained the majority of the variance in the model with smaller amounts of explained variance by negative affect and temperament. Together this suggests that restraint may have the strongest relationship with current bulimic symptomatology among college women, but that there is a role of both temperament and current negative affect.

It is noteworthy that dietary restraint accounts for the majority (approximately 53%) of the variance of bulimic symptomatology in this sample. Previous studies have reported the finding that dietary restraint is a significant predictor of bulimic symptomatology, with R^2 ranging from an estimated .14 to .60 (Shepherd & Ricciardelli, 1998; Stice, Ozer, & Kees, 1997), depending on the measures used to assess dietary restraint and bulimic symptomatology. Thus, the findings of this study are comparable to those reported by researchers using similar measures. Nevertheless, consensus regarding the definition of dietary restraint has remained elusive, and evidence has shown that various measures of dietary restraint are differentially predictive of bulimic behaviors. Stice et al. (1997) have argued that inconsistent findings of the predictive ability of measures of restraint and disinhibited eating are due to the criterion confounding of the Restraint Scale. Given that numerous studies have documented that strict dieting is a risk factor for the development of eating disorder symptoms (Killen et al., 1996; Patton et al., 1990; Stice & Agras, 1998), it is unsurprising that dieting behavior has a robust relationship with bulimic symptoms.

In contrast, hypotheses regarding the association between temperament and bulimic symptomatology were only partially supported. The finding that Negative Emotionality and several of its lower order scales are positively associated with bulimic symptomatology is consistent with available evidence of the temperamental characteristics of individuals with clinical and subclinical eating disorders (Lilenfeld et al., 2000; Pryor & Wiederman, 1996). Contrary to expectations, we found that lower levels of Positive Emotionality rather than elevated impulsive tendencies are associated with bulimic symptomatology in college women.

The majority of investigations that have supported a relationship between Positive Emotionality, trait impulsivity and eating disorders have been conducted using individuals with full syndrome eating disorders (Lilenfeld et al., 2000; Pryor & Wiederman, 1996). In contrast, studies of community samples of individuals with eating disorder symptoms have failed to find support for a relationship between Positive Emotionality, trait impulsivity, and bulimic symptoms (e.g., Leon et al., 1995). Thus, it may be that some of the traits specific to individuals with clinically significant eating disorders are not related to bulimic symptoms in nonclinical samples. It is possible that the relationship between impulsivity and BN is a consequence of the development of a full syndrome eating disorder, rather than a precipitant to the disorder. Alternatively, individuals with higher levels of impulsivity may be more likely to develop more severe bulimic symptomatology and become grouped into clinical samples.

An important consideration in interpreting findings from the present study concerns conceptualization and measurement of risk factors for eating disorders. Some theorists have argued that current mood and temperamental characteristics are distinct constructs, which may influence one another (Meehl, 1995; Siever & Davis, 1991). However, it has been suggested that measures of current mood and temperament may capture the same underlying process (Clark & Watson, 1999; Clark, Watson, & Mineka, 1994; Klein & Miller, 1993; Widiger, Verheul, & van den Brink, 1999). In the present study, negative affect and temperamental characteristics were significantly correlated. Although the degree of association did not preclude inclusion in the model, it does suggest significant overlap in our measures. Future work is needed to refine existing measures of current mood and temperament in order to better characterize the relationships among risk factors for eating disorders.

The present study has several limitations. First, the current sample was relatively homogeneous as most participants were Caucasian women enrolled in college. Thus, these results may not generalize to other populations. Second, the present study relied upon self-report questionnaires. As the assessment of eating disorders is notoriously difficult (Cooper & Fairburn, 1987), future use of semi-structured interviews may provide a more thorough assessment of these behaviors. Finally, the cross-sectional design of this study fails to contribute to our understanding of the temporal nature of the relationships among the variables.

Nonetheless, this is the first study to document a relationship among temperament, current negative affect, dietary restraint, and bulimic symptomatology. The finding that temperament, a biologically-influenced variable makes a significant, albeit small, contribution to bulimic symptomatology will help to stimulate future research on temperament and eating disorders. An increased understanding of temperament in conjunction with other risk factors for the development and maintenance of subclinical and clinical eating disorders also may lead to treatments designed to help individuals with differing temperamental styles.

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Table 1
Participant characteristics (N=276)

	M	SD
Age	19.17	1.28
Weight (lb)	141.27	27.63
BMI (kg/m ²)	23.89	4.40
	% (<i>n</i>)	
Ethnicity (Caucasian)	83.7 (231)	
Previous psych treatment (Yes)	5.4 (15)	
Previous eating disorder treatment (Yes)	4.0 (11)	

Note. BMI=Body Mass Index (kg/m²).

Table 2

Bivariate correlations among independent variables

Variable	BMI	BDI-II	STAI-S	Restraint	PE	NE	CN	Mean	SD
BMI	—	.02	-.04	.28**	.03	-.04	.01	23.89	4.47
BDI-II		—	-.68*	.29*	-.39*	.51*	.00	10.67	7.33
STAI-S			—	.34*	-.27*	.49*	.08	38.20	11.07
Restraint				—	-.11	.31*	.04	12.82	6.51
PE					—	-.09*	-.01	153.83	15.34
NE						—	.18*	136.39	16.11
CN							—	159.25	16.31

Note. BDI-II=Beck Depressive Inventory-II; STAI-S=State Anxiety Scale; Restraint=Restraint Scale; PE=MPQ Positive Emotionality; NE=MPQ Negative Emotionality; CN=MPQ Constraint; BMI=Body Mass Index (kg/m²).

* $p < .05$

** $p < .01$.

Table 3
Summary of hierarchical regression analysis of current mood, restraint, and temperament predicting BULIT-R Scores (N=276)

Variable	B	SE B	β
Step 1			
BDI-II	-.10	.10	-.06*
STAIS	.34	.16	.13
Step 2			
Restraint	2.04	.13	.66**
Step 3			
NE	.13	.06	.11*
PE	-.27	.06	-.20**

Note. BULIT-R=Bulimia Test-Revised; BDI-II=Beck Depressive Inventory-II; STAIS=State Anxiety Scale; Restraint=Restraint Scale; NE=MPQ Negative Emotionality; PE=MPQ Positive Emotionality.

$R^2=.18$ for Step 1; $\Delta R^2=.39$ for Step 2; $\Delta R^2=.04$ for Step 3 ($p<.001$).

*
 $p<.05$

**
 $p<.01$.