



Rumination and self-control interact to predict bulimic symptomatology in college students



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ARTICLE INFO

Article history:

Received 6 May 2015

Received in revised form 25 January 2016

Accepted 1 March 2016

Available online 5 March 2016

Keywords:

Bulimia nervosa

Rumination

Self-control

ABSTRACT

Recent studies suggest that a ruminative response style may contribute to the development and maintenance of Bulimia nervosa. However it is not clear what factors may contribute to the relationship between rumination and BN. One factor may be self-control, as studies suggest that BN symptomatology relates to deficits in self-control. In the present study, we hypothesized that the association between rumination and BN symptomatology would be the strongest among individuals with lower self-control relative to those with higher self-control. Participants were 353 students at a large university. Participants completed measures of self-control, rumination, and eating disorder symptomatology as part of an online study. A hierarchical regression supported an interaction between rumination and self-control predicting bulimic symptomatology, controlling for BMI. Individuals with higher levels of rumination presented more bulimic symptoms if they also had lower levels of self-control, supporting our hypothesis. Based on these findings, assessing rumination in conjunction with self-control among individuals who present with eating concerns may help to direct treatment. Additionally, clinical interventions increasing self-control may also alleviate some BN symptoms in ruminators.

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1. Introduction

Bulimia nervosa (BN) is characterized by a sense of lack of control while eating an unusually large amount of food. This is often followed by shame and secrecy about the quantity eaten, which is in turn followed by compensatory behaviors such as self-induced vomiting (APA, 2013; Fairburn & Cooper, 1984; Fairburn, Wilson, & Schleimer, 1993). It is estimated that between 1% and 4% of American college-age women meet a diagnosis of BN (APA, 2013). A far greater number of college students report sub-clinical bulimic symptoms throughout college (Hoek & Van Hoeken, 2003). As such, understanding the factor that contribute to the development and maintenance of bulimic symptoms among college students is critical.

Individuals who have difficulty in effectively regulating negative emotions are at risk for disordered eating. One type of maladaptive emotion regulation strategy that might be particularly relevant to disordered eating is rumination. Rumination is a response to distress through which an individual focuses on the causes, consequences, and symptoms of one's current negative affect repetitively without proactively engaging in goal directed behavior (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Research demonstrates that the tendency

to ruminate (i.e., having a ruminative response style) is associated with the development and maintenance of negative outcomes such as depression, anxiety, and suicidal ideation (for a review see Smith and Alloy (2009). Most relevant to the present research are studies that have linked a ruminative response style and bulimic symptoms (Holm-Denoma & Hankin, 2010; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007), suggesting that a ruminative response style may play an etiological role in the development of BN. However, only a few studies have investigated factors that might contribute to the relationship between ruminative response styles and BN symptoms.

Research thus far has focused on the role of body-focused thoughts and body dissatisfaction in this relationship. Nolen-Hoeksema et al. (2007) proposed that a ruminative response style leads to an increase in bulimic symptoms and that bingeing and purging serve as an escape from repetitive body-focused thoughts for adolescent girls who are self-conscious about their bodies. As such, it may be that bulimic symptoms are a coping mechanism to escape from 'the self' (Heatherton & Baumeister, 1991; Nolen-Hoeksema et al., 2007) in girls who are overwhelmed with self-focused thoughts. Thus, bingeing and purging break the ruminative self-focused thought cycles that these girls are trapped in. Another study found that increased body dissatisfaction along with high levels of ruminations leads to bulimic symptoms, specifically, bingeing (Holm-Denoma & Hankin, 2010). Though these preliminary results are important, theory driven research focused on potential moderators of this association may help to further inform efforts to treat BN symptoms.

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One theory that may inform the relationship between rumination and BN is the Self-Regulatory Strength Model of Self-Control (Baumeister & Heatherton, 1996; Baumeister, Heatherton, & Tice, 1994). This theory purports that exerting self-control to change behaviors or emotions requires effort expenditure, yet, only a limited amount of resources are available. Thus, when self-regulatory resources have been exhausted, a state of depletion leads to failure on subsequent, unrelated tasks requiring self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). Self-control is key to inhibit undesirable behavior. Recent research on a ruminative response style and anger demonstrates that an angry ruminative response style leads to persistently compromised effortful control, causing one to be at a greater risk for aggression (White & Turner, 2014). It may be that this same pattern is evident in individuals with bulimic symptoms, such that, a ruminative response is particularly dangerous among individuals who are easily depleted (i.e., having poor self-control). Rumination draws on self-control resources and that might lead someone to be less able to handle future demands (e.g., negative body related thoughts), eventually leading to a failure in resisting a binge. Thus, self-control is one factor that may moderate the relationship between ruminative response styles and BN.

Self-control is defined as the capacity of the self to alter one's dominant response and to regulate behavior, thought, and emotions (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). By definition, Bulimia nervosa includes a "sense of lack of control" over eating during binges (Mond, 2013) and low self-control is also associated with more frequent binges (Tangney, Baumeister, & Boone, 2004).

The resource allocation theory proposes that the negative thoughts of rumination deplete the already limited cognitive abilities that would otherwise be directed towards task-relevant processes, such as adaptive emotion regulation strategies (Gotlib & Joormann, 2010; Watkins & Brown, 2002). Therefore, it is likely that the valuable cognitive resources necessary to engage in adaptive emotion regulation strategies are allocated towards the ruminative thought processes, putting those with low levels of self-control at an increased risk to engage in bulimic behaviors. Building upon this research, the present study aimed to investigate the relationship between rumination and bulimic symptoms in a college sample. Based on the prior research on deficits in self-control and BN (Heilbrun & Bloomfield, 1986; Tangney et al., 2004; Tigge mann & Raven, 1998), we examined self-control as a moderator of the relationship between rumination and BN symptomatology. We hypothesized that the association between rumination and BN symptomatology would be the strongest among individuals with lower self-control relative to those with higher self-control.

2. Method

2.1. Participants

Participants were 353 college students (85% female). Participants' ages ranged from 18 to 60 years ($M = 21.93$, $SD = 5.78$). The sample was 55% Caucasian, 18% Asian, 11% African American, and the rest self-identified as "other."

2.2. Procedure

Data collection occurred within the context of a larger, ethics board approved online study. Participants were recruited for the study via an online advertisement and were given course credit in return for their participation. After an informed consent, participants completed measures of rumination (RRS), self-control (SCS), and eating disorder symptomatology (EAT-26).

2.3. Materials

2.3.1. Rumination

The Ruminative Response Scale (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003) is a ten-item subscale of the larger Ruminative Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991) that assess the extent to which individuals repeatedly focus on the self, on symptoms and causes and consequences of their negative mood. The scale measures two factors, reflection and brooding. Reflection focuses on the degree to which individuals engage in cognitive problem solving to alleviate their depressed mood (e.g., analyze recent events to try to understand why you are depressed) and brooding factor reflects an individual's judgmental self-focus contributions for their distress (e.g., think 'What am I doing to deserve this?'). In the current sample, the scale has acceptable internal consistency ($\alpha = 0.83$).

2.3.2. Self-control

The Self-Control Scale (SCS; Tangney et al., 2004) is a trait measure of self-control. The scale contains 36 statements that assess the ability to control one's impulses and regulate behavior. Items are rated on a 5-point scale (1 = not at all like me, 5 = very much like me). The scale has been linked with behavioral measures of self-control (Schmeichel & Zell, 2007). In the current sample, the scale has acceptable internal consistency ($\alpha = 0.86$).

2.3.3. Bulimia symptoms

The Eating Attitudes Test (EAT-26; (Garner, Olmsted, Bohr, & Garfinkel, 1982) was developed as, and is often used, as a screening measurement for identifying symptoms of eating disorders behaviors related to bulimia, weight, body image, and other psychological symptoms. The current study utilized the bulimia and food occupation subscale to assess the frequency of bulimic symptomatology. Sample items include, "I vomit after I have eaten" and "I find myself preoccupied with food." The EAT-26 has been shown to have good concurrent and criterion validity (Gross, Rosen, Leitenberg, & Willmuth, 1986; Rosen, Silberg, & Gross, 1988). The subscales, along with the total score, have demonstrated acceptable internal consistency estimates (Garner et al., 1982). In the current sample, the bulimia subscale has acceptable internal consistency ($\alpha = 0.79$).

2.3.4. Body mass

Body mass index (BMI) was calculated using self-report height and weight. We calculated BMI by dividing weight in kilograms by height and meters' squared. For these analyses, we converted BMI values to age and sex specific percentiles based on norms from the National Health and Nutrition Examination Survey III (Kuczmarski et al., 2002).

3. Results

Table 1 displays correlations, means, and standard deviations for the study variables. Bulimic symptomatology was positively correlated with rumination and negatively correlated with self-control. There were no gender differences in any of the study variables (f_s range from 0.16 to 3.11, p_s range from .08 to .69).

Table 1
Correlations, Means, and Standard Deviations for the Study Variables.

| Variables | 1 | 2 | 3 | 4 | 5 |
|------------------------------|-------|-------|---------|--------|-------|
| 1. Sex | – | – | – | – | – |
| 2. BMI | –0.11 | – | – | – | – |
| 3. Bulimic Symptoms | 0.01 | .08 | – | – | – |
| 4. Ruminative Response Style | 0.11* | .09 | .26*** | – | – |
| 5. Self- Control | 0.06 | –.12* | –.23*** | –.37** | – |
| Mean | – | 23.86 | 2.10 | 25.30 | 37.92 |
| SD | – | 4.66 | 2.44 | 6.21 | 10.07 |

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

The results of a hierarchical regression analysis predicting bulimia symptoms are presented in Table 2. The main effects of rumination and self-control were entered into the first step along with body mass index (BMI) and sex as a control variable. The interaction between rumination and self-control was entered into the second step. All main effects were standardized prior to calculating the interaction term to facilitate the interpretability of the interaction according to the recommendations of Aiken and West (1991). The predictors in the first step (main effects and control variables) accounted for 9% of the variance in bulimia symptoms. Rumination and self-control were both significant predictors. Step 2 yielded a significant interaction between rumination and self-control, which accounted for an additional 2% of the variance in bulimia symptoms.

Given that the interaction term was significant, the pattern of the interaction was probed based on Aiken and West (1991) recommendation. In Fig. 1, the association between rumination and bulimia symptoms is presented as a function of high vs. low levels of self-control. As expected, self-control moderated the impact of rumination, such that individuals with high levels of rumination (1SD above the mean) showed higher levels of bulimic symptoms if they had low levels of self-control. As would be expected, the slope of the line for those with high levels of self-control was non-significant. This suggests that among those with high levels of rumination (i.e., those who are at risk for bulimic symptoms) self-control at higher levels, augments the risk for bulimic symptoms.

4. Discussion

The goal of the present study was to examine the role of self-control as a moderator of the relationship between rumination and bulimic symptomatology. As hypothesized the association between rumination and Bulimia nervosa symptomatology was the strongest among college students with lower self-control relative to those with higher self-control. The interaction of self-control and rumination was predictive above and beyond the substantial variance explained by sex or BMI, suggesting a robust effect. Additionally, the analyses showed that the bulimic symptoms (e.g., binge, purge) had a specific relationship to rumination and self-control. The results from the study are consistent with previous studies suggesting that a ruminative response style predicts an increase in bulimic symptomatology. Thus, our results provide support for and elaborate on the *self-regulatory strength model of self-control* (Baumeister & Heatherton, 1996; Baumeister et al., 1994), demonstrating that a ruminative response is particularly dangerous among individuals whose self-control is easily emotionally depleted.

This finding has important clinical implications as it suggests that patients with BN (or subclinical bulimic symptomatology who present at a counseling center, may benefit from assessing their ruminative response style and self-control. Treatment for those individuals who were screened high for ruminative response style and low for self-control should first target increasing self-control and building adaptive self-regulatory strategies as an alternative to engage in bulimic symptoms. The original response style theory (Nolen-Hoeksema, 1991) suggests that positive distractions (e.g., reading a book, going on a walk) are an adaptive response style to depression that might play a role in

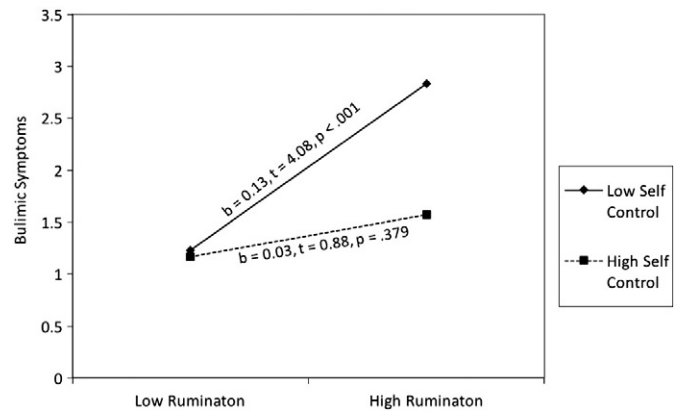


Fig. 1. Graph of interaction plot. Self-control moderates the relationship between rumination and bulimic symptomatology, such that individuals with high levels of rumination (1SD above the mean) showed higher levels of bulimic symptoms if they had low levels of self-control.

breaking the downward spiral of mood in depression. These adaptive response styles work as effectively in treatment for BN at breaking the ruminative cycle and increasing self-control as they do for depression.

According to Mischel and Shoda (1995) *Cognitive-Affective Processing System* (CAPS) model, adaptive response (e.g., positive distraction) styles may also help to increase an individual's self-control. Based on the finding from the current study an increase in self-control might reduce the likelihood that an individual will engage in bulimic behaviors. In the CAPS, affective representations are part of a *hot system* that responds reflexively to situational triggers in the environment (e.g., rumination about body dissatisfaction) to elicit automatic appetitive reactions as the basis of emotionality. These reactions are behaviors typified by a lack of self-control (e.g., binge and purging). On the other hand, rational cognitive representations are identified as part of a *cool system* that is attuned to the informational aspects of a situation to stimulate strategic behavior as the basis of self-control. Adaptive response styles such as reading or engaging in physical activity may divert an individual's attention away from hot, affective representations (e.g., rumination over body dissatisfaction) that trigger bulimic symptoms and in building *cool representations* (i.e., cognitions) to reduce instances of binge and purging.

4.1. Strengths, limitations, and future directions

The findings of the present study should be interpreted within the context of several limitations. First, the study relied on self-report data. Collection of behavioral or interview data could provide more objective measures of study variables. Nevertheless, we utilized well-validated measures that were included in past studies. Second, as this study was conducted with a college population, the findings may not generalize to other community samples. Future research might look at the impact of self-control on the relationship between ruminative response styles and BN in high school students as well as adults. It is important to note, however, that college students are at elevated risk for BN and are thus population of a particular interest. In addition, this study used a cross-sectional research design; thus, causality cannot be determined. Future studies might address the questions associated with causality with a longitudinal design. Finally, the sample was predominantly White and female; thus, results may not generalize to more diverse samples. Despite these limitations, this study adds uniquely to our understanding of factors that may affect risk for BN among college students with a ruminative response style. Further research might investigate the role that these adaptive response styles might actually play in reducing symptoms of BN, as well as replications in more severe and diverse clinical populations using prospective methodology.

Table 2
Results of linear regression analysis.

| | B | SE B | T | P | ΔR^2 |
|---------------------------|--------|-------|--------|------|--------------|
| Step 1 | – | – | – | – | .083*** |
| Sex | –0.070 | 0.378 | –0.185 | .854 | – |
| Body Mass Index | 0.016 | 0.029 | 0.568 | .571 | – |
| Rumination (RRS) | 0.081 | 0.023 | 3.511 | .001 | – |
| Self-Control (SCS) | –0.033 | 0.041 | –2.350 | .019 | – |
| Step 2 | – | – | – | – | .015* |
| Rumination X Self Control | –0.005 | 0.002 | –2.314 | .021 | – |

Note. * $p < .05$, ** $p < .001$.

Role of funding sources

No funding was provided for this study. Lauren Breithaupt is supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1,356,109.

Contributors

Authors 1, 2 and 4 designed the study, conducted the statistical analysis and wrote the protocol. Author 1 conducted literature searches and provided summaries of previous research. Author 1 wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript. Author 3 provided background information about the topic and feedback regarding clinical applications.

Conflict of interest

All authors declare that they have no conflicts of interest.

Acknowledgments

This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1356109. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the authors(s) and do not necessarily reflect the views of the National Science Foundation.

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