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THE EFFECT OF ANGER RUMINATION IN THE RELATIONSHIP BETWEEN BORDERLINE PERSONALITY DISORDER SYMPTOMS AND PRECURSORS

Shannon E. Sauer-Zavala, PhD, Paul J. Geiger, MS, and Ruth A. Baer, PhD

Previous research has identified an invalidating childhood environment and a biological predisposition for affective instability to be two precursors for the development of borderline personality disorder (BPD). In addition, rumination, particularly in response to anger, is significantly associated with symptom severity and dysregulated behavior in BPD. This study examined whether a significant relationship between childhood precursors and current BPD symptom severity could be accounted for by the tendency to engage in anger rumination in a sample of undergraduate students (N = 342), including many with high BPD features. Results showed a significant indirect effect of anger rumination in the relationship between self-reported childhood emotional vulnerability (but not invalidating childhood environment) and BPD symptom severity. This finding suggests that anger rumination could be a risk factor for BPD. These results suggest the importance of continued research on the role of anger rumination in the development and exacerbation of BPD symptoms.

Borderline personality disorder (BPD) is characterized by dysregulation in emotional, interpersonal, and behavioral functioning. Linehan (1993) describes the problems associated with BPD as resulting from a childhood pairing of two theoretical precursors: a biological predisposition for affective instability and an invalidating environment. Affective instability, also known as emotional vulnerability, refers to the tendency to experience easily elicited, intense, long-lasting emotions, while an invalidating environment is a childhood home life characterized by chronic criticism and punishment of emotional expression, typically by parents. There is a growing literature of empirical support for the relationship between these precursors and BPD symptom severity (Rosenthal, Cheavens, Lejuez, & Lynch, 2005; Sauer & Baer, 2009, 2010).

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Rumination, a form of repetitive thought (Watkins, 2008) in which individuals passively focus on their symptoms and the possible causes and consequences of them (Nolen-Hoeksema, 1991), has recently received empirical attention as a process related to BPD. Selby, Anestis, and Joiner (2008) propose the *emotional cascades model* to account for the role of rumination in people with BPD; they suggest that negative affect triggers rumination, which intensifies the affect, leading to more rumination. The cycle of intensifying affect and rumination (the emotional cascade) leads to extreme dysregulated behavior (e.g., self-harm) that functions to distract attention from this negative internal experience. Several authors have confirmed that rumination, particularly in response to anger, is prominent in people with BPD (Abela, Payne, & Moussaly, 2003), correlated with symptom severity (Baer & Sauer, 2011; Smith, Grandin, Alloy, & Abramson, 2006), and indeed predicts dysregulated behavior (Sauer & Baer, 2012; Selby, Anestis, Bender, & Joiner, 2009).

Investigation of the mechanisms through which distal risk factors, like Linehan's (1993) precursors, lead to BPD symptoms is important for intervention, because it may lead to the targeting of proximal processes that are more amenable to change. Rumination may be one such mechanism. First, given that individuals with BPD are prone to have intense emotional reactions (emotional vulnerability) prompting problematic behavior, it seems likely that they would ruminate about past events in an effort to prevent future problems. Second, in an invalidating environment, the individual is repeatedly told that his or her thoughts and emotions are inappropriate. This may lead the individual to ruminate in the service of better understanding and changing his or her emotions and reactions to them. The current study focused on anger rumination, in particular, because previous research suggests that depressive rumination does not account for unique variance associated with BPD symptoms beyond anger rumination. The purpose of the present study was to investigate whether the tendency to ruminate in response to anger mediates the relationship between Linehan's (1993) precursors and BPD symptoms in an undergraduate sample. Given that there is high comorbidity between BPD and depression and that there is a long-standing relationship between rumination and depression, study analyses controlled for depressive symptoms.

METHOD

PARTICIPANTS AND PROCEDURES

Data were derived from a larger study of newly developed measures of childhood emotional vulnerability and invalidating environment (Sauer & Baer, 2010). A total of 342 (194 female; 56%) undergraduate students were recruited from an Introduction to Psychology course. Participants volunteered for this study via an online experiment registration site and were sent a link to a website where they provided informed consent and

completed a series of questionnaires. Participants' ages ranged from 18 to 30 years with a mean age of 19.52 (*SD* = 2.95). The sample was 90% Caucasian, 4% African American, and 6% other races. Scores on the borderline features scale of the Personality Assessment Inventory (PAI-BOR; Morey, 1991) showed that a wide range of BPD features were present in the sample: 17.1% of participants scored above 65T, 70.8% scored in the moderate range (T scores 50–65), and 12.1% scored in the low range (T < 50).

MEASURES

Childhood Emotional Vulnerability. The Emotional Vulnerability-Child Scale (EV-Child; Sauer & Baer, 2010) consists of 21 items that assess a childhood tendency to be highly reactive to emotional stimuli, to experience emotions intensely, and to take a long time to return to a baseline level of functioning after experiencing emotions. This measure was originally adapted from a measure of current emotional reactivity and intensity (Bryant, Yarnold, & Grimm, 1996) developed by Sauer and Baer (2009, 2010) to assess adult retrospective recall of childhood emotional experience. The EV-Child demonstrated good internal consistency (α = .91).

Childhood Invalidating Environment. The Invalidating Environment-Child Scale (IE-Child; Sauer & Baer, 2010) consists of 33 items that assess a history of receiving invalidation from caregivers by asking adult responders to read six scenarios (e.g., losing a valued possession) and to rate the extent to which six parental responses (e.g., tell me I was overreacting) are consistent with how their parents handled such situations. This measure provides total invalidation scores for both mother and father behavior separately; however, due to high correlations between mother and father behavior (*r* = .72), these items are summed to provide a total household invalidation score. Similarly to the EV-Child, this measure was adapted by Sauer and Baer (2009) from an existing measure in which parents rate their own skills (Krause, Mendelson, & Lynch, 2003) and was further validated by Sauer and Baer (2010).

Rumination. The Anger Rumination Scale (ARS; Sukhodolsky, Golub, & Cromwell, 2001) consists of 19 items that measure the proclivity to think repetitively about angry moods and anger-inducing situations (e.g., "When something makes me angry, I turn this matter over and over in my mind") on a four-point Likert scale. This measure showed good internal consistency (α = .93) in the development sample.

BPD Symptoms. The PAI-Borderline Features Scale (PAI-BOR; Morey, 1991) consists of 24 items and measures core features of BPD pathology, including affective instability, identity problems, negative relationships, and self-harm on a four-point Likert scale; all items are summed to create a total score. Example items include "my mood can shift quite suddenly" and "my relationships have been stormy." This measure has shown good internal consistency in previous samples (α = .81).

Depressive Symptoms. The Depression Anxiety Stress Scales (DASS;

Lovibond & Lovibond, 1995), a seven-item depression subscale, was used in the present study. Participants are asked to rate the extent to which they have been experiencing depressive symptoms in the past week on a four-point Likert scale. The DASS depression scale has shown good internal consistency (α = .84) and strong correlations with other measures of depression.

RESULTS

Descriptive statistics for each study variable can be viewed in Table 1. Anger rumination and depressive symptoms were significantly positively skewed; transformations were conducted (square root corrected skew for anger rumination = 3.50; log10 corrected skew for depressive symptoms = 4.56), and these variables were used in subsequent analyses. Preliminary analyses investigated zero-order associations between the variables of interest (Table 2). All study variables were significantly correlated in the expected direction.

The first study hypothesis was that anger rumination would mediate the relationship between the biosocial precursors of BPD (emotional vulnerability in childhood and an invalidating childhood environment) and BPD symptoms. Each of the biosocial precursors was examined separately, using the regression-based methods described by Baron and Kenny (1986), MacKinnon, Krull, and Lockwood (2000), and Sobel (1982) for examining a mediational hypothesis. Results for emotional vulnerability can be seen in Figure 1. Childhood emotional vulnerability (controlling for current depressive symptoms) significantly predicted both BPD symptoms and anger rumination, and anger rumination (controlling for current depressive symptoms) also predicted BPD symptoms, satisfying the first criteria for mediation. The next step is the test of the relationship between the predictor variable and the outcome variable when the mediating variable is included in the model. The prediction in this case was that the magnitude of the relationship between emotional vulnerability (predictor variable) and BPD symptoms (outcome variable) would be significantly reduced when anger rumination (the mediator variable) was included in the model. To test this prediction, level of BPD symptoms was simultaneously regressed onto emotional vulnerability and anger rumination (and depressive symptoms as a controlling variable). As hypothesized, anger rumination remained a significant predictor of BPD symptoms over and above emotional

TABLE 1. Descriptive Statistics for Study Variables

Variable	Mean	*SD*	Skewness	α
Emotional Vulnerability	60.54	14.66	2.70	.91
Invalidating Environment	114.25	23.00	4.07	.89
Anger Rumination	74.00	10.26	6.69	.92
BPD Symptoms	27.16	8.27	3.13	.81
Depressive Symptoms	10.86	4.22	10.00	.88

TABLE 2. Zero-Order Correlations Between BPD Features, Emotional Vulnerability, Invalidating Environment, Anger Rumination, and Depressive Symptoms

Variable	1	2	3	4	5
1. Emotional Vulnerability	—	.18	.44	.47	.36
2. Invalidating Environment-	—	—	.28	.27	.28
3. Anger Rumination	—	—	—	.66	.57
4. BPD Symptoms	—	—	—	—	.65
5. Depressive Symptoms	—	—	—	—	—

Note. All correlations were significant at the $p < .01$ level unless noted.

vulnerability. Additionally, consistent with the prediction of mediation, the predictive utility of emotional vulnerability for BPD symptoms was decreased (beta dropped from .29 to .20) with the inclusion of anger rumination in the model. A *t* test (MacKinnon et al., 2000) showed that this drop in the regression coefficient was significant, $t(341) = 2.04$, $p > .05$. Additionally, a Sobel test of the indirect path between emotional vulnerability and BPD symptoms (through anger rumination) was significant ($z = 2.41$, $p < .05$). These results provide support for the hypothesis that anger rumination partially mediates the relationship between childhood emotional vulnerability and adult BPD symptoms.

These steps were repeated to test the hypothesis that anger rumination mediates the relationship between invalidation in childhood and BPD symptoms. Contrary to predictions, an invalidating childhood environment was not a significant predictor of BPD symptoms or anger rumination when controlling for current depressive symptoms. As such, the subsequent mediational analyses were not conducted.

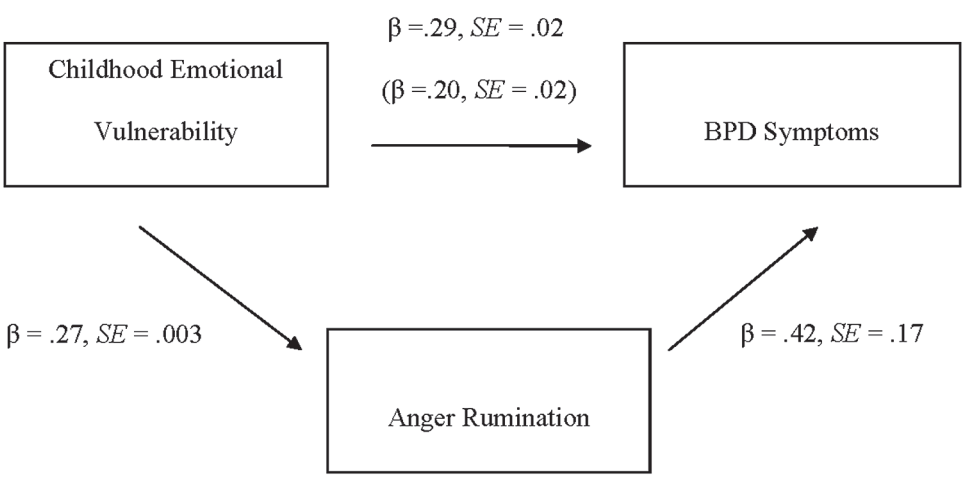

FIGURE 1. Test of mediation by anger rumination of the relationship between childhood emotional vulnerability and BPD symptoms, controlling for depressive symptoms. The values in parentheses show the relationship between the independent variable and BPD symptoms when the mediator is included in the model.

DISCUSSION

Previous research has found strong associations between anger rumination and BPD symptom severity. The present study contributes to this literature by examining whether the tendency to ruminate in response to anger mediates the relationship between Linehan's (1993) precursors and BPD symptom severity. Results indicate that there is a significant indirect effect of anger rumination in the relationship between childhood emotional vulnerability and BPD symptom severity. This finding supports the notion that individuals who experience intense, long-lasting emotions in childhood may be at greater risk for developing BPD symptoms through engaging in high levels of rumination in response to anger. Although individuals with BPD may believe that rumination is an effective strategy to regulate the intensity and duration of negative emotions (Watkins & Baracaia, 2001), these results are consistent with Selby et al.'s (2009) emotional cascade model in BPD. Rumination in response to intense negative affect (in this case, anger) leads to higher levels of negative affect until an individual engages in characteristic BPD behaviors to disrupt the cycle. In fact, the impulsive behaviors that characterize BPD, such as self-harm, substance abuse, and binge eating, are often understood as maladaptive attempts to regulate intense negative affect (Chapman, Gratz, & Brown, 2006). Contrary to predictions, relationships between childhood invalidation and anger rumination BPD symptoms were not significant when controlling for current depression (precluding proposed mediation analyses), perhaps because participants' recollections of their parents' invalidation are confounded with current depressive symptoms.

These results have important implications for treatment of BPD. Distal factors such as emotional vulnerability may be difficult to address through therapy, while there is evidence to suggest that problematic thoughts and cognitions can indeed be changed (Beck, 2005). For example, studies have shown that mindfulness training can reduce the tendency to ruminate (Hayes & Feldman, 2004). The current study suggests that treatment aimed at decreasing ruminative thought patterns may offer a reduction in BPD symptom severity. Treatments that explicitly address rumination have demonstrated promising results for patients with depression and anxiety (Dimidjian et al., 2006; Segal, Williams, & Teasdale, 2002; Watkins et al., 2007), but have not yet been tested in BPD.

The present study has several limitations that must be noted. First, there is theoretical overlap among study variables that may have inflated relationships. For example, anger and affective instability are both symptoms of BPD and are closely related to the study's independent variables (anger rumination and emotional vulnerability). Care was taken to differentiate these constructs by using psychometrically sound measures; the anger rumination scale used in this study has been demonstrated to be distinct from the emotion of anger (Sukhodolsky et al., 2001), and asking participants to reflect on their *childhood* emotional tendencies represents an improvement in measuring Linehan's (1993) emotional vulnerability

from previous work on this topic that assessed current emotional vulnerability (Cheavens et al., 2005; Rosenthal et al., 2005). However, caution should be exercised in interpreting these results because all study variables relied on self-report methods, and retrospective recall may compromise accuracy in reporting. Additionally, a cross-sectional design was used; since all the data were collected at the same time, the directional hypothesis that rumination mediates the relationships between the biosocial precursors (Linehan, 1993) and BPD symptoms should be interpreted with caution. Finally, the use of a student sample is also a limitation. While the PAI-BOR has been shown to effectively measure BPD symptomology in nonclinical student samples, future research should attempt to replicate these findings using a sample that meets diagnostic criteria for BPD.

Despite these limitations, the present study contributes to the literature on the development and treatment of BPD symptoms. The findings suggest that individuals who endorse childhood emotional vulnerability and an invalidating environment may be prone to engage in anger rumination, putting them more at risk for the problems associated with BPD. The identification of proximal processes, such as anger rumination, may help focus treatment efforts on processes that are less resistant to change compared to the distal processes, such as Linehan's precursors. Future research should continue to identify such proximal processes in BPD and develop targeted interventions to address them in treatment.

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