Journal of Personality Disorders, 23(1), 48–61, 2009

RELATIONSHIPS BETWEEN THOUGHT SUPPRESSION AND SYMPTOMS OF BORDERLINE PERSONALITY DISORDER

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The current study examined relationships among childhood emotional vulnerability, an invalidating childhood environment, thought suppression, and symptoms of borderline personality disorder (BPD). Emotional vulnerability and an invalidating childhood environment are described by Linehan (1993) as important biosocial precursors to the development of BPD. Using a student sample selected to have a wide range of BPD symptoms, we examined whether thought suppression mediates the relationship between these biosocial precursors and symptoms of BPD. Results supported the hypothesis that thought suppression fully mediates the relationship between invalidating environment and BPD symptoms. Mixed support was found for the hypothesis that thought suppression mediates the relationship between emotional vulnerability and BPD symptoms. We also examined whether fear of emotions mediates the relationship between the biosocial precursors and thought suppression. Results supported this hypothesis, and also suggested that fear of emotion contributes independently to mediating the relationship between biosocial precursors and BPD symptoms.

Borderline personality disorder (BPD) is characterized by a pervasive pattern of emotional, interpersonal, and behavioral problems. According to Linehan's (1993) biosocial theory, BPD symptoms result from a childhood pairing of an invalidating environment and a biological predisposition for affective instability. An invalidating environment occurs when those who are closest to the child (typically parents) repeatedly engage in criticizing, trivializing, punishing, and erratically reinforcing communication of internal experiences (thoughts and feelings). A biological predisposition for affect intensity, also known as emotional vulnerability, refers to heightened sensitivity and reactivity to emotional stimuli, particularly for negative events and a slow return to emotional baseline.

Several authors have proposed that thought suppression might mediate the relationship between Linehan's (1993) biosocial precursors and BPD

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symptoms (Cheavens et al., 2005; Rosenthal, Cheavens, Lejuez, & Lynch, 2005). Thought suppression involves deliberate attempts to reduce the frequency and intensity of unpleasant, emotion-inducing cognitions by pushing them out of awareness. Early research using nonclinical populations instructed to suppress neutral thoughts showed that thought suppression can have paradoxical consequences, as the suppressed thoughts often return with greater frequency or intensity (Wegner, Schneider, Carter, & White, 1987). In subsequent research, thought suppression has been associated with depression, generalized anxiety disorder, obsessive compulsive disorder, and post-traumatic stress disorder (Purdon, 1999). Thought suppression also has been shown to mediate the relationship between childhood sexual abuse and adult psychological distress (Krause, Mendelson, & Lynch, 2003). In a student sample, Cheavens et al. (2005) found that the relationship between emotional vulnerability and BPD symptoms was, as predicted, mediated by the use of thought suppression as an emotion regulation strategy. They also found that thought suppression partially mediated the relationship between an invalidating environment and BPD symptoms. Additionally, Rosenthal et al. (2005) found that thought suppression fully mediated the relationship between emotional vulnerability and BPD symptoms in a community sample. These findings suggest that avoidant coping with the biosocial precursors may be important in the development of BPD symptoms.

Although these studies provide support for the mediating role of thought suppression in the development of BPD symptoms, the use of alternative measures to assess the biosocial precursors would allow more specific tests of predictions based on Linehan's (1993) biosocial theory. For example, previous studies (Cheavens et al., 2005; Rosenthal et al., 2005) used the negative intensity and negative reactivity subscales of the affect intensity measure (AIM-NI and AIM-NR, respectively; Bryant, Yarnold, & Grimm, 1996) to assess participants' emotional vulnerability. This scale assesses an individual's current frequency and magnitude of emotional responses, which is problematic for two reasons. First, when exploring the origins of BPD symptoms, the construct of interest is emotional vulnerability in childhood. Second, because current affect intensity is considered a central feature of BPD symptoms, using a measure of current affect intensity as a predictor of BPD symptoms might result in inflated relationships. A measure of emotional vulnerability in childhood would be useful for assessing more specifically the construct described in Linehan's (1993) biosocial theory.

In order to assess whether participants experienced an invalidating environment, Cheavens et al. (2005) used the parental criticism subscale of the multi-dimensional perfectionism scale (MPS-PC; Frost, Marten, Lahart, & Rosenblate, 1990). This measure assesses parental criticism in a general way that includes criticism of mistakes or for doing things less than perfectly. However, the MPS-PC does not address parental reactions to a child's emotional experience and expression, which is the central is-

sue in invalidation as defined by the biosocial theory of BPD. Thus, a more specific measure of emotional invalidation in childhood would be useful for testing elements of the biosocial theory.

In addition to replicating previous research with alternative measures of the biosocial precursors, another goal of the current study was to investigate how the biosocial precursors to BPD would result in the use of thought suppression as a coping mechanism. Linehan (1993) suggests that individuals with BPD are emotion-phobic. It seems plausible that emotional vulnerability and an invalidating environment could shape the tendency to be fearful of thoughts and emotions, which could contribute to the tendency to suppress internal experience. First, in an invalidating environment, the child is repeatedly told that his/her thoughts and emotions are inappropriate. This may lead the child to believe that his/her thoughts are truly damaging. Thus, it seems likely that the child would become fearful of these experiences and engage in suppression to avoid them. Second, the fear of losing control of one's emotions might account for the relationship between the biosocial precursor of emotional vulnerability and suppression of internal experience. Given that individuals with BPD are prone to have intense reactions to emotional stimuli, it seems likely that they would worry about losing control and engaging in problematic behavior, and would therefore engage in suppression in an attempt to stop emotional experiences before losing control.

PURPOSE OF STUDY AND HYPOTHESES

This study is intended to replicate and expand upon existing research on the development of BPD symptoms as a function of avoidant coping.

Hypothesis 1: Thought suppression will mediate the relationship between Linehan's biosocial precursors (emotional vulnerability and an invalidating environment) and BPD symptoms. This is a replication of Cheavens et al.'s (2005) and Rosenthal et al.'s (2005) findings using alternate measures for several of the variables. Descriptions of all measures are provided in a later section.

Hypothesis 2: Fear of emotions will mediate the relationships between the biosocial precursors of BPD and thought suppression. This hypothesis is consistent with Linehan's (1993) suggestion that individuals with BPD symptoms are fearful of their emotional states. Analyses will test whether the biosocial precursors of BPD are related to fear of emotion, and whether this fear is related to the tendency to engage in thought suppression.

METHOD

PARTICIPANTS

The present study included 104 participants, who were recruited from a sample of undergraduates enrolled in an Introduction to Psychology

course. A screening measure was employed in order to identify potential participants with a wide range of BPD symptoms. Approximately 1,200 undergraduates filled out a 10-item subset of the Borderline Features Scale of the Personality Assessment Inventory (PAI; Morey, 1991) as part of a larger packet of screening measures for other studies. These 10 items included two or three from each of the four borderline subscales on the PAI (affective instability, identity problems, self-harm, and negative relationships). Scores on the screening measure were prorated and converted to T-score equivalents in order to identify low, medium, and high groups, and 34–35 participants from each group were recruited by telephone to participate. T-score equivalents were 67 and higher for the high group, 51–66 for the medium group, and 49 and below for the low group. Participants' ages ranged from 18 to 34 with a mean age of 19.10. The sample was 87.5% Caucasian, 5.8% African American, 1.9% Asian, 1% Hispanic, and 3.8% other ethnicities. The sample included 80 females and 24 males. A power analysis revealed that 104 participants provided adequate power to detect a small to moderate effect size ($\alpha = .05$ and $1 - \beta = .92$).

According to Trull (1995) and Trull, Useda, Conforti, and Doan (1997), studies of BPD symptoms in nonclinical populations are important for several reasons. First, BPD symptoms are relatively prevalent in nonclinical populations (Zimmerman & Coryell, 1989). Second, clinical participants with BPD may be unrepresentative because the most severe or dysfunctional cases are those that are most likely to be sampled in clinical studies. Finally, evidence suggests that nonclinical young adults with BPD features present a level of dysfunction across a number of spheres of functioning that is severe enough to warrant further study (Trull, 1995).

MEASURES OF BPD SYMPTOMS

Personality Assessment Inventory—Borderline Features Scale (PAI-BOR; Morey, 1991). The PAI–BOR items tap core features of borderline personality pathology, including affective instability, identity problems, negative relationships, and self-harm. Participants respond to 24 items on a 4-point scale (false, slightly true, mainly true, and very true). Examples of items include "my mood can shift quite suddenly," "my relationships have been stormy," and "I sometimes do things so impulsively that I get into trouble."

MEASURES OF BIOSOCIAL PRECURSORS OF BPD

Childhood Emotional Vulnerability. Because we found no published measure assessing this construct, the Emotional Vulnerability in Childhood (EV-Child) measure was adapted for the present study by making minor modifications to the Affect Intensity Measure (AIM; Bryant et al., 1996). In its original form, this measure includes a negative intensity scale assessing the tendency to have intense experiences of negative emotions, and a negative reactivity scale assessing the tendency to become easily disturbed by emotional events. Respondents use a 6-point Likert scale to rate how

much each item describes their current functioning. Emotional vulnerability in the biosocial model of BPD is in the context of childhood, so the items were reworded slightly to reflect childhood tendencies rather than current patterns. On the original AIM, both subscales are comprised of 6 items. Bryant et al. (1996) reported internal consistencies (coefficient alpha) in their validation sample of .70 and .66, respectively. In order to increase internal consistency and broaden the range of emotions addressed, several similar items were added, such as "(in childhood) when I got angry it was a very intense anger." Items addressing Linehan's concept of slow return to baseline also were added; for example, "when I got upset, I stayed upset for quite a while." All items were combined to form a single score for emotional vulnerability in childhood (EV-Child). Psychometric properties of these items will be reported in a later section.

Childhood Invalidation. To measure childhood invalidation we used the Socialization of Emotion Scale (SES; Krause, Mendelson, and Lynch, 2003). This instrument asks adults to report on their parents' typical responses to their childhood displays of negative affect. It contains three 12-item subscales: parental distress reactions (becoming angry, anxious, or upset when the child expresses negative affect), parental punitive reactions (punishing the child in an attempt to reduce the parent's exposure to the child's negative affect), and parental minimization reactions (devaluing the child's problem or distressful reaction). These subscales are very similar to invalidation as defined by Linehan's biosocial theory. Participants complete each item twice in order to rate both their mother's and father's behavior. Krause et al. (2003) reported that internal consistency for each subscale is strong (α = .85, .80, and .78, respectively). They also found that childhood invalidation by parents was significantly correlated with current emotional inhibition and psychological distress. The SES was adapted by Krause et al. (2003) from the Coping with Children's Negative Emotions Scale (CCNES; Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002), which asks parents of young children to report on how they respond to their children's displays of negative emotions. This form of the instrument also has been shown to have good reliability and validity.

MEASURE OF THOUGHT SUPPRESSION

The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) assesses the general tendency to suppress thoughts. This measure is comprised of 15-items presented in Likert-type format. Respondents indicate the degree to which they agree with each item using a 5-point scale (1 = strongly disagree, 5 = strongly agree). The authors indicated that the scale has good internal consistency (α = .89) and test-retest reliability (r = .80). Example items include, "There are thoughts I prefer not to have," and "I always try to put problems out of my head."

MEASURE OF FEAR OF EMOTIONS

The Affective Control Scale (ACS; Williams, Chambless, & Ahrens, 1997) was administered to assess fear of losing control over one's emotions. The items comprise four subscales: fear of anger, depression, anxiety, and positive emotion. Respondents rate the extent to which they agree with statements on 7-point Likert-type scale (1 = very strongly disagree, 7 = very strongly agree). Examples include "I am concerned that I will say things I'll regret when I get angry" and "I can get too carried away when I am really happy." Internal consistency in the validation sample was high for the total score ($\alpha = .94$) as well as for the subscale scores ($\alpha = .72$, .91, .89, and .84, respectively). Test-retest reliability was also acceptable ($r = .78$).

PROCEDURE

Participants completed a battery of questionnaires in groups of approximately 25. Due to the potentially sensitive nature of some of the items, participants were provided with contact information for local mental health resources.

RESULTS

Because our measure of emotional vulnerability (EV-child) had not been used in previous studies, we examined some of its psychometric characteristics. Internal consistency was very high ($\alpha = .92$). The average item-total correlation was .59, ranging from .23 to .75. Content validity was assessed using ratings by six advanced doctoral students with specialized training and experience in DBT. All had completed a one-semester graduate-level DBT seminar taught by a certified DBT therapist who had completed the 80-hour DBT intensive training offered by Linehan and her senior colleagues. In addition, all were currently leading DBT skills group or seeing a DBT client individually under the supervision of the certified DBT therapist. They were provided with the EV-child items and instructions that included a brief reminder of Linehan's (1993) definition of emotional vulnerability in childhood. They were asked to rate the extent to which each item was consistent with this construct, as well as the overall quality of the item, on a 4-point Likert-type scale ranging from 1 (poor) to 4 (excellent). All ratings were anonymous. Mean rating for fit with the construct was 3.44 and the mean rating for item quality was 3.54, suggesting that knowledgable raters found the items to be clear and well written representations of emotional vulnerability in childhood. Finally, as expected, scores on this measure were significantly correlated with current BPD symptoms ($r = .61$, $p < .01$).

HYPOTHESIS 1

The first hypothesis was that thought suppression 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 & Kenny (1986), MacKinnon, Krull, and Lockwood (2000), and Sobel (1982) for examining a mediational hypothesis. Results for emotional vulnerability can be seen in Figure 1a. Childhood emotional vulnerability significantly predicted both BPD symptoms and thought suppression, and thought suppression 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 thought suppression (the mediator variable) was included in the model. To test this, level of BPD symptoms was simultaneously regressed onto emotional vulnerability and thought suppression. As hypothesized, thought suppression remained a significant predictor of BPD symptoms over and above emotional vulnerability. Additionally, consistent with the prediction of mediation, the predictive utility of emotional vulnerability for BPD symptoms was decreased (beta dropped from .61 to .39) with the inclusion of thought suppression in the model. A *t*-test (MacKinnon et al., 2000) showed that this drop in the regression coefficient was not significant, $t\ (103) = 1.28$, $p > .05$. However, a Sobel test of the indirect path between emotional vulnerability and BPD symptoms (through thought suppression) was significant ($z = 7.72$, $p < .01$). These results provide mixed support for the hypothesis that thought suppression mediates the relationship between childhood emotional vulnerability and adult BPD symptoms.

The above steps were repeated to test the hypothesis that thought suppression mediates the relationship between invalidation in childhood and BPD symptoms. Results can be seen in Figure 1b. As expected, an invalidating childhood environment is a significant predictor of both BPD symptoms and thought suppression. When level of BPD symptoms was simultaneously regressed onto both invalidating environment and thought suppression, invalidating environment was no longer a significant predictor of BPD symptoms (beta dropped from .24 to .02) , whereas thought suppression remained a significant predictor of BPD symptoms. A t-test confirmed that this drop in predictive utility for invalidating environment was significant, $t\ (103) = 1.79$, $p < .05$. This finding suggests that thought suppression fully mediates the relationship between invalidating environment and BPD symptoms. The Sobel test of the indirect path between invalidating environment and BPD symptoms (through thought suppression) was also significant ($z = 3.50$, $p < .05$), which provides further

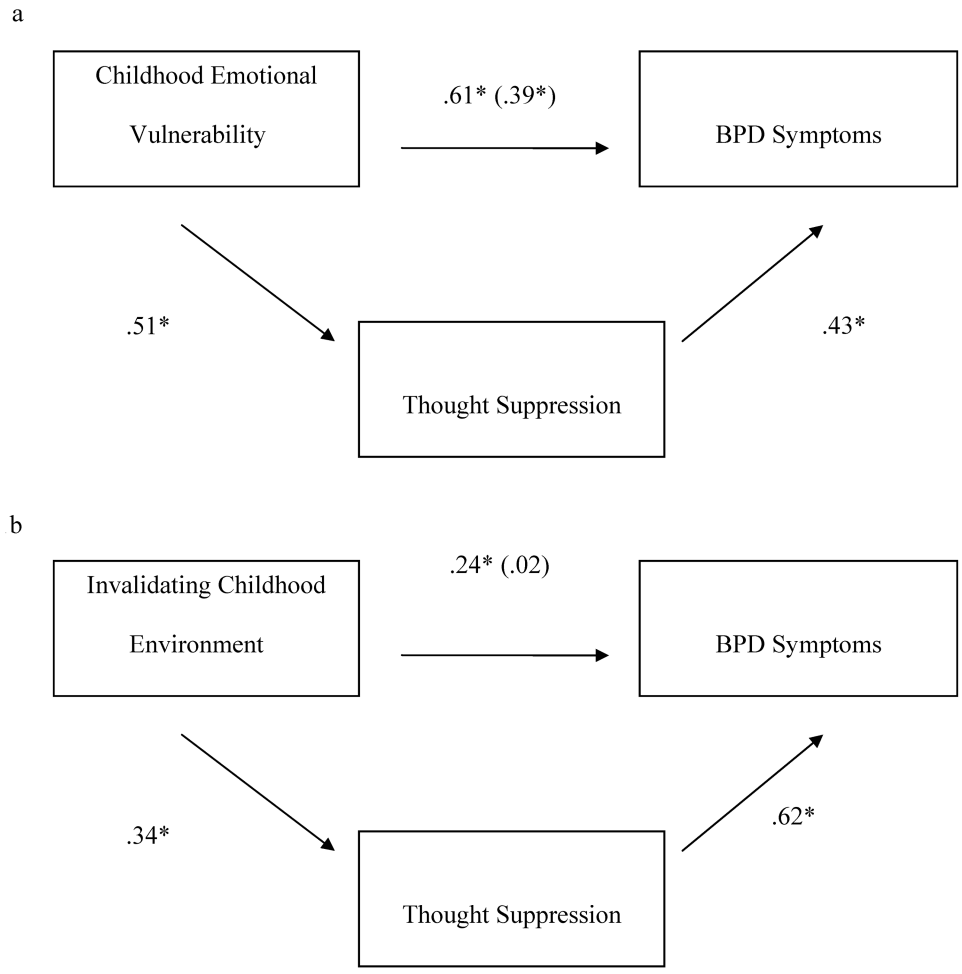

FIGURE 1. Test of mediation by thought suppression of the relationship between childhood emotional vulnerability and BPD symptoms (Figure 1a) and between childhood invalidating environment and BPD symptoms (Figure 1b). All values are beta coefficients. The value in parentheses shows the relationship between the independent variable and BPD symptoms when the mediator is included in the model.

support for the hypothesis that thought suppression mediates the relationship between invalidating environment and BPD symptoms. These findings are consistent with the findings of Cheavens et al. (2005) and Rosenthal et al. (2005).

HYPOTHESIS 2

The second hypothesis was that fear of emotion would mediate the relationship between the biosocial precursors and thought suppression. Each of the biosocial precursors again was examined separately. Results for

emotional vulnerability can be seen in Figure 2a. Emotional vulnerability was a significant predictor of both fear of emotions and thought suppression. When level of thought suppression was simultaneously regressed onto emotional vulnerability and fear of emotions, fear of emotions remained a significant predictor of thought suppression, whereas the predictive utility of emotional vulnerability was largely reduced (beta dropped from .51 to .21). The t test confirmed that this drop in predictive utility was significant, t (103) = 18.8, $p < .05$. Additionally, the Sobel test of the indirect path between emotional vulnerability and thought suppression

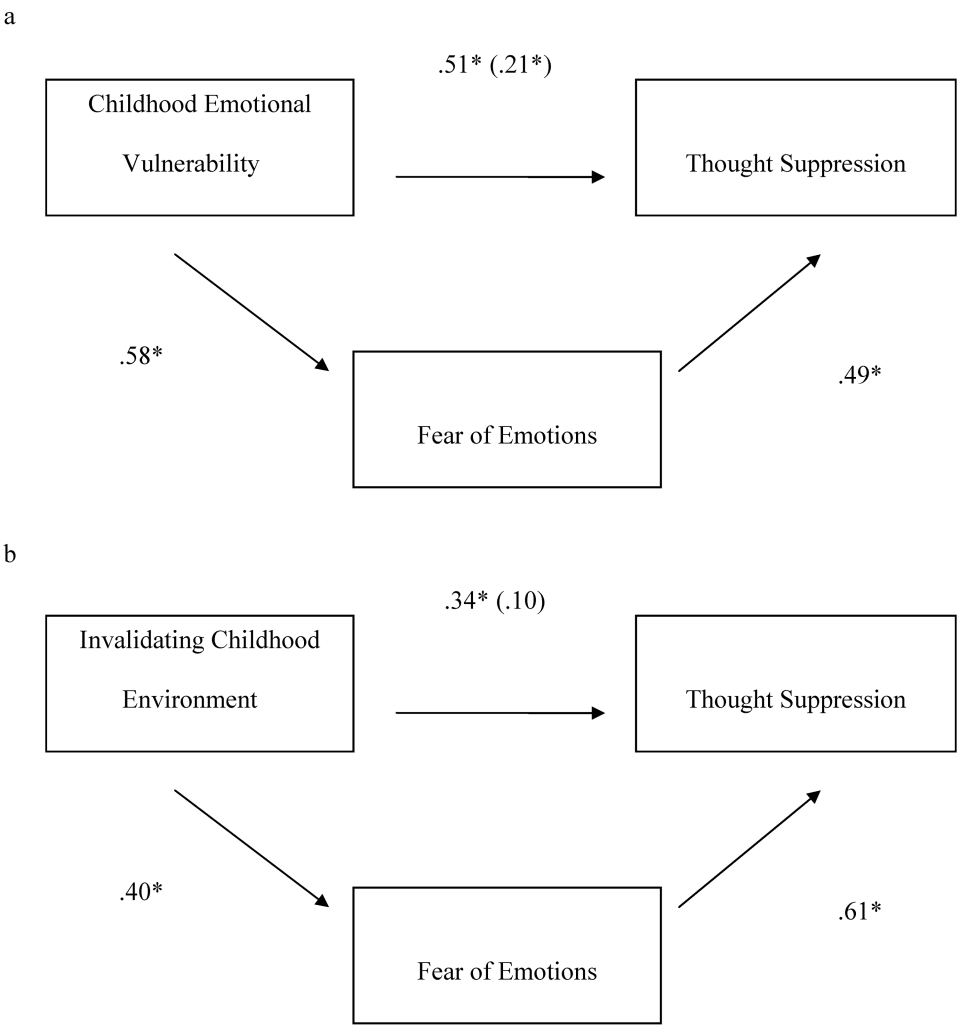

FIGURE 2. Test of mediation by fear of emotions of the relationship between childhood emotional vulnerability and thought suppression (Figure 2a) and between childhood invalidating enviornment and thought suppression (Figure 2b). All values are beta coefficients. The value in parentheses shows the relationship between the independent variable and thought suppression when the mediator is included in the model.

(through fear of emotions) was significant ($z = 4.71$, $p < .05$). These findings suggest that fear of emotions partially mediates the relationship between childhood emotional vulnerability and thought suppression.

The above steps were repeated to test this hypothesis for the other biosocial precursor (invalidating childhood environment). Results can be seen in Figure 2b. Invalidating environment was a significant predictor of both thought suppression and fear of emotions. When thought suppression was simultaneously regressed onto invalidating environment and fear of emotions, fear of emotions remained a significant predictor of thought suppression, whereas invalidating environment was no longer a significant predictor (beta dropped from .34 to .10). The t test revealed that this reduction in the regression coefficient was significant, $t(103) = 22.5$, $p < .05$. Further, the Sobel test of the indirect path between invalidating environment and thought suppression (through fear of emotions) was significant ($z = 3.8$, $p < .05$). These findings suggest that fear of emotions fully mediates the relationship between invalidating environment and thought suppression.

Overall, these findings are consistent with the hypothesis that the biosocial precursors lead to fear of emotion, which in turn encourages thought suppression, which contributes to BPD symptoms. However, because all data were collected at a single time point, alternative models are possible. For example, fear of emotion may contribute directly to the severity of BPD symptoms, independently of its relationship with thought suppression. We tested this idea by conducting two additional regression analyses (one for each biosocial precursor) in which thought suppression, fear of emotion, and the biosocial precursor were entered simultaneously as predictors of BPD symptoms. Results can be seen in Figures 3a and 3b. Results show that thought suppression and fear of emotion contribute significantly and independently to both of the proposed mediational relationships. In each case, the regression coefficient for the relationship between the IV and DV drops significantly when the proposed mediators are included in the model, although for childhood emotional vulnerability the coefficient remains significant, suggesting only partial mediation. Thus, these findings suggest that the biosocial precursors (childhood emotional vulnerability and invalidating environment) contribute to both fear of emotion and thought suppression. Although fear of emotion can lead to thought suppression (Figures 2a and 2b) both variables also have direct relationships with BPD symptoms, suggesting that both variables are important in explaining how Linehan's (1993) biosocial precursors lead to BPD symptoms.

DISCUSSION

The current study had two main goals. The first goal was to replicate the findings of Cheavens et al. (2005) and Rosenthal et al. (2005) using a measure of emotional vulnerability that assesses this constructs in childhood, and a measure of a childhood invalidating environment that focuses spe-

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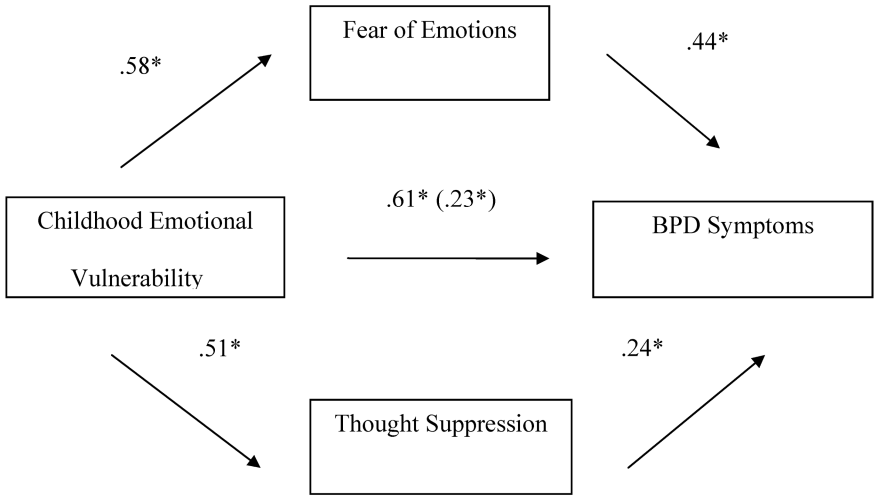

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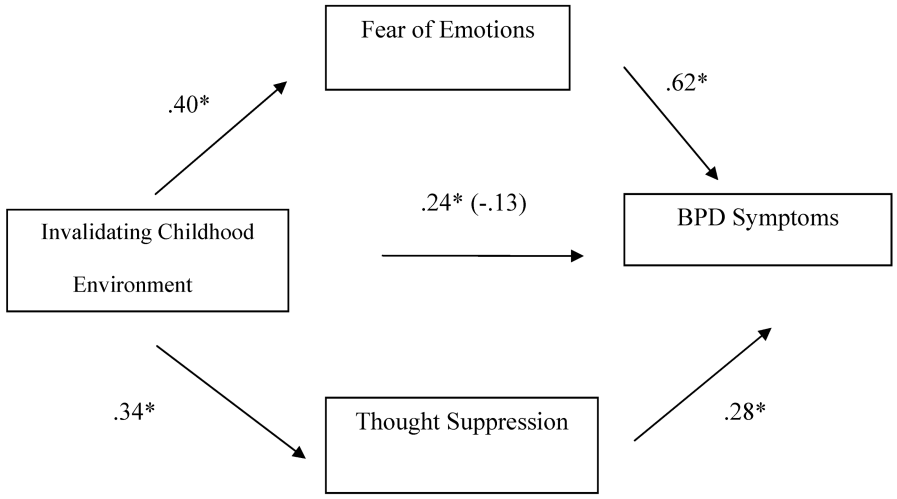

FIGURE 3. Test of mediation by thought suppression and fear of emotions of the relationship between childhood emotional vulnerability and BPD symptoms (Figure 3a) and childhood invalidating environment and BPD symptoms (Figure 3b). All values are beta coefficients. The value in parentheses shows the relationship between the independent variable and BPD symptoms when the mediators are included in the mode.

cifically on emotional invalidation. The measures used in the current study, though not without limitations that will be discussed later, provided a preliminary test of thought suppression as a mediator between both *childhood* emotional vulnerability and emotional invalidation (central constructs in Linehan's biosocial theory) and BPD symptoms. Consistent with

the findings of Cheavens et al.'s (2005), the current results showed that thought suppression fully mediated the relationship between invalidating environment and symptoms of BPD. There was mixed support for thought suppression as a mediator in the relationship between emotional vulnerability and BPD symptoms. Continuity between childhood emotional vulnerability and current affective instability may account for why emotional vulnerability remained a significant predictor of BPD symptoms when thought suppression was included in the model.

This study also expanded upon previous findings by exploring a possible mechanism through which the biosocial precursors of BPD may lead individuals to engage in thought suppression. Given that a core component of an invalidating environment is criticism by caretakers of the individual's emotional expression, it seemed likely that those who have experienced such an environment would develop the belief that their thoughts and emotions are truly dangerous or harmful. Further, given that emotionally vulnerable individuals are highly reactive, experience intense emotions and a slow return to baseline levels of arousal, it seems likely that they may come to fear losing control of their emotions. Results were generally consistent with the hypothesis. Fear of emotions partially mediated the relationship between emotional vulnerability and thought suppression and completely mediated the relationship between an invalidating childhood environment and thought suppression, suggesting that both of the biosocial precursors of BPD may lead individuals to fear their emotions, making them more likely to use thought suppression as an emotion regulation strategy. Findings also suggested that fear of emotion may have a direct effect on BPD symptoms that is not mediated by increased thought suppression. These findings lend support to the clinical utility of the mindfulness component of dialectical behavior therapy (DBT; Linehan, 1993), which is believed to encourage decentering from thoughts and reducing fear of affect. Decentering refers to the ability to differentiate thoughts from facts, which reduces the believability of thoughts and increases willingness to allow thoughts to come and go, rather than attempting to suppress or avoid them. Similarly, reduced fear of emotions is believed to lead to reductions in maladaptive behaviors whose function is avoidance of negative affect.

A few limitations to our methodology must be considered. First, because the measures of childhood invalidation and emotional vulnerability were retrospective, they should be interpreted cautiously. Additionally, our measure of childhood emotional vulnerability had been adapted from an existing measure for use in the present study. While this practice is not ideal, it is important to note that no questionnaire assessing Linehan's conception of emotional vulnerability (in childhood) was found in the literature and our adaptation from the AIM may represent a useful first step in assessing this construct. Although further validation of this questionnaire is necessary, our preliminary findings appear promising. A similar point can be made about our measure of childhood emotional invalidation.

Although this measure has received good support for its reliability and validity in a previous study (Krause et al., 2002), additional validation of this instrument is needed. Another limitation is the study's small sample size. Though a power analysis revealed adequate power to detect small to moderate effects, future research should use larger samples in order to test the proposed relationships using structural equation modeling.

Overall, the current study contributes to the BPD literature in several ways. First, it provided some support for the mediating role of thought suppression, a common avoidant coping strategy, in the relationship between Linehan's (1993) proposed biosocial precursors and BPD symptoms. As expected, thought suppression mediated the relationship between invalidating environment and BPD symptoms. Second, it provided and tested a preliminary hypothesis about why the biosocial precursors may lead to thought suppression, suggesting that fear of emotions may lead individuals who have experienced high levels of the biosocial precursors to suppress their thoughts. It also provided support for Linehan's (1993) contention that individuals with BPD symptoms tend to be fearful of their emotions, and suggested that in combination with the biosocial precursors this fear may contribute to the development of BPD symptoms.

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