


Validation of Measures of Biosocial Precursors to Borderline Personality Disorder: Childhood Emotional Vulnerability and Environmental Invalidation

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Abstract

Linehan's biosocial theory suggests that borderline personality disorder (BPD) results from a transaction of two childhood precursors: emotional vulnerability and an invalidating environment. Until recently, few empirical studies have explored relationships between these theoretical precursors and symptoms of the disorder. Psychometrically sound assessment tools are essential to this area of research. The present study examined psychometric characteristics of recently developed self-report measures of childhood emotional vulnerability and parental invalidation. A large sample of undergraduates completed these measures; parent reports were collected to examine agreement between young adults' and parents' recollections of their emotional style in childhood and the parenting they received. Both measures were internally consistent, showed clear factor structures, and were significantly correlated with BPD features and related constructs. In addition, both showed modest, yet significant agreement between participants' and parents' reports. Overall, this study supports the utility of these measures of childhood emotional vulnerability and environmental invalidation.

Keywords

borderline personality disorder, childhood emotional vulnerability, invalidating environment, assessment

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 two biosocial precursors: 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 criticize, trivialize, and punish the child's communication of internal experiences (thoughts and feelings) and attribute these thoughts and feelings to undesirable traits, such as laziness or immaturity. A biological predisposition for affective instability, also known as emotional vulnerability, refers to heightened sensitivity to emotional stimuli, particularly for negative events, high emotional intensity, and a slow return to emotional baseline.

Several studies have suggested that both emotional vulnerability and an invalidating environment are related to levels of BPD symptoms. In a large sample of undergraduate students, Cheavens et al. (2005) found that negative affect intensity, as measured by subscales of the Affect Intensity Measure (AIM; Bryant, Yarnold, & Grimm, 1996)

was significantly correlated with impulsivity and interpersonal problems. Perceived parental criticism was used as a measure of childhood invalidation and was also significantly correlated with BPD features. Rosenthal, Cheavens, Lejuez, and Lynch (2005) found that negative affect intensity (also measured with the AIM) and childhood sexual abuse (which in Linehan's [1993] theory is conceptualized as an extreme form of invalidation) both significantly predicted BPD diagnostic criteria on the structured clinical interview for *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV)* personality disorders (First et al., 1997). Yen, Zlotnick, and Costello (2002) also reported that negative affect intensity is significantly correlated with BPD traits.

Although these findings provide encouraging support for elements of Linehan's (1993) biosocial theory of BPD,

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a potential limitation of these studies is that emotional vulnerability has often been assessed with the AIM (Bryant et al., 1996), which asks respondents about their *current* levels of emotional reactivity and intensity of negative affect. This is problematic for two reasons. First, when discussing the origins of BPD symptoms, Linehan's biosocial theory stresses the importance of emotional vulnerability in childhood. Second, using a measure of current affect intensity as a predictor of BPD symptoms might lead to inflated relationships, because current affect intensity is considered a central feature of BPD symptoms. In an attempt to address these concerns, Sauer and Baer (2009) created the Emotional Vulnerability–Child scale (EV-Child) by making modifications to the AIM. Items were reworded to reflect childhood tendencies and several new items were added to reflect the slow-return-to-baseline component of Linehan's (1993) definition of emotional vulnerability. In a large student sample selected to include a wide range of BPD symptoms, internal consistency and item-total correlations for this measure were high. Raters with training in Linehan's model of BPD found the items to be clear and well-written representations of emotional vulnerability in childhood as defined by this model, and scores on this measure were significantly correlated with current levels of BPD symptoms. However, more validation of this measure is needed. In particular, although items were written to capture the three elements of Linehan's model of emotional vulnerability (sensitivity, intensity, and slow return to baseline), the factor structure of the instrument has not been examined. Furthermore, because the reliability of retrospective reports of childhood characteristics is difficult to evaluate, relationships between self- and parent reports should be studied. The first goal of the current study, therefore, was to further evaluate the psychometric properties of the EV-Child, which has potential utility for future research on childhood precursors of BPD.

Similar issues can be raised about the methodology used in previous studies to assess invalidating childhood environment. To assess whether participants experienced an invalidating environment, Cheavens et al. (2005) used the Parental Criticism subscale of the Multidimensional 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 issue in invalidation as defined by Linehan's (1993) biosocial theory of BPD. Although some studies have assessed childhood sexual abuse (CSA) as a measure of invalidation (Rosenthal et al., 2005), such measures do not capture the breadth of the construct, as invalidation can occur in the absence of sexual abuse.

A promising approach to assessing childhood invalidation was proposed by Krause, Mendelson, and Lynch (2003) who developed the Socialization of Emotion Scale (SES) by making adaptations to the Coping with Children's Negative Emotions Scale (CCNES; Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). The CCNES asks parents of young children to report on how they respond to their children's displays of negative emotions in a variety of commonplace situations and has been shown to have good reliability and validity (Fabes et al., 2002). The adaptation by Krause et al. uses the same items but asks adults to report retrospectively on their parents' typical responses to their childhood displays of negative emotion. It provides six 12-item subscales, three of which are very similar to invalidation as defined by Linehan (1993). These include distress reactions (becoming angry, anxious, or upset when the child expresses negative affect), punitive reactions (punishing the child to reduce the parent's exposure to the child's negative affect), and minimization reactions (devaluing or trivializing the child's problem or distressful reaction). The other three subscales represent more positive, supportive responses to children's emotions: expressive encouragement (encouraging the child to express his or her feelings), emotion-focused reactions (soothing, distracting), and problem-focused reactions (problem solving to improve the situation). Krause et al. (2003) reported that the invalidation subscales were internally consistent and significantly correlated with current emotional inhibition and psychological distress. However, Krause et al. were studying depression and anxiety and did not examine BPD symptoms. They also did not examine the emotionally supportive subscales of the SES. Sauer and Baer (2009) used Krause et al.'s adaptation and found that it was significantly correlated with current BPD symptoms. However, they neither investigated the supportive subscales of the SES nor did they examine its factor structure or agreement between self- and parent reports. The second goal of the current study, therefore, was to extend previous work on the SES as a measure of childhood invalidation.

Thus, the present study expanded on previous findings in several ways. First, we examined the factor structure of both the EV-Child and the SES. We had no strong a priori predictions about the factor structure of either instrument. Although the EV-Child items appear to capture emotional sensitivity, intensity, and slow return to baseline, it is not clear that these constitute distinct factors. The SES was originally written to contain six subscales but has never been factor analyzed at the item level. Therefore, our analyses were exploratory. Second, we examined the convergence between self-report and other-report versions of these measures. In other contexts, the literature on the agreement between parent and child ratings suggests correlations ranging from .20 to .70 for current behavior (Baldwin & Dadds,

2007; Klassen, Miller, & Fine, 2006; Rey, Schrader, & Morris-Yates, 1992). In the present study, both parent and child were providing retrospective accounts. Therefore, we expected correlations in the lower end of this range. Third, although Sauer and Baer (2009) reported that both the EV-Child and SES were related to BPD features, they did not control for general distress, which is typically high in BPD. Therefore, we included a measure of general distress and predicted significant correlations after controlling for distress. Fourth, we conducted a preliminary assessment of discriminant validity by examining relationships between the EV-Child, the SES, and features of schizotypal personality disorder, an Axis II condition with largely dissimilar symptoms and different theories of etiology from BPD (Raine, 2006). Thus, we predicted that the precursors described by Linehan (1993) would be more strongly related to BPD features than to schizotypal features. Finally, we included measures of two cognitive and emotional processes shown in previous research to be related to BPD symptoms (Cheavens et al., 2005; Rosenthal et al., 2005; Sauer & Baer, 2009). Thought suppression is an avoidant coping strategy that involves deliberate attempts to reduce the frequency and intensity of unpleasant, emotion-inducing cognitions by keeping them out of awareness. It is correlated with deliberate self-harm (Bowen, Witkiewitz, Dillworth, & Marlatt, 2007; Najmi, Wegner, & Nock, 2007), which is conceptualized as an extreme form of avoidant coping common in BPD (Chapman, Gratz, & Brown, 2006; Linehan, 1993; Nock & Prinstein, 2004). Second, fear of emotion involves worries and anxiety about losing control of emotion and engaging in maladaptive behavior. It is expected to be high in persons with BPD because they have repeatedly been told that their emotions are inappropriate and have been punished for expressing them.

Method

Participants

A total of 519 undergraduates (336 female) were recruited from an Introduction to Psychology course. Participants volunteered for this study via an online experiment registration site. The first 177 participants were directed large group data collection sessions in a university classroom. The next 342 participants were sent a link to an online survey. Participants' ages ranged from 18 to 31 years with a mean age of 19.11 years. The sample was 90% Caucasian, 6% African American, and 4% other ethnicities.

The 177 participants in the group data collection sessions were asked to provide mailing addresses for their primary caregivers, who were sent questionnaire packets to complete and return. A total of 104 parent questionnaires (92 female respondents) were returned (return rate = 59%

of 177 packets sent out). The responding caregivers' ages ranged from 35 to 73 years with a mean age of 48.05 years. The majority of the respondents were biological parents (101), while there was one stepparent, one adoptive parent, and one grandparent. The caregiver sample was 95% Caucasian and 5% African American. Caregivers were also asked to indicate the highest level of education they had attained; 3% of the caregiver sample had completed some high school, 8% had attained a high school diploma, 37% had taken some college courses, 30% had attained a bachelor's degree, 6% had completed some graduate work, and 16% had attained a graduate degree.

Because the goal of the present study was to examine psychometric properties of measures of Linehan's (1993) theoretical precursors to BPD, it is important to justify using an undergraduate sample. 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). In our sample, 17.1% scored above 65T on the borderline features scale of the Personality Assessment Inventory (PAI-BOR; Morey, 1991), suggesting that an adequate range of BPD symptoms was represented.

Measures

Childhood emotional vulnerability: Self-report. As noted earlier, Sauer and Baer (2009) developed this measure by making modifications to the AIM (Bryant et al., 1996). The AIM includes a six-item negative intensity scale assessing the tendency to have intense experiences of negative emotions, and a six-item negative reactivity scale assessing the tendency to become easily disturbed by emotional events. Bryant et al. (1996) reported internal consistencies (coefficient alpha) of .70 and .66 for these subscales, respectively. Sauer and Baer reworded the items slightly to reflect childhood tendencies rather than current patterns. An item about speaking to groups was deleted. To increase internal consistency and broaden the range of emotions addressed, Sauer and Baer added several similar items, such as "(in childhood) when I got angry it was a very intense anger." Items addressing Linehan's (1993) concept of slow return to baseline were also added; for example, "when I got upset, I stayed upset for quite a while." The following instructions were provided:

Table 1. Example Items From the Socialization of Emotion Scale

Item Content	Scale
If I became angry because I was hurt or sick and couldn't go to a friend's birthday party, my caretaker would:	
a. get angry at me	Distress reaction
b. tell me not to make a big deal out of missing the party	Minimization reaction
c. help me think of ways I could still be with my friends	Problem-focused reaction
d. soothe me and do something fun with me to make me feel better	Emotion-focused reaction
e. tell me it's OK to cry when I feel unhappy	Expressive encouragement
f. send me to my room to calm down	Punitive reaction

Below are some statements about your emotional style when you were a child. Please think back to your childhood (before the age of 12 years). Read each statement and rate how much it applied to you, when you were a child, using the following scale.

Respondents use a 6-point Likert-type scale (1 = *never*, 6 = *always*) to rate how much each item described their functioning during childhood. Sauer and Baer (2009) reported that the 22-item EV-Child showed high internal consistency ($\alpha = .92$). The average item-total correlation was .59, ranging from .23 to .75. The EV-Child also was significantly correlated with self-reported BPD symptoms. The present study expanded on these previous findings by examining the factor structure of the EV-Child as well as relationships between self-reports and parent reports. Psychometric properties of this measure in the current sample will be presented in the results section.

Childhood emotional vulnerability: Parent report. The parent version of the EV-Child was created by replacing first-person pronouns (I, me, my) with "my child." For example, "My emotions tended to be more intense than those of most children" was reworded to "My child's emotions tended to be more intense than those of most children." Parents used the same 6-point Likert-type scale to rate how well each item applied to their child before the age of 12 years.

Childhood invalidation: Self-report. As noted earlier, the SES (Krause et al., 2003) asks adults to report retrospectively on their parents' typical responses to their childhood displays of negative affect in a variety of commonplace situations. It contains six 12-item subscales, three consistent with invalidation as described by the biosocial theory of BPD (distress reactions, punitive reactions, and minimization reactions) and three representing validating or supportive responses (expressive encouragement, emotion-focused reactions such as soothing and distracting, and problem-solving reactions). Example items can be seen in Table 1. Using a 7-point Likert-type scale, respondents are asked to rate the extent to which each statement reflects how their parents typically responded to their emotional expressions as a child. They complete each item twice to rate both their mother's and father's behavior.

Childhood invalidation: Parent report. As noted earlier, the CCNES (Fabes et al., 2002), asks parents to report on how they respond to their children's displays of negative emotions. Fabes et al. (2002) reported that internal consistency for the subscales is adequate to good ($\alpha = .70, .69, .78, .85, .80, \text{ and } .78$, respectively). They also found that the invalidating subscales were either unrelated to or negatively correlated with the validating subscales. Because the CCNES was used to develop the SES (Krause et al., 2003), the two measures are identical, except that CCNES asks parents to reflect on their own responses to their children and the SES asks adults to reflect on how their parents responded to them. Respondents are asked to rate the extent to which each statement reflects how they responded to their children's emotional expressions (when their child was young) on a 7-point Likert-type scale.

BPD symptoms. The PAI-Borderline Features Scale (PAI-BOR; Morey, 1991) taps 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." The PAI-BOR total score and subscales demonstrated adequate internal consistency in the present sample (total $\alpha = .81$, affective instability $\alpha = .82$, negative relationships $\alpha = .72$, identity problems $\alpha = .69$, and self-injury $\alpha = .71$).

Thought suppression. The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) is a 15-item Likert-type scale assessing the general tendency to suppress thoughts. The authors indicated that the scale has good internal consistency ($\alpha = .89$) 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." The WBSI demonstrated good internal consistency in the present sample ($\alpha = .90$).

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 ($\alpha = .94$) and adequate to high for the subscale scores ($\alpha = .72, .91, .89$, and $.84$, respectively). Test–retest reliability was also acceptable ($r = .78$). Internal consistency in the present sample for the ACS total score was good, ($\alpha = .89$).

Psychological distress. The Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995) was used to assess general psychological distress. The DASS is composed of 42 items assessing negative emotional symptoms and yields three subscale scores for depression, anxiety, and stress. The subscales have shown good internal consistency (alpha coefficients ranging from $.81$ to $.91$), correlations with the Beck Depression Inventory (BDI; Beck & Steer, 1987) ranging from $.58$ to $.74$, and correlations with the Beck Anxiety Inventory (BAI; Beck & Steer, 1990) ranging from $.54$ to $.81$ (Lovibond & Lovibond, 1995). Internal consistency for the DASS total score in the current study was good ($\alpha = .93$).

Schizotypal features. The Coolidge Axis II Inventory (CATI; Coolidge & Merwin, 1992) provides self-report personality pathology measures composed of items consistent with *DSM* criteria for 13 personality disorders. This measure was normed on a nonclinical population because the developers have proposed that personality pathology can be conceptualized on a continuum that ranges from adjustment to impairment. The schizotypal personality disorder scale consists of 22 items in which participants are asked to rate the extent to which each item describes them on a 4-point Likert-type scale. Examples of items include “people may consider my behavior or appearance odd, unusual, or eccentric” and “I neither desire nor enjoy close relationships.” Internal consistency in the current study was good ($\alpha = .84$).

Procedure

Participants volunteered for this study in exchange for credit in an undergraduate psychology class; they initiated participation by signing up using an online registration system. The first 177 participants were directed to a university classroom for 1-hour group sessions of about 50 people. The rest were sent a link to an online survey. After providing informed consent, participants completed all the questionnaires just described, except that participants in the group data collection sessions did not complete the CATI and the DASS. They also were asked to provide the name and address of the individual(s) who had been their primary caregiver(s) while they were growing up. Packets containing

a cover letter, demographic form, and the parent versions of the EV-Child and CCNES, as well as an addressed and stamped envelope in which to return the questionnaire packet, were mailed to caregiver households. The cover letter instructed the parent who had been the primary caregiver to complete the questionnaire packet and return it to the experimenters. All parent data were matched to student data using precoded participant numbers. No identifying information was recorded on any of the questionnaires.

Results

Psychometric Properties of the Emotional Vulnerability–Child Scale

Factor structure and reliability. To examine the factor structure of the EV-Child, students’ responses to the 22 items were subjected to an exploratory factor analysis (EFA) using principle axis factoring with oblique rotation to allow for correlations among the factors. Results of the initial EFA yielded five factors with eigenvalues greater than 1.0 and accounting for 53.82% of the total variance. The last three factors had two or fewer items with loadings greater than $.40$ and therefore did not seem meaningful. The scree plot suggested that a one- or two-factor solution would be more plausible. Floyd and Widaman (1995) argued that the scree plot is a more useful guide to the number of factors to retain, as use of eigenvalues greater than 1.0 can lead to overestimation of the number of meaningful factors. Therefore, a second EFA was conducted, this time specifying that two factors should be derived. All but one of the 22 items had high loadings ($>.40$) on Factor 1. Three of the 22 items had high factor loadings on Factor 2; however two of these items also loaded highly on Factor 1. Only one item loaded uniquely on Factor 2. Item content of the two factors could not be intelligibly distinguished. Therefore, an additional EFA was conducted, specifying that a single-factor solution be derived. Twenty-one of the 22 items had loadings of greater than $.40$ on this single factor, which accounted for 34.41% of the variance. These items are listed in Table 2. The remaining item was dropped from subsequent analyses because of its lower loading on this factor. The resulting 21-item EV-Child demonstrated good internal consistency (Cronbach’s $\alpha = .91$). The mean interitem correlation was $.31$, which is consistent with the range recommended by Clark and Watson (1995) and suggests little redundancy in the items.

Relationships between EV-Child and BPD symptoms and other variables. Descriptive statistics as a function of participant (student) gender can be seen in Table 3. Female students rated themselves as significantly more emotionally vulnerable as children than did male students ($F = 6.90$, $p < .01$); however, this difference was small ($d = 0.29$) and there were no other significant differences on variables of

Table 2. Items and Factor Loadings for the Emotional Vulnerability–Child Scale

Item	Factor Loading
18. When I got upset, I stayed upset for quite awhile	.74
6. When I felt sad, this emotion was very strong	.72
13. Things that seemed minor in others caused strong negative emotions in me	.71
22. It took me a long time to calm down after getting upset about something	.69
9. People who knew me would have said that I got upset very easily	.69
20. My negative emotions were long-lasting	.68
16. I was easily bothered by things that others just brushed off or ignored	.65
4. People who knew me would have said I was emotional	.65
7. When I felt anxiety, it was a very strong feeling	.63
5. Sad stories, TV shows, or movies deeply affected me	.59
1. My emotions tended to be more intense than those of most children	.58
10. If things didn't go my way, I got quite distressed	.57
3. When I got angry, it was a very intense anger	.52
12. Seeing something violent or scary in a book, TV show, or movie made me very upset	.51
14. In scary situations, I got more scared than most other children	.50
15. When I felt guilty, this emotion was quite strong	.50
19. When I was nervous I got shaky all over	.48
17. When I did something wrong, I had strong feelings of guilt or shame	.46
11. People who knew me would have said that I was a tense or high-strung child	.44
21. When I tried something new for the first time, I got shaky all over	.43
8. The sight of someone who was hurt affected me strongly	.41
Dropped item	
2. I felt pretty bad when I did something wrong, like tell a lie	.19

interest. Therefore, remaining analyses were conducted with both genders combined. Correlations between the EV-Child and other variables are shown in the first column of Table 4. The EV-Child was significantly positively correlated with the total BPD symptoms score. Because current BPD symptoms include affective instability (which is a similar construct to emotional vulnerability), it was important to examine whether the relationship between childhood emotional vulnerability and BPD symptoms was a function of the construct overlap between childhood emotional vulnerability and the current affect instability subscale of the PAI-BOR. Examination of the correlations between the EV-Child and the subscales of the PAI-BOR suggest that childhood emotional vulnerability is significantly positively

Table 3. Means (*M*) and Standard Deviations (*SD*) of Study Variables (as Reported by Student Participants) as a Function of Student Gender

	Female Students		Male Students	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
EV-Child	62.45	15.12	58.18	13.76
SES invalidation mother	42.21	15.41	46.07	15.11
SES invalidation father	44.00	17.93	52.97	17.79
SES validation mother	83.20	21.20	72.67	17.75
SES validation father	75.99	24.44	63.72	17.89
BPD symptoms (PAI)	61.80	9.21	62.32	8.04
General distress (DASS)	32.74	10.66	33.51	10.35
Schizotypal features (CATI)	40.50	9.06	42.78	8.07
Thought suppression (WBSSI)	48.27	12.18	49.28	11.04
Fear of emotions (ACS)	134.75	31.10	136.25	29.84

Note. EV-Child = Emotional Vulnerability–Child Scale; SES = Socialization of Emotion Scale; BPD = borderline personality disorder; PAI = Personality Assessment Inventory; DASS = Depression Anxiety Stress Scales; CATI = Coolidge Axis II Inventory; WBSSI = White Bear Suppression Inventory; ACS = Affective Control Scale.

Table 4. Correlations Between Childhood Emotional Vulnerability, Parental Invalidation, and Other Variables (as Reported by Student Participants)

	Emotional Vulnerability	Total Invalidation	Total Validation
PAI-BOR total	.48**	.30**	-.25**
PAI-BOR affective instability	.50**	.25**	-.31**
PAI-BOR negative relationships	.38**	.23**	-.18**
PAI-BOR identity problems	.34**	.17**	-.18**
PAI-BOR self-harm	.15*	.21**	.02
Thought suppression	.29**	.22**	-.10
Fear of emotions	.53**	.34**	-.25**
DASS total	.46**	.31**	-.27**
Schizotypal PD	.31*	.35**	-.30**
Emotional vulnerability	—	.18**	-.15*

Note. PAI-BOR = Personality Assessment Inventory–Borderline Features Scale; DASS = Depression Anxiety Stress Scales; PD = personality disorder.

p* < .05. *p* < .01.

related to negative relationships, identity problems, and self-harm, as well as affect instability. Additionally, the EV-Child was significantly positively correlated with thought suppression and fear of emotions, as expected.

Discriminant validity of the EV-Child was explored in a preliminary way by examining its relationships with

schizotypal features (CATI) and with general psychological distress (DASS). The EV-Child was significantly correlated with general distress (see Table 4). It was therefore important to examine whether the relationship between the EV-child and BPD symptoms is unique or can be attributed to general distress, which is often high in BPD. The partial correlation between the EV-Child and BPD features, controlling for the DASS total score, was significant (partial $r = .34$), suggesting that the relationship between childhood emotional vulnerability and current BPD symptoms is not attributable to general distress. This issue was also examined by computing a partial correlation between the EV-Child and general distress (DASS) while controlling for BPD symptoms. The result was nonsignificant (partial $r = .08$), suggesting that childhood emotional vulnerability is uniquely related to BPD symptoms. A different pattern was found for the relationship between the EV-Child and schizotypal features. Although the EV-Child was significantly correlated with schizotypal features at the zero-order level (see Table 4), a partial correlation, controlling for general distress, was nonsignificant (partial $r = .06$). This suggests that childhood emotional vulnerability is not uniquely related to schizotypal features, but that this relationship is attributable to general distress. In combination, these analyses indicate that, after controlling for general distress, childhood emotional vulnerability (as measured by the EV-Child) has a significant relationship to current BPD features but not to schizotypal features. These findings provide preliminary support for a specific relationship between the EV-Child and BPD features, although other disorders must be examined.

Relationship between EV-Child self-report and parent-report versions. The parent version of the EV-Child that was used in the following analyses included the same 21 items as the self-report EV-Child described above. Internal consistency for the 21-item parent version was high ($\alpha = .91$). Self-report and parent-report versions of the EV-Child were significantly correlated ($r = .27, p < .05$). Parent ratings did not differ as a function of the child's gender ($F = 0.68, p = .41$). To investigate whether level of current BPD symptoms is a moderator of the convergence between parent and student perceptions of childhood emotional vulnerability, correlations between parent and student reports were examined separately for students with high and low levels of BPD symptoms. The agreement between parent and self-reports for students scoring above the mean on BPD symptoms was slightly lower ($r = .14, p > .05$), but not significantly different, than for students scoring below the mean on BPD symptoms ($r = .21, p > .05$). This finding suggests that young adults' reports of their own emotional vulnerability in childhood are modestly consistent with their primary caretakers' retrospective reports of these tendencies, regardless of the presence of current BPD symptoms.

Psychometric Properties of the SES

Factor structure and reliability. To examine the factor structure of the SES, students' responses to the 72 items were subjected to two EFAs (one for ratings of mother behavior and one for ratings of father behavior) using principle axis factoring with oblique rotation to allow for correlations among the factors. Results of the initial EFA for ratings of mother behavior yielded 15 factors with eigenvalues greater than 1.0 and accounting for 57.64% of the total variance. Factors 4 through 15 had very few (0 or 1) items with loadings greater than .40 and therefore did not seem meaningful. The EFA for father behavior yielded 11 factors with eigenvalues greater than 1 and collectively representing 61.42% of the variance. As with the mother data, Factors 4 through 11 had very few items (0 or 1) with loadings greater than .40 and therefore did not seem meaningful. For both EFAs, the scree plot suggested that a two-factor solution or three-factor solution would be more plausible.

Thus, a second set of EFAs was conducted (one for ratings of mother behavior and one for ratings of father behavior), this time specifying that three factors should be derived. Of the 72 items subjected to the EFA for ratings of mother behavior, 28 items loaded on Factor 1 (loadings of at least .40), 26 items loaded on Factor 2, and 1 item loaded on Factor 3. The three factors accounted for 41.61% of the variance. Of the 72 items subjected to the EFA for ratings of father behavior, 22 items loaded on Factor 1, 27 items loaded on Factor 2, and 12 items loaded on Factor 3; these three factors accounted for 51.34% of the variance. In both EFAs, the content of Factor 1 appeared consistent with validating or supportive parenting and Factor 2 appeared to represent invalidating parenting. Item content of Factor 3 for the ratings of father behavior also appeared to be consistent with validation. Item content between Factor 1 and Factor 3 could not be intelligibly distinguished (the two factors did not correspond to specific subscales of the original SES).

Finally, a third set of EFAs was conducted, specifying that a two-factor solution be derived. A total of 51 of the 72 items for ratings of mother behavior had loadings of greater than .40 on one of the two factors, which together accounted for 34.00% of the variance. In all, 57 of the 72 items for ratings of father behavior had loadings of greater than .40 on one of the two factors, which jointly accounted for 42.87% of the variance. As can be seen in Table 5, the general pattern of factor loadings was very similar for ratings of mother and father behavior. A two-factor solution makes interpretive sense as the items that represent validating parenting grouped on Factor 1 and the items that represent invalidating parenting grouped on Factor 2.

Table 5. Items and Factor Loadings for Two-Factor Solution for Socialization of Emotion Scale

Item	Mother		Father	
	Factor 1	Factor 2	Factor 1	Factor 2
1a	.00	.29	-.18	.36
1b	-.24	.32	-.43	.41
1c	.48	.08	.58	.25
1d	-.08	.35	-.12	.46
1e	.15	.35	.26	.27
1f	.52	.15	.68	.16
2a	-.37	-.15	-.43	-.18
2b	.65	.18	.70	.22
2c	-.30	.49	-.49	.50
2d	.51	.23	.50	.21
2e	.55	.19	.62	.19
2f	-.37	.39	-.49	.43
3a	-.30	.42	-.52	.49
3b	-.34	.47	-.44	.51
3c	.61	.11	.67	.22
3d	.54	.15	.69	.22
3e	.42	.19	.59	.25
3f	-.14	.40	-.33	.52
4a	-.39	.44	-.57	.51
4b	.35	.32	.36	.35
4c	-.18	.41	-.30	.54
4d	-.32	.35	-.48	.49
4e	.71	.17	.77	.25
4f	.67	.20	.71	.26
5a	.65	.22	.74	.31
5b	.69	.21	.73	.30
5c	-.45	.50	-.52	.54
5d	-.42	.55	-.55	.53
5e	-.26	.47	-.18	.41
5f	.44	.16	.48	.35
6a	.73	.16	.77	.20
6b	-.39	.49	-.55	.61
6c	-.45	.48	-.42	.43
6d	-.51	.56	-.60	.56
6e	.35	.39	.39	.35
6f	.69	.16	.57	.40
7a	.76	.19	.61	.35
7b	.71	.16	.63	.34
7c	-.43	-.08	-.35	-.23
7d	-.55	.48	-.54	.46
7e	-.41	.46	-.47	.40
7f	.42	.34	.44	.32
8a	-.14	.29	.06	.29
8b	.14	.30	.26	.25
8c	.10	-.43	-.08	-.17
8d	-.05	.33	-.16	.48
8e	.12	.23	-.03	.34
8f	.22	.25	-.35	.34
9a	.43	.38	.50	.25
9b	-.40	.53	-.50	.49
9c	-.37	.51	-.49	.53
9d	.73	.25	.73	.26

(continued)

Table 5. (continued)

Item	Mother		Father	
	Factor 1	Factor 2	Factor 1	Factor 2
9e	-.54	.46	-.57	.49
9f	.59	.18	.72	.23
10a	-.15	-.08	-.09	-.03
10b	-.37	.49	-.56	.48
10c	-.39	.44	-.56	.50
10d	.75	.21	.79	.31
10e	.73	.15	.75	.30
10f	.61	.25	.75	.31
11a	-.12	.31	-.25	.42
11b	.19	.19	.16	.26
11c	-.44	.46	-.49	.51
11d	.66	.27	.65	.35
11e	.75	.16	.78	.32
11f	.45	.39	.52	.36
12a	.69	.19	.70	.28
12b	.62	.26	.62	.27
12c	.76	.23	.71	.34
12d	-.27	.41	-.34	.40
12e	-.04	.29	-.24	.41
12f	-.41	.42	-.54	.46

Note. Bold indicates factor loading greater than .40.

As described earlier, the SES is composed of 12 scenarios, each of which has 6 subitems to be rated. Scenarios were retained if at least five of the six subitems had a loading of at least .40 on one factor (but not the other factor) for ratings of both mother and father behavior. Six of the 12 scenarios met this criterion. Of these, three retained all six subitems and three retained five of the six subitems. The retained scenarios and items used in subsequent analyses are listed in Table 6. Most of the items with high loadings on Factor 1 had substantially smaller loadings on Factor 2. In contrast, many of the items with high loadings on Factor 2 had similar loadings, but in the opposite direction, on Factor 1. The resulting 6-scenario, 33-item SES demonstrated good internal consistency for each subscale (mother invalidation: $\alpha = .88$, father invalidation: $\alpha = .90$, mother validation: $\alpha = .93$, father validation: $\alpha = .95$). The mean interitem correlations were .31, .42, .41, and .45, respectively, which is consistent with the range recommended by Clark and Watson (1995) and suggests little redundancy in the items. Additionally, scores on the validation and invalidation scales were modestly but significantly negatively correlated for both mother and father reports ($r_s = -.28$ and $-.26$, respectively).

Relationships between SES and other variables. Descriptive statistics for the SES can be seen in Table 3. There were significant differences in total validation and total invalidation scores as a function of student gender, such that female

Table 6. Items Retained for Final Version of Socialization of Emotion Scale

Item
3. If I lost some prized possession and reacted with tears, my caretaker would
a. get upset with me for being so careless and crying
b. tell me that I was over-reacting
c. help me think of places I hadn't looked yet
d. distract me by talking about happy things
e. tell me it's okay to cry when you feel unhappy
f. tell me that's what happens when you're not careful
5. If I was going to spend the afternoon at a friend's house and became nervous and upset because my caretaker couldn't stay there with me, my caretaker would
a. distract me by talking about all the fun I was going to have with my friend
b. help me think of things I could do so that being at the friend's house without him/her wasn't scary (e.g., take a favorite book or toy with me)
c. tell me to quit overreacting and being a baby
d. tell me that if I didn't stop that I wouldn't be allowed to go out anymore
e. feel upset and uncomfortable because of my reactions
f. encourage me to talk about my nervous feelings
7. If I was about to appear in a recital or sports activity and became visibly nervous about people watching me, my caretaker would
a. help me think of things that I could do to get ready for my turn
b. suggest that I think about something relaxing so my nervousness would go away
d. tell me that I was being a baby about it
e. tell me that if I didn't calm down, we'd have to leave and go home right away
f. encourage me to talk about my nervous feelings
9. If I was panicky and couldn't go to sleep after watching a scary TV show, my caretaker would
a. encourage me to talk about what scared me
b. get upset with me for being silly
c. tell me that I was overreacting
d. help me think of something to do so that I could get to sleep
e. tell me to go to bed or I wouldn't be allowed to watch any more TV
f. do something fun with me to help me forget about what scared me
10. If I was at a park and appeared on the verge of tears because the other children were being mean to me and wouldn't let me play with them, my caretaker would
b. tell me that if I started crying then we'd have to go home right away
c. tell me I was overreacting
d. comfort me and try to get me to think about something happy
e. help me think of something else to do.
f. tell me that I would feel better soon
12. If I was shy and scared around strangers and consistently became teary and wanted to stay in my bedroom whenever family friends came to visit, my caregiver would
a. help me think of things to do that would make meeting his/her friends less scary
b. tell me that its okay to feel nervous
c. try to make me happy by talking about the fun things we can do with the friends
d. feel upset and uncomfortable because of my reactions
f. tell me that I was being a baby

students rated both parents as more validating (mothers, $F = 21.95$, $p < .01$; fathers, $F = 24.01$, $p < .01$) and less invalidating than did male students (mothers, $F = 5.02$, $p < .05$; fathers, $F = 19.57$, $p < .05$). Additionally, both male and female participants tended to view mothers as more validating than fathers (males, $t = 7.06$, $p < .01$; females, $t = 5.71$, $p < .01$) but only male participants rated fathers as more invalidating than mothers (males, $t = 6.43$, $p < .01$). Validation scores for mothers and fathers were highly

correlated ($r = .76$) as were invalidation scores for mothers and fathers ($r = .72$). Because of these high correlations, for subsequent analyses students' ratings of their mothers' and fathers' behavior were combined to examine the total amount of invalidation and validation experienced in their childhood households. Correlations between the SES invalidation and validation total scores and other variables are shown in Table 4. As expected, the invalidation score was significantly positively correlated with all subscales of

BPD symptoms, thought suppression, and fear of emotions. Also as expected, total validation was significantly negatively correlated with BPD symptoms (with the exception of a nonsignificant relationship with self-injury) and fear of emotions, though not significantly correlated with thought suppression.

Incremental validity of the SES validation and invalidation scores in predicting BPD features was examined using regression analysis. Centered scores for EV-Child, SES total invalidation, and SES total validation were entered simultaneously. Childhood emotional vulnerability ($\beta = .47, p < .01$), total invalidation ($\beta = .19, p < .01$) and total validation ($\beta = -.16, p < .01$) each accounted for significant and unique variance in BPD symptoms.

Discriminant validity of the SES-invalidation score was explored in a preliminary way by examining its relationships with features of a dissimilar personality disorder (schizotypal) and with general distress. SES invalidation was significantly correlated with general distress (see Table 4). Thus, it was important to examine whether the SES uniquely predicts BPD symptoms or if this relationship is attributable to the general distress common to the disorder. A partial correlation between SES invalidation and BPD features, controlling for the DASS total score, was still significant, though smaller (partial $r = .15, p < .05$), suggesting that the relationship between childhood invalidation and current BPD symptoms is not entirely attributable to general distress. A partial correlation between SES invalidation and general distress, controlling for BPD symptoms, was nonsignificant (partial $r = .11$). Overall, this suggests that there is a unique relationship between invalidation and BPD symptoms that cannot be accounted for by general distress. The SES invalidation score also was significantly correlated with schizotypal features at the zero-order level. A partial correlation, controlling for general distress, was significant (partial $r = .28$), suggesting that the relationship between childhood invalidation and schizotypal features is not attributable to general distress. This finding differs from the pattern seen with the EV-Child and suggests that childhood invalidation is related to both types of personality pathology (borderline and schizotypal) assessed in this study, even after controlling for general distress.

Relationships between SES student-report and parent-report versions. The parent-report version of the SES that was used in the following analyses included the same 33 items as the final student-report SES described earlier. Internal consistency for the subscales of the SES for parents' descriptions of their own behavior was adequate (parent invalidation $\alpha = .74$, parent validation $\alpha = .78$). Student-report and parent-report versions of the SES were significantly correlated (invalidation total score: $r = .29, p < .01$, validation total score: $r = .35, p < .01$). Additionally, because the SES requires individuals to rate both parents, we were able to

examine the relationship between the parent-report and the student-report ratings of the responding parent (usually the mother); these relationships were also significant (invalidation, $r = .40, p < .01$; validation, $r = .51, p < .001$). To investigate whether level of current BPD symptoms is related to diverging parent/student perceptions of parenting style, correlations between responding parent and student reports (about the responding parent) were examined separately for students with high and low BPD symptoms. For invalidation, parent/student agreement for students scoring above the mean on BPD symptoms was lower, though still statistically significant ($r = .22, p < .05$) than for students scoring below the mean on BPD symptoms ($r = .59, p < .01$). For validation, parent/student agreement for students falling above and below the mean on BPD symptoms was about the same ($r_s = .47$ and $.49$ respectively, both $p_s < .01$). This suggests that young adults with above average levels of BPD symptoms have less agreement with their parents regarding the invalidation they received in childhood, while student/parent agreement for parental validation is not related to level of BPD symptoms.

Interaction between EV-Child and SES. Linehan's (1993) theory suggests that emotional vulnerability and invalidation may interact to produce BPD symptoms. A two-step hierarchical regression was conducted to check for an interaction between the EV-Child and the SES in predicting BPD symptoms. Centered EV-Child scores and SES total invalidation scores were entered in Step 1. Both the EV-Child ($\beta = .50, p < .01$) and SES invalidation ($\beta = .24, p < .01$) significantly predicted BPD symptoms. The interaction term was entered in Step 2. While the EV-Child remained a significant predictor of BPD symptoms ($\beta = .44, p < .01$), both SES invalidation ($\beta = .16, p > .05$) and the interaction term ($\beta = .16, p > .05$) were nonsignificant. These findings suggest that childhood emotional vulnerability and invalidation contribute independently to the prediction of current BPD symptoms. However, we did not find evidence of an interaction between these two variables.

Discussion

Childhood emotional vulnerability and environmental invalidation are important constructs in the BPD literature. However, until recently few studies have empirically tested their relationships to current BPD symptoms. Although existing studies (Cheavens et al., 2005; Rosenthal et al., 2005; Sauer & Baer, 2009) provide preliminary support for their role as biosocial precursors to borderline symptoms, limitations in the measures used to assess both childhood emotional vulnerability and invalidating environment suggest that additional work on assessment strategies might improve the tools available for advancing this area of research. The goal of the current study, therefore, was to

examine psychometric properties of measures of childhood emotional vulnerability and parental invalidation in order to facilitate more empirical research on the development of BPD.

The EV-Child was created by modifying an existing measure of current emotional intensity and reactivity to reflect childhood tendencies. The current study replicated previous findings showing that the EV-Child is internally consistent and is significantly correlated with current BPD symptoms, thought suppression, and fear of emotions (Sauer & Baer, 2009). Although Linehan (1993) describes childhood emotional vulnerability as comprised of three components (intensity, reactivity, and slow return to baseline), factor and reliability analyses suggested that childhood emotional vulnerability, as assessed by the EV-Child, is parsimoniously conceptualized as unidimensional. It is possible that the distinction between emotional intensity and reactivity is less clear in childhood. Bryant et al. (1996) argue that this distinction develops as people learn to suppress initial reactions to negative emotional stimuli or to dampen their reactions using coping strategies. These abilities may not be well developed until after the childhood years.

The current study also provided new evidence for the utility of the SES in assessing parental validation and invalidation. Whereas previous studies have factor-analyzed this measure at the subscale level (Fabes et al., 2002), the current study included factor analytic work at the item level. These analyses suggested that the SES is composed of two factors representing invalidation and validation. A number of items did not load on either factor and were dropped from subsequent analyses. This reduced the length of the SES from 72 items to 33 items, making it more practical to include in future studies. The total invalidation score was significantly positively related to BPD symptoms, thought suppression, and fear of emotions, whereas the total validation score was significantly negatively related to BPD symptoms and fear of emotions, though unrelated to thought suppression. Both validation and invalidation scores showed incremental validity over childhood emotional vulnerability in predicting BPD features.

In a preliminary exploration of discriminant validity, this study also investigated whether the EV-Child and SES-invalidation score are uniquely related to BPD symptoms or are also related to features of a dissimilar personality disorder (schizotypal) while controlling for general psychological distress. When general distress was partialled, the EV-Child was still significantly correlated with BPD features but not with schizotypal features, providing preliminary support for a specific relationship, independent of general distress, between childhood emotional vulnerability and BPD features. For the SES, however, the pattern of findings was somewhat different. In this case, after general distress was partialled, the SES was significantly related to both

borderline and schizotypal features, suggesting that childhood invalidation may be related to other forms of psychopathology in addition to BPD.

The present study also investigated agreement between parent and student reports as a way of assessing accuracy of young adult's retrospective reports of their emotional behavior and the parenting they received. Modest, yet statistically significant, agreement was found between young adults' and parents' reports on the EV-child. Student and parent reports on the SES were also significantly correlated. Although level of BPD symptoms did not moderate the relationship between young adult and parent reports, there was some evidence that there was better agreement between parents and young adults with lower levels of BPD symptoms on both the EV-child and SES invalidation. These findings suggest that young adults with high levels of BPD symptoms may describe themselves as more emotionally vulnerable than their parents describe them (although the association is still statistically significant). With regard to the SES, young adults with above average levels of BPD symptoms may rate their parents as more invalidating than their parents rate themselves (although the association is still statistically significantly).

Overall, these findings provide encouraging support for the psychometric properties of the EV-Child and the SES. Both appear to be internally consistent and to have clear factor structures. Both are significantly correlated in expected directions with relevant constructs and show a modest but significant level of agreement between young adult and parent ratings that is generally consistent with parent-child agreement in other contexts. Both appear to be useful for testing hypotheses derived from Linehan's (1993) biosocial theory of BPD. As the theory suggests, childhood emotional vulnerability was clearly related to current BPD features, even after controlling for general distress, and this relationship was seen for BPD but not for schizotypal features, suggesting that childhood emotional vulnerability may have some degree of specificity as a precursor to BPD (although other disorders were not examined). Childhood invalidation was also related to current BPD features, though less strongly after accounting for general distress. However, invalidation was also related to schizotypal features, suggesting that its effects may not be specific to BPD. Regression analysis showed that childhood emotional vulnerability and both parental validation and invalidation accounted for significant variance in BPD features. However, we did not find evidence for a significant interaction between emotional vulnerability and invalidation. Linehan's theory emphasizes a longitudinal transaction in which emotional vulnerability and the invalidating environment influence each other repeatedly and reciprocally over time. The present study sheds little light on such a process because data were collected at a single time point. In

addition, the use of a student sample, which probably does not include the more extreme levels of emotional vulnerability or parental invalidation, may have influenced the current findings. Research that uses these measures in a sample with a wide range of borderline features is needed to elucidate whether the contributions of emotional vulnerability and parental invalidation to the development of BPD are independent or interacting.

Despite the importance of developing validated measures of Linehan's biosocial precursors to BPD, the findings of this study should be viewed in the context of its limitations. First, our sample consisted of unselected undergraduates. The utility of conducting BPD research in an undergraduate population has been described (Trull, 1995), and our sample included a number of individuals with clinically significant levels of BPD symptoms according to Trull's criteria. However, the current findings should be considered preliminary until the results are replicated in a clinical sample. A second limitation is that this study relied solely on self-report measures of the relevant constructs, which may have introduced biases. In particular, parents may have been reluctant to acknowledge invalidating responses to their children. However, most correlations were significant and in the predicted directions, suggesting that response bias probably was not extreme. A third limitation is that data were collected at a single time point using retrospective measures. Longitudinal, prospective studies would allow more definitive conclusions about relationships between childhood precursors and BPD. A fourth limitation is our use of schizotypal features as the sole measure of discriminant validity in this study. Limitations on availability of research participation hours meant that our exploration of discriminant validity was minimal. Future research should include measures of all personality disorders, particularly other Cluster B disorders as well as Axis I disorders. Finally, the magnitude of the correlations between child and parent ratings on the EV-Child and SES were small to moderate, ranging from .14 to .52. However, examination of the literature on the agreement between parent and child ratings suggests a range of correspondence from .20 to .70 for current behavior (Baldwin & Dadds, 2007; Klassen et al., 2006; Rey et al., 1992). Thus, the agreement between the EV-Child and SES appears comparable, especially because these measures require retrospective accounts of behavior.

Overall, this study supports the utility of measures of childhood emotional vulnerability and environmental invalidation, which are central to Linehan's (1993) theory of the development of BPD. Future empirical research, using these measures as a starting point, is necessary to better understand how this disorder develops. An understanding of BPD etiology will contribute to the prevention and treatment of this prevalent and costly disorder.

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