

NEGATIVE AFFECTIVITY AND EFFORTFUL CONTROL IN MOTHERS WITH BORDERLINE PERSONALITY DISORDER AND IN THEIR YOUNG CHILDREN

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Research has examined temperament in individuals with borderline personality disorder (BPD) but not in their offspring, despite offspring's risk of developing BPD and the importance of temperament in the etiology of BPD. We recruited a low-socioeconomic sample of 36 mothers with BPD and their children ages 4 through 7, and 34 normative comparisons. Replicating prior studies, mothers with BPD reported themselves as having more negative affectivity (frustration, fear) and less effortful control (inhibitory control, attentional control, activation control) than did comparisons. Mothers with BPD also reported that their offspring had more negative affectivity (anger/frustration, fear) and less effortful control (inhibitory control, attentional focusing) than did comparisons. We were concerned about potential bias and shared method variance. We therefore provided validity support for mothers' ratings of their children with teacher ratings of child behavior and child self-report via their story-stem completion narratives. We discuss children's temperamental vulnerability versus differential susceptibility to the environment.

Borderline personality disorder (BPD) is characterized by unstable affect, volatile relationships, disturbances in identity, and self-destructive behavior (American Psychiatric Association, 2013). BPD is thought to have an etiological basis in biology, including temperament (Siever & Davis, 1991). Indeed, Marsha Linehan proposed a biosocial model such that BPD develops from an interaction between emotional vulnerability and an invalidating childhood environment (Linehan, 1993). She and her colleagues later expanded the model to suggest that emotional vulnerability develops from the temperamental traits of negative affectivity and impulsivity. They theorized that negative affectivity and impulsivity interact with an invalidating environment to make BPD more likely (Crowell, Beauchaine, & Linehan, 2009). In the language of temperament theorists, negative affectivity is defined to

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include fear and anger/frustration; and low effortful control (impulsivity) is defined to include poor inhibitory control (not being able to refrain from doing something there is a strong tendency to do), poor activation control (e.g., procrastination), and poor attentional focusing (Rothbart & Ahadi, 1994).

In the review of BPD and temperament that follows, operationalization of negative affectivity and effortful control follows in parentheses if clarification is necessary. In support of the expanded biosocial model, individuals with BPD report higher negative affectivity and lower effortful control than do normative comparisons (Posner et al., 2003). They also demonstrate more negative affectivity (anger) than do normative and depressed comparisons (Jacob et al., 2009), and more negative affectivity (fear) than those with Cluster C personality disorders and normative comparisons (Arntz, Klokman, & Sieswerda, 2005). Further, in individuals with BPD, the lower the effortful control, the worse the BPD symptoms (Hoermann, Clarkin, Hull, & Levy, 2005). Moreover, in a sample of substance abusers, negative affectivity (stress reactivity) and low effortful control (impulsivity) accounted for 50% of the variance in a BPD diagnosis (Bornovalova, Gratz, Delany-Brumsey, Paulson, & Lejuez, 2006). Additionally, in a normative sample of teenage girls, Stepp and her colleagues found that negative affectivity (emotionality) and effortful control (activity level) predicted BPD symptoms between age 14 and 19 (Stepp, Keenan, Hipwell, & Krueger, 2014). Research thus finds that negative affectivity and effortful control are relevant to BPD. However, we need more knowledge about these temperamental variables in a sample at high risk for developing BPD to inform preventive interventions (Macfie, 2009).

From a developmental psychopathology perspective, offspring of women with BPD are promising to study because they are considered at high risk for BPD themselves (Lenzenweger & Cicchetti, 2005). Indeed, recent longitudinal studies support the intergenerational transmission of BPD symptoms (Barnow et al., 2013; Reinelt et al., 2013; Stepp, Olino, Klein, Seeley, & Lewinsohn, 2013). Further, in terms of the biosocial theory (Crowell et al., 2009; Linehan, 1993), there is evidence for an invalidating environment in infancy and early childhood. In infancy, offspring of mothers with BPD are at an increased risk for insensitive interactions with their mothers (Hobson, Patrick, Crandell, García-Pérez, & Lee, 2005; Hobson et al., 2009; Kiel, Gratz, Moore, Latzman, & Tull, 2011); and in early childhood, offspring tell stories that reflect negative representations of themselves and their caregivers (Macfie & Swan, 2009). However, there is no evidence that young offspring of mothers with BPD share the emotional vulnerability posited by the biosocial theory: the temperamental vulnerabilities related to BPD, specifically negative affectivity and effortful control (Crowell et al., 2009). The current study aimed to address this gap.

Identifying the temperamental traits of negative affectivity and low effortful control in young offspring of mothers with BPD may inform preventive interventions, but not simply because such traits are vulnerability factors for adverse outcomes. There is now evidence for a susceptibility hypothesis in place of a vulnerability theory of the effect of temperament on child development (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007).

Children with high negative affectivity and low effortful control may indeed be differentially *adversely* affected by an *invalidating* environment, but the same children may also be differentially *positively* affected by an *enriched* environment, compared with children with low negative affectivity and high effortful control (Amad, Ramoz, Thomas, Jardri, & Gorwood, 2014).

It is challenging to assess children's temperament before they are old enough for self-report questionnaires. Two choices are parent report and laboratory observations. On the one hand, a parent knows the child better than anyone else. A mother is usually the primary caregiver and spends the most time with the child, and so knows the child best. However, subjectivity may bias her ratings. On the other hand, observers in a laboratory session provide objectivity, but on a small range of behaviors in a short time period. There is some support for the validity of maternal reports. In a normative sample, the convergence of mothers' reports with observer reports accounted for more variance in child temperament than did mothers' temperamental traits for children age 6 months to 3 years (Bates & Bayles, 1984). Moreover, in a sample in which two-thirds of mothers of infants were depressed, mothers were more accurate the more parenting experience they had had compared with observer reports. However, depressed mothers were less accurate assessing negative affectivity than were non-depressed mothers (Forman et al., 2003). In addition, in a normative sample of infants, mothers' and observer reports of children's fear were significantly correlated. However, mothers with high negative affectivity themselves reported more fear in their children than did observers (Gartstein & Marmion, 2008). Research thus finds some convergence and some discrepancies between mother and laboratory observer reports of child temperament. For the current study, we chose a parent-report measure (Putnam & Rothbart, 2006) that was specifically designed to minimize parent subjectivity by assessing discrete observed behaviors instead of more global assessments (F. Putnam, personal communication, October 6, 2010).

There is an additional possible confound, shared method variance, if mothers report on their own and on their children's temperament. We therefore sought to provide validity support for maternal reports of child temperament in two ways: using concurrent teacher reports of child behavior problems and children's narrative representations. First, for teacher reports, research finds some overlap between measures of child temperament and behavior (Eisenberg et al., 2005), but it is not total (Lemery, Essex, & Smider, 2002). We therefore expected: (a) a moderate positive correlation between mothers' reports of children's fear and teacher reports of children's anxious/depressed symptoms, (b) a negative correlation between mothers' reports of attentional focusing and teacher reports of attention problems, and (c) a negative correlation between mothers' reports of children's inhibitory control and teacher reports of oppositional defiant disorder.

Second, we sought to provide validity support for mothers' reports of their children's temperament using children's narrative representations. Narratives are elicited by the completion of story-stems presented to them using family figures and household props (Bretherton, Openheim, Buchsbaum,

TABLE 1. Demographic Differences Between BPD and Comparison Groups

Variable	Whole Sample	BPD	Comparisons	<i>t</i>
	<i>N</i> = 70	<i>n</i> = 36	<i>n</i> = 34	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Child Age (years)	5.37 (0.90)	5.36 (0.93)	5.38 (0.87)	0.11
Family Yearly Income (\$)	31,841 (27,854)	29,385 (19,294)	34,443 (34,841)	0.76
No. of Adults in Home	1.83 (0.78)	1.86 (.80)	1.79 (0.77)	0.36
No. of Children in Home	2.47 (1.16)	2.61 (1.25)	2.32 (1.07)	1.03
				χ^2
Child Sex (girls)	50%	53%	47%	0.23
Child Minority Ethnicity Background	11%	11%	12%	0.01
Child Hispanic	11%	14%	9%	0.44
Mother Graduated High School	89%	81%	97%	4.71*
Mother Has Partner	57%	56%	59%	0.08

**p* < .05.

Emde, & the MacArthur Narrative Group, 1990). Children's narratives provide an age-appropriate approximation to self-report. We therefore expected: (a) a positive correlation between mothers' reports of children's fear and the intrusion of traumatic material (extraneous frightening themes) in children's narratives. Moreover, given the negative correlation between 4-year-olds' inhibitory control and harsh punishment (Olson et al., 2011), we expected: (b) a positive correlation between mothers' reports of children's inhibitory control and non-physical punishment (not harsh, e.g., timeout) in children's narratives. Further, with the association between sleep and disorders of attention (Gregory & Sadeh, 2016), we expected: (c) a negative correlation between mothers' reports of children's attentional focusing and tiredness in children's narratives. Finally, because of the importance of self-regulation in the development of a conscience (Kochanska & Aksan, 2006), we expected: (d) a negative correlation between mothers' reports of children's anger/frustration and reparation/guilt in children's stories.

In the current study, we first aimed to replicate previous findings and hypothesized that mothers with BPD would report more of their own negative affectivity (frustration, fear) and less effortful control (inhibitory control, attentional control, activation control) than would normative comparison mothers (Hypothesis 1). We also hypothesized that mothers with BPD would report that their children would have more negative affectivity (anger/frustration, fear) and less effortful control (inhibitory control, attentional focusing) than would normative comparisons (Hypothesis 2). In all analyses, we controlled for maternal major depressive disorder (MDD), bipolar disorder, and dysthymia, because mood disorders are often comorbid with BPD (Zanarini et al., 1998), and maternal depression in all forms has a strong deleterious effect on child development (Beardslee, Versage, & Gladstone, 1998; DelBello & Geller, 2001; Downey & Coyne, 1990).

METHOD

PARTICIPANTS

The sample consisted of 70 children age 4–7 years and their mothers: 36 children whose mothers had BPD and 34 children whose mothers did not (see Table 1). Both clinical and comparison mothers were recruited from a five-county region in the Southeastern United States. Exclusionary criteria included inability to give informed consent or the presence of psychosis.

A clinical psychologist distributed brochures (which described the study and included diagnostic criteria for BPD) to therapists, physicians, and other healthcare professionals following presentations on treatment for BPD. These professionals then handed the brochures (which included a description of what participation would involve and an invitation for them to call the laboratory) to female patients they thought met criteria for BPD and who had a child between the ages of 4 and 7. Research assistants recruited comparison mothers with brochures (which included a description of what participation would involve and an invitation for them to call the laboratory) that were distributed at local Boys and Girls Clubs and preschools. They also recruited both clinical and comparison mothers from flyers posted throughout the community. Questions on the BPD flyer included: “Do you fear abandonment in relationships? Do you find it difficult to control your anger? Are you very impulsive? Do your relationships have extreme ups and downs? Have you hurt yourself or threatened to do so?” Questions on the comparison flyer included: “Do you have a child aged 4–7 and would you like to take part in a study on child development?” We provided compensation to all participants: gift cards for mothers, small toys for children.

PROCEDURES

All procedures were the same for both the BPD and comparison groups. Research assistants scheduled a home visit during which they met with the mother at her home (or another convenient location if requested) to administer informed consent forms, a maternal self-report screen to assess for a preliminary BPD diagnosis, a preliminary interview screen for mood disorders, and a demographic interview. In addition to consent forms completed by the mother for herself and her child, mothers completed a consent form with contact information for the child’s teacher. After the home visit, research assistants scheduled a laboratory visit where a clinical psychologist assessed mothers further for BPD and current mood disorders with structured clinical interviews. Mothers also completed questionnaires on their own and their children’s temperament. After the laboratory visit, a research assistant made an appointment with the teacher to administer questionnaires.

MEASURES

Demographics. A research assistant assessed demographic information with a maternal interview (Mount Hope Family Center, 1995).

Borderline Personality Disorder. The Structured Clinical Interview for DSM-IV Axis II Disorders, SCID-II (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) is a semi-structured interview for making DSM-IV Axis II personality disorder diagnoses, which is accompanied by a screening self-report measure, the SCID-II Personality Questionnaire. Mothers needed to answer yes to at least five questions on the screen for BPD in order to be invited to join the study for the BPD group, and a maximum of yes to one question for the comparison group.

After screening for maternal BPD during the home visit, the laboratory visit included assessment for BPD. High inter-rater reliability ($k = .91$) has been found for the diagnosis of BPD using the SCID-II (Lobbestael, Leur-gans, & Arntz, 2011). In the current sample, a diagnosis of BPD correlated with a self-report measure of total borderline features (Morey, 1991, 2004), $r = .83$, $p < .001$.

Control Variables. The Structured Clinical Interview for Axis I Disorders, SCID-I (First, Gibbon, Spitzer, & Williams, 1996) is accompanied by a screening interview measure. A research assistant administered the screen during the home visit. At the laboratory, the full SCID-I interview was given to all mothers to assess maternal current MDD, bipolar disorder, and dysthymia as control variables. High inter-rater reliability has been found for mood disorders using the SCID-I (First, Gibbon, Spitzer, & Williams, 2002; Lobbestael et al., 2011).

Mothers' Temperament. Mothers completed the Adult Temperament Questionnaire short form (ATQ; Evans & Rothbart, 2007; Rothbart, Ahadi, & Evans, 2000), which is a 77-item self-report measure of temperament. Items are endorsed using a 7-point Likert scale ranging from 1 (extremely untrue of you) to 7 (extremely true of you). We utilized five scales: negative affectivity (frustration, fear); and effortful control (attentional control, inhibitory control, activation control). Frustration refers to negative affect related to interruption of tasks or goal blocking; fear is related to anticipated distress; attentional control is the ability to focus and shift attention when desired; inhibitory control is the ability to suppress inappropriate approach behavior; and activation control is the ability to perform an action in the face of a desire to avoid doing so. The ATQ's authors found moderate correlations between it and the five-factor model of personality (Evans & Rothbart, 2007). There were some missing data in the ATQ in our sample (0.24%). We therefore imputed the overall item mean for those mothers in the same clinical group (BPD or comparison) as the individual with missing data, as suggested by the ATQ authors.

Cronbach's alpha for maternal inhibitory control in the current sample was initially low, $\alpha = .48$. However, in other studies, alpha for inhibitory control was also low: $\alpha = .36$ (Schwebel, Severson, Ball, & Rizzo, 2006), and $\alpha = .40$ (Gomez, Kyriakides, & Devlin, 2014). In addition, the authors of the scale found $\alpha = .66$ for inhibitory control in an undergraduate sample, which was low compared to alphas for other scales (Evans & Rothbart, 2009). Because of the low-SES background of the current sample and the

complexity of the wording, we therefore dropped one item: “I usually have trouble resisting my cravings for food, drink, etc.,” which led to an improved alpha. Cronbach’s alphas in the current sample were as follows: frustration, $\alpha = .74$; fear, $\alpha = .77$; inhibitory control, $\alpha = .53$; attentional control, $\alpha = .80$; and activation control, $\alpha = .73$.

Child Temperament. Mothers completed the Child Behavior Questionnaire short form, which was designed to assess specific behaviors rather than global qualities in order to reduce the likelihood of parent bias (CBQ, Putnam & Rothbart, 2006). The CBQ short form is a 94-item parent-report measure of temperament for children age 3–7 that uses the same Likert scale as the ATQ. We assessed negative affectivity (anger/frustration, fear) and effortful control (inhibitory control, attentional focusing). *Anger/frustration* is related to interruption of tasks or blocking of goals; *fear* refers to unease, worry, or nervousness related to anticipated pain, distress, and threatening situations; *inhibitory control* is the ability to plan and suppress inappropriate approach responses under instruction or in new situations; and *attentional focusing* is the ability to maintain focus on tasks. There were some missing data in the CBQ in our sample (0.75%). We imputed the overall item mean among those children with the same gender and who had mothers in the same clinical group (BPD or comparison) as the individual with missing data. The CBQ short form demonstrated satisfactory internal consistency and criterion validity comparable to the standard CBQ (Putnam & Rothbart, 2006). Cronbach’s alphas in the current sample were as follows: anger/frustration, $\alpha = .84$; fear, $\alpha = .71$; inhibitory control, $\alpha = .77$; and attentional focusing, $\alpha = .67$.

Support for Validity of Child Temperament Measure. Because of possible maternal bias and shared method variance, we sought independent validity support for mothers’ ratings of their children’s temperament. We did this with data provided by teachers on children’s behavior at school and by the children themselves in their narrative representations:

- Child behavior problems: Teachers assessed children’s behavior in domains related to temperament variables using the Child Teacher Report Form, C-TRF (Achenbach & Rescorla, 2001). We used *t*-scores of teacher ratings of *anxious/depressed symptoms*, *oppositional defiant symptoms*, *attention problems*, and *aggression*. There is support for construct validity (e.g., discrimination between referred and non-referred children for treatment, and association with a variety of other measures of children’s problems), internal consistency, and test-retest reliability for the C-TRF (Achenbach & Rescorla, 2001; Rescorla et al., 2012).
- Narrative representations: A female research assistant told the beginning of each of 10 stories from the MacArthur Story Stem Battery (Bretherton et al., 1990), each about a conflictual or other emotionally charged theme in family life, for example, parents arguing about who lost mom’s car keys. The research assistant matched the ethnic background and gender

TABLE 2. Correlations Between Maternal and Child Temperament Variables, $N = 70$

Child Temperament	Maternal Temperament				
	Negative Affect		Effortful Control		
	Frustration	Fear	Inhibitory Control	Attentional Control	Activation Control
Negative Affectivity					
Anger/Frustration	.44**	.31**	-.28*	-.61**	-.39**
Fear	.22	.42**	-.19	-.39**	-.35**
Effortful Control					
Inhibitory Control	-.33**	-.23	.37**	.42**	.48**
Attentional Focusing	-.34**	-.24*	.36**	.41**	.52**

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

of the child with those of family figures and presented the stories in a dramatic fashion with the family figures and household props. She then asked the child to complete the stories, which she administered in the same order for each child in a session lasting approximately 30 minutes. Because this is consistent with developmentally appropriate play, children enjoy completing them. A second research assistant filmed the session through a one-way mirror. We used the *Narrative Coding Manual, Rochester version* (Robinson, Mantz-Simmons, Macfie, & the MacArthur Narrative Group, 1996) to code the presence/absence of four codes directly from videotapes: *intrusion of traumatic material* (extraneous frightening themes intrude in a striking, incoherent manner), *non-physical punishment* (timeout, scolding, deprivation), *tired* (any reference denoting tiredness, need to rest, going to bed), and *reparation/guilt* (making amends or displaying guilt feelings). For a review of the validity of the story-stem completion measure as representing the child's own self, see Macfie and Swan (2009). Inter-rater reliabilities between two coders, assessed with kappas, were: *intrusion of traumatic material*, $\kappa = .61$; *non-physical punishment*, $\kappa = .85$; *tired*, $\kappa = .72$; and *reparation/guilt*, $\kappa = .66$.

RESULTS

PRELIMINARY ANALYSES

We first tested for group differences on demographic variables. We found that mothers with BPD were less likely to have graduated high school than were comparison mothers (see Table 1). Because education correlated significantly with some of the dependent variables, we entered it as a covariate in addition to current mood disorders in analyses of group differences. See Table 2 for correlations between maternal and child temperament.

Validity Support for Mothers' Ratings of Child Temperament

Teacher Report. As expected, using the C-TRF, mothers' ratings of children's *fear* were positively correlated with teachers' ratings of *anxious/depressed symptoms*, $r = .28$, $p < .05$; mothers' ratings of children's *inhibitory control* were negatively correlated with teachers' ratings of *oppositional defiant*

TABLE 3. Group Differences in Maternal Temperament: Group Means (Standard Deviations) and Univariate *F*-tests, Controlling for Maternal Education, Current MDD, Bipolar Disorder, and Dysthymia

	Mothers With BPD	Comparison Mothers	<i>F</i> (1,64)
	<i>n</i> = 36	<i>n</i> = 34	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Maternal Temperament			
Negative Affectivity			
Frustration	4.77 (0.98)	3.25 (0.91)	22.43***
Fear	4.90 (1.04)	3.16 (0.92)	32.27***
Effortful Control			
Inhibitory Control	3.74 (0.91)	4.56 (1.01)	7.86**
Attentional Control	2.85 (1.03)	4.86 (1.00)	55.90***
Activation Control	3.92 (0.95)	5.47 (0.88)	32.15***

Note. MDD = major depressive disorder. ** $p < .01$. *** $p < .001$.

symptoms, $r = -.26$, $p < .05$; and mothers' ratings of *attentional focusing* were negatively correlated with teachers' ratings of *attention problems*, $r = -.30$, $p < .05$. However, there is no teacher variable that corresponds well with children's anger/frustration when interrupted during tasks or having goals blocked. Mothers' ratings of *anger/frustration* were not significantly correlated with either teachers' ratings of *aggression*, $r = .07$, $p > .10$, or *oppositional defiant symptoms*, $r = .07$, $p > .10$.

Children's Narratives. For further support for the validity of mothers' ratings of their children's temperament, we used children's narratives. As expected, mothers' ratings of children's *fear* were positively correlated with children's narrative representations of the *intrusion of traumatic material*, $r = .29$, $p < .05$; mothers' ratings of children's *inhibitory control* were negatively correlated with children's narrative representations of *non-physical punishment*, $r = -.24$, $p < .05$; mothers' ratings of *attentional focusing* were negatively correlated with children's narrative representations of *tired*, $r = -.27$, $p < .05$; and mothers' ratings of *anger/frustration* were negatively correlated with children's narrative representations of *reparation/guilt*, $r = -.32$, $p < .01$.

HYPOTHESIS TESTING

Mothers' Temperament. We conducted a MANCOVA to test Hypothesis 1, that mothers with BPD would report more of their own negative affectivity and less effortful control than would normative comparisons. The independent variable was BPD status, and the covariates were maternal graduation from high school, current maternal MDD, bipolar disorder, and dysthymia. The dependent variables were aspects of maternal temperament. There was, as hypothesized, a significant main effect for BPD group status, Wilks's approximate $F(5, 60) = 14.01$, $p < .001$, $\eta^2 = .54$. For covariates, the effect of maternal education was $F(5, 60) = 1.21$, $p > .10$, $\eta^2 = .09$, current maternal MDD $F(5, 60) = 0.45$, $p > .10$, $\eta^2 = .04$, current bipolar disorder $F(5, 60) = 2.06$, $p > .10$, $\eta^2 = .15$, and dysthymia, $F(5, 60) = 0.62$, $p > .10$, $\eta^2 = .05$. In

TABLE 4. Group Differences in Child Temperament: Group Means (SD) and Univariate *F*-tests, Controlling for Maternal Education, Current MDD, Bipolar Disorder, and Dysthymia

	Children of Mothers With BPD	Children of Comparison Mothers	<i>F</i> (1, 64)
	<i>n</i> = 36	<i>n</i> = 34	
Child Temperament	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Negative Affectivity			
Anger/Frustration	5.44 (1.20)	4.52 (1.37)	5.80*
Fear	4.57 (1.27)	3.68 (1.19)	9.21**
Effortful Control			
Inhibitory Control	4.00 (1.05)	4.73 (1.23)	6.65*
Attentional Focusing	4.03 (1.08)	4.77 (1.16)	6.81*

Note. MDD = major depressive disorder. * $p < .05$. ** $p < .01$.

univariate tests, mothers with BPD reported significantly more negative affectivity (frustration and fear) and less effortful control (inhibitory control, attentional control, and activation control) than did normative comparison mothers (see Table 3).

Child Temperament. We conducted a second MANCOVA to test Hypothesis 2, that mothers with BPD would report more negative affectivity and less effortful control in their children than would normative comparisons. Again, the independent variable was BPD status and the covariates were maternal graduation from high school, current maternal MDD, bipolar disorder, and dysthymia. The dependent variables were aspects of child temperament. As hypothesized, there was a significant effect for maternal BPD, Wilks's approximate $F(4, 61) = 3.24, p < .05, \eta^2 = .18$. For covariates, the effect of maternal education was $F(4, 61) = 0.68, p > .10, \eta^2 = .04$, current maternal MDD $F(4, 61) = 0.78, p > .10, \eta^2 = .05$, current bipolar disorder $F(4, 61) = 1.27, p > .10, \eta^2 = .08$, and dysthymia, $F(4, 61) = 0.97, p > .10, \eta^2 = .06$. In univariate tests, children whose mothers had BPD demonstrated more negative affectivity (anger/frustration and fear) and less effortful control (inhibitory control and attentional focusing) than did the children of normative comparison mothers (see Table 4).

DISCUSSION

We replicated previous research (e.g., Posner et al., 2003) such that mothers with BPD reported more negative affectivity (assessed as frustration with interruptions and having goals blocked, and fear in anticipation of distress) and less effortful control (assessed as difficulty focusing and shifting attention at will, suppressing inappropriate behavior, and instigating action in the face of a desire to avoid doing so) than did normative comparisons. Moreover, mothers with BPD reported that their children had higher negative affectivity (assessed as anger/frustration when interrupted or goals were blocked, more fearful—worried, uneasy, nervous) and lower effortful control (assessed as

less able to suppress inappropriate behavior when told to do so, and more difficulty maintaining focus on tasks) than did comparisons.

These temperamental difficulties in children whose mothers have BPD may make the development of psychopathology, including BPD, more likely. In a normative sample, preschool-aged children's high negative emotionality and low effortful control were associated concurrently with poorer social competence and adjustment (Liew, Eisenberg, & Reiser, 2004). Moreover, in a normative sample of children in kindergarten, high negative emotionality and low self-regulation predicted behavior problems in third grade (Eisenberg et al., 1996). Further, in a longitudinal sample of at-risk children, emotionality at 30 months and attentional disturbance and emotional instability at age 12 were associated with BPD symptoms at age 28 (Carlson, Egeland, & Sroufe, 2009). Temperament therefore presents a risk factor for offspring, including for BPD.

However, as noted earlier, there has been an important evolution in the way researchers conceptualize the influence of temperament on development, from a vulnerability to a susceptibility model (Belsky et al., 2007). Linehan and colleagues explain the etiology of BPD in terms of a vulnerability perspective: the interaction between a child with a vulnerable temperament (e.g., negative affectivity) and an invalidating environment (Crowell et al., 2009; Linehan, 1993). This conceptualization is supported in a recent study of at-risk teenage girls age 16, where the girls' negative emotional reactivity interacted with exposure to family adversity to predict BPD symptoms at age 18 (Stepp, Scott, Jones, Whalen, & Hipwell, 2016).

The differential susceptibility hypothesis takes a different perspective (Belsky et al., 2007). A child temperamentally susceptible to environmental conditions may indeed be vulnerable to psychopathology in adverse circumstances, but the same child may also respond *better* than would other children in a supportive environment (Belsky et al., 2007). There is now empirical support for the susceptibility hypothesis. Infants with a difficult temperament had *more* behavior problems with poor quality care, but *fewer* behavior problems with good quality care, than did children with an easy temperament (Pluess & Belsky, 2009). On the other hand, a study of children age 8 to 12 in a community sample found support for both a differential susceptibility and a vulnerability hypothesis: The interaction between sensitive parenting and child psychopathology differed depending on which temperamental characteristic was assessed (Kiff, Lengua, & Bush, 2011). However, in a meta-analysis of randomized control interventions with children with behavior problems, there was an effect size of $r = .33$ for the susceptible group, but no significant effect for the non-susceptible group (van IJzendoorn & Bakermans-Kranenburg, 2015). A growing child whose nervous system is highly sensitive to the environment may easily feel overwhelmed and flounder compared with a child who is not as sensitive, but the same child may do much better than a less sensitive child in a supportive setting, which soothes distress and enables the child to be open to learning from the environment (Pluess & Belsky, 2009).

The susceptibility hypothesis has implications for preventive interventions both currently and in the future. Currently, the implications for par-

ents, teachers, and early interventions are that providing additional sensitive care to a child with a difficult temperament may make a huge difference. Whether given by day care providers, family members (e.g., grandparents), or teachers at school (e.g., a tutor, assistant teacher, or after-school coach), additional support for an easily overwhelmed and distressed child may make a huge difference in terms of behavior problems and social competence. In the future, researchers may identify genes that are susceptibility rather than vulnerability genes (Amad et al., 2014). Early interventions could then provide an enriched and supportive environment for susceptible children so that high negative affectivity and low effortful control would not lead to maladaptive behavior (e.g., substance abuse and self-harm), which might otherwise crystallize into BPD (Amad et al., 2014).

STRENGTHS AND LIMITATIONS

Strengths of the study include the recruitment of women with a diagnosis of BPD versus assessing BPD symptoms in a community sample. Also, because mothers with BPD were recruited from both clinical and non-clinical sources, generalizability to the population is increased. Compared with early studies of offspring of women with BPD in the same developmental period (Crandell, Patrick, & Hobson, 2003; Hobson et al., 2005), this was a relatively large sample, approximately three times as large. Further, we were able to address issues of potential bias and shared method variance with validity support from teacher reports and children's narratives, thus strengthening confidence in findings from mothers' reports on their children's temperament.

Limitations include a sample that was largely Caucasian and low socioeconomic status, which does limit generalizability. In addition, despite the provision of validity support for maternal reports of children's temperament, it would have been better to create a latent variable for child temperament that includes parent and observer reports as has been done recently (Stepp et al., 2016). Fathers' temperament should also ideally be included in order to provide a full account of a child's temperament. Moreover, although similar to findings in other studies, we do not know if maternal inhibitory control was measured correctly because internal consistency was poor. Further, Stepp and colleagues found that not only emotionality and activity, but also low sociability and shyness predicted BPD symptoms between age 14 and 19 (Stepp et al., 2014). Although emotionality and activity overlap with negative affectivity and effortful control, we did not assess sociability and shyness. These may also be key to identifying precursors to BPD in early childhood.

CONCLUSION

It is important to study temperament in a high-risk sample of young children whose mothers have BPD, given the increased likelihood of their developing BPD themselves (Zanarini et al., 2004). However, given developments in the

study of the interaction between child characteristics and the environment with the differential susceptibility hypothesis, both high negative affectivity and low effortful control may be more malleable than previously thought. Interventions that provide additional support and enrichment to a child before temperament hardens into maladaptive behavior may be a promising avenue to prevention, at least for some children.

REFERENCES

- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. Burlington: University of Vermont, Research Center for Children, Youth and Families.
- Amad, A., Ramoz, N., Thomas, P., Jardri, R., & Gorwood, P. (2014). Genetics of borderline personality disorder: Systematic review and proposal of an integrative model. *Neuroscience and Biobehavioral Reviews*, *40*, 6–19. <http://dx.doi.org/10.1016/j.neubiorev.2014.01.003>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Arntz, A., Klokman, J., & Sieswerda, S. (2005). An experimental test of the schema mode model of borderline personality disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *36*(3), 226–239.
- Barnow, S., Aldinger, M., Arens, E. A., Ulrich, I., Spitzer, C., Grabe, H.-J., & Stopsack, M. (2013). Maternal transmission of borderline personality disorder symptoms in the community-based Greifswald Family Study. *Journal of Personality Disorders*, *27*(6), 806–819. http://dx.doi.org/10.1521/pedi_2012_26_058
- Bates, J. E., & Bayles, K. (1984). Objective and subjective components in mothers' perceptions of their children from age 6 months to 3 years. *Merrill-Palmer Quarterly*, *30*(2), 111–130.
- Beardslee, W. R., Versage, E. M., & Gladstone, T. R. G. (1998). Children of affectively ill parents: A review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry*, *37*(11), 1134–1141. <http://dx.doi.org/10.1097/00004583-199811000-00012>
- Belsky, J., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science*, *16*(6), 300–304. <http://dx.doi.org/10.1111/j.1467-8721.2007.00525.x>
- Bornovalova, M. A., Gratz, K. L., Delany-Brumsey, A., Paulson, A., & Lejuez, C. W. (2006). Temperamental and environmental risk factors for borderline personality disorder among inner-city substance users in residential treatment. *Journal of Personality Disorders*, *20*(3), 218–231. <http://dx.doi.org/10.1521/pedi.2006.20.3.218>
- Bretherton, I., Oppenheim, D., Buchsbaum, H., Emde, R. N., & the MacArthur Narrative Group. (1990). *MacArthur Story Stem Battery (MSSB)*. Unpublished manuscript.
- Carlson, E. A., Egeland, B., & Sroufe, L. A. (2009). A prospective investigation of the development of borderline personality symptoms. *Development and Psychopathology*, *21*(4), 1311–1334. <http://dx.doi.org/10.1017/S0954579409990174>
- Crandell, L. E., Patrick, M. P. H., & Hobson, R. P. (2003). “Still-face” interactions between mothers with borderline personality disorder and their 2-month-old infants. *British Journal of Psychiatry*, *183*(3), 239–247. <http://dx.doi.org/10.1192/bjp.183.3.239>
- Crowell, S. E., Beauchaine, T. P., & Linehan, M. M. (2009). A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. *Psychological Bulletin*, *135*(3), 495–510. <http://dx.doi.org/10.1037/a0015616>
- DelBello, M. P., & Geller, B. (2001). Review of studies of child and adolescent offspring of bipolar parents. *Bipolar Disorders*, *3*(6), 325–334. <http://dx.doi.org/10.1034/j.1399-5618.2001.30607.x>
- Downey, G., & Coyne, J. C. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin*, *108*(1), 50–76. <http://dx.doi.org/10.1037/0033-2909.108.1.50>
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., Murphy, B. C., Maszk, P., Holmgren, R., & Suh, K. (1996). The relations of regulation and emotionality to problem behavior in elementary school children. *Development and Psychopathology*, *8*(1), 141–162. <http://dx.doi.org/10.1017/S095457940000701X>
- Eisenberg, N., Sadovsky, A., Spinrad, T. L., Fabes, R. A., Losoya, S. H., Valiente, C., . . . Shepard, S. A. (2005). The relations of problem behavior status to children's negative emotionality, effortful control, and impulsivity

- ity: Concurrent relations and prediction of change. *Developmental Psychology*, 41(1), 193–211. <http://dx.doi.org/10.1037/0012-1649.41.1.193>
- Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality*, 41(4), 868–888. <http://dx.doi.org/10.1016/j.jrp.2006.11.002>
- Evans, D. E., & Rothbart, M. K. (2009). A two-factor model of temperament. *Personality and Individual Differences*, 47(6), 565–570. <http://dx.doi.org/10.1016/j.paid.2009.05.010>
- First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. (2002). *User's guide for the Structured Clinical Interview for DSM-IV-TR Axis I disorders-research version (SCID-I) for DSM-IV-TR, Nov. 2002 Revision*. Washington, DC: American Psychiatric Press.
- First, M. B., Gibbon, M., Spitzer, R. L., Williams, J. B., & Benjamin, L. S. (1997). *User's guide for the Structured Clinical Interview for DSM-IV Axis II personality disorders (SCID-II)*. Washington, DC: American Psychiatric Press.
- First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. W. (1996). *User's guide for the Structured Clinical Interview for DSM-IV Axis I disorders (research version)*. Washington, DC: American Psychiatric Press.
- Forman, D. R., O'Hara, M. W., Larsen, K., Coy, K. C., Gorman, L. L., & Stuart, S. (2003). Infant emotionality: Observational methods and the validity of maternal reports. *Infancy*, 4(4), 541–565. http://dx.doi.org/10.1207/S15327078IN0404_08
- Gartstein, M. A., & Marmion, J. (2008). Fear and positive affectivity in infancy: Convergence/discrepancy between parent-report and laboratory-based indicators. *Infant Behavior & Development*, 31(2), 227–238. <http://dx.doi.org/10.1016/j.infbeh.2007.10.012>
- Gomez, R., Kyriakides, C., & Devlin, E. (2014). Attention-deficit/hyperactivity disorder symptoms in an adult sample: Associations with Rothbart's temperament dimensions. *Personality and Individual Differences*, 60, 73–78. <http://dx.doi.org/10.1016/j.paid.2013.12.023>
- Gregory, A. M., & Sadeh, A. (2016). Annual research review: Sleep problems in childhood psychiatric disorders—A review of the latest science. *Journal of Child Psychology and Psychiatry*, 57(3), 296–317. <http://dx.doi.org/10.1111/jcpp.12469>
- Hobson, R. P., Patrick, M., Crandell, L., García-Pérez, R., & Lee, A. (2005). Personal relatedness and attachment in infants of mothers with borderline personality disorder. *Development and Psychopathology*, 17(2), 329–347. <http://dx.doi.org/10.1017/S0954579405050169>
- Hobson, R. P., Patrick, M. P. H., Hobson, J. A., Crandell, L., Bronfman, E., & Lyons-Ruth, K. (2009). How mothers with borderline personality disorder relate to their year-old infants. *British Journal of Psychiatry*, 195(4), 325–330. <http://dx.doi.org/10.1192/bjp.bp.108.060624>
- Hoermann, S., Clarkin, J. F., Hull, J. W., & Levy, K. N. (2005). The construct of effortful control: An approach to borderline personality disorder heterogeneity. *Psychopathology*, 38(2), 82–86. <http://dx.doi.org/10.1159/000084815>
- Jacob, G. A., Kathrin, H., Ower, N., Pillmann, M., Scheel, C. N., Rüsche, N., & Lieb, K. (2009). Emotional reactions to standardized stimuli in women with borderline personality disorder: Stronger negative affect, but no differences in reactivity. *Journal of Nervous and Mental Disease*, 197(11), 808–815. <http://dx.doi.org/10.1097/NMD.0b013e3181bea44d>
- Kiel, E. J., Gratz, K. L., Moore, S. A., Litzman, R. D., & Tull, M. T. (2011). The impact of borderline personality pathology on mothers' responses to infant distress. *Journal of Family Psychology*, 25(6), 907–918. <http://dx.doi.org/10.1037/a0025474>
- Kiff, C. J., Lengua, L. J., & Bush, N. R. (2011). Temperament variation in sensitivity to parenting: Predicting changes in depression and anxiety. *Journal of Abnormal Child Psychology*, 39(8), 1199–1212. <http://dx.doi.org/10.1007/s10802-011-9539-x>
- Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality*, 74(6), 1587–1617. <http://dx.doi.org/10.1111/j.1467-6494.2006.00421.x>
- Lemery, K. S., Essex, M. J., & Smider, N. A. (2002). Revealing the relation between temperament and behavior problem symptoms by eliminating measurement confounding: Expert ratings and factor analyses. *Child Development*, 73(3), 867–882. <http://dx.doi.org/10.1111/1467-8624.00444>
- Lenzenweger, M. F., & Cicchetti, D. (2005). Toward a developmental psychopathology approach to borderline personality disorder. *Development and Psychopathology*, 17(4), 893–898.
- Liew, J., Eisenberg, N., & Reiser, M. (2004). Preschoolers' effortful control and negative emotionality, immediate reactions to disappointment, and quality of social functioning. *Journal of Experimental Child*

- Psychology*, 89(4), 298–313. <http://dx.doi.org/10.1016/j.jecp.2004.06.004>
- Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford.
- Lobbestaal, J., Leurgans, M., & Arntz, A. (2011). Inter rater reliability of the Structured Clinical Interview for DSM IV Axis I disorders (SCID I) and Axis II disorders (SCID II). *Clinical Psychology & Psychotherapy*, 18(1), 75–79. <http://dx.doi.org/10.1002/cpp.693>
- Macfie, J. (2009). Development in children and adolescents whose mothers have borderline personality disorder. *Child Development Perspectives*, 3(1), 66–71. <http://dx.doi.org/10.1111/j.1750-8606.2008.00079.x>
- Macfie, J., & Swan, S. A. (2009). Representations of the caregiver–child relationship and of the self, and emotion regulation in the narratives of young children whose mothers have borderline personality disorder. *Development and Psychopathology*, 21(3), 993–1011. <http://dx.doi.org/10.1017/S0954579409000534>
- Morey, L. C. (1991). *Personality assessment inventory*. Odessa, FL: Psychological Assessment Resources.
- Morey, L. C. (2004). The Personality Assessment Inventory (PAI). In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Volume 3: Instruments for adults* (3rd ed., pp. 509–551). Mahwah, NJ: Erlbaum.
- Mount Hope Family Center. (1995). *Mt. Hope demographic interview*. Unpublished manuscript. University of Rochester.
- Olson, S. L., Tardif, T. Z., Miller, A., Felt, B., Grabel, A. S., Kessler, D., . . . Hirabayashi, H. (2011). Inhibitory control and harsh discipline as predictors of externalizing problems in young children: A comparative study of U.S., Chinese, and Japanese preschoolers. *Journal of Abnormal Child Psychology*, 39(8), 1163–1175. <http://dx.doi.org/10.1007/s10802-011-9531-5>
- Pluess, M., & Belsky, J. (2009). Differential susceptibility to rearing experience: The case of childcare. *Journal of Child Psychology and Psychiatry*, 50(4), 396–404. <http://dx.doi.org/10.1111/j.1469-7610.2008.01992.x>
- Posner, M. I., Rothbart, M. K., Vizueta, N., Thomas, K. M., Levy, K. N., Fossella, J., . . . Kernberg, O. (2003). An approach to the psychobiology of personality disorders. *Development and Psychopathology*, 15(4), 1093–1106. <http://dx.doi.org/10.1017/S0954579403000506>
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment*, 87(1), 102–112. http://dx.doi.org/10.1207/s15327752jpa8701_09
- Reinelt, E., Stopsack, M., Aldinger, M., Ulrich, I., Grabe, H. J., & Barnow, S. (2013). Longitudinal transmission pathways of borderline personality disorder symptoms: From mother to child? *Psychopathology*, 47(1), 10–16. <http://dx.doi.org/10.1159/000345857>
- Rescorla, L. A., Achenbach, T. M., Ivanova, M. Y., Bilenberg, N., Bjarnadottir, G., Denner, S., . . . Verhulst, F. C. (2012). Behavioral/emotional problems of preschoolers: Caregiver/teacher reports from 15 societies. *Journal of Emotional and Behavioral Disorders*, 20(2), 68–81. <http://dx.doi.org/10.1177/1063426611434158>
- Robinson, J. L., Mantz-Simmons, L., Macfie, J., & the MacArthur Narrative Group. (1996). *The narrative coding manual, Rochester version*. Unpublished manuscript.
- Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology*, 103(1), 55–66. <http://dx.doi.org/10.1037/0021-843X.103.1.55>
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology*, 78(1), 122–135. <http://dx.doi.org/10.1037/0022-3514.78.1.122>
- Schwebel, D. C., Severson, J., Ball, K. K., & Rizzo, M. (2006). Individual difference factors in risky driving: The roles of anger/hostility, conscientiousness, and sensation-seeking. *Accident Analysis & Prevention*, 38(4), 801–810. <http://dx.doi.org/10.1016/j.aap.2006.02.004>
- Siever, L. J., & Davis, K. L. (1991). A psychobiological perspective on the personality disorders. *American Journal of Psychiatry*, 148(12), 1647–1658.
- Stapp, S. D., Keenan, K., Hipwell, A. E., & Krueger, R. F. (2014). The impact of childhood temperament on the development of borderline personality disorder symptoms over the course of adolescence. *Borderline Personality Disorder and Emotion Dysregulation*, 1, article 18. <http://dx.doi.org/10.1186/2051-6673-1-18>
- Stapp, S. D., Olino, T. M., Klein, D. N., Seeley, J. R., & Lewinsohn, P. M. (2013). Unique influences of adolescent antecedents on adult borderline personality disorder features. *Personality Disorders: Theory, Research, and Treatment*, 4(3), 223–229. <http://dx.doi.org/10.1037/per0000015>

- Stepp, S. D., Scott, L. N., Jones, N. P., Whalen, D. J., & Hipwell, A. E. (2016). Negative emotional reactivity as a marker of vulnerability in the development of borderline personality disorder symptoms. *Development and Psychopathology*, 28(1), 213–224. <http://dx.doi.org/10.1017/S0954579415000395>
- van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2015). Genetic differential susceptibility on trial: Meta-analytic support from randomized controlled experiments. *Development and Psychopathology*, 27(1), 151–162. <http://dx.doi.org/10.1017/S0954579414001369>
- Zanarini, M. C., Frankenburg, F. R., Dubo, E. D., Sickel, A. E., Trikha, A., Levin, A., & Reynolds, V. (1998). Axis I comorbidity of borderline personality disorder. *American Journal of Psychiatry*, 155(12), 1733–1739.
- Zanarini, M. C., Frankenburg, F. R., Yong, L., Raviola, G., Reich, D. B., Hennen, J., . . . Gunderson, J. G. (2004). Borderline psychopathology in the first-degree relatives of borderline and Axis II comparison probands. *Journal of Personality Disorders*, 18(5), 449–447. <http://dx.doi.org/10.1521/pedi.18.5.439.51327>

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