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Current maternal depression moderates the relation between critical expressed emotion in mothers and depressive symptoms in their adolescent daughters



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ABSTRACT

Prior studies have examined critical expressed emotion (EE-Crit) in mothers in the intergenerational transmission of depression. However, the potential moderating effect of maternal depression diagnostic status in relation to EE-Crit and youth depressive symptoms has yet to be determined. A total of $N=121$ biological mother/daughter dyads that differed in maternal depression diagnostic status were recruited for the present study: (1) currently depressed mothers (current depression, $n=29$); (2) formerly depressed mothers (past depression, $n=39$); and (3) mothers free from any psychiatric history (healthy controls, $n=53$). Mothers were administered structured clinical interviews and completed self-report measures of EE-Crit and psychopathology, and daughters self-reported depressive symptoms. Results indicated no significant group differences in EE-Crit; however, current maternal depression status moderated EE-Crit such that the magnitude of the relation between EE-Crit and adolescent depressive symptoms was significantly greater in daughters of currently depressed mothers. These findings highlight the importance of considering current maternal depression, rather than a history of maternal depression, in relation to EE-Crit and adolescent depressive symptoms, providing impetus for future investigations.

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1. Introduction

Major Depressive Disorder (MDD) is a debilitating clinical syndrome that typically emerges during adolescence (Hankin et al., 1998). MDD is highly recurrent (Boland and Keller, 2009) and even subclinical depressive symptoms during adolescence are predictive of MDD in adulthood (Pine et al., 1999). Importantly, adolescence marks the time in which depression comes to disproportionately affect females, resulting in the 2:1 female to male ratio seen in adult depression (Rudolph, 2009). For these reasons among others, it is imperative to examine the factors that influence depressive symptoms among high-risk adolescents, particularly adolescent girls.

While a variety of psychosocial factors increase risk for childhood depression (i.e., stressful life events, childhood abuse or neglect; Bhatia and Bhatia, 2007), maternal depression has been consistently implicated as a predominant risk factor for children of all ages—from infancy through adolescence (Goodman and Gotlib, 1999). Children of depressed mothers are at greater risk for developing psychopathology, with a specific risk for depression (Downey and Coyne, 1990). Maternal depression has adverse

effects on the child's attachment style (Jameson et al., 1997) and contributes to negative, disengaged parent–child interactions (Lovejoy et al., 2000). Depressed mothers make more negative, critical, and hostile comments about their children (Brennan et al., 2002), further increasing risk for youth depression.

Not surprisingly then, several studies have considered the effects of expressed emotion (EE) in mothers in relation to childhood (child and adolescent) depression. EE is a construct that refers to the presence of negative components such as criticism, hostility, and/or emotional over-involvement (EOI), and positive components such as warmth and positive comments (Hooley, 2007). This growing body of literature points to EE, particularly high maternal critical EE (EE-Crit), as a significant factor in the development of childhood depression (Burkhouse et al., 2012). Some of these studies have employed high-risk designs to examine youth at high familial risk for depression, before they experience a major depressive episode. These study designs are especially informative as they allow for the identification of factors that may increase vulnerability to depression (Gotlib et al., 2010). We are aware of three high-risk design studies that investigated the relations between maternal depression, EE-Crit, and youth depression (Tompson et al., 2010; Burkhouse et al., 2012; Silk et al., 2009). We present these findings to highlight the established relations between these variables; however, it is not our intent to investigate causal relations in the current study.

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Conducting a high-risk cross-sectional study with children (ages 8–12) of mothers with a history of depression, [Tompson et al. \(2010\)](#) found that maternal depression was positively associated with EE-Crit. Both maternal depression history and EE-Crit were significantly associated with MDD in children; however, maternal depression history was the stronger predictor of child depression. Additionally, maternal depression history did not moderate the relation between EE-Crit and child depressive symptoms, but it is important to note that the authors made no distinction between *current* and *past* maternal depression. In examining EE-Crit's contribution to childhood initial MDD onset, [Burkhouse et al. \(2012\)](#) conducted a multi-wave high-risk longitudinal study of children (ages 8–12) of mothers with or without a history of depression. EE-Crit predicted children's depression onset over a 14-month period, even after controlling for maternal and child depressive symptoms at a 6-month follow-up. Maternal depression status, defined as a history of MDD during the child's lifetime, was examined as a moderator of EE-Crit and results were non-significant; however, this was attributed to low statistical power due to an insufficient sample size. Finally, a high-risk longitudinal study conducted by [Silk et al. \(2009\)](#) examined EE-Crit among mothers of children (ages 8–19) with differential depression statuses. EE-Crit was significantly higher among mothers of currently depressed, remitted, and high-risk children as compared to healthy controls. No significant differences were found between the first three groups on EE-Crit. Additionally, EE-Crit was associated with an increased likelihood of depressive onset in children at-risk or with a history of depression, suggesting a potential causal role of EE-Crit. Thus, [Silk et al.'s \(2009\)](#) study emphasizes the transactional nature of EE-Crit. Collectively, the literature suggests that maternal depression is positively associated with EE-Crit, and EE-Crit appears to be a significant, independent predictor of youth depression.

While this research is highly informative, the potential moderating effect of *current*, as compared to *past*, maternal depression on the relation between EE-Crit and adolescent depression has yet to be determined. Prior high-risk studies have generally operationalized maternal depression as mothers with a lifetime history of depression ([Tompson et al., 2010](#)) or mothers who had a major depressive episode during the child's lifetime ([Burkhouse et al., 2012](#)). This failure to distinguish between currently and formerly depressed mothers in the study of EE-Crit likely has implications, as distinct behavioral and emotional changes occur in mothers during the course of major depressive episodes. There are many ways in which *current* maternal depression is associated with compromised parenting (see [Joormann et al., 2009](#)). For instance, currently depressed mothers are more critical and disengaged from their children ([Cox et al., 1987](#)). Moreover, current depression, rather than a history of psychopathology, is predictive of this negative parent–child interaction style ([Adrian, 1989](#)). Taken together, these findings suggest that *current*, rather than *past*, maternal depression may distinctly influence the relation between EE-Crit and child depressive symptoms.

Against this background, the present cross-sectional, high-risk study examined whether the relation between EE-Crit and depressive symptoms in adolescent daughters was moderated by maternal depression diagnostic status (current depression, past depression, and healthy controls). We were specifically concerned with depressive symptoms in adolescent girls due to the fact that a disproportionate number of girls become affected by depression during adolescence ([Rudolph, 2009](#)). Moreover, there are important female-specific factors, particularly in regards to social cognition ([McClure, 2000](#)) and interpersonal style ([Purdie and Downey, 2000](#)) that makes girls particularly susceptible to depressive reactions to EE-Crit and maternal depression ([Davies and Windle, 1997](#)). We had two hypotheses: 1) mothers with current depression would report significantly higher EE-Crit than mothers with past depression and healthy controls; and 2) maternal depression status would moderate the relation between

EE-Crit and depressive symptoms in daughters, such that the magnitude of the relation between EE-Crit and depressive symptoms would be greater among mothers with *current* depression. While positive findings would not establish a causal relationship between EE-Crit and adolescent depression, they would suggest that emphasizing the treatment of EE-Crit, particularly in currently depressed mothers, is warranted. By examining EE-Crit specifically, rather than the general parenting impairments associated with maternal depression (i.e., less warmth and nurture), we aim to provide therapists with a well-operationalized treatment target.

2. Methods

2.1. Participants

A total of $N=121$ biological mother/daughter dyads formed three groups that differed in maternal depression diagnostic status: (1) currently depressed mothers (current depression, $n=29$); (2) formerly depressed mothers (past depression, $n=39$); and (3) mothers free from any history of psychopathology (healthy controls, $n=53$). See [Table 1](#) for the ages of mothers and daughters, respectively. The sample was racially diverse, composed of 23% African American, 44% Caucasian, 15% Multiracial, and 5% Other; 13% chose not to identify. Average annual household income among families was \$42,64K (S.D.=34,74K). Comorbidity among mothers with a history of depression included: panic disorder (current depression: $n=1$, past depression: $n=3$), generalized anxiety disorder (current depression: $n=6$, past depression: $n=1$), social phobia (current depression: $n=5$, past depression: $n=3$), obsessive–compulsive disorder (current depression: $n=1$, past depression: $n=1$), anxiety disorder not-otherwise-specified (current depression: $n=2$, past depression: $n=4$), current alcohol dependence (current depression: $n=0$, past depression: $n=1$), past alcohol dependence (current depression: $n=7$, past depression: $n=7$), and past substance abuse (current depression: $n=7$, past depression: $n=8$).

Inclusion criteria required that mothers in the groups with a history of depression report a lifetime diagnosis of recurrent MDD, and meet criteria for a current major depressive episode (current depression group, specifically), on the Structured Clinical Interview for DSM-IV-TR (SCID-I; [First et al., 2002](#)). Healthy control mothers had to be free of any psychiatric history per the SCID-I. All mothers were required to have biological daughters between the ages of 10 and 16 years-old who are fluent in English, with adequate reading skills for completing self-report measures as determined by the Wide Range Achievement Test 4 (WRAT4; [Wilkinson and Robertson, 2006](#)). If participants failed to meet full criteria, had bipolar I or any psychotic disorder, or any learning disability or mental retardation, they were excluded. Participants were recruited from a diverse major metropolitan area in the continental United States through community advertisements and from local inpatient and outpatient clinics. Advertisements were posted on craigslist and local radio, and flyers were placed at various locations at the university. In all, seventy-two dyads were recruited through advertising, and the remaining forty-two from clinics. Participants in the current and past depression groups responded at similar rates to each recruitment source.

2.2. Measures

2.2.1. The structured clinical interview for DSM-IV TR axis I disorders ([First et al., 2002](#))

The SCID-I was conducted to determine MDD status in mothers. For the assessment of MDD and comorbid psychiatric disorders, all modules were used. Inter-rater reliability on audiotaped SCID-I interviews, with raters blind to the diagnosis of the mother, found Kappa to be 1.00 for current diagnosis of depression and 0.81 for past diagnosis of depression ([Sharp et al., 2014](#)).

2.2.2. General health questionnaire (GHQ, 28-item version) ([Goldberg, 1978](#))

Mothers completed the GHQ as a measure of general psychopathology. The GHQ has a maximum total score of 84 which indicates extreme severity of symptoms. The reliability and validity of the GHQ have received support ([Failde et al., 2000](#); [Lincoln et al., 2003](#)). In the current study, the GHQ had a Chronbach's α of 0.93.

2.2.3. The mood and feelings questionnaire ([Angold et al., 1987](#))

The MFQ was used to measure depressive symptoms in daughters over the previous two-week period. The MFQ is a widely used self-report measure that assesses symptoms of depression in children and adolescents 6–17 years of age and has been extensively used in clinical and epidemiological research ([Sund et al., 2001](#); [Wood et al., 1995](#)). The MFQ has a maximum score of 66, indicating extreme depression. The criterion validity and re-test reliability have been supported in previous work ([Vander Stoep et al., 2012](#); [Wilkinson et al., 2013](#); [Wood et al., 1995](#)). In the current study, the MFQ had a Chronbach's α of 0.93.

2.2.4. The family attitudes scale (Kavanagh et al., 1997)

The FAS, a self-report measure of EE-Crit, was completed by mothers. The FAS was developed in line with the Camberwell Family Interview (CFI: Vaughn and Leff, 1976); however, unlike the CFI, the FAS only measures EE-Crit and thus excludes other EE components, such as EOI and positive comments. Thirty items comprise the FAS, including “She is really hard to take,” “I lose my temper with her,” and “I feel that she is becoming harder to live with.” The FAS has a maximum score of 120, indicating particularly high levels of EE-Crit. Reliability and validity for the FAS has been supported (Fujita et al., 2002; Kavanagh et al., 1997), as has convergent validity for the FAS and CFI (Van Humbeeck et al., 2002; Kavanagh et al., 1997). In the current study, the FAS had a Chronbach's α of 0.94.

2.3. Procedures

This study was approved by the institutional review board of the university at which data was collected. Those interested in the study were required to complete phone screens, and if eligible, were invited to participate. Mothers were administered the SCID-I interview by doctoral graduate students and clinical research assistants who completed multiple training sessions under the supervision of the principal investigator. Mothers and daughters completed self-report measures separately in private. All assessments took place in offices located in the university psychology clinic.

2.4. Data analytic strategy

Pearson correlations between main study variables were examined. Chi-square tests and analyses of variance (ANOVAs) with post-hoc Tukey tests were performed to determine any statistically significant differences between groups on socio-demographic and clinical characteristics, given that meta-analytic findings support significant relations between race, socioeconomic status, and depression (Lorant et al., 2003). Hierarchical linear regression was performed for moderation analyses. To correct for a violation of homogeneity of variance, MFQ scores received a square root transformation. Continuous variables were centered prior to forming interaction terms (Aiken and West, 1991), and Variance Inflation Factor (VIF, $Mdn=1.860$) and Tolerance ($Mdn=0.538$) indices revealed no issues with multicollinearity among predictors (Cohen et al., 2003).

3. Results

3.1. Participant characteristics

For participant characteristics and group differences, see Table 1. Of note, daughters in the current depression group

reported significantly higher MFQ scores than healthy controls ($p=0.001$), and there were no significant differences between groups on EE-Crit ($p=0.302$).

3.2. Moderation analyses

Hierarchical multiple regression analyses were conducted to examine whether maternal depression status (current depression, past depression, or healthy control) moderated the relation between EE-Crit and adolescent depressive symptoms, controlling for general severity of maternal psychopathology (GHQ total scores). In step 1, GHQ scores were entered, with MFQ scores as the dependent variable. The model was significant, $R^2=0.10$, $F(1, 119)=12.71$, $p=0.001$, accounting for 10% of the variance in MFQ scores. In step 2, dummy-coded group variables and FAS scores were entered as predictors. The model remained significant, $R^2=0.16$, $F(4, 116)=5.42$, $p<0.001$, accounting for 16% of the variance; however, individual predictors were non-significant ($p's \leq 0.079$). In step 3, group \times FAS interaction terms were added, and the model account for an additional 7% of MFQ score variance, $R^2=0.23$, $F(5, 115)=5.65$, $p<0.001$. There was a significant interaction between current depression status and FAS scores, $\beta=0.89$, $SE=0.31$, $t=2.93$, $p=0.004$, such that the magnitude of the relation between EE-Crit and depressive symptoms in daughters was significantly greater among currently depressed mothers (see Fig. 1). No other interactions were significant, but past depression group status had a main effect, $\beta=0.58$, $SE=0.28$, $t=2.08$, $p=0.040$, such that daughters of mothers with remitted depression reported significantly higher depressive symptoms compared to healthy controls. Of note, FAS scores were non-significant in the final model, $\beta=-0.03$, $SE=0.21$, $t=-0.12$, $p=0.905$.

4. Discussion

The aim of the current study was to examine whether *current* or *past* maternal depression moderated the relation between EE-Crit and

Table 1
Participant characteristics.

	Depressed mothers ($n=29$)	Remitted mothers ($n=39$)	Never depressed mothers ($n=53$)	p^a	Group difference
Mother age	40.86 (7.88)	39.54 (6.69)	40.21 (7.13)	0.750	
Daughter age	13.03 (1.99)	12.76 (1.84)	12.96 (2.02)	0.814	
FAS total	27.39 (17.24)	24.08 (16.45)	21.57 (13.99)	0.269	
Daughter MFQ	17.59 (14.44)	13.69 (9.91)	8.92 (6.22)	0.001	MDD > HC
Mother SCID # of symptoms	6.28 (2.27)	0.41 (1.25)	0.19 (0.74)	< 0.001	MDD > Rem, HC
Mother GHQ	36.75 (15.90)	25.91 (13.06)	20.52 (9.74)	< 0.001	MDD > Rem, HC
Maternal MDD episodes	4.46 (3.78)	3.11 (2.42)	N/A	0.235	
Maternal age 1st episode	33.00 (13.06)	28.11 (8.07)	N/A	0.337	
Mother's marital status					
Married	10	22	34	$\chi^2=17.133$; $p=0.039$	HC > MDD
Separated	6	2	5		
Divorced	4	9	7		
Living together	6	0	3		
Single	3	6	3		
Widowed	0	0	0		
Mother's years of education	13.64 (2.52)	14.41 (1.19)	14.15 (2.66)	0.440	
Annual family income	33.70K (23.67K)	43.70K (36.05K)	46.40K (38.34K)	0.457	
Race					
Black	3	3	7	$\chi^2=5.285$; $p=0.529$	
White	4	4	6		
Hispanic	5	7	11		
Asian	0	1	0		
Other	0	0	0		
Family history of MDD beyond maternal MDD	2	7	8		$\chi^2=5.487$; $p=0.486$

Note: Data are mean (standard deviation). FAS=Family Attitude Scale; MFQ=Mood and Feelings Questionnaire; SCID=Structured Clinical Interview for DSM-IV-TR Axis I Disorders; GHQ=General Health Questionnaire.

^a p -Value of One-Way ANOVA, otherwise noted as Chi-square test.

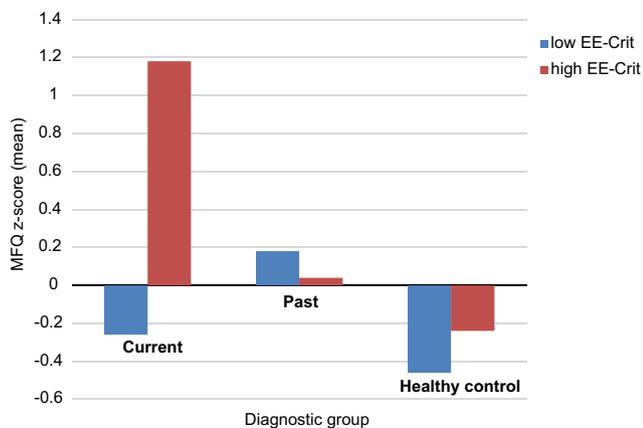


Fig. 1. Current maternal depression moderates the relation between EE-Crit and adolescent depressive symptoms.

High vs. low EE-Crit was determined by a median split of FAS scores within diagnostic groups. MFQ scores are standardized, $M=0$, $S.D.=1$. Current=depressive symptoms among daughters of mothers with current depression; Past=depressive symptoms among daughters of mothers with past depression; Healthy control=depressive symptoms of daughters of mothers with no psychiatric history.

depressive symptoms in adolescent daughters at high risk for depression. We utilized a high-risk design consisting of three biologically-related mother–daughter dyads classified by: (1) mothers with current depression, (2) mothers with past depression, and (3) mothers with no psychiatric history. Findings revealed that *current* maternal depression moderated the relation between EE-Crit and adolescent depressive symptoms, such that the magnitude of the relationship between EE-Crit and depressive symptoms in adolescent daughters of mothers with *current* depression was significantly greater. In other words, when accounting for maternal depression status, EE-Crit predicted depressive symptoms in daughters of currently depressed mothers only. These results support the notion that EE-Crit and maternal depression make synergistic contributions to children's depressive symptoms (Tompson et al., 2010); however, this was only evidenced in the currently depressed group. Second, we provided further evidence that maternal depression, as compared to EE-Crit, is a stronger predictor of adolescent depressive symptoms (Tompson et al., 2010). Importantly, this is the first study to examine *current* maternal depression as a moderator of the relation between EE-Crit and adolescent depressive symptoms. Therefore, the present study provides preliminary evidence for the importance of the interaction between current maternal depression and EE-Crit, providing impetus for future research investigating these relations.

Given prior findings, we expected mothers with current or past depression to report higher EE-Crit as compared to healthy controls (Tompson et al., 2010). Instead, all three groups endorsed similar levels of EE-Crit, which suggests that EE-Crit may not necessarily wax and wane with maternal depressive symptoms. Instead, our results suggest there may be qualitative differences in the expression of EE-Crit by currently depressed mothers, as it relates to adolescent depression. One plausible explanation for non-elevated levels of EE-Crit among currently depressed and remitted mothers may be related to measurement. The Camberwell Family Interview (CFI) and Five Minute Speech Sample (FMSS; Magaña et al., 1986), gold-standard EE interviews, measure both the negative (e.g., critical) and positive components of the EE construct. The FAS measures the critical component only and thus excludes important (positive) aspects of EE. Though it was necessary to use the FAS for its practical utility, it is possible that depression would associate with elevated EE-Crit had we measured the full construct. For instance, maternal depression history has been positively associated with emotional over-involvement (EOI) as measured by the FMSS (Tompson et al., 2010). However, Tompson et al.'s (2010) finding of a negative

relation between current maternal depressive symptoms and high EOI suggests that the inclusion of EOI may not have altered our findings. These mixed results speak to the recent shift in EE research to the use of observational measures rather than interviews, as they can be better indicators of the construct given that self-report instruments are vulnerable to potential biases, such as mood state-dependent biases. To this end, it is possible that the emotional state of the currently depressed group may have influenced self-reported EE-Crit ratings.

The fact that remitted (past) diagnostic status did not interact with EE-Crit in predicting adolescent depressive symptoms shows the value of examining these diagnostic groups distinctly (current vs. past depression). More importantly, it suggests that the effect of EE-Crit is a function of current depression (state-dependent) and not a function of an underlying tendency to become depressed. Although the daughters of currently depressed and remitted mothers presumably have a similar vulnerability to depression, the presence of a current depressive episode often results in the mother engaging in more self-directed negative, critical, and disparaging remarks (Radke-Yarrow et al., 1990). As such, the daughters in the depressed group may develop depressive symptoms through observational learning of the affect, behaviors, and cognitions that their depressed mothers model (Goodman, 2007). There is evidence for this transaction; for example, children of depressed mothers are more likely to endorse similar self-critical statements (Radke-Yarrow et al., 1990), have negative interpretations of events (Dearing and Gotlib, 2009), as well as negative automatic thoughts (Garber and Robinson, 1997).

Consistent with this notion, maternal and child depressive symptoms have been shown to wax and wane (Hammen et al., 1991), which is in line with our finding that MFQ scores were significantly higher for daughters of currently depressed mothers as compared to those of never depressed mothers. EE-Crit likely shapes a negative self-view (Hayden et al., 2013) which is potentially modulated by the depressotypic attributes that these daughters are likely to exhibit. One factor that was not measured in the current study, but that would likely impact the relation between maternal depression, EE-Crit, and adolescent depression is maternal treatment utilization. Many treatments for depression (e.g., Cognitive-Behavioral Therapy and Interpersonal Therapy) target potentially negative effects (e.g., modeling) that depressive behaviors have on significant others, including children. Therefore, differential rates of maternal treatment utilization may have impacted daughters' depressive symptoms in the current study and should be measured in future research.

Finally, the maternal depressive episode itself may serve as a particularly salient stressor for the daughter, with profound effects on the parent–child relationship. Witnessing their mother experience an episode may be especially distressing and the adolescent may blame themselves for their mother's state (Hammen, 2002). This may elicit depressive reactions in the adolescent, which then results in EE-Crit from their mother. Though the directionality of these effects cannot be assumed given the cross-sectional nature of the current study's design, findings from a longitudinal community study indicate that adolescent internalizing symptoms affect levels of maternal EE (both negative and positive components), rather than maternal EE affecting the course of adolescent symptoms (Hale et al., 2011). Extending the study of these bi-directional relations to clinical samples is of particular importance.

The findings of the present study are limited by several factors. Most importantly, the relation among EE-Crit, maternal depression, and adolescent depressive symptoms is most likely transactional (Burkhouse et al., 2012). Ideally, the employment of more complex statistical analyses like structural equation modeling would allow for the disentanglement of these complex interrelated factors; however, the current study was unable to model all directions of influence due to an insufficient sample size. Second, the cross-sectional design

of this study limits the interpretation of these findings by excluding causal interpretations, such that we cannot conclude that EE-Crit precedes adolescent depressive symptoms, or vice versa. While this study enhances understanding of the interaction between current maternal depression and EE-Crit on adolescent depression, a longitudinal design is needed in order to test a broad causal theory. Third, though we chose depression diagnostic status as a moderating variable, we acknowledge there are myriad factors that influence the relation between EE-Crit and adolescent depressive symptoms. Finally, the FAS does not measure all EE components (i.e., EOI, positive comments, and warmth), which may bring into question whether we examined criticism, in general, rather than EE-Crit specifically. Future research should seek to include other self-report EE measures such as the Family Questionnaire (FQ: Wiedemann et al., 2002) and the Brief Dyadic Scale of Expressed Emotion (BDSEE: Medina-Pradas et al., 2011). These measures have some notable advantages over the FAS. For instance, the FQ measures EOI (in addition to EE-Crit) and the BDSEE measures EE from the perspective of the recipient. Moreover, some studies (Lee et al., 2014; López et al., 2004) have demonstrated that certain purportedly negative components of EE (e.g., EOI) are not necessarily detrimental, and may in fact protect against psychopathology. However, the specific relation between positive EE components and depression in adolescents has not been studied, and therefore should serve as a focus in future research.

The present study makes a meaningful contribution by considering the moderating effect of *current* versus *past* maternal depression on the relation between EE-Crit and adolescent depressive symptoms. Our findings not only build on knowledge surrounding the intergenerational transmission of depression, but also highlight the importance of developing family-level interventions that buffer adolescents against potential harmful effects of EE-Crit and current maternal depression.

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