Published in final edited form as:

J Abnorm Child Psychol. 2011 November ; 39(8): 1177–1186. doi:10.1007/s10802-011-9536-0.

Effects of Child Psychopathology on Maternal Depression: The Mediating Role of Child-Related Acute and Chronic Stressors

Elizabeth Raposa¹, Constance L. Hammen¹, and Patricia A. Brennan²

¹Department of Psychology, University of California, Los Angeles, CA

²Department of Psychology, Emory University, Atlanta, GA

Abstract

In light of recent research highlighting the potential effects of children's behavior on mothers' mental health, the current study examined 679 mothers and their adolescent children from a community-based sample to determine the effects of youth psychopathology on maternal depression and levels of child-related stress in mothers' lives. It was hypothesized that the number of past clinical diagnoses in 15-year-old adolescents would predict the presence of maternal depression at youth age 15 and 5 years later, as well as more episodes of maternal depression during the follow-up period. Furthermore, it was hypothesized that increased levels of child-related stress in mothers' lives would mediate these relationships. Regression analyses indicated that past youth diagnoses do confer risk for the presence of current and future maternal depression, as well as more episodes of maternal depression, and mediation analyses revealed that child-related acute and chronic stress were mediators of the relationship between youth diagnoses and the presence of maternal depression at follow-up. Findings suggest that increased levels of child-related objective stress in mothers' lives are one mechanism by which children's psychopathology affects mothers' future risk for depression.

Keywords

Maternal depression; child psychopathology; stress; child effects; community sample

Depression in mothers has substantial and long-lasting implications for the mother-child relationship, as well as the psychological well-being of children. Children of mothers with depression often evidence extensive interpersonal and emotional deficits, including higher rates of internalizing and externalizing symptoms (Beardslee, Versage, & Gladstone, 1998; Civic & Holt, 2004; Foster et al., 2008; Gotlib & Goodman, 1999). While most research has focused on the effects of maternal depression on child mental health, the ways in which children's elevated levels of psychopathology affect depressed mothers are also important to consider. Child psychopathology raises challenges for parenting skills that might already be taxed in depressed mothers, and may contribute to the creation of an especially stressful mother-child relationship. In this way, the challenges of dealing with problematic behaviors in offspring may compound the issue of maternal depression and are likely to have a profound influence on the future course of maternal depression. In order to better understand the role of psychopathology in the mother-child relationship, it is therefore necessary to identify the multiple transactional processes by which children's behaviors might also affect the course of maternal depression, thereby perpetuating the cycle of psychopathology in mothers and their offspring.

Early developmental research in child effects tended to focus on the impact of externalizing behaviors on parenting techniques. Child aggression was hypothesized to lead to disruptions in parenting, as well as irritable exchanges between the parents and child, thereby leading to further escalation of child problem behaviors (Oliver, 1995; Patterson, Dishion, & Bank, 1984). In accordance with these transactional models, parents tend to respond with more coercive and hostile parenting techniques to children who display externalizing behaviors, such as aggression and hyperactivity, during play (DeWolfe, Byrne, & Bawden, 2000; Dunn, 1997; Patterson, DeBaryshe, & Ramsey, 1989). More recent longitudinal studies show that children's externalizing behaviors are associated with decreased parental warmth and increases in parental use of harsh punishment, as well as increases in maternal displays of hostile and controlling behaviors (Hipwell et al., 2008; Marchand, Hock, & Widaman, 2002). Thus, children's behavior in a variety of contexts can significantly affect the parent-child relationship by influencing parents' discipline choices and communication style, thereby perpetuating a vicious cycle of negative parental attitudes and child misbehavior.

The noted effects of child psychopathology on parental attitudes and parenting techniques indicate that child behavior might also have a negative impact on parental mental health. To the extent that these reciprocal maladaptive patterns may influence stress levels within the family, as well as evoke emotional reactions and maladaptive behavior from parents, they might also have a negative effect on parents' mental health. Externalizing behaviors in offspring are associated with higher levels of depression and anxiety in mothers (Fombonne, Simmons, Ford, Meltzer, & Goodman, 2003; Ghodsian, Zajicek, & Wolkind, 1984; Hastings, 2002; Herring et al., 2006). Furthermore, in longitudinal studies of mother-child transactions, non-compliance in early childhood leads to more severe trajectories of maternal depression, characterized by more persistent and higher levels of depressive symptoms (Gartstein & Sheeber, 2004; Gross, Shaw, Burwin, & Nagin, 2009; Gross, Shaw, & Hoilanen, 2008). Importantly, some evidence suggests that these problematic child behaviors affect the mental health outcomes of mothers more strongly than fathers' outcomes, perhaps because of the unique features of the mother-child relationship or gender-specific reactions to stress (Hastings, 2002).

It is therefore clear that problematic behaviors in the context of various forms of child psychopathology may influence parental mental health, and might have particularly negative implications for the severity and recurrence of depression in mothers. However, the mechanisms by which children's actions prospectively shape maternal mental health remain largely unknown. Several mechanisms of child effects have been proposed, including decreased levels of parenting self-efficacy (Baker & Heller, 1996; Cutrona & Troutman, 1986; Teti & Gelfand, 1991), feelings of social isolation (Donenberg & Baker, 1993; Wahler, 1980), and marital discord (Befera & Barkley, 1985; Cui, Donnellan, & Conger, 2007). Despite the number of existing hypotheses, most of these variables have not been examined in longitudinal studies. Furthermore, most studies of the mechanisms of child effects have not controlled for the confounding effects of chronic stressors, such as financial hardships, which might influence both the mother and child. As a result, more precise models of mother-child interactions that include mediational processes are less prevalent, leaving a gap in our understanding of the transactional relationship between mother and child psychopathology. The current project therefore seeks to further explore the dynamics of one particular mechanism of child effects on maternal depression: the mediating role of increased levels of objective child-related acute and chronic stress for mothers in the relationship between child disorders and maternal depression.

The effects of child psychopathology on maternal depression could be partly explained by heightened levels of objective stress associated with child behavior. That is, child emotional and behavioral disorders might lead to stressors such as sibling conflict, academic

difficulties, or problems with peers that also have an impact on mothers' lives. These events might therefore serve as direct or indirect stressors for mothers. Mothers who are already susceptible to emotional distress might then tend to react to these stressors with depression. Depressed individuals, including depressed children and adolescents, have been shown to generate stressful life events by contributing to interpersonal conflicts and other life stressors (Cole, Nolen-Hoeksema, Girgus, & Gilda, 2006; Hammen, 1991, 2006; Rudolph et al., 2000). Often these negative life events occur as a result of the individual's depressive symptoms or their associated impairments and vulnerabilities. This phenomenon of stress generation has most often been studied in relation to depression (Hammen, 2005). However, it is likely that impairment associated with other forms of psychopathology is also capable of precipitating stressful life events (e.g., Riskind, Black, & Shahar, 2010). Thus, it is possible that children and adolescents with elevated levels of any psychopathology are more likely to generate stressors that affect mothers and in turn increase a depressed mother's vulnerability to experience depression.

There is some evidence that being in the mother role is itself associated with stressful experiences due to the child's actions and circumstances. For example, depressed mothers experience higher levels of severe life stressors and marked difficulties than depressed non-mothers, as rated by interviewers taking into account the contextual severity of threat (Feske et al., 2001). Moreover, these increased rates of stressors are largely accounted for by child-related difficulties stemming from childhood psychological or behavioral problems. Moreover, children with developmental delays or elevated levels of externalizing psychopathology present more challenging and stressful situations for mothers, compared with non-impaired children, as evidenced by higher levels of perceived parenting stress (Baker et al., 2003; Fischer, 1990; Hastings, 2002). Although these findings point to a clear increase in parents' acknowledged distress as a result of child misbehavior, the stressful context of parenting tends to be measured by subjective reports of parenting stress. It is therefore unknown whether child psychopathology would lead to increases in more objective measures of acute and chronic child-related stress in mothers' lives. Furthermore, it remains unclear whether elevated levels of child-related stress serve as a mechanism for the impact of child psychopathology on maternal depression.

The present project seeks to address these gaps in the existing literature by examining the effects of child psychopathology on the course of maternal depression, via the mechanism of objective levels of child-related acute and chronic stress. This approach expands upon previous research by adding the component of child effects on maternal mental health to the model of mother-child transactions, and by using longitudinal data to determine more precisely the relationships among these variables. We hypothesize that a history of child psychopathology by youth age 15 will predict current maternal depression at youth age 15, more episodes of maternal depression during the five-year follow-up after the age 15 assessment, and greater likelihood of maternal depression at youth age 20. We also hypothesize that a history of psychopathology in the target youth by age 15 will predict increased exposure of mothers to objectively measured youth-related chronic and acute stress. Finally, we hypothesize that levels of youth-related chronic and acute stress reported by mothers will each mediate the relationship between youth psychopathology and maternal depression. To account for the influence of gender and family income on youth and mother psychopathology, as well as maternal stress, these variables were controlled in all analyses.

Method

Participants

Participants were drawn from a larger sample of 7,775 children born between 1981 and 1984 in Mater Misericordiae Mothers' Hospital. Mother-child pairs were originally studied in a

birth cohort in the Mater Misericordiae Mothers' Hospital-University of Queensland Study of Pregnancy (MUSP; Keeping et al., 1989), largely comprised of publicly supported maternity patients of middle and lower socioeconomic status and educational attainment (Najman, Bor, O'Callaghan, Williams, Aird, & Shuttlewood, 2005). At youth age 15, 816 mother-child pairs were selected from the cohort, based on depression questionnaires completed 4 times by mothers from pregnancy through age 5. This sample was selected to represent a range of exposure to maternal depression, and was over-selected for maternal depression relative to the general population. Four families were excluded from analyses due to incomplete data, leaving 812 participants in the age 15 sample. The adolescent sample at age 15 was 50.4% male and 49.4% female. The families were largely lower income ($M = 3.02$, $SD = 2.1$ on a 9-point ordinal scale), predominately Caucasian (91.4% Caucasian; 3.6% Asian; 5% other or not reported), and 67% of the mothers were married to the biological father of the target child (20% married to others; 13% single). The average maternal age at birth of the child was 25.5 years ($SD = 5.1$), and median for mothers' highest level of education was 10th grade. Family income at youth age 15 was the only demographic variable that moderated key associations among youth stressors, youth diagnoses and maternal depression, and was therefore controlled for in all analyses.

Of the 812 original mothers, 678 (84%) were retained for follow-up at child age 20. Thus, prospective analyses predicting mothers' depression at age 20 in the current project utilized only those 678 mother-child pairs for which mothers were retained for the age 20 follow-up. The mother-child pairs included in these prospective analyses did not differ from those not included in terms of maternal history of depression by youth age 15 ($\chi^2(1, n = 813) = .79, p = 0.37$), mothers' child-related acute stress at age 15 ($t(811) = -.11, p = .91$), chronic stress in the mother-child relationship at age 15 ($t(810) = -.85, p = .39$), history of youth diagnoses at the age 15 interview ($t(811) = -1.32, p = .19$), youth gender ($\chi^2(1, n = 813) = 1.40, p = 0.24$), family income ($t(780) = 1.44, p = .15$), or mothers' marital status at youth age 15, ($\chi^2(2, n = 813) = 2.41, p = 0.30$).

Procedure

At youth age 15 and at youth age 20, the child and mother underwent extensive interviewing and completed a series of questionnaires. These interviews and questionnaires asked about child and mother psychopathology, mothers' chronic and acute stress exposure, and family demographic information. All interviews were conducted in the participants' homes or other locations convenient for the participants and the interviewer. Postgraduate students were trained to appropriately conduct and reliably score these interviews. Participants all gave informed consent, or assent in the case of minors, and the institutional review/ethics panels of the University of Queensland, Emory University, and the University of California, Los Angeles approved the research protocol.

Measures

Maternal depression—Maternal depression was measured using the *Structured Clinical Interview for DSM-IV Axis-I Disorders, Patient Edition* (SCID; First, Spitzer, Gibbon, & Williams, 1997). The SCID is a well-validated and reliable semi-structured interview which covers the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (DSM-IV) criteria for adult psychopathology. This interview was administered at youth age 15 for mothers' current and lifetime depressive disorders (weighted kappas = .87 and .84, respectively), and again at age 20 for maternal depression between youth ages 15 and 20 (weighted kappa = .79). At each interview, each depressive episode was dated as precisely as possible, and probed for number and severity of symptoms. For this project, diagnoses of current Major Depressive Disorder (MDD) or Dysthymia at the youth age 15 interview and the youth age 20 interview were used as a measure of the presence or absence of current

maternal depression at youth age 15 and at follow-up, respectively. We also examined the number of episodes of major depression and/or dysthymia (0, 1, or 2) experienced by the mother during the 5 years between the age 15 interview and the age 20 follow-up interview.

Youth psychopathology—History of youth psychopathology was measured using the *Schedule for Affective Disorders and Schizophrenia for School-age Children, Present and Lifetime Version* (K-SADS-PL; Kaufman et al., 1997). The K-SADS-PL is a well-validated and reliable semi-structured diagnostic interview which covers the DSM-IV criteria for current and lifetime child psychopathology. It was administered separately to the parent and the child at youth age 15 by trained clinical interviewers. Each diagnostic decision was reviewed by an independent clinical rating team based on all available information. A reliability study in the current community sample was based on 75 interviews with youths. Reliabilities for past disorders (depressive disorders, anxiety disorders, substance use disorders, disruptive disorders, and “other”) ranged from .72 to 1.0, with a mean of .81.

For the purposes of this project, the overall measure of past youth psychopathology included the number of diagnoses each child had from the following list: MDD/dysthymia ($n = 103$), ADHD ($n = 56$), PTSD ($n = 12$), separation anxiety ($n = 28$), other anxiety disorders ($n = 68$), conduct disorder ($n = 21$), oppositional defiant disorder ($n = 22$), eating disorders ($n = 13$), drug dependence ($n = 1$), alcohol abuse ($n = 8$), and drug abuse ($n = 12$). Because only 1 child had 5 diagnoses, children were recoded as having 0, 1, 2, 3, or 4 diagnoses. Number of diagnoses was used as a proxy for severity of psychopathology and to facilitate analyses given diverse patterns of comorbidity among youth with multiple disorders. Additional descriptive information is provided in Results.

Child-related stress reported by mothers—Measures of child-related stress were derived from semi-structured interviews with the mothers at youth age 15, using the UCLA Life Stress Interview (Hammen, 1991). The life stress interview is a face-to-face semi-structured interview that uses standard questions to probe mothers’ experiences with chronic and acute stress. First, overall functioning in each of 6 domains (romantic relationships, work, family, relationship with the target child, financial, and health) was discussed, and the interviewer assigned an objective severity rating for the level of chronic stress in each domain. Each domain was rated on a 5-point scale, using behaviorally specific anchor points (with 1 indicating exceptionally good conditions and 5 indicating extreme adversity). For the current analyses, only chronic stress ratings for the relationship with the target child were examined. As an example, a score of 2 in this domain indicates a very good relationship with the youth, generally close, with minor, normal conflicts usually quickly resolved; a rating of 4 indicates poor mother-youth relationship, deficiencies in most quality factors (of closeness, monitoring, child confiding); significant parent-child conflict or potential for abuse or separation. The interrater reliability was .82 for this domain of maternal chronic stress, as measured by the UCLA Life Stress Interview.

Second, consistent with a contextual approach to assessing objective severity of stressors, the interviewer elicited specific information about the nature and circumstances of each acute stressor reported by mothers as occurring in the past 12 months, including a careful dating of its occurrence. Interviewers then wrote narratives of each event that were presented to a team of raters who were blind to the mother’s depression status and actual reactions to the event, and individual acute stressors were rated by the team for objective severity. In order to make acute stress severity ratings, the raters took into account the context in which the stressor occurred in order to judge the objective level of stress that the event would cause to the average individual. Stress severity was rated on a 5 point scale, with 1 indicating *no stress* and 5 indicating *severe stress*. In the present community sample, interrater reliabilities based on independent ratings for 89 cases yielded intraclass

correlations of .92 for severity ratings. Examples of commonly reported acute child-related stressors included suspension or expulsion from school, conflicts with peers and teachers, and accidents or injuries.

For the current study, all narrative accounts of mothers' acute stressors were re-examined by two independent raters. The raters recoded each narrative as either pertaining to the target child or not target child-related, in order to operationalize target child-related acute stress in the analyses. An analysis of interrater reliability for these judgments, based on a sub-sample of 50 mothers' stress narratives, yielded a kappa coefficient of .95. Due to the low number of participants with more than 4 acute stressors ($n = 2$), participants were recoded as having 0, 1, 2, 3, or 4 stressors.

Analyses

The main effects of youth psychopathology on the course of maternal depression were examined by regressing the measures of maternal depression on the measure of youth psychopathology (number of diagnoses) in separate regression analyses. Logistic regressions examined the cross-sectional effects of past (prior to age 15) youth psychopathology on the presence of current maternal depression at the youth age 15 interview, as well as the prospective effects of past youth psychopathology on the presence of maternal depression at the age 20 follow-up. Ordinal regression analyses examined the effects of past youth diagnoses on the number of maternal depressive episodes (0, 1, or 2) during the five years between the age 15 interview and age 20 follow-up. All analyses controlled for youth gender, family income, and maternal history of depression prior to youth age 15 in order to examine the unique effects of youth psychopathology.

Next, linear regression analyses were performed to predict mothers' reports of levels of youth-related stress from youth psychopathology. The mediating effects of youth-related stress on the relationship between youth psychopathology and the presence of maternal depression at the youth age 20 follow-up were then explored. Because the outcome measure of the presence of maternal depression was dichotomous, we utilized logistic regression mediation for these analyses, using the guidelines outlined by MacKinnon & Dwyer (1993). In order to account for the fact that coefficients from ordinary least-squares and logistic regression are on different scales, each coefficient was rescaled by multiplying the standard deviation of the predictor and dividing by the standard deviation of the criterion.

Results

Effects of Youth Psychopathology on Maternal Depression

Predicting current maternal depression at youth age 15—Descriptive statistics for measures of youth psychopathology, child-related stress, and course of maternal depression, as well as bivariate correlations among the variables, are presented in Table 1. Out of the 812 mothers with diagnostic data at the youth age 15 interview, 85 (10%) were currently depressed. Logistic regression analyses examined whether past offspring psychopathology predicted current maternal depression as reported at the youth age 15 interview. The number of past youth diagnoses did significantly predict the presence of current maternal depression, over and above the effects of gender, family income, and mothers' history of depression ($b = .45$, Wald = 11.46, OR = 1.57, 95% CI [1.21 2.04], $p = .001$).

Predicting maternal depression at youth age 20 follow-up—Out of the 678 mothers with diagnostic data at the target child's age 20 interview, 92 (14%) were currently depressed. The overall number of past youth diagnoses at age 15 significantly predicted the presence of maternal depression at youth age 20, over and above the effects of gender,

family income, and maternal history of depression ($b = .35$, Wald = 6.66, OR = 1.42, 95% CI [1.09 1.84], $p = .01$). The total number of past youth diagnoses at the age 15 interview also significantly predicted the number of maternal depressive episodes over the entire 5 year follow-up, over and above the effects of gender, family income, and mothers' history of depression ($b = .32$, Wald = 8.92, 95% CI [.11 .53], $p < .005$).

Effects of Youth Psychopathology on Youth-related Stress

Separate linear regression analyses were performed to investigate the effects of youth psychopathology on maternal reports at youth age 15 of acute and chronic stress related to the child. Consistent with the hypothesis of stress generation, the number of past youth diagnoses significantly predicted a greater number of acute child-related stressors over the past year, over and above the effects of gender, family income, and mothers' history of depression ($b = .21$, $SE = .06$, $t(780) = 6.33$, $p < .001$). The number of past youth diagnoses also predicted higher levels of chronic stress in the mother-child relationship at the age 15 interview, controlling for gender, family income, and maternal history of depression ($b = .17$, $SE = .02$, $t(779) = 7.65$, $p < .001$).

Mediating Effects of Youth-related Stress on the Relationship between Youth Psychopathology and Maternal Depression

Finally, given the hypothesis that elevated levels of child-related stress might account for the prospective effects of youth psychopathology on maternal depression, logistic mediation analyses were conducted. The outcome examined in all analyses was presence/absence of maternal depression at the follow-up interview (at youth age 20). Separate mediations were conducted with chronic mother-child relationship stress and acute stressors as mediators, since both stress measures showed significant relationships to child psychopathology and maternal depression in previous analyses. In each mediation analysis, history of maternal depression was controlled for in the total effect of target psychopathology on presence of maternal depression, and the direct effects of youth psychopathology and target-related stress on the presence of maternal depression. Gender and family income were also controlled for in all regression equations.

Both the total number of acute child-related stressors ($b = .46$, Wald = 9.40, OR = 1.58, 95% CI [1.18 2.11], $p < .005$) and elevated level of chronic stress in the mother-child relationship ($b = .78$, Wald = 13.41, OR = 2.18, 95% CI [1.44 3.30], $p < .001$) at age 15 significantly predicted the presence of maternal depression at the age 20 follow-up, over and above the effects of gender, family income, and maternal history of depression. In addition, when controlling for maternal history of depression, gender, and family income, the relationship between past youth diagnoses and maternal depression at follow-up was fully mediated by levels of chronic stress in the mother-child relationship (Sobel = 2.91, $SE = .005$, $p < .005$; see Figure 1). That is, the relationship between youth psychopathology and the presence of maternal depression was no longer significant in the presence of the mediator. The number of child-related acute stressors was also a full mediator of the relationship between youth psychopathology and the presence of maternal depression at follow-up (Sobel = 2.37, $SE = .006$, $p < .05$; see Figure 2).

Descriptive Analyses of Effects of Youth Diagnostic Categories

In order to clarify whether the impact of youth disorder varied according to characteristics of the disorder, youth were reclassified into one of 5 mutually exclusive groups: depression only ($n = 46$); one anxiety disorder only ($n = 44$); one externalizing disorder only ($n = 44$); more than one disorder (comorbidity; $n = 60$); no disorder ($n = 478$). Several cases were omitted that did not fall into these classifications. The 5 groups were compared on child-

related acute stressors, chronic stress in the mother-child relationship, and maternal depression at youth ages 15 and 20.

The groups showed significant differences in predicting youth acute stressors, $F(4, 672) = 11.56, p < .001$, with highest means for the comorbid group ($M = .83, SD = .98$) and the externalizing only group ($M = .86, SD = 1.03$). Posthoc tests showed that these two groups differed significantly from all other groups except the depression only group (p 's $> .05$). There were also significant differences among diagnostic groups when predicting chronic stress in the mother-child relationship, $F(4, 672) = 4.42, p < .001$, with the comorbid group ($M = 2.55, SD = .69$) and externalizing only group ($M = 2.66, SD = .65$) again showing the highest means, and posthoc tests showing significant differences between these groups and all others (p 's $< .02$). Comparisons among the groups on proportion of maternal depression at youth age 15 indicated overall significant differences, $\chi^2(4, n = 672) = 31.11, p < .001$, with the highest rate (32%) among mothers of youth with comorbid disorders. A similar pattern was observed for maternal depression at youth age 20, $\chi^2(4, n = 672) = 17.70, p < .001$.

Discussion

This study examined the effects of youth disorders on maternal depression, and explored whether this effect was accounted for by youth-related acute and chronic stress experienced by the mother. Such a perspective reverses the typical study of effects of maternal depression on offspring, suggesting that disorders of the mother and child could have mutually adverse effects. Findings revealed that child psychopathology does confer a prospective risk for maternal depression, in that mothers of children with a greater number of past diagnoses by age 15 were more likely to be depressed both at the youth age 15 interview and at the youth age 20 follow-up. In addition to conferring a risk for the presence of maternal depression, youth psychopathology also predicted a greater number of episodes of maternal depression and dysthymia during the 5-year follow-up period. Moreover, these prospective effects of child psychopathology on maternal mental health persisted despite controlling for youth gender, family income, and mothers' prior history of depression.

These results are consistent with previous research illustrating that children's externalizing behaviors can have negative effects on mothers' future mental health (e.g., Gross et al., 2009), and specifically, can exert an influence on the trajectory of maternal depressive symptoms (e.g., Gross et al., 2008). However, the findings extend previous research by indicating that child psychopathology confers risk for clinical levels of depression in mothers, rather than just subclinical depressive symptoms. Moreover, mothers' risk for clinically significant depression increased with the number of diagnoses of the youth, suggesting that families with children with multiple comorbid disorders might be at particular risk for the perpetuation of maternal depression. Also, the results show that child psychopathology confers risk for maternal depression over and above the effects of other challenging contexts within the family that might affect mothers' risk for depression, including the family's financial difficulties and the mother's past struggles with depression. In particular, controlling for maternal history of depression allowed us to control for the effects of maternal mental health on children and to more specifically examine child effects on mothers.

The second hypothesis, that child psychopathology would lead to the generation of child-related stress for mothers, was also supported. Mothers of children with a greater number of past diagnoses experienced elevated levels of child-related acute stressors, such as difficulties in school or conflicts with peers. Mothers of children with more past disorders also reported increased chronic stress in the mother-child relationship, including more than

typical conflict, poor communication, and poor parental control. Thus, not only are children with psychopathology more likely to generate stress in their own lives, but their disorders are also involved in the creation of elevated levels of stress exposure for their mothers. That is, the widespread effects of youth psychopathology on children's behavior and peer relationships, as well as family dynamics, are likely to create a particularly stressful context for mothers, both in terms of the number of child-related acute stressors and chronic stress within the mother-child relationship.

Finally, results also supported the hypothesis concerning the mediating effects of child-related stress on the relationship between child psychopathology and risk for future maternal depression. Levels of chronic stress in the mother-child relationship and the number of child-related acute stressors each accounted for the relationship between the number of past youth disorders and the presence of maternal depression at the age 20 follow-up. Thus, it appears that youth psychopathology gives rise to higher levels of child-related stress for mothers, and these elevated levels of stress in turn increase the risk for maternal depression. These findings highlight objective stress levels as one important mechanism by which youth psychopathology affects maternal mental health and generates an increased risk for maternal depression. Although previous research has discussed stress as a potential mechanism for child effects on maternal mental health (e.g., Hastings, 2002), this is the first known study to use a well-validated contextual assessment of objective stress levels in order to examine child-related acute and chronic stress as mediators of this relationship. Furthermore, the results indicate that objective levels of child-related stress play a role in the effects of youth psychopathology on clinical depression in mothers, and not just maternal reports of subclinical depressive symptoms.

Because certain youth disorders might be expected to contribute more to maternal stress and depression than others, descriptive analyses explored the differential effects of various types of youth psychopathology on our outcomes. For these analyses, youth were separated into groups that contained youth with one depressive disorder only, one anxiety disorder only, one externalizing disorder only, multiple disorders, or no disorders. Interestingly, both the externalizing disorder only group and the comorbid group predicted higher levels of maternal stress and depression than the other groups. Thus, in accordance with our finding that the number of youth diagnoses predicts maternal stress and depression, youth with comorbid disorders appear to be more severe and at particular risk for problematic behaviors that affect their mothers. However, youth externalizing disorders appear to play an especially important role in contributing to mothers' risk for child-related stress and depression and are likely to be driving at least some of our findings of the effects of youth psychopathology on mothers.

While the current study underscores the effects of child psychopathology on mothers' depression, several important limitations must be acknowledged. Firm directional conclusions about the effects of youth psychopathology on maternal depression cannot be made given our retrospective accounts of stressor occurrence and youth diagnoses, as well as the lack of information about long-term patterns in the previous timing of maternal depression and youth disorders. Although maternal history of depression was controlled for in all analyses, doubtless maternal depression and its correlated risk factors contribute to the onset of youth disorders, with most depressed mothers experiencing symptomatic periods throughout the youth's life. In addition, genetic factors affecting both maternal depression and youth diagnoses are also important variables in the transactions under study.

Thus, the current study shows a significant association between mother and youth symptomatology, mediated by current child-related stressors, but the pattern is inherently transactional. Findings are consistent with the idea that mothers' depression is at least in part

reactive to the challenges of dealing with a child with psychopathology and the stressors that accompany life with the child, above and beyond the effect of mothers' prior history of depression. However, the study examines only a slice of what is doubtless an early-developing and continuing reciprocal interaction between child and mother experiences. Future studies with frequent short-term follow-ups, beginning in early childhood, would be necessary to resolve issues of temporal associations.

It should also be acknowledged that there is some potential for bias in the retrospective measure of stressor occurrence due to the fact that it was based on interviews with mothers. Multiple steps were taken to ensure that final ratings of acute and chronic stress were as objective as possible. Independent raters blind to mothers' diagnostic status and subjective reactions to events rated the objective severity of events using behaviorally-specific anchors. In addition, mothers' history of depression was controlled for in all analyses to attempt to control for the effects of maternal depression on the relationships being studied. Nevertheless, it remains possible that depressed mothers might have responded to prompts about the mother-child relationship and the nature of past stressful events differently than non-depressed mothers, thereby affecting final ratings of objective stress.

It is also important to emphasize that maternal depression doubtless reflects responses to a variety of other factors besides child-related stressors. Thus, mothers were experiencing and likely reactive to non-child negative events and chronic conditions, in addition to child-related stressors. The onset and trajectory of maternal depression were therefore likely influenced by multiple risk factors, including stressors not examined in these analyses. Nevertheless, the results of the study indicated that stressors specific to the child are one mechanism by which child and mother disorders are associated, even when controlling for a stressful socioeconomic context. Finally, the current findings were limited to the mother-child relationship, and future research on the mutual influences of child behavior and paternal mental health is needed.

Despite these limitations, findings from the current study expand upon existing literature in several important ways. First, these results provide evidence for the effects of youth psychopathology on objective stress levels of multiple individuals within the family system. Adolescent individuals with depression have repeatedly been shown to generate elevated levels of acute stressors in their own lives (Hammen 1991, 2006). However, the current study indicates that adolescents with a history of any psychopathology also generated elevated levels of acute and chronic stress in the lives of their mothers. Furthermore, stress generation within the mother-child relationship has significant implications for the mental health of mothers. That is, the current study highlights child-related stress as one specific mechanism of the effects of child psychopathology on maternal depression. Previous research has shown that children with elevated levels of externalizing behaviors increase parents' subjective reports of stress (e.g., Baker et al., 2003) and lead to more persistent and more severe trajectories of depressive symptoms in mothers (e.g., Gross et al., 2009). However, this is the first known study to show that increases in stressful mother-child relationships (and not just mothers' subjective experiences of stress) are one important pathway by which children's behaviors increase mothers' risk for depression.

These findings have important implications for the study and treatment of maternal depression, as well as child psychopathology. In particular, treatment needs to recognize the mutual effects of the child and parent on each other as one step in addressing the impact of child emotional and behavioral disorders on the entire family. Additionally, these results underscore the role of maladaptive cycles of psychopathology within the mother-child dyad in the onset and maintenance of maternal depression. Treatments for maternal depression might need to take into account problems in the mother-child relationship, including

maladaptive interactions perpetuated by child misbehavior. In particular, it might be helpful to address the occurrence of child-related stressful events and/or chronic stress within the mother-child relationship in order to prevent some of the negative effects of youth psychopathology on maternal mental health.

Future studies in this area might explore whether certain types of child-related stressors are particularly detrimental to maternal mental health. For example, is confronting a child's constant expulsions and suspensions from school more likely to lead to depression in mothers than dealing with repeated accidents due to the child's careless behavior? The current study looked at all child-related stressors in aggregate, but research that explores child-related stress specificity could be especially useful in modifying current treatments for both youth psychopathology and maternal depression. In addition, it will be necessary to study the ways in which the effects of child psychopathology differ depending on the structure of the family. For example, it is possible that supportive intimate relationships might mitigate the effects of child psychopathology on maternal depression. Finally, future research might also employ more fine-grained measures of the onset and recurrence of child psychopathology, child related stressors, and maternal depressive episodes in order to gain a more detailed understanding of the subtle causal transactions among these three variables. Further exploration in each of these areas will create a more complete model of the complex family dynamics that play a role in the understanding and treatment of both child psychopathology and maternal depression.

References

- Baker BL, Heller TL. Preschool children with externalizing behaviors: Experience of fathers and mothers. *Journal of Abnormal Child Psychology*. 1996; 24:513–532. [PubMed: 8886946]
- Baker BL, McIntyre LL, Blacher J, Crnic K, Edelbrock C, Low C. Pre-school children with and without developmental delay: Behavior problems and parenting stress over time. *Journal of Intellectual Disability Research*. 2003; 47:217–230. [PubMed: 12787154]
- Beardslee WR, Versage EM, Gladstone TR. Children of affectively ill parents: A review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1998; 37:1134–1141. [PubMed: 9808924]
- Befera MS, Barkley RA. Hyperactive and normal girls and boys: Mother-child interaction, parent psychiatric status and child psychopathology. *Journal of Child Psychology and Psychiatry*. 1985; 26:439–452. [PubMed: 4008547]
- Civic DC, Holt VL. Maternal depressive symptoms and child behavior: Problems in a nationally representative normal birthweight sample. *Maternal and Child Health Journal*. 2004; 4:215–221. [PubMed: 11272341]
- Cole DA, Nolen-Hoeksema S, Girgus J, Gilda P. Stress exposure and stress generation in child and adolescent depression: A latent trait-state-error approach to longitudinal analyses. *Journal of Abnormal Psychology*. 2006; 115:40–51. [PubMed: 16492094]
- Cui M, Donnellan MB, Conger RD. Reciprocal influences between parents' marital problems and adolescent internalizing and externalizing behavior. *Developmental Psychology*. 2007; 43(6):1544–1552. [PubMed: 18020831]
- Cutrona CE, Trouman BR. Social support, infant temperament, and parenting self-efficacy: A mediational model of post-partum depression. *Child Development*. 1986; 57:1507–1518. [PubMed: 3802975]
- DeWolfe NA, Byrne JM, Bawden HN. ADHD in preschool children: parent-related psychosocial correlates. *Developmental Medicine and Child Neurology*. 2000; 42:825–830. [PubMed: 11132256]
- Donenberg G, Baker BL. The impact of young children with externalizing behaviors on their families. *Journal of Abnormal Child Psychology*. 1993; 21:179–198. [PubMed: 8491931]
- Dunn J. Lessons from the study of bidirectional effects. *Journal of Social and Personal Relationships*. 1997; 14(4):565–573.

- Feske U, Shear MK, Anderson B, Cyranowski J, Strassburger M, Matty M, et al. Comparison of severe life stress in depressed mother and non-mothers: Do children matter? *Depression and Anxiety*. 2001; 13:109–117. [PubMed: 11387730]
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM IV Axis I Disorders-Clinician Version (SCID-CV). Washington, DC: American Psychiatric Press; 1997.
- Fischer M. Parenting stress and the child with Attention Deficit Hyperactivity Disorder. *Journal of Clinical Child Psychology*. 1990; 19(4):337–346.
- Fombonne E, Simmons H, Ford T, Meltzer H, Goodman R. Prevalence of pervasive developmental disorders in the British nationwide survey of child mental health. *International Review of Psychiatry*. 2003; 15:158–165. [PubMed: 12745327]
- Foster CE, Webster MC, Weissman MM, Pilowsky DJ, Wickramaratne PJ, Rush AJ, et al. Course and severity of maternal depression: Associations with family functioning and child adjustment. *Journal of Youth & Adolescence*. 2008; 37:906–16.
- Gartstein MA, Sheeber L. Child behavior problems and maternal symptoms of depression: A mediational model. *Journal of Child and Adolescent Psychiatric Nursing*. 2004; 17:141–150. [PubMed: 15742795]
- Ghodsian M, Zajicek E, Wolkind S. A longitudinal study of maternal depression and child behavior problems. *Journal of Child Psychological Psychiatry*. 1984; 25:91–109.
- Gotlib, IH.; Goodman, SH. Children of parents with depression. In: Silverman, WK.; Ollendick, TH., editors. *Developmental issues in the clinical treatment of children and adolescents*. Boston: Allyn & Bacon; 1999. p. 415–432.
- Gross HE, Shaw DS, Burwell RA, Nagin DS. Transactional processes in child disruptive behavior and maternal depression: A longitudinal study from early childhood to adolescence. *Development and Psychopathology*. 2009; 21:139–156. [PubMed: 19144227]
- Gross HE, Shaw DS, Moilanen KL. Reciprocal associations between boys' externalizing problems and mothers' depressive symptoms. *Journal of Abnormal Child Psychology*. 2008; 36:693–709. [PubMed: 18288602]
- Hammen, C. *Depression Runs in Families: The social context of risk and resilience in children of depressed mothers*. New York: Springer-Verlag; 1991.
- Hammen C. Stress generation in depression: Reflections on origins, research, and future directions. *Journal of Clinical Psychology*. 2006; 62:1065–1082. [PubMed: 16810666]
- Hammen C, Burge D, Adrian C. Timing of mother and child depression in a longitudinal study of children at risk. *Journal of Consulting and Clinical Psychology*. 1991; 59(2):341–345. [PubMed: 2030197]
- Hammen C, Burge D, Burney E, Adrian C. Longitudinal study of diagnoses in children of women with unipolar and bipolar affective disorder. *Archives of General Psychiatry*. 1990; 47:1112–1117. [PubMed: 2244796]
- Hastings RP. Parental stress and behavior problems of children with developmental disability. *Journal of Intellectual & Developmental Disability*. 2002; 27(3):149–160.
- Hastings RP. Child behavior problems and partner mental health as correlates of stress in mothers and fathers of children with autism. *Journal of Intellectual Disability Research*. 2003; 47:231–237. [PubMed: 12787155]
- Herring S, Gray K, Taffe J, Tonge B, Sweeney D, Einfeld S. Behavior and emotional problems in toddlers with pervasive developmental disorders and developmental delay: Associations with parental mental health and family functioning. *Journal of Intellectual Disability Research*. 2006; 50:874–882. [PubMed: 17100948]
- Hipwell A, Keenan K, Kasza K, Loeber R, Stouthamer-Loeber M, Bean T. Reciprocal influences between girls' conduct problems and depression, and parental punishment and warmth: A six year prospective analysis. *Journal of Abnormal Child Psychology*. 2008; 36:663–677. [PubMed: 18172753]
- Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P, et al. Schedule for affective disorders and schizophrenia for school-age children – present and lifetime version (KSADS-PL): initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1997; 36:980–8. [PubMed: 9204677]

- Keeping JD, Najman JM, Morrison J, Western JS, Andersen MJ, Williams GM. A prospective longitudinal study of social, psychological, and obstetrical factors in pregnancy: Response rates and demographic characteristics of the 8,556 respondents. *British Journal of Obstetrics and Gynecology*. 1989; 96:289–297.
- MacKinnon DP, Dwyer JH. Estimating mediated effects in prevention studies. *Evaluation Review*. 1993; 17:144–158.
- Marchand JF, Hock E, Widaman K. Mutual relations between mothers' depressive symptoms and hostile-controlling behavior and young children's externalizing and internalizing behavior problems. *Parenting: Science and Practice*. 2002; 2(4):335–353.
- Najman JM, Bor W, O'Callaghan M, Williams GM, Aird R, Shuttlewood G. Cohort profile: The Mater-University of Queensland Study of Pregnancy (MUSP). *International Journal of Epidemiology*. 2005; 34(5):992–997. [PubMed: 15951358]
- Oliver C. Self-injurious behaviour in children with learning disabilities: recent advances in assessment and intervention. *Journal of Child Psychology and Psychiatry*. 1995; 36:909–927. [PubMed: 7593402]
- Patterson GR, DeBaryshe B, Ramsey E. A developmental perspective on antisocial behavior. *American Psychologist*. 1989; 44:329–335. [PubMed: 2653143]
- Patterson GR, Dishion TJ, Bank L. Family interaction: A process model for deviancy training. *Aggressive Behavior*. 1984; 10:253–267.
- Pelham WE, Lang AR, Atkeson B, Murphy DA, Gnagy EM, Greiner AR, et al. Effects of deviant child behavior on parental distress and alcohol consumption in laboratory interactions. *Journal of Abnormal Child Psychology*. 1997; 25:413–424. [PubMed: 9421749]
- Riskind JH, Black D, Shahar G. Cognitive vulnerability to anxiety in the stress generation process: Interaction between the looming cognitive style and anxiety sensitivity. *Journal of Anxiety Disorders*. 2010; 24(1):124–128. [PubMed: 19854612]
- Rudolph KD, Hammen C, Burge D, Lindberg N, Herzberg D, Daley SE. Toward and interpersonal life-stress model of depression: The developmental context of stress generation. *Development and Psychopathology*. 2000; 12:215–234. [PubMed: 10847625]
- Teti DM, Gelfand DM. Behavioral competence among mothers of infants in the first year: The Mediation role of maternal self-efficacy. *Child Development*. 1991; 62:918–929. [PubMed: 1756667]
- Wahler RG. The insular mother: Her problems in parent-child treatment. *Journal of Applied Behavioral Analysis*. 1980; 13(2):207–219.

Figure 1.

The mediational model of past youth psychopathology, chronic stress in the mother-child relationship, and presence of maternal depression at the follow-up. This figure illustrates that chronic stress in the mother-target relationship serves as a full mediator in the relationship between youth psychopathology before the age of 15 and the presence of maternal depression at youth age 20. The direct relationship between past youth psychopathology and presence of maternal depression becomes non-significant when levels of chronic stress are included in the model.

*p .05, **p .01, ***p .001.

Figure 2.

The mediational model of past youth psychopathology, number of child-related acute stressors, and presence of maternal depression at the follow-up. This figure illustrates that the number of child-related acute stressors serves as a full mediator in the relationship between target psychopathology before the age of 15 and the presence of maternal depression at youth age 20. The direct relationship between past youth psychopathology and presence of maternal depression becomes non-significant when child-related acute stressors are included in the model.

*p .05, **p .01, ***p .001.

Correlations and Means (SD) of Youth Psychopathology, Youth-related Stress, and Maternal Depression Variables

Table 1

Study Variable	M	SD	1	2	3	4
1. Number of past youth diagnoses	0.42	0.75	--			
2. Number of youth-related acute stressors	0.45	0.72	.23**	--		
3. Chronic stress in the mother-child relationship	2.23	0.5	.30**	.30**	--	
4. Number of maternal depressive episodes during follow-up	0.41	0.63	.17**	.06	.14**	--

Note.

*
p .05,
**
p .01