Published in final edited form as:

Fam Relat. 2012 April 1; 61(2): 271–282. doi:10.1111/j.1741-3729.2011.00694.x.

A Longitudinal Study of the Relation Between Depressive Symptomatology and Parenting Practices

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Abstract

This longitudinal study examined whether mothers' depressive symptomatology predicted parenting practices in a sample of 199 mothers of 3-year-old children with behavior problems who were assessed yearly until age 6. Higher maternal depressive symptoms were associated with higher overreactivity and laxness and lower warmth when children were 6 years old. Higher maternal depressive symptoms were also related to increases in overreactivity across the preschool years. Moreover, depression and parenting practices (overreactivity and laxness) covaried over time within mothers. These results provide evidence of a strong link between maternal depression and parenting during the preschool years.

Keywords

behavior problems; growth curve modeling; maternal depressive symptomatology; parenting; preschool children

Parenting practices have long been recognized as playing a critical role in child development (e.g., Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, & Gerris, 2009; McLeod, Weisz, & Wood, 2007), motivating researchers to better understand determinants of parenting. Of particular interest have been parenting dimensions that have been consistently linked to child development, including harsh/overreactive and permissive/lax discipline, and warm/supportive parenting practices (Anderson & Sabatelli, 2003; Hoeve, Dubas et al., 2009; Kendziora & O'Leary, 1993; McLeod et al., 2007). Parenting practices are thought to be multiply determined (Belsky, 1984; Belsky & Jaffee, 2006); however, parents' psychological functioning in general, and parental depression more specifically, are thought to play an especially pivotal role (Belsky, 1984). In fact, a large body of research has linked parental depression with disruptions in various types of parenting behavior including laxness; anger, hostility, overreactivity; and low maternal nurturance, sensitivity, and engagement (Cohn, Campbell, Matias, & Hopkins, 1990; Leung & Slep, 2006; Lovejoy, 1991; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Zahn-Waxler, Duggal, & Gruber, 2002).

Although extant research on depression and parenting practices has provided important insights into the ways in which parental depression might disrupt parenting, it is based largely on correlational and cross-sectional data comparing depressed mothers' parenting

behaviors to those of non-depressed mothers. Many of these studies control for socioeconomic status, child characteristics, and contextual sources of stress and support. However, it is not possible to control for all possible confounding variables in studies that examine how depression and parenting practices covary across individuals. Examining this relation using other research methods, such as experimental and longitudinal designs, may provide a better understanding of the causal relation between these constructs.

Experimental evidence that negative mood inductions in mothers result in fewer positive statements toward their children, less verbal interaction (Jouriles, Murphy, & O'Leary, 1989), and less success in eliciting positive responses from their infants (Zekoski, O'Hara, & Willis, 1987) provides strong support for the notion that maternal depressive mood may cause deficits in parenting. However, inducing negative mood is not synonymous with experiencing depression, which limits the external validity of these studies. Prospective and retrospective studies that have examined the temporal relation between depression and parenting practices have also provided support for a causal link between these variables. Retrospective studies have found that mothers who reported lifetime depression and were not currently depressed were more negative and coercive in their parenting behaviors than mothers with no history of depression (Lovejoy et al., 2000), suggesting that effects of depression on parenting may be enduring. A few prospective studies provide a more rigorous test of the temporal relation between depression and parenting practices. In these studies, early depression has been linked with disruptions in later parenting practices, with mothers whose depression recurs over time demonstrating particularly strong disruptions in later parenting (Letourneau, Salmani, & Duffett-Leger, 2010; McLearn, Minkovitz, Strobino, Marks, & Hou, 2006a, 2006).

Although studies linking early depression to later parenting practices provide important advances, they, like cross-sectional studies, still involve between-individual comparisons. Longitudinal research examining how depression and parenting covary over time *within individuals* would provide stronger evidence for, and a better understanding of, the link between depression and parenting practices. That is, it has been well established that mothers who report experiencing high levels of depression parent differently than mothers who report lower levels of depression, and there is some evidence that this effect is lasting. However, longitudinal research documenting within-subject covariance between depressive symptomatology and parenting practices would help rule out stable characteristics of depressed mothers that could act as third variables, explaining their parenting difficulties. If parenting practices worsen during times of relatively higher levels of depression, and improve during periods of relatively lower levels of depression, this would provide stronger evidence of a direct link between parenting difficulties and depressive symptomatology. We are aware of only one study that has examined this type of within-parent relation. Waylen and Stewart-Brown (2010) found that changes in maternal depression predicted changes in parenting from age 8 to 33 months. Additional research is needed to replicate this finding and to assess changes over a longer timeframe and with more than two time points. Furthermore, examining both between person and within person variation may provide insight into possible differential effects of components of depression that are more episodic in nature compared to effects of the components of depression that are more enduring or chronic.

Understanding the relation between depressive symptomatology and parenting practices in a group of children at risk of developing behavior problems has particularly strong clinical implications. The preschool years are thought to be a critical time for the development of behavior problems. Although behavior problems are common in preschool children, approximately half of young preschool-aged children with behavior problems go on to have significant behavior problems at school-entry (Campbell, Ewing, Breaux, & Szumowski,

1986). Parenting practices may be a key determinant of which children outgrow behavior problems, and it is therefore critical to identify factors that interfere with effective parenting among mothers of preschoolers with behavior problems.

The Present Study

The present study examines how depressive symptomatology in mothers relates to parenting practices over time in a sample of preschoolers with behavior problems. This study focuses both on between-mother as well as within-mother variation in depression, and how these variations relate to parenting practices over time. This study focuses on three specific parenting practices: (a) overreactivity (harsh, angry discipline); (b) laxness (permissive, inconsistent discipline); and (c) warmth. In particular, the following questions are addressed:

1) *Does mothers' depressive symptomatology during their children's preschool years predict their parenting practices when their children are 6 years old?* It was predicted that higher levels of average maternal depressive symptomatology during children's preschool years would be associated with greater overreactivity and laxness, as well as less warmth, when their children reached age 6.

2) *Does mothers' depressive symptomatology during their children's preschool years predict changes in parenting practices over this period?* It was predicted that higher levels of average maternal depressive symptomatology during children's preschool years would be associated with worse trajectories of parenting practices over time.

3) *Does mothers' depressive symptomatology covary with parenting practices within mothers over time?* It was predicted that depressive symptomatology would covary with overreactivity, laxness, and warmth over time within mothers, with mothers exhibiting more overreactivity and laxness, and less warmth during times when their depression is higher than during times when their depression is lower.

Method

Participants

Participants were 199 mothers of children who took part in a 4-year longitudinal research project investigating the early development of ADHD and ODD. Target children (107 boys; 92 girls) were 3 years old at the time of the first assessment, and were assessed every year until they were 6 years old. Fifty-nine percent of the mothers identified themselves as European-American (non-Hispanic), 25% as Latino (predominately of Puerto Rican descent), 13% as African American, 1% as Asian, and 2% as multi-racial (i.e., identified with two or more races/ethnicities). At the beginning of the study, 31% of the mothers were single, with an average age of 32 ($SD = 6.99$), average years of education of 13.29 ($SD = 2.87$), and a median combined family income of \$47,108. Parenting and depressive symptomatology data were collected from 184 of these mothers at Time 2, 161 at Time 3, and 164 at Time 4.

Procedure

All participants were recruited through state birth records, pediatrician offices, childcare centers, and community centers throughout western Massachusetts. Families were recruited from a sample of 1752 families of 3-year-old children whose parents completed a screening packet including the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992). Inclusion criteria were: (a) parent responded "yes" or "possibly" to the question, "Are you concerned about your child's activity level, defiance, aggression, or impulse control?" and (b) BASC Hyperactivity and/or Aggression subscale T scores of at

least 65. Eligible families were assessed during annual home visits, and each parent was paid for participating. Written informed consent was obtained from all mothers who participated. The study was conducted in compliance with the authors' Internal Review Board. For Spanish-speaking families, bilingual staff conducted home visits and questionnaires were in Spanish.

Measures

Demographic information—Mothers provided information about their race/ethnicity, education, age, marital status, and family income. Education level was coded in terms of years of education completed.

Assessment of parenting practices

Self report assessment: Mothers' parenting practices were assessed using the Parenting Scale (Arnold, O'Leary, Wolff, & Acker, 1993), which is a 30-item self-report scale of parental discipline. Each item is rated on a scale from 1 to 7, where 7 represents the "ineffective" end of the item. This measure has demonstrated good validity and reliability in a preschool sample (Arnold et al., 1993) and an elementary school sample including children with ADHD (Harvey, Danforth, Ulaszek, & Eberhardt, 2001). Factor analyses from these two studies reveal both Overreactivity (10 items) and Laxness (11 items) nonoverlapping factors. Arnold et al. (1993) found that Overreactivity and Laxness factors correlated significantly with observers' global ratings of overreactivity and laxness during a parent-child interaction. Moreover, the Overreactivity factor has been found to predict later child behavior problems among young preschool children (O'Leary, Smith Slep & Reid, 1999). In the present study, mothers' scores on overreactivity and laxness were computed using the factor structure cited in Arnold et al. (1993). On these subscales, higher scores indicate greater difficulty in the parenting role. Internal consistency was adequate in the present sample ($\alpha = .82$ for maternal laxness and $\alpha = .69$ for maternal overreactivity at Time 1).

Observational assessment: Observational assessment consisted of a videotaped structured parent-child interaction. Mothers and their children were videotaped in their homes engaging in a 5-minute free play with Duplos© followed by a clean-up task. The experimenter first explained the tasks to the parent privately as follows: "For the first task we would like you and (child's name) to play with the Duplos© together. We have no specific instructions on what you should build. All we ask is that you and your child play together for five minutes. The second task is supposed to be similar to situations where you try to get your child to clean up his/her toys after playing. So, for this task we will ask you to try to get (child's name) to clean up the Duplo© pieces, and put them back in the large container. If it is possible, we would like (child's name) to do most of the work himself/herself. The task will last approximately 5 minutes." Next, the experimenter emptied a large bin of Duplos© on the floor and asked the parent and child to play with them for 5 min. After 5 min, the experimenter instructed the parent to have the child clean up the Duplos©. This task ended when the clean up was complete; if clean-up was not complete after 5 min, the task was ended. Trained research assistants coded global maternal warmth during the 5-min play task and the clean-up task. Ratings of warmth measured the extent to which the mother was positively attentive to the child, and displayed positive affect, enthusiasm, approval, encouragement, and support toward the child. Warmth was rated on a scale from 1 (*no warmth*) to 7 (*high level of warmth*). Two independent raters coded each videotape. Ratings were averaged across the play and clean-up tasks at each time point. Intraclass correlations (ICCs) suggested good inter-rater reliability (average ICC across the four time points was .71). Warmth ratings at Time 1 were found to distinguish children who entered this study with behavior problems from a sample of children without behavior problems who

also participated in this study, $F(1, 233) = 4.02, p = .023$, providing support for the validity of this measure.

Assessment of maternal depressive symptomatology: The MCMI-III (Millon, Davis, & Millon, 1997), which is a self-report questionnaire consisting of 175 true-false items that measures a wide range of adult psychopathology, was used to assess maternal depressive symptomatology. The internal consistency for the MCMI-III scales in a clinical population ranged from .66 to .90; test-retest reliabilities ranged from .84 to .96 (Millon et al., 1997). In the present study, the MCMI-III subscales that assess Major Depression, Dysthymia, and Depressive personality were administered at Times 1, 2, 3 and 4. Since the objective of the current study was to analyze changes in depressive symptomatology over time, 8 of the 33 items were omitted from analyses because they assess symptoms over a long time-frame. Following instructions from MCMI-III manual (Millon et al., 1997), items considered prototypical for the Major Depression scale were double-weighted. Prototypical items from the Dysthymia and Depressive personality scales were not double-weighted since they represent less severe symptoms. Responses to the 25 items were summed to create a raw score, with higher scores indicating greater levels of depressive symptomatology. Internal consistency for these 25 items in the sample at Time 1 was excellent ($\alpha = .91$). Since some items were omitted, raw scores (which could range from 0 to 31), instead of standardized base rate scores, were used. Raw scores allowed for an assessment of the absolute change in depressive symptomatology over time rather than relative change.

Assessment of child behavior: Children's behavior problems were assessed at screening using the preschool version of the Behavior Assessment System for Children – Parent Rating Scale (BASC-PRS). The BASC-PRS is a widely used comprehensive rating scale that assesses a broad range of psychopathology in children ages 2–6 and older (Reynolds & Kamphaus, 1992), and demonstrates good reliability and validity for children (Reynolds & Kamphaus, 1992). The Externalizing Problems score was used in this study to control for child behavior and had excellent internal consistency ($\alpha = .91$).

Data Management

Univariate outliers that were more than 3.29 SD above or below the mean were transformed by replacing their raw score value with the next highest value as recommended by Tabachnick & Fidell (2001). There were 11 outliers for mothers' depressive symptomatology, 3 for overreactivity, 4 for laxness, and no outliers for warmth across the four time points.

Data Analysis

Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 1992) was used to analyze the relation between mothers' depressive symptomatology and parenting practices across the four time points. HLM, also known as multi-level analysis, is ideally suited for longitudinal data because it allows one to estimate change over time within individuals, and to predict this change. In particular, a Level 1 equation models individual j 's repeated measures of y (y represents parenting practices in the present study) across multiple time points (from 1 to i) as follows:

$$\text{Basic Level 1 Model: } y_{ij} = \beta_{0j} + \beta_{1j} * \text{Time}_{ij} + r_{ij}$$

where the intercept β_{0j} represents person j 's expected value of y when Time = 0, and slope β_{1j} represents the expected linear rate at which person j 's scores on y changes as a function

of time. The time variable can be centered so that Time = 0 represents a meaningful point in time (e.g., the final time point).

Level 2 models are subsequently used to predict individual variation in trajectory intercepts (β_{0j}) and slopes (β_{1j}) as follows:

$$\begin{aligned}\text{Basic Level 2 model: } \beta_{0j} &= \gamma_{00} + \gamma_{01} * \text{predictor}_j + \mu_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11} * \text{predictor}_j + \mu_{1j}\end{aligned}$$

where γ_{01} represents the relation between the predictor variable and individuals' level of the outcome variable at Time = 0, and γ_{11} represents the relation between the predictor variable and individuals' linear rate of change in the outcome variable. An unconditional model can also be estimated without including predictors in the Level 2 model, and provides information about the average y trajectory across individuals, and whether there is significant variability in trajectory parameters.

Note that a quadratic (Time₂) term can also be added to the Level 1 model to test whether there is significant curvature (acceleration or deceleration in change) in changes in y over time. The linear term, in the presence of a quadratic term, represents the rate of change when Time = 0. An additional repeated measure variable (time-varying covariate z) can also be added to the Level 1 model to estimate how year to year changes in z correspond to year-to-year changes in y . Details regarding the HLM models that were constructed are presented in the results section.

Results

Descriptive Statistics

Table 1 presents descriptive statistics for mothers' depressive symptomatology scores, overreactivity, laxness, and warmth, for each time point. Averages were calculated across the four time points to obtain measures of average depressive symptomatology and parenting dimensions for each mother and intercorrelations among these variables and Time 1 demographics were examined (Table 2). Mothers' depressive symptomatology was positively correlated with overreactivity and laxness, and negatively correlated with warmth. Laxness was negatively correlated with warmth and positively correlated with overreactivity. Mothers' years of education and family income were inversely correlated with depressive symptomatology and laxness, and were positively correlated with warmth, but were not significantly related to overreactivity.

Construction of Hierarchical Linear Models

For each parenting variable, an unconditional model was examined first followed by the construction of a full model.

Unconditional model—An unconditional model (with no predictors in the Level 2 model) was estimated with child's age (the measure of time) and child's age squared as the only Level 1 predictors. This model allows one to assess whether average levels of parenting changed as a function of time and whether there was significant variability in change across mothers (see Table 3). Child's age was centered at 72 months (age 6) so the intercept would define parenting practices of children at age 6.

Full model—The approach to constructing the full model provides information about (a) how variation between mothers in average depression relates to variation between mothers

in parenting change and outcomes, and (b) how year-to-year changes in a mother's depressive symptomatology corresponds to year-to-year changes in her parenting over time. This strategy for separating these time-varying (within mother) and time-invariant (between mother) components is described by Horney, Osgood, and Marshall (1995).

Level 1 model—The full model was estimated for each parenting variable with mothers' depressive symptomatology included as a Level 1 time varying covariate, group mean centered (calculated by subtracting each mother's depression score from the mean of her four depression scores in order to remove between-individual variation of this variable and leave only within-individual variation). A quadratic term was included in the Level 1 model only if it was significant in the unconditional model. Thus, to characterize mothers' parenting trajectories, the Level 1 models defined the following parameters: 1) parenting outcomes when children were 6 years old (the intercept, β_0); 2) the rate of change in parenting of children from age 3 to age 6 (β_1); 3) the rate of acceleration or deceleration in parenting practices across time (quadratic effect, β_2); and 4) the relation between mothers' depressive symptomatology and parenting within individuals over time (β_3).

Level 2 model—The following variables were included as Level 2 predictors for parenting outcome (β_0 from the Level 1 model), and as predictors of the rate of change in parenting (β_1 from the Level 1 model). Mothers' average depressive symptomatology was calculated by averaging depressive symptomatology across the four time points and was entered in the Level 2 model grand mean centered (subtracting each mother's score from the mean depression score of the whole group). Mothers' years of education, family income, and child externalizing problems were also entered as control variables at Level 2. Table 4 presents the final model for each parenting variable.

Results of Hierarchical Linear Models

Prediction of mothers' overreactivity—Results of the unconditional model yielded no significant linear or quadratic effect of time, indicating that on average, mothers' overreactivity did not increase or decrease during their children's preschool years (Table 3). However, more relevant to the aims of the current study, this model revealed significant variability in the linear rate of change of overreactivity, $\chi^2(179) = 257.12, p < .001$. In other words, even though as a group there was no significant change in overreactivity over time, some mothers increased, some mothers decreased, and other mothers experienced little change in overreactivity (see Figure 1 for an illustration of the slopes of change among a random subset of mothers). This variability provides support for further examination of predictors of variation in parenting trajectories.

Higher mean levels of maternal depressive symptomatology during their children's preschool years were associated with higher maternal overreactivity when children were 6 years old and also with worsening trajectories of overreactivity over time (Table 4). In particular, given that the average overreactivity trajectory was flat, these results suggest that mothers with higher levels of depression were more likely to exhibit an increase in overreactivity, whereas mothers with lower levels of depression were more likely to decrease in overreactivity. In addition, time-varying depressive symptomatology was a significant predictor of time-varying overreactivity, with higher levels of depression associated with higher levels of overreactivity within mothers.

Prediction of mothers' laxness—The unconditional model for laxness (Table 3) indicated a small, but significant, positive curvature in the trajectory of mothers' laxness, suggesting that during their children's preschool years, laxness in parenting tended to decrease and then increase. Baseline analyses revealed significant variability in the linear

rate of change of laxness at age 6, $\chi^2(179) = 258.91, p < .001$. Note that in the presence of a significant quadratic term, the linear term refers to the linear rate of change at Time = 0 (at age 6 in the current model). Higher average levels of maternal depressive symptomatology during children's preschool years predicted higher maternal laxness when children were 6 years old, but did not significantly predict of change in laxness at age 6. Within-mother variation in depressive symptomatology over time was a significant predictor of within mother variation in laxness, with mothers reporting higher levels of laxness at time points during which they reported higher levels of depressive symptomatology (Table 4).

Prediction of mothers' warmth—There was no significant linear or quadratic effect of time, suggesting that on average mothers warmth did not increase or decrease during their children's preschool years. Baseline analyses revealed significant variability in the linear rate of change of warmth, $\chi^2(167) = 233.19, p < .001$, supporting further examination of predictors of this variability. Higher average levels of maternal depressive symptomatology during children's preschool years predicted lower maternal warmth when children were 6 years old but did not significantly predict change in warmth at age 6. In addition, time-varying depressive symptomatology was not a significant predictor of time varying warmth (Table 4).

Examination of gender—Because the relation between maternal depression and parenting may vary as a function of children's gender, additional analyses were conducted to examine whether maternal depression interacted with child gender in predicting each parenting dimension. To examine possible moderating effects of gender, gender and a product term (gender times centered maternal depression) were entered together with maternal depression and control variables in the Level 2 models. There were no significant interactions between depression and gender in predicting parenting trajectories, suggesting that the relation between maternal depression and parenting was not significantly different for mothers of boys than for mothers of girls.

Discussion

The present study extended existing cross-sectional research on the relation between maternal depression and parenting practices by examining how maternal depressive symptomatology and parenting practices covary both within and between mothers across the preschool years. Longitudinally linking depression and parenting provides stronger, though still not definitive, evidence for a direct link between these variables, compared to cross-sectional studies. In the present study, it was hypothesized that (a) mothers' average depressive symptomatology levels across children's preschool years would predict their later parenting practices when their children were 6 years old and would predict changes in parenting practices over this period; and (b) mothers' depressive symptomatology would covary with parenting practices within mothers over time.

Higher maternal depressive symptoms during children's preschool years were associated with higher levels of overreactivity and laxness and with lower levels of warmth as children entered school-age (age 6). This finding is consistent with previous research that early maternal depression is associated with disruptions in later parenting (e.g., Letourneau et al., 2010). Moreover, greater maternal depression during children's preschool years was associated with increases in overreactive parenting across the preschool years, but not with changes in laxness and warmth. Depressive symptomatology also covaried over time with overreactivity and laxness within mothers; mothers tended to be more overreactive and lax at times when they experienced greater depression than at times when their depression was lower. This finding corroborates and extends results reported by Waylen and Stewart-Brown (2010) who found that changes in depression corresponded with changes in parenting during

children's first three years of life. However, previous research findings that the effects of maternal depression may be enduring (Lovejoy et al., 2000) suggest that although parenting may improve when depression ebbs, there may still be some lingering effects.

The fact that depressive symptomatology was so consistently linked with both levels and changes in maternal overreactivity in both between-parent and within-parent analyses suggests that maternal depressive symptomatology during children's preschool years may play an important role in mothers' use of harsh parenting practices. These results are consistent with Lovejoy and colleagues' (2000) meta-analyses which suggested that maternal depression was most strongly associated with negative maternal behaviors toward children, including irritability and hostility. Additional research is needed to understand the mechanisms underlying the relation between maternal depression and harsh parenting. For example, this relation may be a function of a vicious cycle in which depressive symptomatology leads to more overreactive parenting, resulting in more child behavior problems, which in turn elicits even more overreactivity and depression in mothers. It is also possible that poor parenting leads mothers to make negative judgments about themselves as parents which may lead to depression. Finally, it may be that depressed mothers' negative social cognitions partly explain their parenting difficulties (Zahn-Waxler et al., 2002). Depressed mothers may make negative attributions for their children's behavior which may promote "harsh parenting practices" (Geller & Johnston, 1995).

While maternal laxness was not as consistently linked with maternal depression as was maternal overreactivity, there was nonetheless clear evidence that maternal depression was associated with maternal laxness in both within- and between-mother analyses. These findings are consistent with previous cross-sectional studies linking maternal depression to lax parenting (e.g., Leung & Slep, 2006). Research is needed to understand the mechanisms underlying the relation between maternal depression and lax parenting practices. For example, depression may decrease mothers' motivation and energy for consistently enforcing rules. This possibility is consistent with previous experimental evidence that negative mood inductions decrease mothers' verbal interactions with their children (Jouriles et al., 1989); such mood-induced disengagement may contribute to lax parenting. Further research is needed to examine this possibility.

The finding that average maternal depressive symptomatology during children's preschool years predicted warmth when children reached age 6, but that changes in depressive symptomatology did not predict changes in warmth over the preschool years, suggests that the association between warmth and maternal depressive symptomatology may be accounted for by more stable third variables that are linked with maternal depressive symptomatology, such as underlying personality attributes. Consistent with this notion, greater personality disorder symptoms have been linked with low parental warmth (Johnson, Cohen, Kasen, Ehrensaft, & Crawford, 2006) and with greater depression (Hirschfeld, 1999). It may also be that the observational measure of warmth was less reliable and valid than self-reported measures and was not sufficiently sensitive to detect changes in warmth. Since the same task was used every year to observe warmth, it is possible that the familiarity with the task may have masked individual differences. In addition, the observational assessments were very brief and were a fairly narrow snapshot of the mother-child relationships, and may not have well-represented mothers' warmth more generally. It is also possible that because they were being observed, mothers behaved in a socially desirable manner. Alternatively, the link between maternal depressive symptomatology and self-reported measures of parenting practices could be accounted for by shared method variance or by depressive symptoms coloring mothers' perceptions of their own parenting practices. In fact, it has been well-documented that maternal depression distorts mothers' perceptions and ratings of their own children's behavior (e.g., Youngstrom, Izard, & Ackerman, 1999). Depression may similarly

bias mothers' perceptions and ratings of their own parenting. In this study, because warmth was measured using observational data, its relation to maternal depression would not have been affected by these factors. Future research is needed to tease apart these possible explanations.

Linking variation in depressive symptomatology and variation in parenting practices within mothers using longitudinal data allowed us to rule out many other time-invariant variables that could account for the well-documented cross-sectional association between depressive symptomatology and parenting practices, such as early experiences and personality. Using within-subject comparisons provides stronger, though not definitive, causal support for the relation between maternal depressive symptomatology and parenting practices. There are, however, other possible causal explanations for these findings. For example, deteriorating parenting practices may lead to maternal depression. It is also possible that a third variable that varies together with depressive symptoms and parenting practices could account for this link. For example, changes in children's behavior problems during the preschool years due to maturation may result in transient maternal depressive symptomatology and changes in parenting practices. In fact, previous studies have documented the effects of child behavior on both maternal mood and on parenting (Arnold & O'Leary, 1995; Marchand, Hock, & Widaman, 2002). Although this study was able to control for between group variation in child behavior, there were not sufficient time points to be able to control for time-varying child behavior. Future studies should examine other family factors that may covary with both depression and parenting practices.

Parenting practices are thought to play a key role in helping young children with behavior problems outgrow their difficulties (Campbell, Pierce, Moore, & Marakovitz, 1996). Our finding that maternal depression is closely tied to parenting practices among children with behavior problems, suggests that maternal depressive symptomatology among at-risk children may be particularly problematic to the extent that it results in deteriorating parenting over time. Interventions for mothers of preschoolers with behavior problems that foster mothers' well-being and prevent or decrease depressive symptomatology could help improve mothers' parenting practices, and indirectly, have a positive impact on children's development.

These findings should be considered in the context of several limitations of this study. First, this study focused only on three of many parenting behaviors: overreactivity, laxness, and warmth. Second, depressive symptomatology and two of the three parenting measures were self-report, which may have inflated some relations due to shared method variance. Third, additional research is needed to examine whether our findings can be generalized to mothers of children with no behavioral problems. Fourth, the present study examined only maternal depressive symptomatology; future research is needed to also examine paternal depressive symptomatology, given evidence that fathers' psychopathology also plays an important role in child development (Phares & Compas, 1993). And fifth, while attrition was relatively low and the statistical approach used is ideal for handling missing data, estimates of change would have been less reliable for families who did not complete all time points.

Despite these limitations, our study is one of the few studies to examine how depressive symptomatology in mothers relates to parenting practices using longitudinal data, and provides stronger evidence than previous cross-sectional studies for a direct link between depressive symptomatology and parenting. Our study also suggests that parenting practices may improve when depression abates in mothers, emphasizing the importance of prevention and treatment of maternal depressive symptomatology as a way of promoting children's well-being.

Acknowledgments

This research was supported by an American Association of University Women fellowship awarded to the first author and by a grant from the National Institute of Health (MH60132) awarded to the second author.

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Figure 1.
Example of Mothers' Variability in Parenting Overreactivity

Table 1

Means and Standard Deviations for Parenting and Depressive Symptomatology at Each Time Point

	Time 1	Time 2	Time 3	Time 4
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Mothers' Depressive Symptomatology	6.12 (6.62)	6.07 (7.12)	5.67 (7.19)	5.40 (6.7)
Mothers' Overreactivity	2.81 (.76)	2.76 (.78)	2.66 (.74)	2.74 (.79)
Mothers' Laxness	2.99 (1.00)	2.76 (.93)	2.66 (.96)	2.70 (.92)
Mothers' Warmth	4.33 (1.15)	4.19 (.99)	4.44 (.62)	4.30 (.49)

Table 2

Intercorrelations among Demographic Variables and Averages Across Time for Parenting and Depressive Symptomatology

Variable	1	2	3	4	5
1. Mothers' Education					
2. Family Income	.53***				
3. Mothers' Average Depressive Symptomatology	-.35***	-.26***			
4. Mothers' Average Overreactivity	.00	-.04	.32***		
5. Mothers' Average Laxness	-.30***	-.24**	.34***	.24***	
6. Mothers' Average Warmth	.35***	.26***	-.34***	-.04	-.26***

 $p < .001$,

**
 $p < .01$

Table 3

Unconditional Models for Parenting Dimensions and Depressive Symptomatology

<i>Fixed Effect</i>	<i>Self-reported Overreactivity</i>		<i>Self-reported Laxness</i>		<i>Observed Warmth</i>		<i>Depressive Symptomatology</i>	
	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>
Intercept	2.713 ***	0.051	2.727 ***	0.066	4.306 ***	0.044	5.788 ***	0.465
Child's Age	0.000	0.003	-0.003	0.003	0.002	0.004	-0.041 *	0.017
Child's Age Squared	0.000	0.000	0.0002 *	0.000	0.000	0.000	-0.001	0.001

 $p < .001$,**
 $p < .01$,*
 $p < .05$

Table 4
Final Models of Time-Invariant and Time-Variant Predictors for Mothers' Parenting

Predictors	Self-reported Overreactivity		Self-reported Laxness		Observed Warmth	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
<u>Predictors of Level of Parenting Outcome (β_{0j}) at Age 6 (Level 2):</u>						
Intercept	2.745 ***	0.046	2.727 ***	0.060	4.310 ***	0.038
Mothers' Average	0.048 ***	0.008	0.036 ***	0.010	-0.020 **	0.007
Depressive Symptomatology						
Mothers' Years of Education (T1)	0.030	0.018	-0.038	0.024	0.040 *	0.016
Family Income (T1)	-0.000	0.000	-0.000	0.000	0.000	0.000
Child's Externalizing Problems	-0.007	0.004	0.005	0.005	0.007	0.004
<u>Predictors of Linear Rate of Change (β_{1j}) in Parenting (Level 2):</u>						
Intercept	-0.001	0.002	-0.001	0.003	0.000	0.002
Average Depressive Symptomatology	0.001 ***	0.000	0.000	0.000	0.001	0.000
Child's Externalizing Problems	-0.000	0.000	-0.000	0.000	-0.000	0.000
<u>Predictor of Curvature (β_{2j}) in Parenting (Level 2):</u>						
Intercept			0.0003 *	0.0001		
Time-varying Predictors:						
Mothers' Time-varying Depressive Symptomatology (Level 1)	0.025 ***	0.007	0.016 *	0.007	0.005	0.010
Deviance of Model & Number of Estimated Parameters	1240.230 (13)		1380.494 (14)		1281.765 (13)	

 $p < .001$,

**
 $p < .01$,

*
 $p < .05$

Note. T1 refers to Time 1 in the study