Maternal Depressive Symptoms, Father’s Involvement, and the Trajectories of Child Problem Behaviors in a US National Sample

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Objective: To examine the effect of maternal depressive symptoms on child problem behavior trajectories and how the father’s positive involvement may modify this association.

Design: Secondary data analysis using data from the National Longitudinal Survey of Youth.

Setting: A nationally representative household sample of men and women from the National Longitudinal Survey of Youth.

Participants: The study sample includes 6552 mother-child dyads interviewed biennially between January 1, 1992, and December 31, 2002; children were 0 to 10 years old at baseline.


Main Outcome Measures: Maternal self-reports of child internalizing and externalizing behaviors were assessed repeatedly using a modified Child Behavior Checklist.

Results: Linear growth curve models indicate that the adverse effects of maternal depressive symptoms on child problem behavior trajectories become negligible after controlling for the father’s involvement and other covariates, including the child’s age, sex, and race/ethnicity; the mother’s educational level; maternal age at child birth; number of children; poverty status; urban residence; and father’s residential status. Positive involvement by the father was inversely associated with child problem behavior trajectories. The effects of maternal depressive symptoms on child problem behaviors varied by the level of the father’s positive involvement.

Conclusion: When the father actively compensates for limitations in the depressed mother’s functioning, the child’s risk of problem behaviors may be reduced.

The association between maternal depression and child problem behavior has been widely documented.1 Children of depressed parents display problems such as difficult temperament, aggression, poor self-esteem, poor peer relations, depressed mood, insecure attachment patterns, and attention deficits.1-3 Children’s behavior problems may be indicators of the beginning of mental health problems.4

Most research on the effects of maternal depression on offspring has focused on early childhood development and is limited by various methodological problems, including small sample sizes, cross-sectional design, imprecise measures of maternal depression and child outcomes, and incorrect statistical modeling for data with cluster structures.3,7 Longitudinal studies examining the adverse effects of maternal depression have begun to emerge in the past decade. However, the few studies with longitudinal designs have usually covered only limited periods of child development (ie, childhood or adolescence but not both) and often have included child outcome measures from only 1 or 2 time points.8-18 For example, Radke-Yarrow et al9 assessed the change in problem behaviors over 3 years among young children of depressed mothers. They found that children of depressed mothers had more disruptive and depressive problems than those of nondepressed mothers. Furthermore, children’s problem behaviors increased over time, and the continuity of problems was greater among children of depressed mothers compared with children of nondepressed mothers.9 The findings from this study enhanced our understanding of children of a depressed par-
ent during childhood, but the sample size was small, and child problem behavior assessments included only 2 time points. Longer-term longitudinal analyses spanning different developmental stages are needed to gain a better understanding of the effects of maternal depression on change in child problem behaviors over time.

Despite the adversity of having a depressed mother, many children exhibit competent adaptation to their adverse environment.19 Little is known about protective factors associated with better outcomes for children of depressed parents,20 but one factor is the availability of a support system for a child,21 such as a good relationship with at least 1 parent.22 The father’s role has traditionally been neglected in the child development literature.23,24 Some studies14,25-27 have found that fathers have a positive effect on children’s well-being, whereas others28-30 have reported that fathers are peripheral to certain child and adolescent outcomes. These mixed findings may be attributed to the differences in the measurement of the father’s involvement, with some studies reporting the frequency of paternal contacts and others assessing the quality of the father’s involvement.31

The present study examines the effects of maternal depressive symptoms on the trajectories of offspring problem behaviors in childhood and early adolescence over 10 years. The study also evaluates the extent to which the effect of maternal depressive symptoms on child problem behaviors varies by the level of the father’s positive involvement. This study was approved by the institutional review board at the University of North Carolina at Chapel Hill.

METHODS

STUDY DESIGN AND SAMPLE

This study uses data from the National Longitudinal Survey of Youth (NLSY79).22 Since 1979, the NLSY79 has conducted in-home interviews with a nationally representative household sample of men and women to trace their labor market experiences. Since 1986, detailed information about their biological children, including each child’s behavioral and social functioning, has been collected biennially. Each mother can be matched with more than 1 biological child.32

The present investigation spans from January 1, 1992 (when depressive symptoms were first included), to December 31, 2002. Children eligible for the analysis sample were 0 to 10 years old in 1992, were living with their biological mother, and must have been interviewed at least once during the study period. Mothers must have complete maternal depression data to be eligible. This results in an analytic sample of 6552 children of 3197 NLSY79 mothers. The NLSY79 children are representative of children born to women in the United States who were 21 through 29 years of age in 1986.

MEASURES

Maternal Depressive Symptoms

Maternal self-reported depressive symptoms were measured in 1992 using the Center for Epidemiologic Studies–Depression (CES-D) scale. The CES-D scale is a 20-item self-report instrument designed to assess the frequency of depressive symp-
Familial poverty status compared the respondent’s income with the corresponding poverty threshold for the respondent’s family size and the year in which the interview was conducted. Respondents whose income was below this threshold were classified as being in poverty. Because family income may fluctuate over time, poverty status was treated as a time-varying measure with multiple assessments. Urban residency was a 0/1 dummy variable. This measure was also coded as time varying with multiple assessments. A time-varying binary resident father status indicator was constructed based on self-reported data from children aged 10 to 14 years. The presence of a resident father was indicated if a child reported living with either a biological father or a stepfather.

STATISTICAL ANALYSIS

To accommodate the nested structure of the data and to obtain unbiased estimates, growth curve analysis of hierarchical linear modeling was performed. The growth curve models simultaneously estimate intra-individual time-based trajectories and test whether interindividual differences in the parameters of these trajectories are a function of time-invariant and time-variant predictors. A general form of the full linear growth curve model is as follows:

\[ Y_{ijt} = \mu_i + \alpha_1 \text{Time} + \alpha_2 X_{it} + \alpha_3 X_{jt} + \epsilon_{ijt}. \]

The variable \( \alpha_1 \) represents the maternal depressive symptoms measure. The vectors \( X_i \) and \( X_j \) include observed child- and mother-specific factors, respectively, which may affect the trajectories of child problem behaviors. The vectors \( \mu_i \) and \( \mu_j \) represent the time-invariant, unobserved child (i) and maternal (j) factors that affect child behavior outcomes.

At each wave of NLSY79 data, the distributions of internalizing and externalizing scores were positively skewed. This violates the assumption of normality of the dependent variable for linear growth curve modeling. Several transformations of outcome measures were attempted. Among all, a log-transformation of the outcome subtracted by a constant yielded an approximately normal distribution of outcomes. Hence, this article reports results based on the log-transformed outcome data.

RESULTS

The mean age of the children in 1992 was 5.6 years (Table 1). The proportions of boys and girls were approximately the same (50.1% were boys). There were more white (50.0%) than black (27.8%) or Hispanic (22.2%) children. The mean (SD) child internalizing and externalizing scores in 1992 were both 104 (15). The mean maternal age was 30.7 years. Most mothers had at least a high school education (87.0%), reported living in an urban area (81.5%), and had a mean of 2 children. The mean maternal age at child birth was 27.6 years. Approximately 24% of the mothers lived in poverty, and 23.4% of women in the study sample reported having depressive symptoms. Most children (67.4%) reported living with either their biological father or stepfather. The degree of the father’s involvement ranged from 0 to 3.5, with a mean of 2.2. A mean of 2.2 reflects moderate levels of positive involvement by the father (eg, sometimes talking over important decisions with the child, listening to the child’s side of an argument, and the child reporting feeling fairly close to the father).

First, 2 unconditional growth curve models were estimated for internalizing and externalizing behaviors. The unconditional growth model estimated that the mean trajectories for child internalizing and externalizing behaviors have a nonzero intercept and a nonzero slope (internalizing: \( P_{\text{int} \text{intercept}} \leq .001, P_{\text{int} \text{slope}} \leq .001 \); externalizing: \( P_{\text{ext} \text{intercept} < .001, P_{\text{ext} \text{slope} < .001}} \) (data not shown). The variances around the mean intercept and slope were also significant (\( P < .001 \)), indicating that there is notable diversity in children’s individual trajectories of problem behaviors. The slope is the rate of change in problem behaviors over time represented by child age at each wave centered at 4.

Next, separate conditional growth models were constructed to examine whether individual changes in child problem behaviors over time differ by maternal depressive symptoms. A multiplicative interaction term of maternal depressive symptoms and rate of change was tested. Covariates such as child’s sex, race/ethnicity, maternal education, maternal age at child birth, number of children, poverty status, urban residency, and resident father status were included to control for potential confounding. The conditional growth curve models estimated a statistically significant effect of maternal depressive

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Child age, y</td>
<td></td>
</tr>
<tr>
<td>( \leq 4 )</td>
<td>3271 (55.0)</td>
</tr>
<tr>
<td>5-8</td>
<td>1646 (27.7)</td>
</tr>
<tr>
<td>( &gt; 9 )</td>
<td>1030 (17.3)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>5.6 (3.1)</td>
</tr>
<tr>
<td>Child sex, male</td>
<td>3283 (50.1)</td>
</tr>
<tr>
<td>Child race/ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1452 (22.2)</td>
</tr>
<tr>
<td>Black</td>
<td>1824 (27.8)</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>3276 (50.0)</td>
</tr>
<tr>
<td>Child standardized BPI score, mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Internalizing</td>
<td>104 (15.8)</td>
</tr>
<tr>
<td>Externalizing</td>
<td>104 (15.4)</td>
</tr>
<tr>
<td>Age of mother, mean (SD), y</td>
<td></td>
</tr>
<tr>
<td>( &lt; 12 )</td>
<td>417 (13.1)</td>
</tr>
<tr>
<td>12</td>
<td>1395 (43.7)</td>
</tr>
<tr>
<td>( &gt; 12 )</td>
<td>1382 (43.3)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>12.9 (2.3)</td>
</tr>
<tr>
<td>Urban residency</td>
<td>5273 (81.5)</td>
</tr>
<tr>
<td>No. of children of mother in the household, mean (SD)</td>
<td>2.1 (1.3)</td>
</tr>
<tr>
<td>Age of mother at childbirth, mean (SD), y</td>
<td></td>
</tr>
<tr>
<td>27.6 (5.1)</td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>1349 (23.9)</td>
</tr>
<tr>
<td>Mother's educational level (n = 3197), y</td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>541 (6.1)</td>
</tr>
<tr>
<td>Father’s involvement</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0-3.50</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>2.20 (0.88)</td>
</tr>
<tr>
<td>Resident father</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>759 (67.4)</td>
</tr>
<tr>
<td>No</td>
<td>368 (32.7)</td>
</tr>
</tbody>
</table>

Abbreviation: BPI, Behavioral Problems Index.

aData are given as number (unweighted percentage) except where otherwise indicated.

Father’s resident status was first assessed in 1994 for children aged 10 to 14 years in the self-administered questionnaire.
The present study shows that the adverse effects of maternal depressive symptoms on the trajectories of child problem behaviors across childhood and early adolescence are negligible after the role of positive paternal involvement is considered. We observed that higher levels of positive involvement by the father were negatively associated with trajectories of child problem behaviors. Higher levels of positive involvement by the father also attenuated the adverse effect of maternal depressive symptoms on trajectories of child problem behaviors.

Radke-Yarrow and associates\(^9\) reported increases in disruptive and depressive problems in young children of affectively ill mothers compared with children of control mothers, but their analysis did not include the father’s involvement and did not extend beyond 2 time points, in contrast to the multiple assessments of the present study. When one parent is depressed, the other parent may attempt to compensate for the impaired functioning of the depressed parent,\(^\text{15,20}\) possibly resulting in better parenting practices.

**COMMENT**

Table 2. Multilevel Trajectory Models of the Effects of Maternal Depressive Symptoms on Child Problem Behaviors From the National Longitudinal Survey of Youth, 1992-2002\(^a\)

<table>
<thead>
<tr>
<th></th>
<th>Prediction of Log (Internalizing – 84)</th>
<th>Prediction of Log (Externalizing – 81)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\beta (SE)^b)</td>
<td>(P) Value</td>
</tr>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept(^c)</td>
<td>3.02 (0.08)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Growth rate in problem behaviors (slope)</td>
<td>−0.04 (0.01)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Maternal depression</td>
<td>0.09 (0.14)</td>
<td>.50</td>
</tr>
<tr>
<td>No. of children(^d)</td>
<td>−0.02 (0.01)</td>
<td>.01</td>
</tr>
<tr>
<td>Poverty</td>
<td>0.10 (0.03)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Maternal educational level(^f)</td>
<td>−0.01 (0.01)</td>
<td>.16</td>
</tr>
<tr>
<td>Father’s involvement</td>
<td>−0.10 (0.02)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No resident father/stepfather</td>
<td>−0.02 (0.03)</td>
<td>.44</td>
</tr>
<tr>
<td>Maternal age at child birth(^d)</td>
<td>−0.02 (0.004)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Child sex (1 = male)</td>
<td>0.003 (0.02)</td>
<td>.91</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>−0.03 (0.03)</td>
<td>.32</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.02 (0.03)</td>
<td>.48</td>
</tr>
<tr>
<td>Urban residency</td>
<td>−0.01 (0.02)</td>
<td>.68</td>
</tr>
<tr>
<td>Rate of change (slope) × MDS</td>
<td>0.01 (0.02)</td>
<td>.41</td>
</tr>
<tr>
<td>MDS × father’s involvement</td>
<td>0.06 (0.02)</td>
<td>.02</td>
</tr>
<tr>
<td><strong>Random Effects (Variance Components)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual (residual) (level 1)</td>
<td>0.24 (0.01)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intercept (level 2)</td>
<td>0.79 (0.24)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Slope (level 3)</td>
<td>0.01 (0.003)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intercept/mother (level 3)</td>
<td>0.18 (0.01)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Abbreviation: MDS, maternal depressive symptoms. 
\(^a\)Based on a subject-specific longitudinal model fit by using the PROC MIXED procedure in SAS software (SAS Institute Inc, Cary, North Carolina). N = 6552. 
\(^b\)Each \(\beta\) coefficient represents the change in the log (internalizing – 84) or log (externalizing – 81) for a 1-unit increase in the \(x\) variable, unless otherwise indicated. 
\(^c\)Log of the (internalizing – 84) or (externalizing – 81) problem behavior level at age 4 years for a white female child with no father’s involvement in her life, who does not live with either the biological father or the stepfather and lives in a rural area, and has a nondepressed mother whose educational level, number of children in the household, and age at childbirth are average relative to other mothers in the study sample. 
\(^d\)Mean centered for ease of interpretation.

Symptoms that was positively associated with the trajectory of externalizing behavior over time (\(P= .01\)) (data not shown) but not with the trajectory of internalizing behavior after controlling for confounders.

We next tested the effect modification role of the father’s positive involvement. Table 2 displays the means and variances of each parameter estimate from this analysis. For internalizing behavior, a significant negative rate of change was obtained (\(P< .001\)), indicating that internalizing behaviors decreased during the study. In contrast, externalizing behaviors remained stable over time as the rate of change was not statistically significant. After controlling for the father’s positive involvement and other covariates, maternal depressive symptoms were not associated with the trajectories of child problem behaviors. A statistically significant independent effect of the father’s positive involvement on the trajectories of child problem behaviors was found (\(P_{\text{internalizing}}< .001, P_{\text{externalizing}}< .001\)). Higher levels of positive involvement by the father were negatively associated with child problem behaviors over time. In addition, the father’s positive involvement significantly modified the association between maternal depressive symptoms and trajectories of child problem behaviors (\(P_{\text{internalizing}}=.02, P_{\text{externalizing}}=.008\)). The Figure illustrates these findings. The protective effect of the father’s positive involvement was statistically significant for children of depressed and nondepressed mothers, and the effects seem larger for the nondepressed group.
in the home environment. Therefore, the father’s positive involvement should not be overlooked when evaluating the effect of maternal depression on child development. Previous research on 2-parent families generally have found that feelings of closeness between fathers and children were associated with positive child outcomes, such as low levels of psychological distress and delinquency. Consistent with previous research, we observed that higher levels of positive involvement by the father were associated with lower levels of child problem behaviors. We also observed that the protective effect of the father’s positive involvement was larger for the nondepressed group than for the depressed group (Figure 1). Having a depressed parent is a marker of risk of living in a family context characterized by considerable disadvantage. Children with a depressed parent are at higher risk for chronic stress, family crises, parental marital conflict, family violence, and possibly a disturbed second parent. This adversity in families with a depressed parent may explain the difference in the protective effect of the father’s involvement experienced by the depressed and nondepressed groups in the present study. Results of the present study have important implications for intervention. Promoting increased levels of positive involvement from a father may be another avenue for reducing negative effects on child development when a mother displays depressive symptoms.

Previous research suggests that childhood problem behaviors frequently endure over time. The present study shows stability in externalizing behaviors from childhood to earlier adolescence but a decline in internalizing behaviors. The decline in internalizing behaviors may reflect true change over time, or it may be a result of possible measurement error in maternal self-reported child problem behavior data. This study observed significant within-subject effects from the growth curve models, implying that levels of problem behavior varied over time and that the individual trajectory differed from one child to another. This confirms the need to study individual change over time when the child is exposed to maternal depressive symptoms. The conventional population-average approach assumes the same population mean and slope in predicting child problem behaviors for all children. Present within-individual effects suggest that intervention programs tailored to individuals’ specific needs and backgrounds may be warranted for children with problem behaviors who are living with a depressed mother.

Some methodological limitations of this study need to be considered in interpreting the study findings. The CES-D scale used in the NLSY79 is not a diagnostic criteria-based assessment tool for clinical depression. Moreover, maternal depressive symptoms were considered only at baseline. Depressive symptoms often wax and wane during an individual’s lifetime.

Multiple assessments of this exposure are needed to better understand the effect of maternal depression on child behaviors over time. The BPI scores used in this study are not comparable with a Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) diagnoses of externalizing disorders in later childhood, and to use mental health services later in childhood. The present study was also limited by no independent (beyond the mothers’) report of children’s behavior problems. Nonetheless, previous studies have found that mothers’ reports on emotional and behavior problems in children were consistent with the reports of others, including teachers and mental health professionals.

Past research has suggested that depressed mothers’ impaired cognition and perceptions may bias their report and result in higher rates of child problem behaviors. Hence, measurement error in child problem behavior is possible. In general, the older the child at exposure, the more likely the child will be resilient to the adversity of maternal depression because the child will have developed competencies that prepare him or her for successful coping. The inclusion of children at varying ages of exposure at baseline may have resulted in an underestimation of the effect of maternal depression on child problem behaviors. This investigation was also limited by a lack of information on potential confounders.
such as domestic violence, genetic data, paternal depression, and maternal treatment status for depression.

This study also has considerable methodological strengths, including a large and ethnically diverse sample and the availability of measures of long-term child and adolescent outcomes in a continuous context. To our knowledge, this is the first longitudinal study that incorporates multiple assessments of family environment in studying child problem behaviors. Most previous studies of child development measured family characteristics at only 1 point in time, assuming that the life circumstances a child experiences remain constant over time. In addition, the literature about depressed mothers rarely considers the fathers’ involvement.

In conclusion, the results of this study show that higher levels of positive involvement by the father were inversely associated with child problem behaviors over time and that the effects of maternal depressive symptoms on child behaviors vary by the level of the father’s positive involvement. Poor maternal mental health has serious implications for the health of women and for their children. Increased recognition and treatment of maternal depression is needed. The protective effect of a father’s positive involvement documented in this study suggests that health care professionals should encourage the father’s increased positive involvement with his children. When the father readily compensates for the limitations on the depressed mother’s functioning, the child’s risk of problem behaviors may be reduced.19

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Author Contributions: Dr Chang had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Chang. Acquisition of data: Chang. Analysis and interpretation of data: Chang, Halpern, and Kaufman. Drafting of the manuscript: Chang and Kaufman. Critical revision of the manuscript for important intellectual content: Chang, Halpern, and Kaufman. Statistical analysis: Chang and Kaufman. Administrative, technical, and material support: Chang. Study supervision: Halpern and Kaufman.

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The average news broadcast contains as much violence, sex, and action as many of the 
most popular entertainment shows on TV.

—From http://www.talkingwithkids.org