



Labored love: Examining the link between maternal depression and parenting behaviors

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ABSTRACT

Theoretical perspectives suggest a strong link between maternal mental health and parenting, which may facilitate the intergenerational transmission of disadvantage from depressed mothers to their children. In this paper, I extend prior research by using data from the Fragile Families and Child Wellbeing Study ($N = 3659$). Pooled OLS and random-effects regression models document a strong link between maternal depression and the following parenting behaviors: neglect, psychological aggression, physical assault, and engagement. Fixed-effects models, however, show little evidence that changes in maternal depression are linked to changes in parenting behaviors, suggesting some negative consequences of depression are driven by variation across individuals or unobserved time-invariant characteristics. Further, the consequences of depression for parenting behaviors do not vary by mother's marital status, suggesting that marriage may not be protective with respect to the parenting behaviors of depressed mothers.

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1. Introduction

Depression is a common mental health condition that affects more than 10% of people in the United States annually, and lifetime prevalence rates are even higher (Kessler and Zhao, 1999). Some subgroups of the population – including the unmarried or poorly educated – are especially susceptible to depression and depressive episodes (Kessler and Zhao, 1999; Meadows et al., 2008). Women are also more vulnerable to depression than men, and some evidence suggests that mothers with children – compared to their childless counterparts – are especially likely to report depression (Cowan and Cowan, 1992). The consequences of maternal depression are far-reaching, and a burgeoning literature documents how depression among mothers affects individuals and families. Depression and other mental illnesses, for example, impair a single mother's likelihood of marriage (Teitler and Reichman, 2008). Depressed mothers also report lower quality relationships with their romantic partners and are more likely to report material hardship (Frech and Williams, 2007; Heflin and Iceland, 2009; Kim and McKenry, 2002).

In addition to the wide-ranging consequences that depression may have for the sufferer, a large, robust literature documents that children are particularly vulnerable to maternal depression. Children of depressed mothers, compared to their counterparts never exposed to maternal depression, have worse behavioral outcomes throughout the life course (Goodman and Gotlib, 2002; Turney, forthcoming). One pathway through which depressed mothers may transmit disadvantages to their children may be through parenting behaviors such as discipline. Indeed, empirical research consistently finds that depressed mothers may be limited in their capacity to parent effectively (Gotlib and Goodman, 1999; Kiernan and Huerta, 2008; Lovejoy et al., 2000; Marmorstein et al., 2004). Depressed mothers, for example, may be less empathetic, more

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aggressive, and less emotionally responsive to their children than their non-depressed counterparts (Feng et al., 2007; Lovejoy et al., 2000; Silberg and Rutter, 2002). In addition, maternal depression is linked to greater negative interactions and fewer positive interactions with children (Cummings and Davies, 1994; Lovejoy et al., 2000). Given children's sensitivities to parenting behaviors, and the implications of parenting for children's life course trajectories, understanding the link between maternal depression and parenting is crucial (Belsky, 1984).

Though existing literature documents a strong link between maternal depression and parenting behaviors, there are several opportunities to extend this literature. Many existing conclusions, for example, come from small, non-representative samples with limited generalizability. Often times, samples are limited to clinical populations or non-clinical groups that are homogenous with respect to race, socioeconomic status, or marital status (for an exception, see Kiernan and Huerta, 2008). The fact that little research exists on the consequences of maternal depression for parenting behaviors among unmarried mothers is a particularly stark omission, given the substantial demographic changes of the past five decades (Ellwood and Jencks, 2004). Children born to unmarried parents now account for nearly 40% of all children born in the United States, and researchers are only beginning to examine how this diverse and generally disadvantaged group of children fares (Hamilton et al., 2009). In addition, there are likely important unobserved differences between depressed and non-depressed mothers that are not captured by most existing research. Many prior examinations rely on cross-sectional data or OLS regression models that make it impossible to account for unobserved heterogeneity or discern the causal ordering between maternal depression and parenting.

Given theoretical perspectives and empirical research that suggest far-reaching consequences of depression, and some limitations of existing research, in this paper, I examine the link between maternal depression and parenting behaviors. I use data from the Fragile Families and Child Wellbeing Study, a longitudinal survey of nearly 5000 new and mostly unmarried parents in 20 US cities who gave birth between 1998 and 2000. Mothers were first interviewed in the hospital when their children were born, and were re-interviewed when their children were about 1, 3, and 5 years old. Using these data, I examine how maternal depression is linked to a wide range of parenting behaviors: neglect, discipline (including both psychological aggression and physical assault), and engagement. I pay particular attention to differences in this association between mothers married and unmarried at the birth of their child. Though these four indicators of parenting behaviors are not exhaustive of all ways mothers interact with their young children, they capture both positive and negative dimensions of parenting and provide a solid foundation for understanding the consequences of maternal depression for the broader family system (Lovejoy et al., 2000). Furthermore, all of these parenting behaviors have strong, robust associations with wellbeing in early childhood, a crucial period in the life course when children are placed on often static educational and socioemotional trajectories (Entwisle and Alexander, 1989; Pianta and Cox, 1999).

2. Background

Given the large number of individuals and families affected by depression, as well as the unequal distribution of depression across the population, understanding the consequences of mental health disparities is important for understanding broader stratification processes (Kessler and Zhao, 1999; Yu and Williams, 1999). It is well known that depressed mothers may transmit disadvantages to their children. Children of depressed mothers, compared to their counterparts with non-depressed mothers, are more likely to have impaired social, behavioral, and cognitive outcomes throughout the life course (Dodge, 1990; Downey and Coyne, 1990; Goodman and Gotlib, 2002). The mechanisms through which maternal depression affects children are not fully understood, but some evidence suggests maternal parenting behaviors may be one important pathway. A recent examination of families in the United Kingdom, for example, found that three types of parenting behaviors – reading activities, mother–child relations, and discipline practices – mediated the link between maternal depression and young children's internalizing and externalizing behaviors (Kiernan and Huerta, 2008). Other research arrives at similar conclusions (Conger et al., 2002).

Additionally, as mentioned above, understanding the relationship between maternal depression and parenting behaviors is critical because favorable parenting behaviors are consistently linked to child wellbeing (Amato and Fowler, 2002; Elder et al., 2003; Simons et al., 1994). For example, children neglected by their mothers are more likely than their non-neglected counterparts to have internalizing and externalizing behavior problems, as well as other socioemotional difficulties (Hildyard and Wolfe, 2002; Tyler et al., 2006). Similarly, children have more behavior problems when parents report physical discipline (Bodovski and Youn, 2010). Disadvantages in early childhood behaviors often translate to disadvantages throughout adolescence and adulthood, which makes it particularly important to understand the social antecedents of problem behaviors in early childhood (Elder et al., 2003).

2.1. Maternal depression as a predictor of maternal parenting behaviors

Belsky's (1984) process model of parenting suggests that parents' psychological resources are the most important determinant of how they parent their children and, thus, may reproduce the existing social structure. Though other aspects of the social environment predict parenting behaviors, depression may be an important, direct link to parenting (Belsky, 1984). This is consistent with other theoretical perspectives that suggest depression impairs the sufferer's interpersonal relationships and functioning; it is likely that worse parenting behaviors is one manifestation of such impairments (Coyne, 1976).

Taken together, these theoretical perspectives suggest a strong, inverse link between maternal depression and favorable parenting behaviors, and empirical research consistently supports these theories. Below, I briefly summarize prior research that links maternal depression to each of the parenting behaviors examined in this paper.

2.1.1. Neglect

First, some research links maternal psychological wellbeing to neglectful parenting behaviors. Neglectful parenting behaviors are rarely operationalized consistently across studies, but may include behaviors such as leaving one's child home alone (Tyler et al. 2006). Depressed mothers are more likely than their non-depressed counterparts to engage in neglectful behaviors (Egami et al., 1996; Ethier et al., 1995; Tyler et al., 2006). Depressed mothers are also more likely to report aggravation with their children (Lyons-Ruth et al., 2002), more likely to have negative emotions about their children (Bird, 1997), and less likely to feel invested in their children (Bradley et al., 1997), all of which may lead to neglectful behavior.

2.1.2. Discipline

Additionally, existing literature suggests that depressed mothers may discipline their children more frequently or harshly than non-depressed mothers (Cummings and Davies, 1994; Kochanska et al., 1987; Lyons-Ruth et al., 2002). For example, a recent study used data from the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) and found that depression in parents is associated with greater use of physical discipline (Bodovski and Youn, 2010). Psychological control – when parents use guilt or withhold love to control children's behavior – is another discipline strategy that is more frequently used by mothers who report high levels of depressive symptoms (Cummings et al., 2005).

2.1.3. Engagement

Depression also influences the frequency and quality of mothers' interactions with their young children. Depressed mothers, for example, are less likely than their non-depressed counterparts to participate in reading activities with their young children (Kiernan and Huerta, 2008). Additionally, according to a meta-analysis about the link between maternal depression and observed parent-child interactions, there is a moderate correlation between depression and disengagement among mothers (Lovejoy et al., 2000).

2.2. Maternal depression and parenting behaviors: differences by marital status

Prior research highlights the salience of maternal mental health as an antecedent of parenting behaviors, and it is likely this association varies depending on the marital status of the mother. The stress process theory (Pearlin et al., 1981; Pearlin, 1989; Turner et al., 1995), for example, provides one way to understand why married and unmarried mothers may respond differently to episodes of depression. This theory posits that individuals are differentially exposed to stressors and that individuals have differential access to resources (e.g., social support such as marriage) to help them cope with these stressors (Pearlin, 1989; Turner et al., 1995). Thus, marriage may buffer depressed mothers from a stressor such as depression, while depressed mothers without such support may be more likely to engage in unfavorable parenting practices. Fathers, for example, may provide emotional support to depressed mothers that make it easier for them to cope with life's challenges, which may then translate to less harm for children (Meadows et al., 2007). This is consistent with other research that suggests depressed individuals, compared to their non-depressed counterparts, are in greater need of the support often provided by marriage (Frech and Williams, 2007). Or, by simply being an additional adult in the household, fathers may serve as a form of social control that inhibit mothers from engaging in non-normative parenting behaviors (Horwitz, 1990). Fathers may be able to shoulder some parenting burden of which depressed mothers are not capable, such as ensuring there is food in the household or getting children medical care.

In addition, it is well known that married and unmarried mothers differ dramatically on a host of demographic and socioeconomic characteristics (Carlson et al., 2004). Most relevant to this paper, marriage confers mental health benefits to individuals, above and beyond those benefits garnered from cohabiting with an unmarried romantic partner or having a romantic partner (Dush and Amato, 2005; Lamb et al., 2003; Meadows et al., 2008). Married mothers are less likely than their unmarried counterparts to report depression (Waite and Gallagher, 2001; Wood et al., 2007). Additionally, married and unmarried mothers may parent differently. Beck and colleagues, for example, find that mothers who experience family instability, particularly recent family transitions, are more likely to harshly discipline their young children than those who do not experience instability (Beck et al., 2010). Single mothers, particularly those with mental health impairments, experience particular challenges with respect to the parental role that may not be experienced by married mothers (Jackson, 2000; Jackson et al., 2009). Other research comes to similar conclusions (Amato and Booth, 1996; Hetherington et al., 1982; for contrary findings, see Gibson-Davis (2008)).

2.3. Contributions

Taken together, the review of the literature suggests a strong theoretical basis for linking maternal depression to maternal parenting behaviors and provides a host of empirical evidence to support the theoretical framework. However, there are several important limitations to this growing body of literature. To begin with, the majority of research that examines the consequences of maternal depression for parenting behaviors uses cross-sectional data (Bradley et al., 1997; also see Tyler et al.,

2006). In addition to not accounting for the time-varying nature of depression and parenting, cross-sectional data makes it impossible to discern the direction of causality (i.e., it is possible that mothers who harshly discipline their children may become depressed because of their difficulty in handling the parental role). Additionally, the majority of existing research is based on small, non-representative samples that are limited in their generalizability (Cummins et al., 2005; Ethier et al., 1995; also see Lovejoy et al., 2000). Many samples are limited to clinical populations or non-clinical groups that are homogenous with respect to race or socioeconomic status. One noteworthy exception is research by Kiernan and Huerta (2008) uses data from the Millennium Cohort Study, a representative birth cohort study of children in the United Kingdom, to examine the association between maternal depression, parenting, and children's outcomes. Their analysis provides a thorough picture of the consequences of maternal depression, but they only consider maternal depression and parenting at one point in time (also see Bodovski and Youn, 2010).

In this paper, I address these limitations and make several additional contributions. To begin with, I use longitudinal data that takes into account the time-varying nature of both depression and parenting. The longitudinal data allow for an examination of within-person changes in maternal depression and parenting behaviors (i.e., how changes in depression are linked to changes in parenting behaviors). Though I cannot provide definitive causal conclusions about the effect of maternal depression on parenting behaviors, the longitudinal data allow for a better estimation of this relationship. Additionally, the data include a large, diverse sample of both marital and nonmarital births, which make it possible to examine if the association between maternal depression and parenting behaviors varies by marital status. Further, in the Fragile Families data, mothers were asked a rich set of questions that make it possible to control for characteristics that have been previously unaccounted for in research of this nature. A final contribution of this paper is that the models presented provide some evidence of the mechanisms through which maternal depression might influence a host of parenting behaviors.

2.4. Research questions

Taken together, prior research suggests a robust association between maternal depression and parenting behaviors including neglect, discipline, and engagement. However, as discussed above, there are several opportunities to strengthen our knowledge about the consequences of maternal depression for parenting behaviors and, ultimately, child wellbeing. In this paper, I examine two research questions. First, to what extent is maternal depression associated with mothers' reports of parenting behaviors, including neglect, discipline, and engagement? Based on existing literature, I hypothesize that depressed mothers will exhibit less optimal parenting behaviors than their non-depressed counterparts. In the longitudinal, heterogeneous, and recent sample that allows me to account for some unobserved differences between depressed and non-depressed mothers, I expect depressed mothers to report more neglectful behavior, more harsh discipline practices, and less engagement.

Second, is marriage protective against the negative consequences of maternal depression? Though a large body of literature demonstrates the benefits of marriage for adults and children, as well as stark differences between married and unmarried mothers, little research exists about subgroup differences in the association between maternal depression and parenting behaviors. Based on prior research about the protective effects of marriage I hypothesize that the negative relationship between maternal depression and favorable parenting behaviors will be stronger for unmarried mothers than for married mothers.

3. Methods

3.1. Data

This paper uses data from the Fragile Families and Child Wellbeing study, a longitudinal survey of nearly 5000 new and mostly unmarried parents in 20 US cities that were stratified by labor market conditions, welfare generosity, and child support policies. Unmarried mothers were oversampled, which means the sample over-represents minorities and socioeconomically disadvantaged mothers (Ellwood and Jencks, 2004). Married mothers comprise about 25% of the analytic sample, which allows for comparisons between married and unmarried mothers. Mothers completed a 30- to 40-min in-person interview at the hospital after the birth of their child, between February 1998 and September 2000, and mothers and fathers were interviewed by telephone when their children were approximately 1, 3, and 5 years old. Additionally, a subset of families participated in an additional, In-Home component of the survey when children were about 3 and 5 years old. Response rates varied by marital status, but were relatively high (Bendheim-Thoman Center for Research on Child Well-Being, 2008,2009; Reichman et al., 2001).¹

It is important to note that in this paper I examine only maternal depression and parenting behaviors, as opposed to considering characteristics of both mothers and fathers. Though fathers play an important role in children's development (Phares and Compas 1992), a full examination of paternal depression is outside the scope of this paper and represents an important direction for future research. In the Fragile Families data, children nearly universally live with their mother and substantially

¹ Of those mothers sampled to participate in the baseline interview, about 82% of mothers married at baseline and 87% of mothers unmarried at baseline participated. Of mothers who responded to the baseline interview, 89% (90% of married mothers and 89% of unmarried mothers) participated in the 1-year survey, 86% (89% of married mothers and 86% of unmarried mothers) participated in the 3-year survey, and 85% (85% of married mothers and 84% of unmarried mothers) participated in the 5-year survey.

fewer live with their fathers. Only 61% of children in the analytic sample lived with their father at the 1-year survey, 55% at the 3-year survey, and 46% at the 5-year survey. Additionally, in these data, attrition is more common among fathers than mothers, and most measures of parenting behaviors come from the In-Home surveys primarily administered to mothers.

3.2. Measures

3.2.1. Maternal depression

Indicators of maternal depression come from mothers' responses to the Composite International Diagnostic Interview Short Form (CIDI-SF) Version 1.0 November 1998 (Kessler et al., 1998). Mothers were asked if, at some time during the past year, they had feelings of depression or were unable to enjoy things that were normally pleasurable. Those who experienced at least one of these two conditions most of the day, every day, for a two-week period were asked additional questions (about losing interest in things, feeling tired, experiencing a change in weight of at least 10 lbs, having trouble sleeping, having trouble concentrating, feeling worthless, or thinking about death), and those who answered affirmatively to three or more of these questions are considered depressed. These are not lifetime measures but instead refer to individuals as likely having Major Depressive Disorder (MDD) in the previous year. Although limitations to the CIDI-SF exist (Link, 2002), it is commonly used in large-scale community surveys to estimate the prevalence of depression in the population (Aalto-Setälä et al., 2002). About 14% of mothers in the analytic sample report depression in the 1-year survey, 21% in the 3-year survey, and 17% in the 5-year survey.

3.2.2. Maternal parenting behaviors

Maternal parenting behaviors include the following: neglect, psychological aggression, physical assault, and engagement. Unfortunately, not all indicators of parenting behaviors were asked at all waves of data collection. Questions about neglect, psychological aggression, and physical assault were only asked at the 3- and 5-year waves, and only of the subsample of mothers who participated in the In-Home survey. Questions about engagement were asked of all mothers at the 1-, 3-, and 5-year surveys.

To begin with, mothers were asked questions from the Parent–Child Conflict Tactics Scales (CTSPC) about neglectful parenting behaviors (Straus, 1990; Straus et al., 1998). Examples of neglectful behaviors include having to leave the focal child home alone or not being able to get the child food ($\alpha = 0.489$ at the 3-year survey, $\alpha = 0.444$ at the 5-year survey). I use yearly prevalence measures for each of the five indicators of neglect (1 = *happened in the past year*, 0 = *did not happen in the past year*), and take an average of these dummy variables that ranges from 0 to 1.² I then standardize this variable (mean = 0, standard deviation = 1), as well as other indicators of maternal parenting behaviors, to more readily make comparisons across outcomes. See Appendix A for a complete description (and unstandardized mean) of the individual items that comprise this and the other parenting behaviors.

Mothers were also asked a variety of questions from the CTSPC about discipline practices, and responses to these questions comprise two indicators of discipline: psychological aggression and physical assault (Straus, 1990; Straus et al., 1998). Psychological aggression includes questions about discipline such as shouting, yelling, or screaming at the child, or threatening to kick the child out of the house ($\alpha = 0.471$ at the 3-year survey, $\alpha = 0.507$ at the 5-year survey). Physical assault includes spanking or shaking the child ($\alpha = 0.530$ at the 3-year survey, $\alpha = 0.534$ at the 5-year survey). Similar to the measure of neglect, I use yearly prevalence measures for each of the questions and standardize the average of mothers' responses. Higher values indicate more harsh discipline.

Mothers were also asked about their engagement with their child, measured by the number of days per week they participated in various activities with their child. At the 1-, 3-, and 5-year surveys, mothers were asked how many days per week they did various activities with the focal child including playing games, reading, or telling stories ($\alpha = 0.801$ at the 1-year survey, $\alpha = 0.674$ at the 3-year survey, and $\alpha = 0.702$ at the 5-year survey). Because mothers' interactions with their children may vary by the children's developmental age, mothers were asked about slightly different activities at the three waves.³ Across each of the waves, the final engagement measure is a standardized average of responses. Higher values indicate more engagement.

3.2.3. Time-invariant covariates

The multivariate analyses control for various time-invariant characteristics that may be associated with maternal depression or parenting behaviors. These include race, immigrant status, childhood family structure, homeownership, and several child-level characteristics. Mother's race is represented by a series of dummy variables: non-Hispanic white (reference category in the multivariate analyses), black, Hispanic, and other race. Immigrant status is a dummy variable indicating if the

² Indicators of chronicity – as opposed to prevalence – are available for the following three parenting behaviors: neglect, psychological aggression, and physical assault. In supplemental analyses, I estimate the chronicity of these behaviors, as a function of maternal depression, by assigning weights to values in accordance with the frequencies indicated by the response categories (0 = *this has never happened or this has happened before, but not in the past year*; 1 = *once*; 2 = *twice*; 4 = *three to five times*; 8 = *six to 10 times*; 15 = *11 to 20 times*; 25 = *more than 20 times*). For all three outcomes, the magnitude and significance of the maternal depression coefficient is similar when prevalence measures are used. Because prevalence measures are preferred to those measures of chronicity (Straus, 2001), I report those in the tables.

³ Results are robust if I only examine indicators of maternal engagement asked at all three waves.

respondent was born outside of the United States (1 = *foreign-born*, 0 = *native-born*). I include a dummy variable indicating the mother lived with both of her biological parents at age 15 (1 = *lived with both biological parents*, 0 = *did not live with both biological parents*). I also include a dummy variable for homeownership (1 = *homeowner*, 0 = *not a homeowner*), which may be an indicator of wealth or residential stability. Finally, I control for various child characteristics that might affect parenting behaviors. Child gender is represented with a dummy variable (1 = *male*, 0 = *female*), and I also include a dummy variable indicating the child was born low birth weight (1 = *child born low birth weight*, 0 = *child not born low birth weight*). Child temperament is a subscale of the Emotionality, Activity, and Sociability Temperament Survey for Children (Buss and Plomin, 1984). At the 1-year wave, mothers were asked to respond to the following about their child (1 = *not like my child at all*, 5 = *very much like my child*): child tends to be shy (reverse coded), child often fusses and cries (reverse coded), child is very sociable, child gets upset easily (reverse coded), child reacts strongly when upset (reverse coded), and child is very friendly with strangers. Higher scores indicate better temperament, and including this variable in the analyses addresses the potentially transactional relationship between mothers and their children ($\alpha = 0.520$). It is likely that children's temperaments vary over time, but mothers were not asked similar questions about temperament at each wave; thus, I include this as a time-invariant variable. Finally, I include children's age at the 5-year survey into the multivariate models.

3.2.4. Time-varying covariates

Time-varying characteristics include the following: maternal age, number of children in household, frequency of attendance at religious services, education, employment status, income-to-poverty ratio, relationship status, grandmother in the household, fair or poor health, and parenting stress. Both mother's age and number of children in the household are continuous variables. Mothers were asked how often they attended religious services, which is represented by a series of dummy variables: at least once a week (reference category), several times a month, several times a year or hardly ever, and never. Mother's education comprises a series of dummy variables: less than high school diploma (reference category), high school diploma or GED, some college, and college degree or higher. Employment status is a dummy variable indicating the mother worked in the week prior to the interview. I also include a control for income-to-poverty ratio, which is the ratio of the total household income to the official poverty thresholds established by the US Census Bureau. Poverty thresholds correspond to the year before the interview, and are based on reports of household size and composition. The mother's current relationship status is represented by a series of dummy variables: married to child's biological father, cohabiting with father, romantically involved with father, married to new partner, cohabiting with new partner, romantically involved with new partner, and not in a relationship (reference category). The multivariate analyses include a control for the presence of a grandmother in the household (1 = *grandmother in household*, 0 = *no grandmother in household*), as well as mothers' self-reported health (1 = *fair or poor health*, 0 = *excellent, very good, or good health*). Finally, parenting stress comprises responses to the following items (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*): being a parent is harder than I thought it would be; I feel trapped by my responsibilities as a parent; taking care of my children is much more work than pleasure; and I often feel tired, worn out, or exhausted from raising a family ($\alpha = 0.617$ at the 1-year survey, $\alpha = 0.633$ at the 3-year survey, $\alpha = 0.660$ at the 5-year survey). The final measure of parenting stress is a standardized average of responses to these four questions. Higher values indicate more parenting stress.

3.3. Analytic sample

The analytic sample for this paper consists of 3659 mothers and their children. I exclude the 1239 observations missing data on maternal depression at the 1-, 3-, or 5-year survey. The majority of these missing cases result from the mother not completing the survey at one or more of the follow-up waves.⁴ There are very few differences between the analytic sample and the full sample. The mothers in the analytic sample, for example, are as likely as mothers in the full sample to be minorities, to not have graduated from high school, and to be employed ($p < 0.05$). To reduce bias and maximize the number of observations used, I allow the number of observations used to vary across outcome variables. Thus, the sample size is reduced substantially in the models predicting neglect ($n = 2838$), psychological aggression ($n = 2838$), and physical assault ($n = 2838$), as these questions were only asked of the subsample of mothers who completed the In-Home survey.⁵

3.4. Analytic plan

In the first set of multivariate analyses (Table 3), I use pooled ordinary least squared (OLS) regression models to estimate maternal parenting behaviors as a function of maternal depression and the covariates. The data are structured in a parent-wave format where each mother is observed up to three points in time. The key independent variable, maternal depression,

⁴ Among mothers who participated in the 1-year survey, mothers who participated in the 3-year survey and mothers who did not participate in the 3-year survey are equally likely to report depression at the 1-year survey. There are also no differences in 1-year depression between mothers who participated in the 5-year survey and mothers who did not participate in the 5-year survey. This suggests that maternal depression is not associated with attrition. In supplemental analyses not presented, I use a broader sample inclusion criterion by allowing mothers to be in the sample if they have nonmissing data on depression at any wave and use multiple imputation to impute missing values on depression. Results are robust to this specification.

⁵ In supplemental analyses, I restrict the models predicting engagement to those mothers with available data on the other three outcome variables (neglect, psychological aggression, and physical assault). The findings presented are robust to this reduced sample size.

Table 1
Descriptive statistics of variables included in analyses.

Variable	Entire sample (N = 3659)		Married at birth (N = 916)		Unmarried at birth (N = 2743)		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Race (b)							
White	0.219		0.449		0.142		***
Black	0.490		0.250		0.570		***
Hispanic	0.256		0.234		0.264		
Other race	0.035		0.067		0.024		***
Immigrant (b)	0.142		0.242		0.109		***
Age (b)	25.157	6.013	29.313	(5.611)	23.769	(5.507)	***
Lived with both biological parents at age 15 (b)	0.428		0.648		0.354		***
Homeowner (b)	0.358		0.535		0.299		***
Number of children in household (b)	2.260	1.296	2.099	(1.185)	2.313		***
Child is male (b)	0.524		0.523		0.524		
Child age, in months (y5)	64.358	(3.255)	64.521	3.283)	64.307	(3.245)	***
Child favorable temperament (y1)	3.404	(0.762)	3.535	(0.712)	3.360	(0.774)	***
Child born low birth weight (b)	0.096		0.056		0.109		***
Frequency of attendance at religious services (y5)							
At least once a week	0.390		0.482		0.360		***
Several times a month	0.202		0.174		0.210		*
Several times a year or hardly ever	0.290		0.268		0.297		
Never	0.118		0.075		0.132		***
Education (y5)							
Less than high school	0.254		0.129		0.296		***
High school diploma or GED	0.216		0.152		0.237		***
Some college	0.391		0.331		0.411		***
College degree or higher	0.130		0.389		0.056		***
Employed (y5)	0.596		0.607		0.593		
Income-to-poverty ratio (y5)	1.985	(2.275)	3.539	(3.393)	1.460	(1.394)	***
Relationship status (y5)							
Married to father	0.320		0.823		0.152		***
Married to new partner	0.039		0.019		0.046		***
Cohabiting with father	0.143		0.007		0.188		***
Cohabiting with new partner	0.118		0.033		0.146		***
Romantic with father	0.015		0.000		0.020		***
Romantic with new partner	0.106		0.087		0.131		***
No romantic involvement	0.274		0.063		0.336		***
Grandmother in household (y5)	0.116		0.063		0.134		***
Fair or poor health (y5)	0.136		0.094		0.151		***
Parenting stress (y5)	2.182	(0.680)	2.130	(0.630)	2.199	(0.695)	**

Notes: b, baseline survey; y1, 1-year survey; y5, 5-year survey. Symbols compare mothers married at birth to mothers unmarried at birth.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

is included in all of the models.⁶ The second set of models includes the following covariates: race, immigrant status, age, lived with both biological parents at 15, homeowner, number of children in the household, and a host of characteristics of the child (gender, age, temperament, and born low birth weight). Model 3 includes additional characteristics that may be endogenous to maternal depression: frequency of attendance at religious services, education, employment status, income-to-poverty ratio, relationship status, grandmother in the household, fair or poor self-rated health, and parenting stress. This final model provides some evidence of the mechanisms underlying the association between depression and parenting behaviors. These OLS models provide a estimate of the overall association between maternal depression and parenting behaviors, controlling for a host of observed estimates.

Next, I use random-effects models to estimate the association between maternal depression and parenting behaviors, capturing both within- and between-subject variation. One advantage that random-effects models have over OLS models is that they can take into account both time-varying and time-invariant characteristics of individuals. The random-effects models are limited, however, because they do not take into account unobserved heterogeneity. Thus, in the final set of models in Table 3, I use fixed-effects models to take into account stable characteristics of the mother and capture within-individual variation; this more conservative technique allows me to examine how a change in maternal depression is

⁶ Maternal depression measured at the 1-year survey may include mothers who experience short-term post-partum depression (Kearns et al., 1997). If this temporary post-partum depression has less of an influence on maternal parenting behaviors than Major Depressive Disorder, the analyses may under-estimate the importance of maternal depression. Findings, however, are robust when I restrict the analyses to changes in depression and parenting behaviors between the 3- and 5-year surveys.

associated with a change in parenting behaviors, net of time-varying observed characteristics and time-invariant characteristics, and thus allows a better estimate of the causal relationship. In both the random- and fixed-effects models, I first estimate the bivariate association between maternal depression and parenting behaviors, and then extend the models to include a host of time-invariant and time-varying characteristics.

Finally, I use random- and fixed-effects regression models to test the hypothesis that the association between maternal depression and parenting behaviors varies by the baseline marital status of the mother. Of course, not all mothers married at baseline stay married throughout the duration of the survey and many unmarried mothers get married over the course of the five years. Results are consistent regardless of when marital status is measured, so I present an interaction term between depression and marital status at baseline. Results are also robust to interactions between maternal depression and co-residential status (i.e., combining married and cohabiting mothers). I only present findings from the random-effects models in Table 4, though discuss the fixed-effects models in the text. Both Models 1 and 2 include all covariates from Model 3 in Table 3, as well as a dummy variable indicating baseline marital status. Model 2 includes an interaction term between depression and baseline marital status.

Few observations are missing covariates, and I use multiple imputation (the *ice* command in Stata) to impute missing data (Royston, 2004). In the imputation model, I include variables related to the research questions or to the likelihood of being missing (Allison, 2002). Analyses that use list wise deletion produce consistent estimates. The majority of the analyses rely heavily on observations with complete In-Home surveys, a subsample of observations for which there is no appropriate sample weight. In all multivariate analyses, I use robust standard errors to account for the clustering of observations on individuals.

3.5. Sample description

Table 1 presents demographic information about mothers and their children. Because prior research demonstrates stark differences between married and unmarried mothers, I present the descriptives for the entire sample and separately by the mother's marital status at the focal child's birth. On average, married mothers are more likely to be white (45%, compared to 14% of unmarried mothers) and less likely to be black (25%, compared to 57% of unmarried mothers). Married mothers are more likely to be immigrants (24%, compared to 11% of unmarried mothers) and more likely to attend religious services weekly (48%, compared to 36% of unmarried mothers). They are about five years older than their unmarried counterparts and, on average, have fewer children in their households.

4. Results

4.1. Bivariate association between maternal depression and parenting behaviors

Table 2 presents descriptive statistics for maternal depression and parenting behaviors over time, separately for married and unmarried mothers. Readers should keep in mind that all indicators of parenting behaviors are standardized to have a mean of 0 and a standard deviation of 1. Consistent with prior research, these descriptives demonstrate large, substantively important differences between married and unmarried mothers. At the 1-year survey, for example, about 12% of married mothers and 17% of unmarried mothers report depression ($p < 0.001$). The greater prevalence of depression among unmarried mothers at the 3- and 5-year surveys is also statistically significant. Additionally, at both the 3- and 5-year surveys, mothers who were unmarried at the focal child's birth reported more neglectful behaviors ($p < 0.001$ at the 3-year wave, $p < 0.01$ at the 5-year wave), psychological aggression ($p < 0.001$ at both waves), and physical assault ($p < 0.001$ at both waves). The differences in maternal engagement by marital status at birth are not statistically significant.

4.2. Maternal parenting behaviors as a function of maternal depression

The first series of models in Table 3 present the pooled OLS regression models. I only present the coefficient for maternal depression in this table, for the sake of parsimony, but full random- and fixed-effects models can be found in Appendices B and C. The bivariate models demonstrate a strong association between maternal depression and all four parenting behaviors. Depressed mothers are more likely than their non-depressed counterparts to report neglect, psychological aggression, and physical assault. They also report less engagement with their children. These associations are strongly significant across all outcomes ($p < 0.001$).

These bivariate models, however, do not account for additional factors that may alter the relationship between maternal depression and parenting. When I better isolate this relationship by including a host of individual-level covariates in Model 2, maternal depression is still strongly predictive of parenting behaviors. Across each outcome, the inclusion of the covariates reduces the magnitude of the maternal depression coefficients, but depression is still strongly associated with impairments in parenting. Model 3, the most conservative model that includes additional individual-level covariates, also shows a strong association between maternal depression and parenting behaviors. The magnitude of the association between maternal depression and parenting behavior attenuates across all outcomes, with percentage changes ranging from 28% for

Table 2
Descriptive statistics of maternal depression and parenting behaviors over time.

Variable	Married at birth				Unmarried at birth			
	1-year Mean S.D.	3-year Mean S.D.	5-year Mean S.D.	N	1-year Mean S.D.	3-year Mean S.D.	5-year Mean S.D.	N
Depression	0.117 (0.321)	0.152 (0.359)	0.136 (0.343)	916	0.167*** (0.373)	0.228*** (0.420)	0.179** (0.384)	2743
Neglect	–	–0.134 (0.736)	–0.096 (0.829)	576	–	0.044*** (1.070)	0.030* (1.046)	2364
Psychological aggression	–	–0.182 (0.930)	–0.227 (0.933)	576	–	0.060*** (1.015)	0.071*** (1.010)	2364
Physical assault	–	–0.205 (0.983)	–0.197 (0.952)	576	–	0.068*** (0.997)	0.062*** (1.007)	2364
Engagement	0.038 (0.972)	0.016 (0.951)	–0.048 (1.000)	915	–0.013 (1.009)	–0.006 (1.016)	0.016 (1.000)	3623

Notes: All parenting behaviors standardized (mean = 0, standard deviation = 1). Symbols compare mothers married at birth to mothers unmarried at birth.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 3
Estimating maternal parenting behaviors as a function of maternal depression.

Outcome	Pooled OLS regression		Random-effects		Fixed-effects		N
	B	S.E.	B	S.E.	B	S.E.	
<i>Neglect</i>							
Model 1	0.279	(0.045)***	0.252	(0.034)***	0.099	(0.056)	2838
Model 2	0.275	(0.044)***	0.249	(0.034)***	0.101	(0.056)	2838
Model 3	0.179	(0.042)***	0.172	(0.035)***	–0.102	(0.057)	2838
<i>Psychological aggression</i>							
Model 1	0.332	(0.036)***	0.252	(0.033)***	0.027	(0.048)	2838
Model 2	0.286	(0.036)***	0.221	(0.032)***	0.028	(0.049)	2838
Model 3	0.207	(0.036)***	0.160	(0.033)***	0.008	(0.049)	2838
<i>Physical assault</i>							
Model 1	0.212	(0.036)***	0.172	(0.033)***	0.069	(0.048)	2838
Model 2	0.165	(0.035)***	0.140	(0.032)***	0.068	(0.048)	2838
Model 3	0.098	(0.035)**	0.090	(0.033)**	0.057	(0.049)	2838
<i>Engagement</i>							
Model 1	–0.133	(0.029)***	–0.105	(0.025)***	–0.069	(0.029)*	3642
Model 2	–0.143	(0.028)***	–0.111	(0.024)**	–0.070	(0.029)*	3642
Model 3	–0.065	(0.029)*	–0.061	(0.025)*	–0.049	(0.030)	3642

Note: Coefficient for maternal depression presented. Model 1 includes no covariates. Model 2 includes the following covariates: race, immigrant status, age, lived with both biological parents at age 15, homeowner, number of children, child is male, child age, child temperament, and child born low birth weight. Model 3 includes all covariates from Model 2 and the following covariates: religiosity, education, employment status, income-to-poverty ratio, relationship status, grandmother in household, fair or poor health, and parenting stress.

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

psychological aggression to 55% for engagement. However, maternal depression is still associated with nearly one-fifth of a standard deviation increase in neglectful behaviors ($p < 0.001$). Additionally, when mothers are depressed, they report levels of psychological aggression that is about one-fourth of a standard deviation higher than their non-depressed counterparts ($p < 0.001$). These full models also show that maternal depression is associated with greater levels of physical assault and less engagement.

These estimates are limited because they do not take into account time-varying characteristics of individuals and, thus, may overestimate the link between maternal depression and parenting behaviors. An alternative way to model maternal parenting behaviors as a function of maternal depression is to use random-effects models, which account for both between- and within-person effects. The random-effects models produce results consistent with the pooled OLS models: Depressed mothers engage in less favorable parenting practices with their young children compared to their non-depressed counterparts. Because the findings are slightly smaller in magnitude across all four outcomes, they suggest a weaker association between maternal depression and parenting behaviors. For example, in the full models predicting psychological aggression, the

Table 4

Random-effects models estimating association between maternal depression and maternal parenting behaviors by marital status at birth.

	Neglect		Psychological aggression		Physical assault		Engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Depression	0.171*** (0.035)	0.202*** (0.077)	0.160*** (0.033)	0.201** (0.073)	0.089** (0.033)	0.163* (0.072)	-0.062* (0.025)	-0.014 (0.054)
Unmarried at baseline	0.089* (0.044)	0.097 (0.050)	0.057 (0.048)	0.066 (0.050)	0.030 (0.047)	0.047 (0.050)	0.110** (0.039)	0.120 (0.041)
Depression * unmarried at baseline		-0.038 (0.085)		-0.052 (0.081)		-0.092 (0.080)		-0.060 (0.061)
Constant		-0.815		-0.523		0.012		1.577
N	2838	2838	2838	2838	2838	2838	3642	3642

Note: Models include all covariates from Model 3 of Table 3.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

maternal depression coefficient is strongly significant in both the pooled OLS models and the random-effects models, but about one-fourth smaller in the final random-effects model (0.207, compared to 0.160).

Lastly, I use fixed-effects models to estimate the link between maternal depression and parenting behaviors. By only taking into account within-person changes in depression and parenting behaviors, these models provide the most conservative estimate of this relationship. The results from the fixed-effects models are strikingly different from the random-effects models in that they show a much weaker – and mostly non-existent – association between maternal depression and parenting behaviors. To begin with, the fixed-effects models show that, even at the bivariate level, there are no discernable differences between reports of neglect, psychological aggression, or physical assault when mothers experience a change in depression between waves.

Model 1, however, shows that a change in maternal depression is associated with less engagement. The association persists in Model 2, but disappears when the full set of covariates are taken into account in Model 3. Thus, the link between maternal depression and parenting behaviors may be driven by variation across individuals or unobserved time-invariant characteristics of the mothers. Taken together, these models suggest that maternal depression is associated with less favorable parenting behaviors but that it does not necessarily lead to impairments in parenting.

Additional covariates are generally consistent with prior literature (see Appendices B and C). Holding constant a host of individual-level characteristics, the random-effects models show that minority mothers generally report less positive parenting behaviors than their white counterparts. Employment is associated with less physical assault and less engagement, and a greater income-to-poverty ratio is protective against less optimal parenting behaviors. Also, mothers married or cohabiting with the focal child's father, compared to mothers not in a romantic relationship, report fewer neglectful behaviors. Consistent with expectations, greater numbers of children in the household, having a temperamentally difficult child, and having a male child are linked to parenting difficulties. Parenting stress is one of the most robust predictors of parenting behaviors. Greater parenting stress is associated with less favorable parenting, and this association holds up in all but one of the fixed-effects models.

4.3. Association between maternal depression and parenting behaviors, by marital status at birth

By using longitudinal data from a large and recent sample of mothers, prior findings extend much of what we know about the consequences of maternal depression for parenting behaviors. Though it is important to understand the average effects of maternal depression, it is equally important to understand how this relationship may vary among subgroups of the population. Given the voluminous literature that documents the emotional benefits of marriage, as well as other work that demonstrates stark differences between married and unmarried mothers, it is likely that maternal depression is not an equal opportunity risk factor for impaired parenting.

Thus, in Table 4, I predict maternal parenting behaviors, paying particular attention to the interaction between maternal depression and marital status at birth. Turning first to the random-effects models shown in Table 4, Model 1 extends the final model from Table 3 to include marital status at birth. The interaction between maternal depression and marital status at birth, presented in Model 2, is statistically insignificant across all four outcomes. Regardless of marital status at birth, maternal depression has similar consequences for maternal parenting behaviors. The models presented in Table 4 include all covariates from Model 3 of Table 3. Some of these variables may be endogenous to maternal depression and, thus, the effects of maternal depression on parenting may be underestimated. However, similar findings persist when I examine the interaction between maternal depression and marital status at birth with a limited set of covariates. Additionally, the fixed-effects models (not presented) show that the relationship between maternal depression and parenting behaviors is similar for mothers married and unmarried at the birth of the focal child.

5. Discussion

In his process model of parenting, Belsky (1984) posits that parents' psychological resources are the most important correlate of parenting behaviors. According to this theory and other empirical research, children of depressed mothers may be more likely than their counterparts with non-depressed mothers to experience harsh or disengaged parenting. In this paper, I extend prior empirical research on parenting by examining how depression, one indicator of a deficit in psychological resources, is associated with four aspects of parenting behaviors: neglect, psychological aggression, physical assault, and engagement. Using pooled OLS and random-effects models from the longitudinal Fragile Families and Child Wellbeing Study, I find evidence that maternal depression is strongly, consistently associated with impairments in parenting. The association between maternal depression and parenting persists despite adjusting for a host of characteristics of the mother and child. The results provide some evidence that socioeconomic resources, family structure, and parenting stress may be mechanisms through which maternal depression is linked to parenting. Future research will benefit from a more thorough examination of these and additional mechanisms.

These findings are consistent with a large body of literature that suggests depressed mothers experience substantial impairments in parenting (Lovejoy et al., 2000). For example, the fact that depressed mothers are more likely than non-depressed mothers to report neglectful behaviors (Egami et al., 1996; Tyler et al., 2006) or discipline their children harshly (Cummings and Davies, 1994; Kochanska et al., 1987) is consistent with the work of others. Though neglect is a relatively rare occurrence among mothers in this sample, it is strongly associated with child wellbeing (Tyler et al., 2006).

However, the fixed-effects models show that much of the link between maternal depression and parenting is due to variation across individuals or unobserved time-invariant characteristics of these mothers. Depressed mothers, for example, are not more likely than their non-depressed counterparts to be psychologically aggressive toward their children or to physically assault their children. A change in maternal depression is associated with less engagement, but only when adjusting for a limited set of controls. The fact that maternal depression is weakly associated with engagement in the fixed-effects models is, however, inconsistent with other work that suggests a stronger effect of depression on negative parenting behaviors than positive parenting behaviors (Lovejoy et al., 2000). Children of both depressed and non-depressed mothers experience similar negative parenting behaviors, but these two groups of children experience slightly divergent positive parenting behaviors.

In this paper, I also examined variation in the association between maternal depression and parenting behaviors by marital status at the birth of the focal child. The fixed-effects models show that the consequences of maternal depression for neglect, psychological aggression, physical assault, and engagement is similar for both married and unmarried mothers. Marriage does not protect depressed mothers from being more likely than their non-depressed counterparts to report unfavorable parenting behaviors. Although some mothers married at the birth of their child subsequently separated or divorced their child's father, the majority (82%) of these mothers are still married when their child is 5 years old. Perhaps fathers cannot protect children of depressed mothers from maternal neglect. Fathers, for example, may not be able to provide emotional support to depressed mothers that make it easier for them to cope with life's challenges. Other types of support, perhaps instrumental support from family members (i.e., child care), may be more crucial in buffering mothers from the negative effects of depression (Pearlin et al., 1981). It is also possible that depressed mothers view social situations through a negative lens and may thus report more unfavorable parenting behaviors, and marriage may not be able to buffer depressed mothers from these misperceptions.

Why do the results provide little evidence that maternal depression is associated with less favorable parenting behaviors? There are at least several possibilities. First, much prior research on maternal depression and parenting relies on small, clinical, or non-representative samples of mothers who are often homogenous with respect to demographic characteristics such as race, socioeconomic status, and marital status. In this paper, I use data from a large sample that includes both depressed and non-depressed mothers and both married and unmarried mothers. Additionally, the inconsistency with prior research may result from this study's reliance on longitudinal data, which is different from most examinations that use cross-sectional data. The longitudinal data make it possible to examine how a change over time in depression is associated with a change in parenting behaviors and, thus, come closer to estimating a causal effect of depression. Relatively few mothers moved into or out of depression across waves, which may explain part of the weak association in the fixed-effects models. About 20% of mothers in the analytic sample report a change in depression between the 1- and 3-year waves, and 20% report a change in depression between the 3- and 5-year waves. Finally, the weak association between maternal depression and parenting behaviors may also be an artifact of the parenting measures available in the Fragile Families data. Though the four indicators examined provide a useful starting point for understanding this complex relationship, and have been linked to children's outcomes, they are not exhaustive of all types of potential parenting behaviors. Perhaps other forms of parenting – such as withdrawn interactions with children – are more strongly linked to maternal depression. Because some indicators of parenting, such as neglect, are operationalized differently across studies, it is difficult to compare results (Tyler et al., 2006).

Other limitations exist as well. First, these analyses do not provide definitive causal conclusions about the effect of maternal depression on parenting behaviors. Though longitudinal data are preferred to cross-sectional data, and fixed effects models can account for unobserved characteristics by comparing within individuals, these models are limited

because there may be additional, unobserved time-varying characteristics that are unaccounted for in the models. Additionally, measures of parenting behaviors are self-reported by the mother, and it is possible that mothers over-report favorable parenting behaviors (i.e., reading to their children) or under-report socially sanctioned parenting behaviors (i.e., leaving child home alone). However, there is no reason to believe that depressed and non-depressed mothers would differentially report socially desirable responses. Some indicators of parenting are comprised of individual questions that are only moderately correlated. I use these indicators because they are established scales and because prior research has found them to be highly correlated with children's outcomes (e.g., Taylor et al., 2010). Finally, the dichotomous measure of depression does not allow the possibility of looking at parents who do not meet the criteria for depression but still exhibit some symptoms (Mirowsky and Ross, 2002). Similarly, mothers who report depression at each wave are a heterogeneous group, and there is no way to distinguish between mothers depressed for only two weeks during the year and mothers depressed for the entire year. Ideally, I would have information about maternal mental health more frequently, and future data collection efforts should consider collecting this information.

This paper examines the consequences of maternal depression for a host of parenting behaviors, all of which have important implications for child wellbeing. Taken together, the results suggest that maternal depression and unfavorable parenting go hand in hand, but provide little evidence that maternal depression is causally linked to unfavorable parenting behaviors. Once stable characteristics of the mother, as well as a host of time-varying characteristics, are taken into account, a transition into depression between waves is not associated with neglectful behaviors or harsh discipline, and only weakly associated with less engagement. This suggests that unobserved heterogeneity may have biased the results of prior research. These findings suggest that future research should move beyond depression to explore other factors that may influence how mothers handle the parental role. Understanding how maternal depression and other maternal characteristics may influence parenting behaviors can inform policy interventions to improve the psychosocial and academic development of young children and reduce social disparities.

Table A1

Means of Individual Items Comprising Maternal Parenting Behaviors.

	1-year Mean	3-year Mean	5-year Mean
Neglect (0 = did not do in past year, 1 = did in past year)			
Had to leave child home alone		0.016	0.020
Were so caught up in own problems, not able to show child love		0.069	0.078
Were not able to make sure child got food he or she needed		0.024	0.019
Were not able to make sure child goes to a doctor or hospital		0.029	0.019
Were so drunk or high that you had a problem taking care of child		0.008	0.006
Psychological aggression (0 = did not do in past year, 1 = did in past year)			
Shouted, yelled, or screamed at child		0.826	0.876
Threatened to spank or hit child but did not actually do it		0.788	0.789
Swore or cursed at child		0.182	0.248
Called child dumb or lazy or some other name like that		0.040	0.063
Said you would send child away or would kick child out of the house		0.053	0.085
Physical assault (0 = did not do in past year, 1 = did in past year)			
Spanked child on the bottom with your bare hand		0.728	0.667
Hit child on the bottom with a hard object		0.233	0.315
Slapped child on the hand, arm, or leg		0.614	0.532
Pinched child		0.078	0.093
Shook child		0.050	0.063
Engagement (0 = 0 days per week, 7 = 7 days per week)			
Played games like "peek-a-boo" or "gotcha" with child	5.999		
Sang songs or nursery rhymes with child	5.559	5.254	4.587
Hugged or showed physical affection to child	5.975	6.910	
Told child that you love him/her		6.909	
Let child help you with simple household chores		5.270	
Played imaginary games with child		4.634	
Read stories to child	4.146	5.217	4.730
Told stories to child	3.279	4.500	4.174
Played inside with toys such as blocks or legos with child	5.115	5.492	4.740
Told child that you appreciated something he/she did		6.361	6.407
Took child to visit relatives	2.805	3.173	
Went to a restaurant or out to eat with child		1.754	
Assisted child with eating		2.921	
Put child to bed	5.767	6.376	
Played outside in the yard, park, or playground with child			3.789
Take child on an outing, such as shopping, or to a restaurant, church, or museum			3.237
Watch TV or a video together			5.301

Note: Because only developmentally appropriate questions were asked, the individual items that comprise engagement vary across waves.

Table B1

Full random-effects models estimating maternal parenting behaviors as a function of maternal depression.

	Neglect		Psychological aggression		Physical assault		Engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Depression	0.249*** (0.034)	0.172*** (0.035)	0.221*** (0.032)	0.160*** (0.033)	0.140*** (0.032)	0.090** (0.033)	-0.111*** (0.024)	-0.610* (0.025)
Race								
White (reference)	-	-	-	-	-	-	-	-
Black	0.121** (0.039)	0.084* (0.041)	0.170*** (0.041)	0.157*** (0.042)	0.424*** (0.040)	0.389*** (0.042)	-0.167*** (0.034)	-0.149*** (0.035)
Hispanic	0.138** (0.046)	0.114* (0.048)	0.022 (0.048)	0.016 (0.049)	0.033 (0.047)	0.014 (0.048)	-0.209*** (0.039)	-0.185*** (0.040)
Other race	0.041 (0.089)	0.019 (0.088)	0.122 (0.092)	0.103 (0.091)	0.251** (0.091)	0.238** (0.090)	0.076 (0.074)	0.089 (0.073)
Immigrant	0.029 (0.050)	0.036 (0.050)	-0.315*** (0.052)	-0.282*** (0.052)	-0.333*** (0.051)	-0.319*** (0.051)	-0.388*** (0.041)	-0.402*** (0.041)
Age	0.001 (0.002)	0.003 (0.003)	-0.010*** (0.003)	-0.007** (0.003)	-0.011*** (0.002)	-0.010*** (0.003)	-0.088*** (0.002)	-0.012*** (0.002)
Lived with biological parents at age 15	0.001 (0.032)	0.006 (0.031)	-0.074* (0.033)	-0.054 (0.032)	0.033 (0.032)	0.041 (0.032)	0.018 (0.027)	0.009 (0.027)
Homeowner	0.002 (0.031)	0.021 (0.031)	-0.030 (0.032)	-0.005 (0.032)	0.013 (0.032)	0.022 (0.032)	0.035 (0.027)	0.004 (0.027)
Number of children in household	0.030** (0.010)	0.021 (0.011)	0.003 (0.010)	0.001 (0.011)	-0.016 (0.010)	-0.022* (0.011)	-0.003 (0.008)	0.006 (0.008)
Child is male	-0.010 (0.029)	-0.018 (0.028)	0.085** (0.030)	0.081** (0.029)	0.117*** (0.029)	0.109*** (0.029)	-0.047 (0.025)	-0.043 (0.024)
Child age, in months	0.002 (0.005)	0.003 (0.005)	0.002 (0.005)	0.003 (0.005)	-0.002 (0.005)	-0.001 (0.005)	-0.015** (0.004)	-0.016*** (0.004)
Child favorable temperament	-0.064** (0.019)	-0.035 (0.019)	-0.059** (0.020)	-0.031 (0.020)	-0.067** (0.019)	-0.054** (0.019)	0.093*** (0.016)	0.061*** (0.016)
Child born low birth weight	-0.016 (0.049)	0.074 (0.049)	-0.072 (0.050)	-0.080 (0.049)	-0.093 (0.050)	-0.090 (0.049)	-0.044 (0.042)	-0.034 (0.042)
Frequency of attendance at religious services								
At least once a week (reference)	-	-	-	-	-	-	-	-
Several times a month		0.074* (0.036)		0.132*** (0.034)		0.026 (0.034)		0.002 (0.024)
Several times a year or hardly ever		0.025 (0.034)		0.163*** (0.033)		0.048 (0.032)		-0.080** (0.024)
Never		0.053 (0.046)		0.205*** (0.045)		-0.009 (0.044)		-0.155*** (0.032)
Education								
Less than high school (reference)	-	-	-	-	-	-	-	-
High school diploma or GED		-0.001 (0.041)		0.030 (0.042)		0.119** (0.041)		0.039 (0.033)
Some college		-0.038 (0.038)		0.055 (0.039)		0.094* (0.038)		0.089** (0.031)
College degree or higher		-0.030 (0.060)		-0.092 (0.061)		-0.011 (0.060)		0.032 (0.049)
Employed		-0.033 (0.028)		0.051 (0.027)		0.088** (0.026)		-0.083*** (0.020)
Income-to-poverty ratio		-0.011 (0.007)		-0.005 (0.007)		-0.021** (0.007)		0.015** (0.006)
Relationship status								
Married to father		-0.082 (0.041)		-0.032 (0.040)		0.024 (0.040)		0.060 (0.031)
Married to new partner		0.080 (0.086)		-0.128 (0.082)		-0.064 (0.081)		0.052 (0.066)
Cohabiting with father		-0.084 (0.043)		-0.035 (0.041)		-0.051 (0.041)		0.016 (0.029)
Cohabiting with new partner		-0.078 (0.049)		-0.041 (0.046)		0.012 (0.046)		0.023 (0.036)
Romantic with father		0.182 (0.100)		0.077 (0.094)		0.123 (0.093)		0.054 (0.056)
Romantic with new partner		0.074 (0.047)		0.079 (0.045)		-0.008 (0.044)		-0.064 (0.034)
No romantic involvement (reference)	-	-	-	-	-	-	-	-
Grandmother in household		-0.020 (0.041)		-0.108** (0.040)		-0.035 (0.039)		0.009 (0.028)

(continued on next page)

Table B1 (continued)

	Neglect		Psychological aggression		Physical assault		Engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fair or poor health		–0.003 (0.040)		–0.020 (0.038)		0.002 (0.037)		–0.092** (0.028)
Parenting stress		0.199 (0.021)		0.184*** (0.020)		0.166*** (0.020)		–0.155*** (0.015)
Constant	–0.124	–0.694	0.282	–0.444	0.383	–0.120	1.130	1.722
N	2838	2838	2838	2838	2838	2838	3642	3642

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Table C1**

Full fixed-effects models estimating maternal parenting behaviors as a function of maternal depression.

	Neglect		Psychological aggression		Physical assault		Engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Depression	0.107 (0.056)	0.102 (0.057)	0.028 (0.049)	0.008 (0.049)	0.068 (0.048)	0.057 (0.049)	–0.070* (0.029)	–0.049 (0.030)
Race								
White (reference)	–	–	–	–	–	–	–	–
Black								
Hispanic								
Other race								
Immigrant								
Age	0.007 (0.012)	0.012 (0.013)	0.002 (0.010)	0.008 (0.011)	–0.005 (0.010)	–0.001 (0.011)	0.004 (0.005)	0.004 (0.005)
Lived with biological parents at age 15								
Homeowner								
Number of children in household	–0.025 (0.025)	–0.027 (0.026)	0.001 (0.022)	0.003 (0.022)	0.020 (0.022)	0.018 (0.022)	0.033** (0.012)	0.039** (0.013)
Child is male								
Child age, in months								
Child favorable temperament								
Child born low birth weight								
Frequency of attendance at religious services								
At least once a week (reference)								
Several times a month		0.087 (0.058)		0.009 (0.050)		–0.010 (0.050)		0.055* (0.027)
Several times a year or hardly ever		–0.007 (0.063)		0.025 (0.054)		0.057 (0.054)		–0.013 (0.031)
Never		0.158 (0.089)		0.169** (0.077)		0.030 (0.076)		–0.081 (0.042)
Education								
Less than high school (reference)								
High school diploma or GED		–0.008 (0.213)		0.104 (0.186)		0.003 (0.183)		0.021 (0.094)
Some college		0.048 (0.170)		–0.021 (0.148)		–0.136 (0.146)		0.031 (0.079)
College degree or higher		–0.290 (0.299)		0.032 (0.264)		–0.360 (0.260)		–0.220 (0.139)
Employed		0.030 (0.046)		0.041 (0.039)		–0.001 (0.039)		–0.064** (0.023)
Income-to-poverty ratio		0.004 (0.012)		–0.005 (0.010)		–0.014 (0.010)		0.020** (0.008)
Relationship status								
Married to father		–0.005 (0.097)		0.015 (0.084)		0.038 (0.083)		0.153 (0.047)
Married to new partner		0.177 (0.150)		–0.159 (0.120)		–0.085 (0.129)		0.091 (0.080)
Cohabiting with father		–0.015 (0.079)		–0.008 (0.068)		–0.033 (0.068)		0.023 (0.037)

Table C1 (continued)

	Neglect		Psychological aggression		Physical assault		Engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Cohabiting with new partner		0.034 (0.078)		−0.098 (0.068)		0.021 (0.067)		0.033 (0.043)
Romantic with father		0.371** (0.148)		−0.056 (0.128)		0.010 (0.127)		0.070 (0.062)
Romantic with new partner		0.164* (0.069)		0.090 (0.060)		0.013 (0.059)		−0.086* (0.038)
No romantic involvement (reference)		–		–		–		–
Grandmother in household		0.040 (0.071)		−0.120 (0.061)		−0.009 (0.060)		−0.046 (0.034)
Fair or poor health		−0.219** (0.064)		−0.036 (0.055)		−0.027 (0.055)		−0.076* (0.033)
Parenting stress		0.133** (0.042)		0.095*** (0.036)		0.047 (0.036)		−0.087*** (0.020)
Constant	−0.159	−0.635	−0.078	−0.500	0.094	−0.037	−0.186	−0.025
N	2838	2838	2838	2838	2838	2838	3642	3642

Note: Fixed-effects models do not provide estimates for time-invariant variables.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

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Appendix A

See Table A1.

Appendix B

See Table B1.

Appendix C

See Table C1.

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