

Parental Depression and Children's Developmental Outcomes:
The Mediating Influence of Parenting Behavior

Center for Research on Child Wellbeing
Working Paper 2008-17-FF

Running head: Parental Depression and Children's Outcomes

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UNDER REVIEW

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The Fragile Families and Child Wellbeing Study was supported by Grant Number R01HD36916 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). The contents of the paper are solely the responsibility of the author and do not necessarily represent the official views of the NICHD.

Parental Depression and Children's Developmental Outcomes: The Mediating Influence of Parenting Behavior

This paper uses data from a subsample of the Fragile Families and Child Well-being survey (N = 1,799) to examine the relationship between parental depression and children's developmental outcomes. Results suggest that parental depression when children are 12 months old, particularly maternal depression, leads to less favorable behavioral but not cognitive outcomes among children. Maternal parenting behaviors including discipline, neglect, and parenting stress are also associated with children's behavior, and attenuate the negative consequences of episodic but not chronic maternal depression. This research extends past literature by using a large, non-clinical, and representative sample; by incorporating reports of both parents; and, importantly, by elucidating mechanisms through which depression matters for children.

Key words: Fragile Families and Child Wellbeing study, mental health, depression, children's behavioral outcomes, transition to parenthood

Increasing numbers of families and children are affected by depression (Kessler et al. 1994). Nationally, as many as 10% of individuals suffer from major depressive disorder (MDD) each year, and lifetime prevalence rates are about 17% (Kessler and Zhao 1999). The family is an important institution through which depression gets played out, as depressed individuals often have challenged interpersonal relationships and negative interactions with others that can facilitate the maintenance of depressive symptoms (Coyne 1976).

Understanding the consequences of MDD for new parents may be particularly important, as the transition to parenthood is often viewed as a turning point in one's life and may be accompanied with emotional and financial stress (Cowan and Cowan 1992; Melson, Windecker-Nelson, and Schwarz 1998; Mulsow et al. 2002). Notably, the addition of a child may bring changes in psychological well-being (Cowan and Cowan 1992; McLanahan and Adams 1987; Miller and Sollie 1980).

This paper examines how parental depression is associated with children's early developmental outcomes, outcomes that have important implications for school readiness and throughout the life course (Entwisle and Alexander 1989; McLeod and Kaiser 2004). Less favorable internalizing and externalizing behaviors among young children, for example, are associated with reduced educational attainment (McLeod and Kaiser 2004). Externalizing behavior problems in childhood are also associated with lower psychological well-being, less kin support, and lower quality intimate relationships in adulthood (Knoester 2003). Children may be most vulnerable to parental depression in their earliest years, as it is during infancy when individuals attach themselves to others and learn to regulate their emotions (Baydar, Brooks-Gunn, and Furstenberg 1993; Gladstone and Beardslee 2002; Goodman and Gotlib 1999).

Understanding how parental depression influences the family environment is particularly important given the dramatic changes in family structure that have occurred throughout the second half of the twentieth century. Marriage has become increasingly optional and more uncertain, and the prevalence of cohabitation and nonmarital childbearing mean that substantial numbers of children live with unmarried parents (Bumpass and Lu 2000; Ellwood and Jencks 2004). The majority of existing research that examines the consequences of parental depression, however, is based on small samples of married parents and their adolescent children, which ignores the heterogeneous types of family arrangements that children experience as well as the consequences of parental depression for young children.

This paper uses data from the In-Home Longitudinal Study of Pre-School Aged Children, a subsample of 3,288 families who participated in the Fragile Families and Child Wellbeing survey. The Fragile Families survey is a longitudinal study of nearly 5,000 new and mostly unmarried parents in 20 U.S. cities. Mothers were interviewed in the hospital after giving birth to a child between 1998 and 2000, and fathers were interviewed as soon as possible after the birth. Both parents were interviewed by telephone when their children were 12, 30, and 60 months old. This paper extends past literature on parental depression and children's outcomes in three ways: a.) by using a representative sample of parents and their children; b.) by accounting for both maternal and paternal depression; and c.) most importantly, by examining mechanisms that underlie the association between parental depression and children's behavior.

Parental Depression and Children's Developmental Outcomes

Depression affects the sufferer's interpersonal relationships (Coyne 1976), which may create a stressful family environment, disrupt family routines, or limit one's ability to parent effectively (Marmorstein, Malone, and Iacono 2004; Oysterman et al. 2003; Parker et al. 1997).

Indeed, depressed parents, for example, often exhibit hostile and negative behavior or withdrawn behavior when interacting with their children (Cummings and Davies 1994; Downey and Coyne 1990; Lovejoy et al. 2000; Lyons-Ruth et al. 2002).

Empirical research consistently finds that parental depression, particularly maternal depression, is associated with children's outcomes from infancy through adolescence (Dodge 1990; Downey and Coyne 1990; Goodman and Gotlib 2002; Phares and Compas 1992). For example, children of depressed mothers have less favorable parent- and teacher-reported behavioral outcomes, such as internalizing and externalizing problems, than their counterparts with healthy mothers (Cummings and Davies 1994; Downey and Coyne 1990; Lovejoy et al. 2000; Brennan et al. 2000; Dawson et al. 2003; Lovejoy et al. 2000; Meadows, McLanahan, and Brooks-Gunn 2007). Another line of research finds that maternal depression is associated with a host of cognitive outcomes in children (Brennan et al. 2000; Cummings and Davies 1994; Tannenbaum and Forehand 1994).

The influence of paternal depression has been ignored until recently (Phares and Compas 1992), but research now suggests paternal depression and depressive symptoms are associated with more behavioral problems in children, particularly externalizing problems, net of maternal depression (Brennan et al. 2002; Kane and Garber 2004; Phares and Compas 1992). However, other research finds that paternal depression does not matter above and beyond mothers' characteristics (Mezulis, Hyde, and Clark 2004) or that the relationship is more nuanced (Meadows et al. 2007). Fathers can also buffer the negative ramifications of mothers' psychological problems (Brennan et al. 2002; Goodman et al. 1993; Goodman and Gotlib 1999; Mezulis et al. 2004). Non-depressed fathers, for example, may be positive role models for their children or provide offspring with emotional support their mothers may be unable to give. This

buffering may translate to more favorable outcomes for children (Mezulis et al. 2004; Tannenbaum and Forehand 1994). Children may be most at risk if both parents are depressed (Brennan et al. 2002; Meadows et al. 2007; Merikangas et al. 1998). Given the prevalence of assortative mating on psychological characteristics, which is higher among unmarried couples, a substantial minority of children face this increased risk of less favorable outcomes (Brennan et al. 2002; DeKlyen et al. 2006).

Furthermore, past research finds chronicity of depression to be associated with children's outcomes; when maternal depression persists across multiple years, children are particularly disadvantaged (Beardslee, Versage, and Gladstone 1998; Goodman and Gotlib 1999; Mowbray et al. 2004; Oyserman et al. 2003). In addition, depressive symptoms are not static, and children may not adjust when their parents move in and out of depressive episodes; it is possible that the consequences of even short-lived parental depression for children may be long-lasting (Downey and Coyne 1990).

Maternal Parenting Behaviors as a Predictor of Children's Behavior

Although a growing literature links parental depression to children's outcomes, researchers know very little about the mechanisms through which depression influences children's cognitive and behavioral functioning (Downey and Coyne 1990; Gotlib and Lee 1996; Goodman and Gotlib 2002; Kane and Garber 2004). Genetic factors undoubtedly facilitate the intergenerational transmission of impaired psychological well-being. Children may inherit depression, as well as characteristics associated with the development and maintenance of the condition, from their parents (Downey and Coyne 1990; Goodman and Gotlib 1999). But environmental factors, particularly parenting behaviors, may also explain at least part of the relationship between parental depression and children's behavior. In particular, depressed

mothers may be limited in their capacity to parent effectively (Beardslee et al. 1998; Gotlib and Goodman 1999; Lovejoy et al. 2000; Marmorstein et al. 2004; Oysterman et al. 2003; Parker et al. 1997). Additionally, Conger et al. (2002) take a step toward understanding this complex relationship by examining a sample of two-caregiver African-American families in Iowa and Georgia. They find that emotional distress among caregivers leads to less favorable parenting practices, which in turn is related to less favorable internalizing and externalizing behaviors among 10- and 11-year old children. Past research also shows that parental depression is associated with parenting behaviors such as discipline, neglect, instability in routines, and parenting stress, and that these parenting characteristics are associated with children's outcomes, but little research tests the hypothesis that maternal parenting characteristics can mediate the relationship between depression and outcomes. Thus, discipline, neglect, instability in routines, and parenting stress may be facets of parenting that ameliorate the negative consequences of parental depression. Though these measures of parenting behaviors are not exhaustive, they are a starting point for understanding the complex relationship between parental depression, parenting, and children's outcomes.

Discipline. To begin with, research suggests that depressed mothers may discipline their children more frequently or harshly than non-depressed mothers (Lyons-Ruth et al. 2002; Cummings and Davies 1994). Depressed mothers may be particularly likely to engage in inconsistent discipline practices (Lyons-Ruth et al. 2002), which may make it difficult for children to gauge maternal expectations and adjust their behavior according to these expectations. Indeed, harsh and inconsistent discipline is associated with more behavior problems in young children (O'Leary et al. 1999; Dodge et al. 1994; McLoyd and Smith 2002).

Neglect. Additionally, mothers who neglect their children are more likely to be depressed than those who do not (Dunn et al. 2002; Egami et al 1995; Tyler et al. 2006). Depressed mothers are also more likely to feel aggravated with their child (Lyons-Ruth et al. 2002) and less likely to feel invested in their children (Bradley et al. 1997), which may facilitate neglectful behavior. Importantly, neglectful parenting is associated with behavioral outcomes throughout childhood. Neglected children are more likely than their counterparts to have internalizing and externalizing behavior problems (Hildyard and Wolfe 2002; Kaplan, Pelcovitz, and Labruna 1999; Tyler et al. 2006; Crouch and Miller 1993).

Instability in routines. In addition to experiencing inconsistent discipline practices, children of depressed parents may experience other forms of inconsistent parenting such as inconsistent daily routines (Compas et al. 2002). Though little research examines the link between parental depression and daily routines, one study found that children of depressed parents are more likely to have inconsistent routines for naptimes, bedtimes, and mealtimes (Lyons-Ruth et al 2002). Further, little research examines the association between unstable routines and children's outcomes, though it is likely that unstable routines may produce confusion and uncertainty among children, which may lead to less favorable behavioral outcomes.

Parenting stress. Not surprisingly, stress that rises from the parental role is associated with depression (Abidin 1990; Belsky 1984; Belsky, Crnic, and Woodworth 1995; Crnic and Acevado 1995), although the relationship is likely reciprocal. Depressed parents may experience more parenting stress or perceive their lives to be more stressful because of their depression, or high levels of parenting stress may facilitate the onset of depression. Parents with more stress related to the parenting role are less likely to be involved in parenting their children (Belsky

1984), and their children are more likely to have parent- and teacher-reported behavior problems (Anthony et al. 2005; Crnic, Gaze, and Hoffman 2005).

Thus, the literature that links parental depression to child outcomes lacks an understanding of the mechanisms that underlie this association. We know that parental depression is detrimental to children, though we know little about how this relationship works. Additionally, much existing research is based on small and nonrepresentative samples that are limited in their generalizability (Downey and Coyne 1990). Much research is limited to clinical populations or non-clinical groups that are homogenous with respect to race and marital status (for an exception, see Meadows et al. 2007). It is, in fact, particularly important to understand outcomes of minority children and children of unmarried parents, as these groups are more likely than their counterparts to face the double disadvantage of having a depressed parent and socioeconomic hardship in young childhood.

Research Questions

This paper examines three research questions. First, how is parental depression associated with children's developmental outcomes? Based on past literature, I hypothesize that children of depressed parents have worse behavioral and cognitive outcomes than those without depressed parents, and that maternal depression is a more important predictor of children's outcomes than paternal depression.

Second, to what extent does maternal parenting behaviors such as discipline, neglect, instability in routines, and parenting stress mediate the association between parental depression and children's developmental outcomes? Existing research finds that depressed mothers exhibit less optimal parenting behaviors, and suggests that the differences in parenting between depressed and non-depressed mothers may account for the variation in children's outcomes.

Thus, I expect that maternal parenting behaviors will account for the negative association between parental depression and child developmental outcomes.

Finally, how is parental depression over time associated with children's developmental outcomes? I expect that children of consistently depressed parents will have the least favorable outcomes in early childhood. I also expect that the consequences of parental depression are long-lasting; thus, children of parents who are depressed at one point in time will have worse behavioral outcomes than their counterparts whose parents never report depression.

Method

Participants

I use data from the In-Home Longitudinal Study of Pre-School Aged Children, a subsample of 3,288 families who participated in the Fragile Families and Child Wellbeing survey. The Fragile Families survey is a longitudinal study of nearly 5,000 new and mostly unmarried parents in 20 U.S. cities. Unmarried parents were oversampled; this means the sample over-represents minorities, low-income parents, parents with low education, and non-residential fathers. The In-Home survey includes two components: a parent survey questionnaire and an activity booklet. In the parent survey, the child's caregiver (in 96% of observations, the child's mother) answered questions about family functioning and child well-being. The activity booklet includes anthropometric measures of the mother and child, PPVT scores, child care information, and observations about the child's home environment. Data were mostly collected in 2002 and 2003.

In the Fragile Families survey, mothers completed a 30- to 40-minute in-person interview at the hospital after the birth of their child, between February 1998 and September 2000. Fathers were interviewed as soon as possible after the child's birth. Mothers and fathers were

interviewed by telephone when their child was approximately 12, 30, and 60 months old.

Response rates varied by marital status and gender, but were still relatively high. See Reichman, Teitler, Garfinkel, and McLanahan (2001) for further information about the study design and response rates.

I use the first three waves of the Fragile Families survey, as well as the In-Home survey, in my analyses. These data are well-suited to answer my research questions. To begin with, these data include a nationally representative sample of nonmarital births, a group of families neglected in the literature on parental depression and children's outcomes. Additionally, these data are unique because they include information – notably, on depression and parenting practices – from both mothers and fathers.

Although the full In-Home sample includes 3,288 couples and their children, the analytic sample for this paper consists of 1,799 families. I first excluded the 1,065 observations in which information on parental depression is not available for both the biological mother and father at the 12- and 30-month waves (most often because one parent did not participate in the survey), and an additional 424 observations missing children's behavioral outcomes. Thus, it is important to keep the analytic sample in mind when interpreting the findings. The analytic sample is generally more advantaged than the full sample, which means that my estimates are going to be more conservative estimates for the population.

Both mothers and fathers in the analytic sample, on average, are more likely to have education beyond high school ($p < 0.001$ for mothers and fathers), and mothers have higher levels of income ($p < 0.001$). Parents in the analytic sample are also more likely to be white ($p < 0.001$ for mothers and fathers) and more likely to be married ($p < 0.001$). Children in the analytic sample have more withdrawn behavior ($p < 0.01$), but the two groups of children are similar on

other outcomes. Importantly, mothers and fathers in the analytic sample report similar amounts of depression at both waves as those in the full sample.

Measures

Children's developmental outcomes. Children's behavioral outcomes include the following: anxious/depressed behaviors, withdrawn behaviors, attention deficit hyperactivity disorder (ADHD) behaviors, aggressive behaviors, and oppositional defiant disorder (ODD) behaviors. Anxious/depressed, withdrawn, and aggressive behaviors are subscales from the Child Behavior Checklist 2-3 (CBCL), which is established to use for children under the age of five (Achenbach 1992; Achenbach and Rescorla 2000). ADHD and ODD are clinical scales. Though some argue that clinical measures of behavior, particularly in children, may be socially constructed (Horwitz and Wakefield 2007), it is important to examine correlates of such behaviors as they are associated with educational and socioeconomic outcomes throughout the life course.

Mothers were given a list of behaviors and were asked to rate their child's behavior (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). For consistency across outcomes, I take the average of responses for each scale and standardize each to have a mean of 0 and a standard deviation of 1. I re-standardize this measure for my analytic sample. Higher scores indicate worse behavior. Analyses include five subscales, as recent research suggests that parental depression may be differentially associated with internalizing and externalizing behaviors in children (Goodman and Gotlib 2002; Downey and Coyne 1990). See Appendix A for a complete description of the five subscales.

Children's cognitive development is measured with the Peabody Picture Vocabulary Test-Third Edition (PPVT-III), which measures children's verbal ability and was administered to

children during the In-Home survey. The PPVT is highly correlated with standardized measures of intelligence such as the Wechsler Intelligence Scale-Third Edition (Dunn and Dunn 1997). About 7% of children were administered a cognitive test were given the Spanish version of the PPVT (the TVIP). I do not include these children in my analyses, as the English and Spanish tests are not comparable.

Parental depression. Twelve-month DSM-IV diagnoses of major depressive episodes come from responses to the Composite International Diagnostic Interview Short Form (CIDI-SF) Version 1.0 November 1998 (Kessler et al. 1998). Mothers and fathers 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 one of these two conditions for at least a two-week period were asked additional questions (losing interest in things, feeling tired, experiencing a change in weight of at least 10 pounds, 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 depression experienced in the previous year (1 = *presence of major depression*, 0 = *absence of major depression*). Although limitations to the CIDI-SF exist (Link 2002), most researchers agree it is an acceptable measurement tool to diagnose mental illness (Aalto-Setälä, Haarasilta, Marttunen, et al. 2002).

Most analyses consider the emotional resources of both parents, represented by a series of mutually exclusive and exhaustive variables: both parents depressed; only mother depressed; only father depressed; and both parents not depressed (reference category). It is possible that some parents suffer from post-partum depression when their children are 12 months old, though parents are actually more likely to report depression in the later wave. I also create a series of

mutually exclusive and exhaustive variables that measure maternal and paternal depression over time: depression in both the 12- and 30-month waves; no depression in the 12-month wave and depression in the 30-month wave (increasing depression); depression in the 12-month wave and no depression in the 30-month wave (decreasing depression); and no depression in either waves (reference category).

Maternal parenting behaviors. The analyses include six types of maternal parenting behaviors: nonviolent discipline, psychological aggression, physical assault, neglect, instability in routines, and parenting stress. I examine maternal parenting as opposed to paternal parenting, as children nearly universally live with their mothers. I examine three types of discipline – nonviolent discipline, psychological aggression, and physical assault, all of which come from the Parent-Child Conflict Tactics Scales (CTSPC) (Straus et al. 1998) – as it is likely these measures may be differentially related to children’s outcomes. It is possible that nonviolent discipline, for example, may help children learn to regulate their behaviors, while physical assault is likely to have negative consequences for children. For each of these three discipline measures, mothers were asked a series of questions about how often they enacted various behaviors with their children in the past year. For example, the five items that comprise the psychological aggression index include the following: shouted, yelled, or screamed at; threatened to spank or hit but didn’t actually do it; swore or cursed at; called him/her dumb or lazy or some other name like it; said you would send him/her away or would kick him/her out of the house. Mothers were given one point for each behavior they engaged in in the past year. Higher values on all three of the discipline measures indicate more discipline.

The measure of neglect comprises a sum of mothers’ responses to questions about neglectful parenting behavior, also taken from the CTSPC. Questions about parenting stress are

borrowed from the Child Development Supplement-Parenting (CDS-P) of the Panel Study of Income Dynamics (PSID). Higher levels of neglect and parenting stress, as well as lower levels of instability, indicate less favorable parenting behavior. Some of the parenting behaviors have relatively low internal consistency, though results are consistent when each item of the scales are added separately. See Appendix B for a complete description of maternal parenting behaviors.

Covariates. The multivariate analyses control for various demographic and socioeconomic characteristics that prior research has shown to be associated with depression or children's outcomes. To begin with, I control for mother's and father's age, as the likelihood of depression varies across the life course (Mirowsky and Ross 1999). Age is a continuous variable measured at baseline, and I include a squared term in the multivariate analyses to account for nonlinearities. Prior research also finds that although blacks have more persistent disorders than whites, they have lower rates of mood disorders that cannot be explained by socioeconomic status (Kessler et al. 1994). Thus, mother's and father's race is represented by a series of dummy variables: white (reference category in my multivariate analyses), black, Hispanic, and other race.

Socioeconomic characteristics such as education and income are related to both depression and children's outcomes. Depression is more common among those with fewer resources (Kessler and Zhao 1999), and disadvantaged children have less favorable outcomes (Lee and Burkam 2002). Mother's and father's education is represented by a series of dummy variables: less than high school diploma (includes parents with a GED and is the reference category), high school diploma, some college, and college degree. I use a logged measure of household income for mothers and fathers from the third wave.

Additionally, I include several controls for family structure. Married individuals are less likely to experience depression and depressive symptoms than their single counterparts (Lamb, Lee, and DeMaris 2003), and children have more favorable outcomes when they live with both parents (Sigle-Rushton and McLanahan 2004). Preliminary analyses showed no substantial differences between married and cohabiting parents, so I include a dummy variable indicating if the parents are living together (1 = *coresidential parents*, 0 = *non-coresidential parents*). Number of children in the household is a continuous variable that ranges from 0 to 10 for both mothers and fathers. The presence of a grandparent in the household is represented by a dummy variable (1 = *grandparent in household*, 0 = *no grandparent in household*). A dummy variable indicates whether or not the mother smoked during her pregnancy (1 = *prenatal smoking*, 0 = *no prenatal smoking*). Finally, to account for the potential intergenerational transmission of psychological well-being (Cummings and Davies 1994; Goodman and Gotlib 1999; Silberg and Rutter 2002), I include dummy variables indicating whether or not at least one of the mother's and father's biological parents experienced a two-week period of feeling depressed, down in the dumps, or blue.

The multivariate analyses also control for various child characteristics that might affect the family system (Cummings and Davies 1994). Child gender is an important predictor of child outcomes (Lee and Burkam 2002), and is represented with a dummy variable (1 = *male*, 0 = *female*). Age of child at the time of the In-Home survey is a continuous variable measured in months. Mothers and fathers were asked to report on their child's overall health, which is a continuous variable (1 = *excellent*, 5 = *poor*). Finally, child temperament is a subscale taken from the emotionality and shyness dimensions of the Emotionality, Activity, and Sociability

Temperament Survey for Children (Buss and Plomin 1984). Higher scores indicate better temperament ($\alpha = 0.526$ for mothers in analytic sample, $\alpha = 0.457$ for fathers).

Sample Characteristics

Table 1 contains descriptive statistics of variables included in the analyses. Importantly, a substantial proportion of mothers and fathers suffer from major depressive disorder (MDD) when their children are young. When their children are about 1 year old, for example, about 15% of mothers and 11% of fathers are depressed (descriptives not shown). The percentage of mothers and fathers suffering from major depression at the 30-month wave increases to 21% and 13%, respectively (descriptives not shown). About 23% of children have at least one depressed parent when they are 1 year old (with 2% of children having two depressed parents). Furthermore, about 8% of children have mothers depressed at both the 12- and 30-month waves and 5% of children have fathers depressed at both waves. Taken together, these descriptives suggest that limited psychological resources is an important social problem for these families.

[Table 1 about here.]

The prevalence of depression among parents in the Fragile Families sample is slightly higher than the general population; these discrepancies may be because the sample is over-representative of nonmarital births and, therefore, economically disadvantaged parents who may be more susceptible to depressive episodes (Kessler and Zhao 1999). Additionally, new mothers and fathers may also be more susceptible to post-partum depression (Cummings and Davies 1994). The greater numbers of depressed mothers, compared to depressed fathers, is consistent with prior research that finds gender differences in depression (Kessler et al. 1994).

In terms of demographic characteristics, a substantial proportion of sample members are minorities. About half (48% of mothers and 51% of fathers) are black, about one-fifth (21% of

mothers and 20% of fathers) are Hispanic, and about one-fourth (27% of mothers and 24% of fathers) are white. Many parents have not received education beyond high school; more than one-third of mothers and fathers do not have a high school diploma, and slightly more than one-fourth of mothers and fathers have a high school diploma but no additional schooling. At the 30-month wave, 63% of the children's biological parents are living together. About 35% of mothers and 29% of fathers report that at least one of their parents experienced depression.

Procedures

I first present descriptive statistics to explore the bivariate association between parental depression and children's developmental outcomes. I compare the means of behavioral and cognitive outcomes by parental depression when the children are 12 months old. I compare children of two depressed parents, children of depressed mothers, and children of depressed fathers to children with no depressed parents. I use two-tailed T-tests to determine the statistical significance of the difference of the means between the groups.

The first set of multivariate analyses, in Table 3, use ordinary least squared (OLS) regression models to predict the following behaviors among children: anxious/depressed, withdrawn, ADHD, aggressive, and ODD. I consider how maternal parenting behaviors such as discipline (nonviolent discipline, psychological aggression, and physical assault), neglect, instability in routines, and parenting stress mediate the relationship between parental depression and children's behavior. The first set of models extends the bivariate analyses from Table 2 to include a host of parental and child characteristics. The next six models include one of the six maternal parenting behaviors, and the final model includes all covariates and maternal parenting characteristics. In the next table, I use OLS regression to examine the association between maternal and paternal depression over time and children's behavior. The final set of analyses, in

Table 5, considers how maternal parenting behaviors mediate the association between maternal depression over time and children's behavioral outcomes.

Few observations are missing control variables, and I impute these missing values using a regression-based approach in Stata. Additionally, I use the survey command in Stata to compensate for unequal probabilities of selection into the sample and to adjust for nonresponse.

Results

Bivariate Association between Parental Depression and Child Developmental Outcomes

The bivariate results presented in Table 2 suggest children have worse behavioral outcomes when their parents, particularly their mothers, are depressed when the children are about one year old. Children suffer the most when both parents are depressed; these children, compared to children of two healthy parents, score significantly worse on all five behavioral outcomes. Children's behavioral outcomes are also less favorable when only their mother is depressed but not when only their father is depressed. The exception here is that children do not exhibit statistically different withdrawn behaviors when their mother is depressed, compared to when neither parent is depressed. Contrary to expectations, there is no association between parental depression when children are 12 months old and children's cognitive outcomes when they are 30 months old.

[Table 2 about here.]

Table 2 also shows that parental depression is related to maternal parenting. First, when both parents are depressed or the mother is depressed, compared to when both parents are not depressed, mothers report disciplining their children at higher levels. Children with depressed mothers, whether or not they have a depressed father, are more likely to experience nonviolent discipline and psychological aggression. Children with two depressed parents are also more

likely to experience physical assault from their mother. Additionally, consistent with expectations, depressed mothers are more likely to report neglecting their children and higher levels of parenting stress. Parental depression is not associated with unstable routines. In families with only depressed fathers, mothers report parenting behaviors comparable to families with two healthy parents. This suggests that paternal depression does not negatively influence mothers' parenting, at least when the mothers are not depressed.

Maternal Parenting Behaviors as a Mechanism between Depression and Children's Behavior

The prior bivariate association between parental depression and children's developmental outcomes is limited because these analyses do not account for the possibility that these differences are simply artifacts of other variation between these families, such as socioeconomic status or family structure. Table 3 presents multivariate analyses that estimate the relationship between parental depression and children's outcomes and control for many factors that might influence both depression and children's behavior. Because Table 2 shows no relationship between parental depression and PPVT scores, the following analyses focus solely on behavioral outcomes.

Turning first to the models that predict anxious/depressed behaviors, the covariates in Model 1 attenuate the association between parental depression and anxious/depressed behaviors from Table 2. In fact, once an array of demographic and socioeconomic characteristics are accounted for, children with only one depressed parent (either a depressed mother or a depressed father) and children with two non-depressed parents exhibit similar anxious/depressed behaviors. However, having two depressed parents is associated with less favorable anxious/depressed behaviors.

[Table 3 about here.]

The next three models, respectively, include the three measures of discipline – nonviolent discipline, psychological aggression, and physical assault. Each of these discipline measures, most strongly psychological aggression and physical assault, are associated with less favorable anxious/depressed behaviors. Each additional form of psychological aggression a mother exhibits, for example, is associated with a 0.61 increase in anxious/depressed behaviors ($p < 0.001$). Each additional form of physical assault is associated with a 0.48 increase in anxious/depressed behaviors ($p < 0.001$). Accounting for psychological aggression completely attenuates the negative consequences of having two depressed parents.

The subsequent model includes maternal neglect, which is strongly and negatively associated with children's anxious/depressed behaviors (1.03, $p < 0.01$). Model 6 takes into account instability, which does not predict anxious/depressed behavior, and Model 7 includes parenting stress, which is associated with less favorable behavior (0.13, $p < 0.01$). Neither neglect nor parenting stress independently attenuates the association between having two depressed parents and anxious/depressed behaviors, although the parental depression coefficients decrease in both cases. Interestingly, the coefficient for having two depressed parents increases slightly when instability is added into the models. Finally, when all six measures of maternal parenting behaviors are taken into account in the final model, children with two depressed parents have anxious/depressed behaviors similar to their counterparts with two healthy parents (0.30, n.s.). In this final model, psychological aggression and parenting stress are independently predictive of children's anxious/depressed behavior.

The models predicting aggressive and ODD behaviors are fairly consistent with those predicting anxious/depressed behavior. The first set of models shows that children are more likely to exhibit aggressive behaviors when either parents or their mother is depressed and more

likely to exhibit ODD behaviors when both parents are depressed, even after controlling for a host of covariates. The magnitude and significance of these coefficients disappear when maternal parenting behaviors are included in the models. All six maternal parenting behaviors attenuate the association between maternal depression and children's aggressive behavior, often reducing the coefficients of parental depression to nonsignificance. Before maternal parenting behaviors are accounted for in the models, children of two depressed parents score 0.48 points ($p < 0.01$) worse than those with two healthy parents, and this coefficient is reduced to 0.32 (n.s.) when all maternal parenting behaviors are included. For children with a depressed mother, their scores fall from 0.19 ($p < 0.01$) to 0.15 (n.s.). Similarly, in the models predicting ODD behaviors, maternal parenting behaviors completely attenuate the negative consequences of having two depressed parents (0.27, n.s. in the final model).

Different patterns emerge when predicting withdrawn and ADHD behaviors. Once demographic and socioeconomic characteristics are held constant, parental depression is not associated with withdrawn behaviors. In fact, counter-intuitively, children with one depressed parent exhibit less withdrawn behaviors than their counterparts with two healthy parents, though these coefficients do not reach statistical significance. Although none of the parental depression coefficients reach statistical significance, maternal parenting behaviors slightly attenuate these coefficients. With respect to ADHD behaviors, children of depressed mothers are particularly disadvantaged and this disadvantage does not disappear when maternal parenting behaviors are held constant. In the final model predicting ADHD behaviors, for example, children of depressed mothers still have scores that are 0.26 points worse than their counterparts with no depressed parents ($p < 0.01$). Particularly when predicting externalizing behaviors such as ADHD, aggressive, and ODD behaviors, the inclusion of maternal parenting characteristics explains a

substantial portion of the variation. For example, the R-squared in the first model that predicts aggressive behaviors is 0.12; when all parenting behaviors are included in the final model, the R-squared increases to 0.23.

The last models predicting each outcome show that maternal parenting behaviors are independently associated with behavioral outcomes in children, particularly externalizing problems such as ADHD, aggressive, and ODD behaviors. Parents who are more likely to engage in any of the three disciplining behaviors or who exhibit more parenting stress have children with less favorable behaviors. On the other hand, once all maternal parenting behaviors are accounted for, neglect and instability in routines are not independently associated with children's internalizing or externalizing behaviors. One exception persists: Neglect is an independent predictor of withdrawn behavior. Standardized coefficients (not shown) show that psychological aggression, physical assault, and parenting stress are the most important parenting behaviors in predicting externalizing behaviors such as ADHD, aggressive, and ODD behaviors. Neglect and parenting stress are the parenting behaviors that most strongly predict anxious/depressed and withdrawn behaviors. These standardized coefficients also show that in nearly all cases, parenting behaviors are more strongly related to children's outcomes than parental depression.

Thus, parenting behaviors play an important role in mediating the negative association between parental depression and behavioral outcomes of three-year-old children. These findings are robust to additional model specifications (not presented, tables available upon request). For example, I include a control for the comorbidity of parental generalized anxiety disorder (GAD) and substance dependence at the 12-month wave, two conditions often associated with depression (Kessler et al. 1994) and children's outcomes (Osborne and Berger, forthcoming).

The inclusion of parental GAD and substance dependence does not substantively change the coefficients for parental depression or parenting behaviors. Additionally, with the exception of father's GAD predicting less favorable anxious/depressed behaviors (0.32, $p < 0.05$) and ADHD behaviors (0.36, $p < 0.01$), these conditions are not independently associated with children's behavior.

I omit the coefficients of the covariates from the tables for the sake of parsimony, though these covariates are generally consistent with prior literature. Compared to their counterparts with white mothers, children of black mothers have less favorable anxious/depressed behaviors but better ODD scores once other factors are held constant. Hispanic children have less favorable anxious/depressed and withdrawn behaviors. Mother's socioeconomic status (education and household income) is associated with more favorable anxious/depressed and withdrawn behaviors. Though depression in a maternal grandparent is associated with all behaviors in the first set of models, these associations disappear when maternal parenting behaviors are included in the models. The exception is that depression in a maternal grandparent is negatively related to ADHD behaviors, even when parenting behaviors are included. Depression in a paternal grandparent does not independently predict outcomes. This suggests a sociological explanation rather than a biological one. Perhaps children spend more time with their maternal grandparents, which may facilitate the intergenerational transmission of well-being.

Parental Depression Over Time and Children's Behavior

The prior multivariate models use a static measure of depression and thus do not account for the possibility that parents may move in and out of depressive episodes. Table 4 takes a step toward rectifying this by looking at how parental depression over time influences children's behavior, net of demographic and socioeconomic characteristics. These models cannot

completely account for the dynamic nature of depression – it is possible that parents move in and out of depression several times between the two waves – but extend prior analyses that only consider depression at one point in time. The top panel of Table 4 shows that children of consistently depressed mothers – mothers who report depression when their children about one and three years old – have worse behavioral outcomes than children of mothers who do not report depression at either point in time. These associations are strong and persist across all outcomes. Maternal depression is most strongly associated with aggressive and ODD behaviors; children of consistently depressed mothers score 0.52 points ($p < 0.001$) worse than those with healthy parents on the aggressive scale and 0.05 points ($p < 0.001$) worse on the ODD scale. Furthermore, children’s behavior suffers in three domains – aggressive, ADHD, and ODD behaviors – when their mothers become depressed between the two waves. Contrary to expectations, children have slightly more favorable withdrawn behaviors when their mothers become depressed between waves ($-0.01, p < 0.05$). This coefficient is small but statistically significant. On the other hand, mothers whose depression remits between the two waves have children with behavior similar to those who are consistently not depressed.

[Table 4 about here.]

The bottom panel in Table 4 examines the relationship between paternal depression and children’s behavior. Paternal depression at both or either points in time is generally not associated with children’s behavior. One exception exists: When children have fathers whose depression remits between the two waves, compared to those of fathers who never report depression, they experience worse anxious/depressed behaviors ($0.23, p < 0.05$). Counter-intuitively, having a consistently depressed father or a father who becomes depressed over time is not associated with this behavioral outcome.

These findings are also robust to alternative model specifications. Results are similar when GAD and substance dependence are added as controls. Additionally, in models not presented, I include a control for the other parent's depression at the 12-month wave. When maternal depression is the main variable of interest, paternal depression does not change the substantive influence of maternal depression over time and is not independently associated with children's behavioral outcomes. Likewise, maternal depression does not change the substantive interpretation of the influence of paternal depression in Table 4. In these models, though, maternal depression is independently associated with all behavioral outcomes except withdrawn scores.

Finally, in Table 5, I examine how maternal parenting behaviors attenuate the association between maternal depression over time and children's outcomes. Although accounting for maternal parenting behaviors does ameliorate the disadvantage that children face when their mother experiences depression at one point in time, it does not ameliorate the negative consequences associated with chronic maternal depression. For example, turning to the models predicting anxious/depressed behaviors, accounting for maternal parenting behaviors does not completely reduce the association between maternal depression over time and anxious/depressed behavior. Children of consistently depressed mothers score 0.35 ($p < 0.001$) points worse on the anxious/depressed scale before the inclusion of parenting behaviors (see Table 4), but still have less favorable anxious/depressed behavior than their counterparts in the final model (0.30, $p < 0.01$). Thus, maternal parenting behaviors slightly attenuate the negative consequences of maternal depression, but do not reduce it to nonsignificance.

[Table 5 about here.]

The models predicting the other behavioral outcomes – particularly ADHD, aggressive, and ODD behaviors – are similar. Maternal parenting behaviors completely attenuate the association between depression at one point in time and children’s outcomes. However, similar to models predicting anxious/depressed behavior, children with consistently depressed mothers still experience considerable disadvantage even once parenting behaviors are taken into account. The final model shows that children of consistently depressed mothers exhibit more ADHD (0.34, $p < 0.01$), aggressive (0.43, $p < 0.001$), and ODD (0.40, $p < 0.001$) behaviors. Thus, although maternal parenting behaviors account for the association between maternal depression when children are one year old and their outcomes when they are about three years old, these characteristics do not attenuate the negative consequences of having a consistently depressed mother.

Discussion

This paper uses data from the In-Home Longitudinal Study of Pre-School Aged Children, a subsample of 3,288 families who participated in the Fragile Families and Child Wellbeing survey, a birth cohort of children born in urban areas in 1998-99. I focus on the association between parental depression and children’s developmental outcomes, paying particular attention to the role of maternal parenting behaviors in this relationship. A substantial number of young children – about 23% of children when they are one year old and 30% of children when they are three years old – have at least one depressed parent. Results suggest that parental depression – particularly maternal depression – is associated with behavioral but not cognitive outcomes among three-year-old children. Maternal parenting behaviors such as discipline, neglect, and parenting stress play an important role in completely attenuating the negative influence of parental depression on children’s behavioral outcomes. In families where both parents or only

the mother is depressed, children's behavior may not be affected if their mothers exhibit parenting behaviors similar to non-depressed mothers. This research is consistent with past literature that suggests parenting behaviors such as discipline (Lyons-Ruth et al. 2002), neglect (Hildyard and Wolfe 2002; Tyler et al. 2006), and parenting stress (Anthony et al. 2005; Crnic et al. 2005) matter for children's outcomes. Additionally, this research provides a direct test of the idea that children of depressed parents may experience worse outcomes because their caregivers have a limited capacity to parent. This is important, as the mechanisms through which depression affects children are generally unexplored (Goodman and Gotlib 2002).

Although findings are generally consistent across all five behavioral outcomes, several nuances exist. Perhaps most importantly, parental depression differentially influences children's withdrawn behavior. In fact, once controls are included in the models, depression is not a significant predictor of withdrawn behavior. This is consistent with some research that finds parental depression, particularly paternal depression, to be a more important predictor of externalizing behaviors opposed to internalizing behaviors (Phares and Compas 1992). The covariates included in the models are generally weak predictors of withdrawn behavior as well, which may indicate this is a poor measure for three-year-old children.

Contrary to expectations, parental depression is not associated with children's cognitive performance. This is inconsistent with some prior research that finds a positive association between parents' – particularly mothers' – mental state and children's cognitive outcomes (Brennan et al. 2000; Murray 1992; Tannenbaum and Forehand 1994). The inconsistency may arise from several factors. First, unlike prior studies based on non-representative samples, these data include a nationally representative sample of children born to unmarried parents. These children may be more disadvantaged than children born to married parents, with respect to their

socioeconomic status (Ellwood and Jencks 2004), exposure to parental depression (Kessler and Zhao 1999), and cognitive outcomes (Sigle-Rushton and McLanahan 2004). Or, inconsistencies may result from my focus on young children, a stark contrast from most of the literature that focuses on adolescents (i.e., Tannenbaum and Forehand 1994).

Additionally, I find that children of consistently depressed mothers are particularly disadvantaged with respect to their behavioral outcomes. Maternal depression that emerges between the child's first and third birthdays is also predictive of less favorable behavioral outcomes among children, while children's behavior does not seem to suffer when maternal depression remits over time. These findings are consistent with prior research that points to the detrimental consequences of chronic maternal depression for children (Beardslee et al. 1998; Cummings and Davies 1994; Goodman and Gotlib 2002; Meadows et al. 2007; Petterson and Albers 2001). These findings also suggest that the negative consequences associated with having a chronically depressed mother cannot be attenuated when a host of maternal parenting behaviors are considered. This, along with the fact that children bounce back when their mothers become healthy, suggests the importance of early intervention and treatment for depressed mothers.

A different story emerges when looking at the influence of paternal depression over time, one that is consistent with research that suggests maternal depression is more strongly related to children's outcomes than paternal depression (Meadows et al. 2007; Mezulis et al. 2004). Having a chronically depressed mother is detrimental to children's behavioral outcomes, but children's behavior does not seem to suffer from chronic depression among fathers. It is likely that the fathers in this sample are heterogeneous with respect to their engagement with their children or the extent to which they collaborate with mothers in parenting. Looking at father involvement is beyond the scope of this paper, though it is likely that such involvement influences how children

respond to their fathers. For example, chronically depressed fathers may be less likely to share parenting responsibilities with the mother and, thus, have less influence on children's outcomes.

Of course, these analyses cannot speak to causal mechanisms. The time-ordering of the variables suggest that parental depression when their children are about one year old is associated with maternal parenting behaviors when their children are about three years old, but it is likely parenting also influences depression. Although parenting stress is relatively stable over time (Crnic et al. 2005), high levels of parenting stress, for example, may cause an onset or recurrence of depression. It is also possible that the mechanisms might influence each other (Tyler et al. 2006). Furthermore, although these data include a rich array of variables that allow me to hold constant many factors associated with both parental depression and children's outcomes, the possibility for unobserved heterogeneity exists. I do not consider, for example, the potential mediating influence of intimate partner relationship quality or social support networks, two factors that might play an important role in the intergenerational transmission of psychological well-being. Additionally, I cannot ignore the potential role of genetics in predicting children's behavioral outcomes (Downey and Coyne 1990; Goodman and Gotlib 1999). The analyses control for parent reports of their parents' mental health, but this imperfect measure is subject to both shared methods variance and recall error.

Additional limitations exist. First, these data are only representative of unmarried parents in urban areas, and the results might differ for parents in rural areas or parents of older children. Another limitation is the relatively high attrition among fathers; depressed fathers may be more difficult to locate (Eaton et al. 1992). However, about 10% of fathers interviewed at the 30-month wave and 12% of fathers not interviewed at the 30-month wave reported depression in the 12-month wave, and the differences between the groups are not statistically significant. Further,

attrition analyses find that my analytic sample has higher socioeconomic status than the full sample, which suggests my findings are conservative estimates of the population. There are also limitations concerning the measurement of some variables. The dichotomous measure of MDD, for example, does not allow the possibility of looking at parents who do not meet the criteria for MDD but still exhibit some symptoms of depression (Mirowsky and Ross 2002). Importantly, children's behavioral outcomes are reported by their mother, as some research demonstrates that depressed mothers distorted, negative beliefs about their children's behavior (Chi and Hinshaw 2002). Other research using Fragile Families data, however, demonstrates this is not likely (Meadows et al. 2007), and others suggest that depressed mothers are accurate reporters of their children's behavior (Richters 1992).

These findings extend prior research on the consequences of parental depression using a representative sample of new parents and their children. Findings suggest that parental depression, particularly maternal depression, has substantial implications for three-year-old children's behavioral outcomes. Parental depression can manifest itself through unfavorable parenting behaviors characteristics that are associated with children's behavioral outcomes. Thus, children of depressed parents enter school with worse behavior than their counterparts. Children's transition to schooling is an important predictor of later outcomes, which means these disadvantages in early childhood can translate into much larger disadvantages throughout the life course (Entwisle and Alexander 1989; McLeod and Kaiser 2004).

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