Pathways of disadvantage: Explaining the relationship between maternal depression and children's problem behaviors ☆

Kristin Turney

University of California, 3151 Social Science Plaza, Irvine, CA 92697, United States

A B S T R A C T

A large body of literature documents that children of depressed mothers have impaired cognitive, behavioral, and health outcomes throughout the life course, though much less is known about the mechanisms linking maternal depression to children's outcomes. In this paper, I use data from the Fragile Families and Child Wellbeing Study to estimate and explain the consequences of maternal depression for 5-year-old children's internalizing and externalizing problem behaviors. Ordinary least squared (OLS) regression models and propensity score models show that children exposed to both chronic and intermittent maternal depression have more problem behaviors than their counterparts with never depressed mothers. Results also show that economic resources and maternal parenting behaviors mediate much of the association between maternal depression and children's problem behaviors, but that relationships with romantic partners and social support do little to explain this association. This research extends past literature by illuminating some mechanisms through which maternal depression matters for children; by utilizing longitudinal measures of depression; by employing rigorous statistical techniques to lend confidence to the findings; and by using a large, diverse, and non-clinical sample of children most susceptible to maternal depression. Given that early childhood problem behaviors lay a crucial foundation for short- and long-term life trajectories, the social consequences of maternal depression may be far-reaching.

© 2012 Elsevier Inc. All rights reserved.

1. Introduction

A substantial literature addresses inequalities in the social and emotional wellbeing of young children, as well as explanations for these inequalities and the consequential, long-term effects of divergent outcomes. Internalizing problem behaviors (such as feeling lonely or nervous) and externalizing problem behaviors (such as destroying things or fighting) are perhaps the most commonly studied indicators of social and emotional wellbeing in early childhood. Impaired behaviors during early childhood may place children on trajectories to experience disadvantages throughout the life course (Caspi et al., 1989; Crosnoe and Elder, 2004; Entwisle et al., 2005; McLeod and Fettes, 2007; McLeod and Kaiser, 2004; though see Duncan et al., 2007).

Children's internalizing and externalizing problem behaviors are not randomly distributed across the population but are instead influenced by a host of individual- and family-level characteristics such as race (Lee and Burkam, 2002),

socioeconomic status (Duncan and Brooks-Gunn, 1997), and family instability (Fomby and Cherlin, 2007). One predictor of children's problem behaviors that has received relatively less attention in the literature is maternal depression. Major depressive disorder is one of the most common, chronic, and debilitating mental health disorders, affecting more than 13 million individuals – many of them parents – in the United States annually (Kessler et al., 2003).

There are compelling conceptual reasons that may explain why maternal depression is associated with young children's problem behaviors. Depression – which is characterized by symptoms including fatigue, difficulty concentrating, and losing interest in daily activities – is a leading cause of role impairment that may compromise a mother's ability to provide her child necessary developmental resources. The social consequences of depression are far-reaching, with sufferers reporting being unable to carry out usual activities for nearly 30 days each year (Kessler et al., 2003; Merikangas et al., 2007). Depression may increase economic insecurity (Frank and Koss, 2005; Marcotte and Wilcox-Gok, 2001), impair a mother's ability to parent effectively or consistently (Lovejoy et al., 2000; Marmorstein et al., 2004), and facilitate withdrawn or negative interactions in romantic partnerships and other social relationships (Coyne, 1976; Kim and McKenry, 2002), all of which are independently and robustly associated with child wellbeing. Maternal depression may be especially detrimental to young children, as young children are dependent on their parents, have little exposure to social settings outside the home, and may be less equipped to cope with stressors.

Indeed, existing research finds maternal depression is associated with impaired cognitive, behavioral, and health outcomes from infancy through adulthood (Augustine and Crosnoe, 2010; Downey and Coyne, 1990; Goodman and Gotlib, 2002; Hammen et al., 2008; Kiernan and Carmen Huerta, 2008; Weissman et al., 2006). Though this research suggests maternal depression has important, negative, and long-lasting consequences for children, there are several opportunities to advance our understanding of this relationship, not the least of which is understanding the pathways linking maternal depression to children's outcomes. Theoretical perspectives suggest several potential mechanisms through which maternal depression renders children vulnerable and researchers agree about the importance of understanding these pathways (Downey and Coyne, 1990; Goodman and Gotlib, 2002; Gunlicks and Weissman, 2008; Hammen and Brennan, 2003; Turney, 2011a), but relatively little research has comprehensively explored these mechanisms.

Thus, in this paper, I broaden our understanding of the consequences of depression by investigating the relationship between maternal depression and 5-year-old children's internalizing and externalizing problem behaviors. I use data from the Fragile Families and Child Wellbeing Study, a survey of nearly 5000 mostly unmarried couples who had children between 1998 and 2000, which provides an exceptional empirical lens to understand this relationship. These data include a large, diverse sample of children arguably most at risk of exposure to maternal depression and to problem behaviors; feature a longitudinal design that includes established measures of depression and problems behaviors; and contain unusually rich information about family functioning and other previously unobserved information (e.g., depression in the child's maternal and paternal grandparents, co-parenting among the child's mother and father). Given that substantial numbers of children are exposed to maternal depression, the unequal distribution of maternal depression, and the importance of early childhood behaviors for life course trajectories, disentangling the consequences of maternal depression for children adds a new dimension to our understanding of social inequalities.

2. Background

2.1. Why should we expect maternal depression to matter for children's problem behaviors?

In accordance with the life course perspective that highlights the interdependency of parents and their children, there is reason to believe that maternal depression may be particularly consequential for wellbeing in early childhood (Elder, 1998). Depression is fundamentally psychological but has durable social consequences for sufferers and their family members, not the least of which include consequences for children's problem behaviors. The role impairment perspective suggests many potential reasons why maternal depression may be linked to children's behaviors. Indeed, depression is a leading cause of disability and its influence on role impairment often exceeds that of common physical illnesses (Merikangas et al., 2007). Virtually all depressed individuals experience some resulting impairment that affects their ability to carry out normal activities (Baune et al., 2010; Kessler et al., 2003). Even when not completely incapacitated, depressed individuals may still experience impairments in their ability to (1) economically support themselves and their families; (2) parent effectively and consistently; (3) maintain supportive relationships with romantic partners; and (4) garner instrumental and emotional support from family members and friends.[1] Below I document how each of these four proposed mechanisms may link maternal depression to children's problem behaviors.

2.1.1. Economic resources

To begin with, economic resources may be one mechanism linking maternal depression and children's problem behaviors. Consistent with the role impairment perspective, depression may compromise a mother's ability to economically support herself and her family. Empirical evidence suggests that economic insecurity is one of the many social consequences of

---

[1] It is also possible maternal depression has a direct effect on children's problem behaviors, as children may inherit genes that increase their susceptibility to depression, anxiety, or other mental health conditions (Downey and Coyne, 1990) or children may mirror symptoms of depression exhibited by their mothers.

depression (Currie and Madrian, 1999; Frank and Koss, 2005). Depressed mothers may be less likely than their counterparts to be employed, as symptoms of depression may impede motivation to search for work and, once employed, make it difficult to sustain employment (Jackson et al., 1998). Among the employed, individuals with mental illness earn between $3500 and $6000 less annually, are more likely to be in poverty, and more likely to prematurely exit the labor market (Frank and Koss, 2005; Kessler et al., 2003; Marcotte and Wilcox-Gok, 2001).

Furthermore, economic resources are a consistent, robust predictor of children's problem behaviors. Few economic resources may mean children attend poor quality child care programs that do not facilitate the development of behaviors generally rewarded by society (Burchinal, 1999) or that mothers cannot purchase materials (i.e., books) or services (i.e., art classes or music lessons) that may benefit children. Indeed, children from economically distressed families have more problem behaviors than their advantaged counterparts (Duncan and Brooks-Gunn, 1997).

2.1.2. Parenting behaviors

Maternal parenting behaviors may be an additional mechanism linking maternal depression to children's problem behaviors, as depression may impair a mother's role as a parent. In fact, Belsky's (1984) process model of parenting suggests mental health is one of the most important predictors of parenting. Symptoms of depression may compromise a mother's ability to parent effectively or consistently, perhaps by facilitating negative, withdrawn, or aggravated interactions with children (Cummings and Davies, 1994; Lovejoy et al., 2000). Depressed mothers may be insensitive, aggressive, and emotionally unresponsive to their children (Lovejoy et al., 2000). Depression is associated with fewer interactions with children (Turney, 2011b), and depressed mothers are more likely to neglect and harshly discipline their children (Bodovski and Youn, 2010; Kiernan and Carmen Huerta, 2008).

Parenting behaviors such as neglect or harsh discipline are consistently linked to child wellbeing (Amato and Fowler, 2002; Simons et al., 1994). For example, neglected children have more problem behaviors than their non-neglected counterparts (Hildyard and Wolfe, 2002; Tyler et al., 2006). Similarly, children have more problem behaviors when parents report physical discipline (Bodovski and Youn, 2010).

2.1.3. Relationship supportiveness and co-parenting

Relationship supportiveness and co-parenting is a third potential mechanism linking maternal depression to children's problem behaviors. For one, research suggests depression impairs the sufferer's interpersonal relationships and functioning (Coyne, 1976). Depressed mothers are more likely than their counterparts to criticize, be physically or verbally aggressive, or have inconsistent routines that place stress on the couple relationship (Proulx et al., 2007; Whisman, 2001). These mothers may also be unable to sustain romantic relationships or fend off destructive partnerships.

Indeed, frequent changes in household living arrangements or poor quality relationships between partners may create an unstable household environment for children. Children exposed to warm, supportive, and companionate relationships have fewer problem behaviors than their counterparts, and conflictual or hostile relationships lead to problem behaviors (Amato et al., 1995; Dadds and Powell, 1991; Fomby and Osborne, 2010).

2.1.4. Social support

Social support is a final potential mechanism linking maternal depression and children's problem behaviors. In the same way that depression may facilitate poor relationships with intimate partners, it is likely depressed mothers also experience impairments in their roles as family members and friends. Depression may cause friends and family members to limit their provisions of instrumental and emotional support (Lin et al., 1999; Thoits, 1984). Symptoms of depression (such as feeling worthless) may also make it difficult for depressed mothers to activate social support networks when necessary or may lead to incongruence between perceptions and availability of support (Meadows, 2009).

Mothers' perceived instrumental and emotional support is associated with advantages for children. Children of mothers lacking social support – especially socially isolated mothers – are more likely than their counterparts to experience an accident or injury (Leininger et al., 2009). Mothers' perceived instrumental support is also associated with fewer problem behaviors among children (Ryan et al., 2009). Further, among Mexican immigrants to the United States, higher levels of financial and emotional support are associated with a reduced likelihood of mother-reported fair or poor child health (Kana'Iaupuni et al., 2005).

2.2. Empirical evidence linking maternal depression to children's problem behaviors

Given the compelling reasons documenting why maternal depression may lead to problem behaviors in children, it is unsurprising a large body of literature finds children of depressed mothers are disadvantaged. Children exposed to maternal depression experience disadvantages in their academic, health, and behavioral outcomes, and this relationship begins in infancy and lasts through adulthood (Augustine and Crosnoe, 2010; Downey and Coyne, 1990; Goodman and Gotlib, 2002; Hammen et al., 2008; Kiernan and Carmen Huerta, 2008; Meadows et al., 2007; Turney, 2011a, 2011c; Weissman et al., 2006).

Much of this research considers children's behaviors (Cummings and Davies, 1994; Downey and Coyne, 1990; Kahn et al., 2004; Kiernan and Carmen Huerta, 2008; Meadows et al., 2007). For example, 3-year-old children are more likely to have anxious/depressed, attention deficit, and oppositional defiant disorders when their mothers report depression or anxiety

(Meadows et al., 2007; also see Turney, 2011a). Maternal depression has also been linked to greater reports of childhood depressive symptoms (Whitaker et al., 2006), antisocial behavior (Kim-Cohen et al., 2005), overanxious symptoms (Foley et al., 2001), and conduct disorder (Marmorstein et al., 2004). However, much existing research is based on small, non-representative samples that are limited in their generalizability (Downey and Coyne, 1990; for recent noteworthy exceptions, see Kiernan and Carmen Huerta, 2008; Meadows et al., 2007), making it difficult to ascertain the robustness and generalizability of this association.

Further, little existing research considers maternal depression chronicity. Major depression is often chronic, with its symptoms cycling over time and occasionally disappearing (Kendler et al., 2000). Children residing with chronically depressed mothers are likely exposed to persistently stressful, unsupportive social contexts and may be more vulnerable than children of mothers with fleeting depression (Giles et al., 2011; Turney, 2011a; though see Alpern and Lyons-Ruth, 1993).

Although a large literature links maternal depression to children's outcomes, the mechanisms underlying this relationship are not well understood. Research on this topic commonly considers only one set of proposed mechanisms (i.e., parenting behaviors). One noteworthy analysis, for example, found that three types of parenting behaviors – reading activities, mother–child relations, and discipline practices – mediated the relationship between maternal depression and young children's behaviors (Kiernan and Carmen Huerta, 2008). Other investigations, often based on small and homogeneous samples, provide inconsistent support for the idea that maternal parenting behaviors (Conger et al., 1992, 2002; Du Rocher Schudlich and Cummings, 2007; Mustillo et al., 2011) and relationship quality (Conger et al., 1992; Du Rocher Schudlich and Cummings, 2007; Leinonen et al., 2003; Papp et al., 2004) indirectly link the association between maternal depression and children's outcomes. To my knowledge, however, there exists no empirical research that has comprehensively considered the independent contributions of economic resources, parenting behaviors, relationship quality, and social support.

2.3. Additional correlates of maternal depression and children's problem behaviors

Additional characteristics are associated with both depression and children's behaviors. Though race/ethnic differences in depression are inconsistent (Simpson et al., 2007), minorities and children of immigrants have more problem behaviors than their counterparts (Lee and Burkam, 2002). Maternal age is associated with both depression (Kessler and Zhao, 1999) and children's behaviors (Turley and Lopez, 2003), as is maternal religiosity (Bartkowski et al., 2008; Ellison et al., 2001). Socioeconomic status consistently predicts children's behaviors (Duncan and Brooks-Gunn, 1997) and is also correlated with depression (Heflin and Iceland, 2009). Characteristics of the family environment are associated with depression (Meadows et al., 2008) and children's behaviors (Fomby and Osborne, 2010). Maternal self-rated health is associated with depression (Schnittker, 2005) and child wellbeing (Currie, 2005). Finally, child characteristics such as gender and low birth weight are known correlates of children's behaviors (Klebanov et al., 1994; Zill, 1999).

2.4. Research questions

To contribute to our understanding of the relationship between maternal depression and child wellbeing, this paper addresses two research questions. First, how robust is the association between maternal depression and children's internalizing and externalizing problem behaviors? I expect children of depressed mothers, especially chronically depressed mothers, will have more problem behaviors than their counterparts with never depressed mothers. I expect this association will persist after adjusting for a host of baseline characteristics and when using propensity score matching estimators. Second, to what extent do economic resources, maternal parenting behaviors, relationship supportiveness and co-parenting, and perceived instrumental and emotional support mediate the association between maternal depression and children's problems behaviors? Though these proposed mechanisms are not exhaustive of all pathways through which maternal depression may influence children, and may be related to one another (e.g., Cui and Conger, 2008), they provide a useful starting point. I expect all four sets of mechanisms will explain the consequences of maternal depression.

3. Methods

3.1. Data source

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 that were stratified by labor market conditions, welfare generosity, and child support policies. Because unmarried mothers were oversampled, the sample over-represents minority children, economically disadvantaged children, and children with non-residential fathers. 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 were interviewed by telephone when their children were approximately 1, 3, 5, and 9 years old. Response rates were relatively high.[2] See Reichman et al. (2001) for further information about the study design.

---

[2] Of those sampled to participate in the baseline interview, 82% of married and 87% of unmarried mothers participated. Of mothers who responded to the baseline interview, 89% participated in the 1-year survey, 86% participated in the 3-year survey, and 85% participated in the 5-year survey.

Additionally, I use data from the In-Home Longitudinal Study of Pre-School Aged Children, a subsample of families who participated in the Fragile Families survey. When children were approximately 5 years old, researchers administered a survey in the child's home. In this survey, the child's caregiver (usually the child's mother) answered questions. About 61% of families in the baseline Fragile Families sample participated in the 5-year In-Home survey (Bendheim-Thoman Center for Research on Child Wellbeing, 2009).

The final analytic sample includes 2655 observations. Of the 4898 observations in the baseline sample, I dropped the 1920 (39%) observations that did not participate in the 5-year In-Home survey, when the dependent variables were measured, and an additional 323 (7%) were excluded because of missing data on children's problem behaviors. Of observations in the analytic sample, about 22% are missing data on fathers' reports of his parents' depression and 9% are missing data on maternal depression at all waves. Other control variables are missing fewer than 4% of observations, and I preserve all missing data with multiple imputation (with 828 observations having at least one imputed value).[3] I produce 20 data sets using the ICE procedure in Stata (Royston, 2007). In the imputation model, I include variables related to the research questions or to the likelihood of being missing (Allison, 2002). Importantly, mothers in both the analytic and full samples were equally likely to report depression, report similar behaviors in their children, and have similar values on the proposed mechanisms. However, there are some differences between the full and analytic samples. Mothers in the analytic sample are more likely to be Black and less likely to be Hispanic, other race, or foreign-born. These mothers have higher educational attainment, and children are slightly younger ($p < 0.05$).

3.2. Measures

3.2.1. Children's problem behaviors

Children's internalizing and externalizing problem behaviors are measured by the Child Behavior Checklist (CBCL), an established measure of problem behaviors in children (Achenbach, 1992). During the 5-year telephone and In-Home surveys, mothers were asked to rate aspects of their children's behaviors, and these responses comprise the internalizing and externalizing scales (see Appendix A for individual items that comprise each scale). In the multivariate analyses, I sum responses for each scale and standardize each to have a mean of 0 and a standard deviation of 1 for consistency across outcomes ($\alpha = .75$ for internalizing behaviors, $\alpha = .86$ for externalizing behaviors).

Though commonly used indicators for studying problem behaviors in children, these outcomes are limited because they are reported by children's mothers. This may be problematic if depressed mothers have distorted views about their children (Chi and Hinshaw, 2002; Chilcoat and Breslau, 1997; for contrary findings, see Achenbach et al., 1987; Richters, 1992). This is an important limitation to keep in mind, and one that I address with supplemental analyses described below (also see Meadows et al., 2007).

3.2.2. Maternal depression

Maternal depression is measured by mothers' responses to the Composite International Diagnostic Interview Short Form (CIDI-SF) (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 normally pleasurable things. Those who experienced at least one of these two conditions for a 2-week period most of the day, every day were asked additional questions (e.g., feeling tired), and those who reported affirmative answers to at least three of these seven additional symptoms are considered depressed. Although limitations to the CIDI-SF exist (Link, 2002; also see Horwitz and Wakefield, 2007), it is commonly used in large-scale community surveys (Aalto-Setala et al., 2002). Based on mothers' responses at the 1-, 3-, and 5-year surveys, I create mutually exclusive variables that capture depression chronicity: never depressed, depressed at one wave, depressed at two waves, and depressed at three waves.[4]

3.2.3. Control variables

I control for a host of maternal and child characteristics measured at baseline. Mother's race is represented by a series of dummy variables: White, Black, Hispanic, and other race. A dummy variable indicates the mother was born outside of the United States. Mother's age is a continuous variable. Mutually exclusive dummy variables represent mother's attendance at religious services (at least once a week, several times a month, several times a year or hardly ever, and never) and education (less than high school diploma, high school diploma or GED, and postsecondary education). A dummy variable indicates the child's birth was paid for by Medicaid, and I include a logged measure of household income. Mutually exclusive dummy variables represent the mother's relationship status with the child's father: married, cohabiting, dating but not residential, and separated. A dummy variable indicates the child's grandmother lived in the household, and a continuous variable indicates the number of children in the household. Mother's health is represented by a dummy variable

---

[3] Maternal depression is not associated with attrition, as mothers depressed at the 1-year survey were equally likely as their non-depressed counterparts to participate in each of the following surveys. In supplemental analyses, I use a stricter sample inclusion criterion by additionally restricting the sample to mothers with nonmissing data on depression. Findings are robust to this specification.

[4] Maternal depression measured at the 1-year survey may include mothers experiencing short-term post-partum depression (Kearns et al., 1997). Given the percentages of mothers affected by depression are highest at the 3-year survey (20%, compared to 16% and 17% at the 1- and 5-year surveys, respectively), there is no reason to believe an unusually large number of mothers report post-partum depression.

Table 1
Descriptive statistics of variables included in analyses.

Variable	Mean or %	S.D.	Min.	Max.
Children's problem behaviors				
Internalizing behaviors (y5, ih5)	5.373	(4.272)	0.000	26.000
Externalizing behaviors (y5, ih5)	12.586	(7.490)	0.000	45.000
Maternal depression				
Maternal depression over time (y1, y3, y5)				
Never depressed	65.3%			
Depressed at one wave	20.1%			
Depressed at two waves	9.7%			
Depressed at three waves	4.9%			
Control variables				
Race (b)				
White	21.5%			
Black	52.5%			
Hispanic	23.3%			
Other race	2.7%			
Immigrant (b)	11.2%			
Age (b)	25.044	(6.007)	15.000	43.000
Frequency of attendance at religious services (b)				
At least once a week	21.7%			
Several times a month	16.2%			
Occasionally	47.9%			
Never	14.2%			
Education (b)				
Less than high school	31.8%			
High school diploma or GED	31.7%			
Post-secondary education	36.5%			
Household income, log (b)	9.856	(1.324)	0.000	11.804
Medicaid birth (b)	60.6%			
Relationship status (b)				
Married	23.0%			
Cohabiting	35.3%			
Non-residential romantic relationship	28.7%			
Separated	13.0%			
Grandmother in household (b)	25.2%			
Number of children in household (b)	2.268	(1.316)	1.000	9.000
Fair or poor health (b)	7.6%			
Depression in child's maternal grandparent (y3)	32.4%			
Depression in child's paternal grandparent (y3)	29.5%			
Child age, in months (ih5)	64.151	(2.894)	47.400	75.580
Child is male (b)	51.9%			
Child born low birth weight (b)	10.5%			
Potential mechanisms				
Economic resources				
Employed (y5)	60.2%			
Income-to-poverty ratio (y5)	1.880	(2.155)	0.100	34.800
Material hardship (y5)	0.145	(0.156)	0.000	0.923
Maternal parenting behaviors				
Neglect (y5)	0.027	(0.442)	0.000	1.000
Psychological aggression (y5)	0.412	(0.201)	0.000	1.000
Physical assault (y5)	0.332	(0.241)	0.000	1.000
Engagement (y5)	4.647	(1.166)	0.000	7.000
Relationship supportiveness and coparenting				
No relationship (y5)	26.8%			
Low supportive behaviors (y5)	33.9%			
High supportive behaviors (y5)	39.3%			
Shared responsibility in parenting (y5)	2.433	(1.207)	1.000	4.000
Cooperation in parenting (y5)	3.034	(1.111)	1.000	4.000
Social support				
Perceived instrumental support (y5)	0.944	(0.230)	0.000	1.000
Number of friends (y5)	4.661	(4.930)	0.000	30.000
Presence of a close confidante (y5)	91.5%			
N	2655			

Note: b: Baseline survey; y1: 1-year survey; y3: 3-year survey; y5: 5-year survey; ih5: 5-year In-Home survey.

(1 = *fair or poor*, 0 = *excellent*, *very good*, *or good*). Additionally, I include dummy variables indicating one of the mother's and father's biological parents experienced a 2-week period of feeling depressed, down in the dumps, or blue. Dummy variables

indicate the child is male and was born low birth weight (less than 2500 grams), and a continuous variable indicates age at the 5-year survey.

3.2.4. Mechanisms

I consider four sets of mechanisms: economic resources, maternal parenting behaviors, relationship supportiveness and co-parenting, and social support. All mechanisms are measured at the 5-year survey, which is at or before the measurement of maternal depression.[5] To begin with, the three indicators of economic resources include employment status, income-to-poverty ratio, and material hardship. A dummy variable indicates the mother is employed. Income-to-poverty ratio is the ratio of total household income to official poverty thresholds established by the US Census Bureau. Finally, material hardship is an average of mothers' responses to 12 questions about experiencing events because there was not enough money (e.g., received free food or meals). See Appendix B for a complete description of the individual items that comprise this measure as well as other measures.

Four indicators of maternal parenting behaviors include the following: neglect, psychological aggression, physical assault, and engagement. Mothers were asked questions from the Parent–Child Conflict Tactics Scales (CTSPC) about neglect and two types of discipline: psychological aggression and physical assault (Straus, 1990). Examples of neglect include leaving the child home alone or not getting the child food (α = .44). Psychological aggression includes questions such as shouting at the child (α = .50). Physical assault includes spanking or shaking the child (α = .53). I use yearly prevalence measures for each of the separate indicators of neglect, psychological aggression, and physical assault (1 = *happened in the past year*, 0 = *did not happen in the past year*), and take an average of these variables that ranges from 0 to 1. Additionally, maternal engagement is measured by the average number of days per week mothers participated in various activities with their child (e.g., playing games) (α = .69).

Three indicators of relationship supportiveness and co-parenting include the following: supportive behaviors, shared responsibility in parenting, and cooperation in parenting. Supportive behaviors comprises three mutually exclusive dummy variables (no relationship, low supportiveness, and high supportiveness) based on maternal reports about things such as her partner's willingness to compromise (α = .94). Shared responsibility in parenting is the average of mothers' responses to four questions about how often the father assists with things such as running errands (α = .93), and cooperation in parenting is the average of mothers' responses to six statements about the father's role in parenting (i.e., how often the parents talk about problems that come up with raising the child) (α = .96).

Social support is measured by three variables. First, mothers were asked if they could count on someone during the next year for various forms of instrumental support, which comprise the measure of perceived instrumental support (α = .79). Number of close friends is a continuous variable, and a dummy variable indicates the presence of a confidante.

3.3. Analytic strategy

The multivariate analyses proceed in three parts. In the first stage, presented in Table 3, ordinary least squared (OLS) regression models estimate children's internalizing and externalizing problem behaviors. In all models, I include dummy variables that indicate maternal depression chronicity. Model 1 presents the unadjusted association between maternal depression and children's problem behaviors. Model 2 includes the maternal and child baseline control variables described above.

In the second stage, I use propensity score matching to estimate the effect of maternal depression on children's problem behaviors. Propensity score matching is a way to diminish concerns about pre-existing differences between groups by matching individuals on the distribution of their observed covariates (Morgan and Harding, 2006; Rosenbaum and Rubin, 1983). Propensity score matching approximates an experimental design by using observed variables to comprise a treatment group (in this case, depressed mothers) and a control group (never depressed mothers). Propensity score models have at least two advantages over conventional OLS regression models. In contrast to OLS regression models, propensity score models make no functional form assumption about the relationship between the covariates and outcome variables. Additionally, propensity score matching makes the treatment and control groups as similar as possible, which is especially beneficial given the stark differences between never-depressed and ever-depressed mothers (see Table 2). Importantly, propensity score matching only eliminates bias due to observed variables and *not* unobserved variables.

I estimate three sets of propensity score models, comparing children of mothers depressed at one, two, and three survey waves to those with never depressed mothers. I first generate a propensity score for each observation that estimates the probability of maternal depression at one wave, at two waves, or at three waves.[6] I include the following variables in the logistic regression model that generates the propensity score (most measured at baseline): mother's race, mother's immigrant

---

[5] For some mothers (e.g., mothers only depressed at the 1-year survey), the measurement of depression is quite distal from the measured mechanisms. Thus, it is possible the analysis underestimates the relevance of the mechanisms. However, supplemental analyses that consider mechanisms at the 3-year survey reveal these mechanisms explain less of the relationship between maternal depression and children's problem behaviors than when measured at the 5-year survey.

[6] Propensity score methods are only able to estimate the effect of a dichotomous treatment (i.e., children of mothers depressed at one survey wave, compared to those with never depressed mothers) and not a categorical treatment (as used in the OLS regression models). Thus, when matching on maternal depression at one survey wave, I drop observations in which mothers report depression at two or three survey waves. I employ similar sample restrictions when matching on depression at two and three survey waves.

Table 2
Descriptive statistics of variables included in analyses, by maternal depression chronicity.

Variable	Never depressed	Depressed at one wave	Depressed at two waves	Depressed at three waves
Children's problem behaviors				
Internalizing behaviors (y5, ih5)	4.782	6.034*	7.000*	7.502*
Externalizing behaviors (y5, ih5)	11.597	13.898*	15.232*	16.589*
Control variables				
Race (b)				
White	22.8%	18.7%	25.3%	20.1%
Black	50.8%	56.3%	52.5%	57.5%
Hispanic	23.7%	21.7%	21.0%	18.8%
Other race	2.7%	3.3%	1.2%	3.6%
Immigrant (b)	12.2%	8.9%	4.6%*	8.3%
Age (b)	25.362	24.321*	24.693	24.823
Frequency of attendance at religious services (b)				
At least once a week	23.8%	18.5%	14.7%*	23.9%
Several times a month	17.1%	14.9%	15.3%	11.1%
Occasionally	45.8%	51.8%	53.2%	51.1%
Never	13.3%	14.8%	16.8%	13.9%
Education (b)				
Less than high school	29.3%	35.4%	32.8%	33.8%
High school diploma or GED	32.0%	32.7%	31.4%	28.3%
Post-secondary education	38.7%	31.9%	35.8%	37.9%
Household income, log (b)	9.966	9.756*	9.693*	9.614*
Medicaid birth (b)	58.1%	64.1%	65.3%	61.2%
Relationship status (b)				
Married	26.6%	18.1%*	16.1%*	18.3%
Cohabiting	34.6%	34.5%	37.8%	37.0%
Non-residential romantic relationship	27.9%	31.3%	28.8%	25.7%
Separated	10.9%	16.1%*	17.3%	19.0%
Grandmother in household (b)	23.8%	30.9%	24.2%	29.3%
Number of children in household (b)	2.233	2.350*	2.370	2.176
Fair or poor health (b)	5.1%	11.6%*	11.9%*	11.2%*
Depression in child's maternal grandparent (y3)	22.4%	43.5%*	59.1%*	61.5%*
Depression in child's paternal grandparent (y3)	27.6%	30.8%	37.9%*	33.5%
Child age, in months (y5)	64.142	64.094	63.851	64.569
Child is male (b)	52.3%	48.3%	56.4%	54.9%
Child born low birth weight (b)	10.5%	11.6%	8.7%	10.5%
Potential mechanisms				
Economic resources				
Employed (y5)	64.4%	54.9%*	51.7%*	50.1%*
Income-to-poverty ratio (y5)	2.128	1.501*	1.467*	1.279*
Material hardship (y5)	0.111	0.170*	0.254*	0.292*
Maternal parenting behaviors				
Neglect (y5)	0.020	0.034*	0.037*	0.073*
Psychological aggression (y5)	0.392	0.444*	0.449*	0.495*
Physical assault (y5)	0.318	0.363*	0.367*	0.360
Engagement (y5)	4.688	4.642	4.470*	4.435
Relationship supportiveness and coparenting				
No relationship (y5)	24.6%	28.5%	32.1%	32.9%
Low supportive behaviors (y5)	33.6%	34.6%	35.1%	38.7%
High supportive behaviors (y5)	41.8%	36.9%	32.8%*	28.4%*
Shared responsibility in parenting (y5)	2.558	2.285*	2.106*	1.971*
Cooperation in parenting (y5)	3.137	2.917*	2.798*	2.536*
Social support				
Perceived instrumental support (y5)	0.969	0.916*	0.887*	0.899*
Number of friends (y5)	5.099	4.115*	3.724*	3.683*
Presence of a close confidante (y5)	92.4%	90.4%	91.4%	86.4%
N	1734	534	257	130

Note: b: Baseline survey; y1: 1-year survey; y3: 3-year survey; y5: 5-year survey; ih5: 5-year In-Home survey. Asterisks indicate mean or percentage is statistically significantly different from "never depressed" mothers according to chi-square tests or ANOVA tests with Tukey–Kramer pairwise comparisons ($p < 0.05$).

status, mother's age, mother's frequency of attendance at religious services, mother's education, mother's household income, mother's relationship status, presence of a grandmother in the household, number of children in the household, mother's self-reported health, mother's employment status, mother's income-to-poverty ratio, father's depressive symptoms, depression in a child's maternal grandparent, child's temperament, race * depression in a child's maternal grandparent, and income-to-poverty ratio * depression in a child's maternal grandparent.

After generating propensity scores for each observation, I then match observations on the probability of experiencing depression. I restrict the analysis to regions of common support. Given there is little consensus about the best matching estimator (Morgan and Harding, 2006), I use three matching procedures: nearest neighbor matching, radius matching, and kernel matching. Nearest neighbor matching estimates children's behaviors by comparing each treatment observation to a control observation with the closest propensity score. I use matching with replacement, meaning each control observation can be matched to more than one treatment observation. Radius matching compares each treatment observation with control observations within a specific radius (caliper = 0.005). Kernel matching compares each treatment observation with all control observations, but weights these observations according to their distance from treatment cases (bandwidth = 0.006; kernel = Gaussian). All propensity score analyses were conducted using Stata (Becker and Ichino, 2002).[7]

Previewing the results slightly, both the OLS and propensity score models suggest maternal depression has negative consequences for children's problem behaviors. Thus, in the final analytic stage, I again turn to OLS regression models to examine how much of the association between maternal depression and children's problem behaviors is explained by the proposed mechanisms. In Tables 5 (internalizing behaviors) and 6 (externalizing behaviors), the first model can be considered a baseline model and includes all covariates from Model 2 of Table 3. Model 2 includes indicators of economic wellbeing, Model 3 includes parenting behaviors, Model 4 includes relationship supportiveness and co-parenting, and Model 5 includes perceived instrumental and emotional social support. The final model includes all potential mechanisms. To account for the clustering of individuals in cities, all models include city fixed-effects and use robust standard errors.

3.4. Sample description

Table 1 presents descriptive statistics of all variables. More than one-third (35%) of children have mothers who report depression at least once throughout their first 5 years, and 5% of children have mothers who report depression at all three points in time. In terms of demographic characteristics, more than half of mothers (53%) are Black and nearly one-fourth (23%) are Hispanic. Mothers are, on average, 25 years old when their children were born. At baseline, nearly two-thirds of mothers do not have education beyond high school. About 58% of mothers are in marital or cohabiting relationships with their child's father.

4. Results

4.1. Estimating children's problem behaviors as a function of maternal depression

Descriptive statistics presented in Table 2 demonstrate substantial differences in children's problem behaviors by maternal depression. Chi-square tests and ANOVA tests with Tukey–Kramer adjustments for pairwise comparisons compare children of never depressed mothers to other groups of children. Children of mothers depressed at one, two, or three survey waves have more internalizing and externalizing problem behaviors than their counterparts with never depressed mothers ($p < .05$). Compared to other mothers, never depressed mothers differ in a host of additional characteristics. For example, never depressed mothers report higher household income, are more likely to be married, and are less likely to be in fair or poor health at baseline ($p < .05$). They also report more less material hardship, more favorable parenting behaviors, and more supportive relationships at the 5-year survey ($p < .05$).

4.1.1. OLS regression models

Model 1 in Table 3 estimates children's internalizing and externalizing problem behaviors as a function of maternal depression. Children of mothers depressed at one, two, or three survey waves have more internalizing and externalizing problem behaviors than their counterparts with never depressed mothers. The magnitudes of these associations are considerable. For example, children of chronically depressed mothers (i.e., mothers depressed at all three waves) have internalizing and externalizing problem behaviors that are about two-thirds of a standard deviation worse than children of never depressed mothers (0.642, $p < .001$ for internalizing behaviors; 0.680, $p < .001$ for externalizing behaviors).

After adjusting for a wide array of individual-level characteristics (including race, socioeconomic status, and family structure) in Model 2, the size and statistical significance of the maternal depression coefficients are reduced. But maternal depression still remains a statistically significant predictor of children's problem behaviors. Children of chronically depressed mothers have behaviors that are more than half of a standard deviation worse than those with never depressed mothers (0.551, $p < .001$ for internalizing behaviors; 0.558, $p < .001$ for externalizing behaviors). Children also experience vulnerabilities when mothers are depressed at one or two survey waves, though tests for group differences show these children experience fewer impairments than children of chronically depressed mothers.

---

[7] Because the Stata commands for estimating propensity score models cannot be used appropriately with multiple imputed data sets, I estimate these models for the first imputed data set. The results presented are robust to using different single data sets.

Table 3
OLS regression models estimating children's internalizing and externalizing problem behaviors, by maternal depression.

Variable	Internalizing behaviors				Externalizing behaviors			
	Model 1		Model 2		Model 1		Model 2	
Maternal depression								
Never depressed (reference)	–	–	–	–	–	–	–	–
Depressed at one wave	0.304	(0.048)***	0.224	(0.050)***	0.315	(0.053)***	0.225	(0.047)***
Depressed at two waves	0.519	(0.078)***	0.423	(0.086)***	0.481	(0.085)***	0.359	(0.082)***
Depressed at three waves	0.642	(0.122)***	0.551	(0.128)***	0.680	(0.114)***	0.588	(0.110)***
Control variables								
Race								
White			–	–			–	–
Black			−0.084	(0.042)^			−0.029	(0.053)
Hispanic			0.092	(0.051)^			−0.019	(0.049)
Other race			0.076	(0.107)			0.192	(0.107)^
Immigrant			0.200	(0.074)*			−0.022	(0.080)
Age			−0.001	(0.003)			−0.006	(0.003)*
Frequency of attendance at religious services								
At least once a week			–	–			–	–
Several times a month			−0.054	(0.054)			−0.061	(0.057)
Occasionally			−0.037	(0.045)			−0.013	(0.043)
Never			−0.022	(0.046)			0.012	(0.070)
Education								
Less than high school			–	–			–	–
High school diploma or GED			−0.047	(0.030)			−0.051	(0.053)
Post-secondary education			−0.225	(0.057)**			−0.177	(0.046)**
Household income (log)			−0.024	(0.014)^			−0.010	(0.016)
Medicaid birth			0.065	(0.047)			0.124	(0.041)**
Relationship status								
Married			–	–			–	–
Cohabiting			0.141	(0.065)*			0.090	(0.052)
Non-residential romantic relationship			0.195	(0.078)*			0.221	(0.070)**
Separated			0.078	(0.088)			0.133	(0.076)^
Grandmother in household			0.015	(0.035)			0.002	(0.040)
Number of children in household			0.014	(0.012)			0.042	(0.015)*
Fair or poor health			0.263	(0.116)*			0.164	(0.083)^
Depression in child's maternal grandparent			0.180	(0.042)***			0.165	(0.038)***
Depression in child's paternal grandparent			0.031	(0.036)			0.084	(0.043)^
Child age, in months			−0.001	(0.009)			−0.013	(0.007)^
Child is male			0.024	(0.035)			0.135	(0.043)**
Child born low birth weight			0.023	(0.070)			0.094	(0.076)
Intercept	−0.307		−0.114		−0.155		0.633	
R-squared	0.070		0.117		0.058		0.115	
N	2655		2655		2655		2655	

Note: All models include city fixed effects. Standard errors in parentheses.
^ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

The above analyses show that 5-year-old children experience disadvantages when their mothers are depressed at one, two, or three survey waves. But there may be important differences *within* these groups of mothers. For example, a mother depressed at one survey wave could have reported depression when the child was one (4 years prior to the outcomes), when the child was three (2 years prior to the outcomes), or when the child was five. Thus, in supplemental analyses not presented (available upon request), I substitute the current measure of maternal depression with the following dummy variables that capture both chronicity and timing: never depressed (reference category), depressed only at the 1-year survey, depressed only at the 3-year survey, depressed only at the 5-year survey, depressed at the 1- and 3-year surveys, depressed at the 1- and 5-year surveys, depressed at the 3- and 5-year surveys, and depressed at all surveys.

Results show nearly any experience with maternal depression, compared to no maternal depression, is associated with worse internalizing and externalizing problem behaviors. For example, depression at only the 1-year survey is associated with internalizing problems about one-seventh of a standard deviation higher (0.143, $p < 0.10$), depression at only the 3-year survey is associated with internalizing problems about one-fifth of a standard deviation higher (0.190, $p < 0.05$), and depression at only the 5-year survey is associated with internalizing problems more than one-third of a standard deviation higher (0.369, $p < 0.01$). Though it appears depression has stronger consequences for children's problem behaviors when it is proximately occurring, tests reveal no statistically significant differences between these groups. Similarly, there are no statistically significant differences between the three types of mothers depressed at two waves. Results for externalizing problem

Table 4
Propensity score matching models estimating the consequences of maternal depression for children's internalizing and externalizing problem behaviors.

	Treatment *N*	Control *N*	Internalizing behaviors		Externalizing behaviors	
Depressed at one wave						
Nearest neighbor matching	529	1586	0.234	(0.059)***	0.187	(0.059)**
Radius matching	525	1586	0.207	(0.056)***	0.182	(0.056)**
Kernel matching	532	1586	0.213	(0.054)***	0.304	(0.054)***
Depressed at two waves						
Nearest neighbor matching	244	1586	0.378	(0.087)***	0.348	(0.082)***
Radius matching	244	1586	0.370	(0.084)***	0.323	(0.078)***
Kernel matching	251	1586	0.366	(0.080)***	0.312	(0.075)***
Depressed at three waves						
Nearest neighbor matching	127	1586	0.519	(0.108)***	0.466	(0.113)***
Radius matching	127	1586	0.480	(0.104)***	0.480	(0.107)***
Kernel matching	132	1586	0.523	(0.098)***	0.500	(0.102)***

Note: Standard errors are in parentheses. In estimating the effect of maternal depression at one survey wave, I drop observations in which mothers report depression at two or three survey waves. Similarly, I drop observations in which mothers report depression at one or three survey waves when estimating the effect of maternal depression at two waves, and observations in which mothers report depression at one or two survey waves when estimating the effect of maternal depression at all three waves.

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

behaviors are nearly identical, with one exception. Children of mothers depressed at the 1- and 3-year surveys (compared to children of never depressed mothers: 0.201, *n.s.*) have fewer externalizing problems than children of mothers depressed at the 1- and 5-year surveys (compared to children of never depressed mothers: 0.611, $p < 0.001$) ($p < 0.05$).

An important limitation, as discussed earlier, is that children's problem behaviors are reported by their mothers and depressed mothers may have negative or distorted views. Although children's fathers were not administered the full CBCL questionnaire, they were asked a subset of these questions at the 5-year survey. I capitalize on this information by estimating father-reported problem behaviors as a function of maternal depression. Before proceeding to these supplemental results, one caveat is in order. I restrict this analysis to children living with their fathers at the 5-year survey ($n = 1112$), as non-residential fathers may have not have complete information about children's behaviors. The sample size is reduced dramatically (by 42%), so I combine children with mothers depressed at two and three survey waves ($n = 102$). These paternal reports are not a perfect substitute for maternal reports, but they are moderately correlated ($r = .27$ for both internalizing and externalizing behaviors).

Results suggest that maternal depression, especially persistent depression, is associated with children's father-reported outcomes. Taking into account the baseline demographic and socioeconomic characteristics (the equivalent of Model 2 in Table 3), fathers report that children have worse internalizing (0.146, $p < .05$) and externalizing (0.184, $p < .05$) problem behaviors when mothers are depressed at two or three survey waves. Depression at one survey wave is not associated with father-reported outcomes.

4.1.2. Propensity score matching

In Table 4, I present results using propensity score matching. Each of the three matching strategies suggests children with depressed mothers have more problem behaviors than their counterparts with never depressed mothers. The average treatment effect for the treated (ATT) estimates for maternal depression at one survey wave range from 0.207 (radius matching) to 0.234 (nearest neighbor matching) for internalizing problem behaviors and from 0.182 (radius matching) to 0.304 (kernel matching) for externalizing problem behaviors. Interpreting the most conservative estimates, those garnered from a radius matching approach, children of mothers depressed at one survey wave have behaviors that are nearly one-fifth of a standard deviation worse than those with never depressed mothers.

The next two panels of Table 4 estimate the effect of maternal depression at two and three waves, respectively. These results are consistent with findings from the OLS regression models. Maternal depression at two or three survey waves is associated with internalizing and externalizing problem behaviors in children. Taken together, these propensity score models suggest that when children of depressed mothers are matched to other children, so that the only observed difference between the two groups is the presence or absence of maternal depression, there remains an association between maternal depression and children's problem behaviors.

4.2. Explaining association between maternal depression and children's problem behaviors

Both the OLS models and propensity score models establish maternal depression is associated with children's problem behaviors, but these analyses do not consider the mechanisms underlying this association. I turn first to estimates of children's internalizing problem behaviors in Table 5. Model 1 presents a baseline model and includes all control variables from Model 2 of Table 3. Adjusting for economic resources in Model 2 reduces the magnitude and statistical

Table 5
OLS regression models estimating internalizing problem behaviors, by maternal depression with mechanisms.

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Maternal depression												
Never depressed (reference)	–	–	–	–	–	–	–	–	–	–	–	–
Depressed at one wave	0.224	(0.050)***	0.187	(0.045)**	0.176	(0.048)**	0.208	(0.048)***	0.211	(0.052)**	0.137	(0.046)**
Depressed at two waves	0.423	(0.086)***	0.329	(0.086)**	0.370	(0.088)**	0.395	(0.082)***	0.402	(0.087)***	0.282	(0.088)**
Depressed at three waves	0.551	(0.128)***	0.429	(0.120)**	0.420	(0.137)**	0.506	(0.127)**	0.531	(0.130)**	0.311	(0.132)*
Potential mechanisms												
Economic resources												
Employed			−0.026	(0.042)							−0.032	(0.037)
Income-to-poverty ratio			−0.006	(0.009)							−0.003	(0.009)
Material hardship			0.706	(0.128)***							0.488	(0.118)**
Maternal parenting behaviors												
Neglect					1.325	(0.280)***					1.197	(0.280)**
Psychological aggression					0.534	(0.079)***					0.483	(0.084)***
Physical assault					0.354	(0.057)***					0.324	(0.054)***
Engagement					−0.030	(0.017)^					−0.020	(0.018)
Relationship supportiveness and coparenting												
No relationship							–	–			–	–
Low supportive behaviors							0.242	(0.048)***			0.213	(0.049)***
High supportive behaviors							−0.020	(0.042)			0.020	(0.042)
Shared responsibility in parenting							−0.074	(0.028)*			−0.045	(0.029)
Cooperation in parenting							0.007	(0.032)			0.009	(0.030)
Social support												
Perceived instrumental support									−0.213	(0.074)*	−0.163	(0.089)^
Number of friends									−0.006	(0.004)	−0.002	(0.004)
Presence of a close confidante									−0.017	(0.062)	−0.043	(0.065)
Constant	−0.115		−0.139		−0.335		−0.012		0.110		−0.194	
R-squared	0.117		0.128		0.164		0.134		0.121		0.180	
N	2633		2633		2633		2633		2633		2633	

Note: All models include covariates from Model 2 of Table 3. All models include city fixed effects. Standard errors in parentheses.
^ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

significance of maternal depression. I include all three indicators of economic resources simultaneously in the model, as a chi-square test revealed joint significance ($F = 10.890$, $p < .001$). Taking into account economic resources reduces the magnitude of chronic depression by 22%. The statistical significance of the coefficient is also reduced. For mothers depressed at one and two waves, respectively, the coefficient is reduced by 17% and 22%. In Model 2, I adjust for maternal parenting behaviors, which also substantially reduces the maternal depression coefficients. As in the prior model, I test the joint significance of these variables ($F = 45.180$, $p < .001$). In this case, the coefficient for chronic maternal depression is reduced by 24%. The coefficients for maternal depression at one and two waves are also reduced by 21% and 13%, respectively. Relationship supportiveness and co-parenting (Model 4) does little to explain the association between maternal depression and children's internalizing behaviors, reducing the magnitude of these coefficients by 7–8% ($F = 22.090$, $p < .001$). Similarly, perceived social support (Model 5) does little to explain the association ($F = 3.280$, $p < .05$). In Model 6, which includes all potential mechanisms, the coefficient for maternal depression at one wave is reduced by 39%, at two waves by 33%, and at three waves by 44%. All maternal depression coefficients are statistically significant in this final model, suggesting a remaining direct effect of maternal depression or the existence of additional mechanisms.

Table 6, which displays estimates of externalizing problem behaviors, tells a generally consistent story. In Model 2, taking into account economic resources ($F = 20.610$, $p < .001$) reduces the coefficient for maternal depression at one wave by 19%, at two waves by 32%, and at three waves by 25%. Adjusting for maternal parenting behaviors in Model 3 also reduces the association between maternal depression and children's externalizing behaviors ($F = 247.76$, $p < .001$). Relationship supportiveness and co-parenting (Model 4) and perceived social support (Model 5) do little to explain the relationship between maternal depression and children's externalizing problem behaviors ($F = 14.400$, $p < 0.001$; $F = 3.700$, $p < .001$). When considering all mechanisms (Model 6), the maternal depression coefficients are reduced by about half (49% for mothers depressed at one wave, 48% for mothers depressed at two waves, and 47% for mothers depressed at three waves) and in statistical significance.[8]

---

[8] These results about the relative importance of economic resources and parenting as mechanisms are corroborated by results from a more formal decomposition of direct and indirect effects for regression models (Sobel–Goodman mediation tests).

Table 6
OLS regression models estimating externalizing problem behaviors, by maternal depression with mechanisms.

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Maternal depression												
Never depressed (reference)	–	–	–	–	–	–	–	–	–	–	–	–
Depressed at one wave	0.225	(0.047)***	0.182	(0.043)**	0.153	(0.040)**	0.204	(0.046)***	0.215	(0.048)***	0.114	(0.037)**
Depressed at two waves	0.359	(0.082)***	0.243	(0.078)**	0.286	(0.070)**	0.320	(0.079)**	0.341	(0.081)**	0.188	(0.069)*
Depressed at three waves	0.588	(0.110)***	0.440	(0.108)**	0.437	(0.100)***	0.524	(0.114)***	0.576	(0.111)***	0.314	(0.103)**
Potential mechanisms												
Economic resources												
Employed			−0.007	(0.043)							−0.030	(0.039)
Income-to-poverty ratio			0.001	(0.011)							0.007	(0.010)
Material hardship			0.918	(0.117)***							0.579	(0.099)***
Maternal parenting behaviors												
Neglect					0.452	(0.234)^					0.333	(0.218)
Psychological aggression					1.195	(0.115)***					1.137	(0.114)***
Physical assault					0.631	(0.096)***					0.591	(0.095)***
Engagement					−0.020	(0.014)					−0.008	(0.015)
Relationship supportiveness and coparenting												
No relationship							–	–			–	–
Low supportive behaviors							0.199	(0.062)**			0.153	(0.058)*
High supportive behaviors							−0.103	(0.051)^			−0.056	(0.057)
Shared responsibility in parenting							−0.063	(0.032)^			−0.030	(0.031)
Cooperation in parenting							−0.023	(0.031)			−0.027	(0.030)
Social support												
Perceived instrumental support									−0.144	(0.058)*	−0.094	(0.065)
Number of friends									−0.007	(0.005)	−0.002	(0.005)
Presence of a close confidante									0.102	(0.053)^	0.052	(0.046)
Constant	0.633		0.620		−0.063		0.869		0.710		0.095	
R-squared	0.115		0.131		0.228		0.136		0.117		0.247	
N	2633		2633		2633		2633		2633		2633	

Note: All models include covariates from Model 2 of Table 3. All models include city fixed effects. Standard errors in parentheses.
^ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

5. Discussion

In this paper, I use data from the Fragile Families and Child Wellbeing Study, a rich data source uniquely suited to understand the wellbeing of young children, to examine how maternal depression chronicity has consequences for children's internalizing and externalizing problem behaviors. Depression is a severe, often chronic mental disorder that has durable social consequences for sufferers, and results suggest the social consequences for sufferers may have spillover effects onto their children. I find children of depressed mothers, especially chronically depressed mothers, have more internalizing and externalizing problem behaviors than their counterparts with never depressed mothers. The relationship between maternal depression and children's problem behaviors exists independent of a wide array of mother and child characteristics, including several indicators of socioeconomic status measured at baseline. The magnitudes of these associations are substantial. In the fully specified model (Model 2 of Table 3), chronic depression is associated with more than half of a standard deviation increase in both internalizing and externalizing problem behaviors. Further, for both internalizing and externalizing problem behaviors, no variables are as important predictors of children's problem behaviors as maternal depression chronicity.

These results are consistent with a large body of evidence documenting the deleterious consequences of maternal depression for child wellbeing (Augustine and Crosnoe, 2010; Giles et al., 2011; Goodman and Gotlib, 2002; Hammen et al., 2008; Meadows et al., 2007; Turney, 2011a; Weissman et al., 2006). But these results also extend this literature in several ways. In addition to adjusting for a wide array of variables that may alter the relationship between maternal depression and children's problem behaviors, I employ propensity score models to minimize bias. The propensity score models, though still subject to unobserved heterogeneity, allow me to match the covariate distributions of "treatment" observations to those of other observations similar in many ways except for the presence of depression.

Conceptually, there are many reasons to expect why maternal depression – with its debilitating symptoms that often include fatigue, irritability, or loss of interest in daily activities – may lead to problem behaviors in children, and an examination of these potential explanations is a second contribution of this paper. The role impairments associated with depression may lead to reduced economic wellbeing, impaired parenting behaviors, hampered social relationships with intimate partners, or less perceived social support, all of which have consequences for child wellbeing. Indeed, the wide-reaching social consequences of depression – those that impair mothers' abilities as earners, parents, and partners – explain the deleterious consequences of depression for children. Together, economic resources, parenting behaviors, relationship supportiveness

and co-parenting, and perceived social support explain a large proportion of the association between maternal depression and children's problem behaviors. These mechanisms explain 44% of the relationship between chronic depression and internalizing behaviors and 47% of the relationship between chronic depression and externalizing behaviors. These findings suggest the importance of paying greater attention to understanding and ameliorating the wide-ranging social consequences of depression. Interventions that decrease economic hardship and improve parenting skills may aid in leveling the playing field for children of depressed mothers.

Economic resources and parenting behaviors are especially strong mechanisms. This is consistent with expectations, as the socioeconomic and parenting consequences of depression are well documented (Kessler et al., 2003; Lovejoy et al., 2000; Marcotte and Wilcox-Gok, 2001). In addition, economic resources are a consistent, robust predictor of children's problem behaviors, with children from impoverished families having more problems than their economically advantaged counterparts (Duncan and Brooks-Gunn, 1997). Economically disadvantaged children, for example, may attend poor quality child care programs that do not facilitate the development of positive behaviors (Burchinal, 1999). Similarly, parenting behaviors such as neglect and harsh discipline have been consistently linked to children's outcomes (Amato and Fowler, 2002; Bodovski and Youn, 2010).

Research on depression suggests the disorder impairs the sufferer's interpersonal relationships and functioning (Coyne, 1976), and a large body of empirical research confirms that, indeed, depression disrupts social relationships (Proulx et al., 2007; Whisman, 2001). Contrary to expectations, the two sets of mechanisms related to social relationships – relationship supportiveness and co-parenting and perceived social support – play only a weak role in attenuating the relationship between maternal depression and children's problem behaviors despite their independent correlations with both depression and problem behaviors. It is possible the origins of depression have the same origins of relationship supportiveness and co-parenting and, thus, accounting for these factors only marginally diminishes the already deleterious consequences of maternal depression for children. Future research should examine the upstream factors associated with depression, as understanding these origins may further shed light on its social consequences. Indeed, other research has found that relationship quality does not mediate the association between depression and children's outcomes (Du Rocher Schudlich and Cummings, 2003; Papp et al., 2004; though see Leinonen et al., 2003). Comparing across studies is difficult, though, as relationship quality is rarely measured consistently and employed measures are often conceptually distinct (i.e., ranging from positive to negative aspects of the relationship, and from self-reports to interviewer observations). Thus, future research would also benefit from understanding the multi-dimensional, longitudinal nature of the association between relationship quality and depression. With respect to social support, depressed mothers may have a distorted view of their available support, and this measurement error may lead to imprecise estimates (Meadows, 2009; Wethington and Kessler, 1986).

6. Limitations

Several limitations exist. To begin with, I cannot make causal conclusions about the effect of maternal depression on children. Though employing propensity score models substantially improves upon many other research designs, unobserved characteristics may render the association between maternal depression and children's problem behaviors spurious. Fixed-effects models would eliminate much unobserved heterogeneity, but would drop all observations in which maternal depression does not change over time, making it impossible to examine the differential effect of chronic and transitory depression. Another limitation is that children's problem behaviors are reported by their mothers and depressed mothers may have negative perceptions of their children (Chi and Hinshaw, 2002; Chilcoat and Breslau, 1997). However, supplemental analyses, discussed at length above, suggest the association between maternal depression and children's problem behaviors is not biased by systematic measurement error. Other research using these data also finds no evidence of reporting bias (Meadows et al., 2007). An ideal research design would have independent assessments of children's behaviors, and future research on this topic should consider multiple reporters of children's behaviors. Additionally, these data are not representative of all families in the United States. Unmarried mothers were oversampled, which means the sample over-represents children most likely to be exposed to maternal depression (Wood et al., 2007) and have problem behaviors (Osborne and McLanahan, 2007).

Further limitations exist regarding variable measurement. It is possible that some mechanisms considered influence one another or that maternal depression is endogenous to some mechanisms. For example, economic hardship may lead to depression (Conger et al., 1992; Heflin and Iceland, 2009). The analytic design, with its particular attention to the time ordering of variables and the inclusion of extensive baseline controls, addresses most threats to endogeneity.[9] Furthermore, the Fragile Families sampling design, with its focus on unmarried mothers, reduces socioeconomic heterogeneity. Given depression does indeed affect the most vulnerable mothers, though, children of depressed mothers likely experience an accumulation of disadvantages and future research would benefit from an explicit exploration of this. Finally, the dichotomous indicator of depression does not allow for an examination of mothers who do not meet the criteria for major depression but exhibit symptoms of depression (Mirowsky and Ross, 2002).

---

[9] Endogeneity could be a concern if a mother reports depression at the 5-year survey, when the mechanisms are measured. Because supplemental analyses showed substantively similar findings when I only used indicators of depression at the 1- and 3-year surveys, I present these findings to take advantage of having measuring depression at three survey waves.

7. Conclusions

Overall, results suggest maternal depression has important implications for child wellbeing. Children exposed to maternal depression early in the life course, especially those exposed to depression across multiple years, are more likely than their counterparts to have internalizing and externalizing problem behaviors when they are 5 years old. Much of the independent consequences of depression for children, though, stem not directly from depression but instead from other social consequences of depression. These findings extend prior research on the consequences of maternal depression for children by using a large, non-clinical sample; by utilizing longitudinal measures of maternal depression; by employing rigorous statistical techniques to lend confidence to the findings; and, most importantly, by elucidating mechanisms through which depression matters for children. Given the importance of early childhood behavioral problems predicting short- and life-term trajectories, these findings may have implications for the intergenerational transmission of inequality.

Acknowledgments

Appendix A. Description of 5-year-old children's problem behaviors

---

Internalizing behaviors (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true)
Complains of loneliness
Complains that no one loves him/her
Cries a lot
Feels he/she has to be perfect
Fears he/she might think or do something bad
Feels that others are out to get him/her
Feels too guilty
Feels worthless or inferior
Nervous, high strung, or tense
Rather be alone than with others
Refuses to talk
Secretive, keeps things to self
Self-conscious or easily embarrassed
Shy or timid
Stares blankly
Sulks a lot
Suspicious
Too fearful or anxious
Underactive, slow moving, lacks energy
Unhappy, sad, or depressed
Withdrawn, doesn't get involved with others
Worries

Externalizing behaviors (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true)
Argues a lot
Brags or boasts
Cruel, bullies, shows meanness
Destroys others' things
Destroys own things
Disobedient at home
Disobedient at school/childcare
Doesn't seem to feel guilty after misbehaving
Easily jealous
Gets in many fights
Hangs around with others who get in trouble
Has sudden changes in mood or feeling
Has temper tantrums or hot temper
Lies or cheats

Appendix A (*continued*)

Physically attacks people
Prefers being with older kids
Runs away from home
Screams a lot
Sets fires
Shows off or clowns around
Steals at home
Steals outside the home
Stubborn, sullen or irritable
Swears or uses obscene language
Talks too much
Teases a lot
Threatens people
Unusually loud
Vandalizes
Wants a lot of attention

Appendix B. Description of potential mechanisms

Material hardship (1 = occurred in past year, 0 = did not occur in past year)
Received free food or meals
Child was hungry but couldn't afford more food
Were hungry but didn't eat because couldn't afford enough food
Did not pay the full amount of rent or mortgage payments
Were evicted from your home or apartment for not paying the rent or mortgage
Did not pay the full amount of a gas, oil, or electricity bill
Gas or electric was turned off, or the heating company did not deliver oil, because there wasn't enough money
Borrowed money from friends or family to help pay bills
Moved in with other people even for a little while because of financial problems
Stayed at a shelter, in an abandoned building, an automobile, or any other place not meant for regular housing
Anyone in your household who needed to see a doctor or go to the hospital but couldn't go because of the cost
Cut back on buying clothes for self
Worked overtime or taken a second job

Neglect (0 = did not do in past year, 1 = did in past year)
Had to leave child home alone
Were so caught up in own problems, not able to show child love
Were not able to make sure child got food he or she needed
Were not able to make sure child goes to a doctor or hospital
Were so drunk or high that you had a problem taking care of child

Psychological aggression (0 = did not do in past year, 1 = did in past year)
Shouted, yelled, or screamed at child
Threatened to spank or hit child but didn't actually do it
Swore or cursed at child
Called child dumb or lazy or some other name like that
Said you would send child away or would kick child out of the house

Physical assault (0 = did not do in past year, 1 = did in past year)
Spanked child on the bottom with your bare hand
Hit child on the bottom with a hard object
Slapped child on the hand, arm, or leg
Pinched child
Shook child

Engagement (0 = 0 days per week, 7 = 7 days per week)
Sang songs or nursery rhymes with child

Appendix B (continued)

Read stories to child
Told stories to child
Played inside with toys such as blocks or legos with child
Told child that you appreciated something he/she did
Played outside in the yard, park, or playground with child
Take child on an outing, such as shopping, or to a restaurant, church, or museum
Watch TV or a video together

Supportive behaviors (0 = no partner, 1 = never, 2 = sometimes, 3 = often)
Fair and willing to compromise
Expresses love or affection
Encourages or helps you do things
Listens when you need someone to talk to
Understands your hurts and joys

Shared responsibility in parenting (1 = never, 2 = rarely, 3 = sometimes, 4 = often)
Looks after child when you need to do things
Runs errands for you like picking things up at the store
Fixes things around your home, paints, or makes it look nicer
Takes child places he needs to go, such as the doctor

Cooperation in parenting (1 = never, 2 = rarely, 3 = sometimes, 4 = always)
When father is with child, acts like the father you want
Can trust father to take good care of child
Father respects the schedules and rules you make for child
Father supports you in the way you want to raise child
You and father talk about problems that come up when raising child
Can count on father to help when you need someone to look after child

Perceived social support (1 = available, 0 = not available)
Loan for $200
Loan for $1000
Place to live
Child care
Cosigner for $1000
Cosigner for $5000

References

Aalto-Setala, T., Haarasilta, L., Marttunen, M., Tuulio-Henriksson, A., Poikolaninen, K., Aro, H., Lonnqvist, L., 2002. Major depressive episode among young adults: CIDI-SF versus SCAN consensus diagnosis. Psychological Medicine 32, 1309–1314.

Achenbach, Thomas M. 1992. Manual for the Child Behavior Checklist/2–3 and 1992 Profile. University of Vermont Department of Psychiatry, Burlington, VT.

Achenbach, Thomas M., McConaughy, Stephanie H., Howell, Catherine T., 1987. Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. Psychological Bulletin 101, 213–232.

Allison, Paul D., 2002. Missing Data. Sage Publications, New York.

Alpern, Lisbeth, Lyons-Ruth, Karen, 1993. Preschool children at social risk: chronicity and timing of maternal depressive symptoms and child behavior problems at school and at home. Development and Psychopathology 5, 371–387.

Amato, Paul R., Fowler, Frieda, 2002. Parenting practices, child adjustment, and family diversity. Journal of Marriage and the Family 64 (3), 703–716.

Amato, Paul R., Loomis, Laura Spencer, Booth, Alan, 1995. Parental divorce, marital conflict, and offspring well-being during early adulthood. Social Forces 73 (3), 895–915.

Augustine, Jennifer March, Crosnoe, Robert, 2010. Mother's depression and educational attainment and their children's academic trajectories. Journal of Health and Social Behavior 51 (3), 274–290.

Bartkowski, John P., Xu, Xiaohe, Levin, Martin L., 2008. Religion and child development: evidence from the early childhood longitudinal study. Social Science Research 37, 18–36.

Baune, Bernhard T., Miller, Robyn, McAfoose, Jordan, Johnson, Melissa, Quirk, Francis, Mitchell, David, 2010. The role of cognitive impairment in general functioning in major depression. Psychiatry Research 176, 183–189.

Becker, Sascha O., Ichino, Andrea, 2002. Estimation of average treatment effects based on propensity scores. The Stata Journal 2 (4), 358–377.

Belsky, Jay, 1984. The determinants of parenting: a stress model. Child Development 55 (1), 83–96.

Bendheim-Thoman Center for Research on Child Wellbeing, 2009. Five-Year In-Home Longitudinal Study of Pre-school Aged Children. Office of Population Research, Princeton University, Princeton, NJ.

Bodovski, Katerina, Youn, Min-Jong, 2010. Love, discipline, and elementary school achievement: the role of family emotional climate. Social Science Research 39, 585–595.

Burchinal, Margaret R., 1999. Child care experiences and developmental outcomes. Annals of the American Academy of Political and Social Science 563, 73–97.

Caspi, Avshalom, Bem, Daryl J., Elder Jr., Glen H., 1989. Continuities and consequences of interactional styles across the life course. Journal of Personality 57 (2), 375–406.

Chi, Terry C., Hinshaw, Stephen P., 2002. Mother–child relationships of children with ADHD: the role of maternal depressive symptoms and depression-related distortions. Journal of Abnormal Child Psychology 30 (4), 387–400.

Chilcoat, Howard D., Breslau, Naomi, 1997. Does psychiatric history bias mothers' reports? An application of a new analytic approach. Journal of the American Academy of Child and Adolescent Psychiatry 36 (7), 971–979.

Conger, Rand D., Conger, Katherine J., Elder Jr., Glen H., Lorenz, Frederick O., Simons, Ronald L., Whitbeck, Les B., 1992. A family process model of economic hardship and adjustment of early adolescent boys. Child Development 63, 526–541.

Conger, Rand D., Wallace, Lora Ebert, Sun, Yumei, Simons, Ronald L., McLoyd, Vonnie C., Brody, Gene H., 2002. Economic pressure in African American families: a replication and extension of the family stress model. Developmental Psychology 38 (2), 179–193.

Coyne, James C., 1976. Depression and the response of others. Journal of Abnormal Psychology 85 (2), 186–193.

Crosnoe, Robert, Elder, Glen, 2004. From childhood to the later years: pathways of human development. Research on Aging 26, 623–654.

Cui, Ming, Conger, Rand D., 2008. Parenting behavior as mediator and moderator of the association between marital problems and adolescent maladjustment. Journal of Research on Adolescence 18 (2), 261–284.

Mark Cummings, E., Davies, Patrick T., 1994. Maternal depression and child development. Journal of Child Psychology and Psychiatry 35 (1), 73–112.

Currie, Janet, 2005. Health disparities and gaps in school readiness. Future of Children 15 (1), 117–138.

Currie, Janet, Madrian, Brigette C., 1999. Health, health insurance and the labor market. In: Ashenfelter, O., Card, D. (Eds.), Handbook of Labor Economics. Elsevier, New York, pp. 3309–3407.

Dadds, Mark R., Powell, Martine B., 1991. The relationship of interpersonal conflict and global marital adjustment to aggression, anxiety, and immaturity in aggressive and nonclinic children. Journal of Abnormal Child Psychology 19 (5), 553–567.

Downey, Geraldine, Coyne, James C., 1990. Children of depressed parents: an integrative review. Psychological Bulletin 108 (1), 50–76.

Du Rocher Schudlich, Tina, Mark Cummings, E., 2003. Parental dysphoria and children's internalizing symptoms: marital conflict styles as mediators of risk. Child Development 74 (6), 1663–1681.

Du Rocher Schudlich, Tina, Mark Cummings, E., 2007. Parental dysphoria and children's adjustment: marital conflict styles, children's emotional security, and parenting as mediators of risk. Journal of Abnormal Child Psychology 35, 627–639.

Duncan, Greg J., Brooks-Gunn, Jeanne, 1997. Consequences of Growing Up Poor. Russell Sage Foundation, New York.

Duncan, Greg J., Dowsett, Chantelle J., Claessens, Amy, Magnuson, Katherine, Huston, Aletha C., Klebanov, Pamela, Pagani, Linda S., Feinstein, Leon, Engel, Mimi, Brooks-Gunn, Jeanne, Sexton, Holly, Duckworth, Kathryn, 2007. School readiness and later achievement. Developmental Psychology 43 (6), 1428–1446.

Elder Jr., Glen H., 1998. The life course and human development. In: Damon, W., Lerner, R.M. (Eds.). Handbook of Child Psychology: Theoretical Models of Human Development, vol. 1. Wiley, New York, pp. 939–991.

Ellison, Christopher G., Boardman, Jason D., Williams, David R., Jackson, James S., 2001. Religious involvement, stress, and mental health: findings from the 1995 Detroit Area Study. Social Forces 80 (1), 215–249.

Entwisle, Doris R., Alexander, Karl L., Olson, Laurie S., 2005. First grade and educational attainment by age 22: a new story. American Journal of Sociology 110 (5), 1458–1502.

Foley, Debra L., Pickles, Andrew, Simonoff, Emily, Maes, Hermine H., Silberg, Judy L., Hewitt, John K., Eaves, Lindon J., 2001. Parental concordance and comorbidity for psychiatric disorder and associate risks for current psychiatric symptoms and disorders in a community sample of juvenile twins. Journal of Clinical Psychology and Psychiatry 42, 381–394.

Fomby, Paula, Cherlin, Andrew, 2007. Family instability and child well-being. American Sociological Review 72, 181–204.

Fomby, Paula, Osborne, Cynthia, 2010. The influence of union instability and union quality on children's aggressive behavior. Social Science Research 39, 912–924.

Frank, Richard G., Koss, Catherine, 2005. Mental Health and Labor Markets Productivity Loss and Restoration. World Health Organization, Geneva, Switzerland.

Giles, Lynne C., Davies, Michael J., Whitrow, Melissa J., Warin, Megan J., Moore, Vivienne, 2011. Maternal depressive symptoms and child care during toddlerhood relate to child behavior at age 5 years. Pediatrics 128 (1), e1–e7.

Goodman, Sherryl H., Gotlib, Ian H., 2002. Children of Depressed Parents: mechanisms of Risk and Implications for Treatment. American Psychological Association, Washington, DC.

Gunlicks, Meredith L., Weissman, Myrna M., 2008. Change in child psychopathology with improvement in parental depression: a systematic review. Journal of the American Academy of Child and Adolescent Psychiatry 47 (4), 379–389.

Hammen, Constance, Brennan, Patricia A., 2003. Severity, chronicity, and timing of maternal depression and risk of adolescent offspring diagnoses in a community sample. Archives of General Psychiatry 60, 253–258.

Hammen, Constance, Brennan, Patricia A., Keenan-Miller, Danielle, 2008. Patterns of adolescent depression to age 20: the role of maternal depression and youth interpersonal dysfunction. Journal of Abnormal Child Psychology 36, 1189–1198.

Heflin, Colleen M., Iceland, John, 2009. Poverty, hardship, and depression. Social Science Quarterly 90 (5), 1051–1071.

Hildyard, Kathryn L., Wolfe, David A., 2002. Child neglect: developmental issues and outcomes. Child Abuse and Neglect 26, 679–695.

Horwitz, Allan V., Wakefield, Jerome C., 2007. The Loss of Sadness: How Psychiatry Transformed Normal Sorrow Into Depressive Disorder. Oxford University Press, Oxford.

Jackson, Aurora P., Gyamfi, Phyllis, Brooks-Gunn, Jeanne, Blake, Mandy, 1998. Employment status, psychological well-being, social support, and physical discipline. Journal of Marriage and the Family 60, 894–903.

Kahn, Robert S., Brandt, Dominique, Whitaker, Robert C., 2004. Combined effect of mothers' and fathers' mental health symptoms on children's behavioral and emotional well-being. Archives of Pediatric and Adolescent Medicine 158, 721–729.

Kana'iaupuni, Shawn M., Donato, Katharine M., Thompson-Colon, Theresa, Melissa Stainback, M., 2005. Counting on kin: social networks, social support, and child health status. Social Forces 83, 1137–1164.

Kearns, Robin A., Neuwelt, Patricia M., Hitchman, Belinda, Lennan, Michele, 1997. Social support and psychological distress before and after childbirth. Health and Social Care in the Community 5 (5), 296–308.

Kendler, Kenneth S., Thornton, Laura M., Gardner, Charles O., 2000. Stressful life events and previous episodes in the etiology of major depression in women: an evaluation of the 'kindling' hypothesis. American Journal of Psychiatry 157, 1243–1251.

Kessler, Ronald C., Berglund, Patricia, Demler, Olga, Jin, Robert, Koretz, Doreen, Merikangas, Kathleen R., John Rush, A., Walters, Ellen E., Wang, Philip S., 2003. The epidemiology of major depressive disorder: results from the national comorbidity survey replication (NCS-R). Journal of the American Medical Association 289 (3), 3095–3105.

Kessler, Ronald C., Andrews, Gavin, Mroczek, Daniel, Ustun, Bedirhan, Wittchen, Hans-Ulrich, 1998. The World Health Organization composite international diagnostic interview short-form (CIDI-SF). International Journal of Methods in Psychiatric Research 7, 171–185.

Kessler, Ronald C., Zhao, Shanyang, 1999. Overview of descriptive epidemiology of mental disorders. In: Aneshensel, C.S., Phelan, J.C. (Eds.), Handbook of the Sociology of Mental Health. Springer, New York, pp. 127–150.

Kiernan, Kathleen, Carmen Huerta, M., 2008. Economic deprivation, maternal depression, parenting, and children's cognitive and emotional development in early childhood. The British Journal of Sociology 59 (4), 783–806.

Kim, Hyoun K., McKenry, Patrick C., 2002. The relationship between marriage and psychological well-being – a longitudinal analysis. Journal of Family Issues 23, 885–911.

Kim-Cohen, Julia, Moffitt, Terrie E., Taylor, Alan, Pawlby, Susan J., Caspi, Avshalom, 2005. Maternal depression and children's antisocial behavior: nature and nurture effects. Archives of General Psychiatry 62, 173–181.

Klebanov, Pamela K., Brooks-Gunn, Jeanne, McCormick, Marie C., 1994. Classroom behavior of very low birth weight elementary school children. Pediatrics 94, 700–708.
Lee, Valerie E., Burkam, David T., 2002. Inequality at the Starting Gate: Social Background Differences in Achievement as Children Begin School. Economic Policy Institute, Washington, DC.
Leininger, Lindsey J., Ryan, Rebecca M., Kalil, Ariel, 2009. Low-income mothers' social support and children's injuries. Social Science and Medicine 68, 2113–2121.
Leinonen, Jenni A., Solantaus, Tytti S., Punamaki, Raija-Leena, 2003. Parental mental health and children's adjustment: the quality of marital interaction and parenting as mediating factors. Journal of Child Psychology and Psychiatry 44 (2), 227–241.
Lin, Nan, Ye, Xiaolan, Ensel, Walter M., 1999. Social support and depressed mood: a structural analysis. Journal of Health and Social Behavior 40 (4), 344–359.
Link, Bruce, 2002. The challenge of the dependent variable. Journal of Health and Social Behavior 43 (2), 247–253.
Lovejoy, M. Christine., Graczyk, Patricia A., O'Hare, Elizabeth, Neuman, George, 2000. Maternal depression and parenting behavior: a meta-analytic review. Clinical Psychology Review 20 (5), 561–592.
Marcotte, Dave E., Wilcox-Gok, Virginia, 2001. Estimating the employment and earnings costs of mental illness: recent developments in the United States. Social Science and Medicine 53 (1), 21–27.
Marmorstein, Naomi, Malone, Stephen M., Iacono, William G., 2004. Psychiatric disorders among offspring of depressed mothers: associations with paternal psychopathology. American Journal of Psychiatry 161, 1588–1594.
McLeod, Jane D., Kaiser, Karen, 2004. Childhood emotional and behavioral problems and educational attainment. American Sociological Review 69, 636–658.
McLeod, Jane D., Fettes, Danielle L., 2007. Trajectories of failure: the educational careers of children with mental health problems. American Journal of Sociology 113 (3), 653–701.
Meadows, Sarah O., McLanahan, Sara S., Brooks-Gunn, Jeanne, 2007. Parental depression and anxiety and early childhood behavioral problems across family types. Journal of Marriage and Family 69 (6), 1162–1177.
Meadows, Sarah O., McLanahan, Sara S., Brooks-Gunn, Jeanne, 2008. Stability and change in family structure and maternal health transitions. American Sociological Review 73 (2), 314–334.
Meadows, Sarah O., 2009. Is it there when you need it? Mismatch in perception of future availability and subsequent receipt of instrumental support. Journal of Family Issues 30, 1070–1097.
Merikangas, Kathleen R., Ames, Minnie, Cui, Lihong, Stang, Paul E., Bedirhan Ustun, T., Von Korff, Michael, Kessler, Ronald C., 2007. The impact of comorbidity of mental and physical conditions on role disability in the US adult population. Archives of General Psychiatry 64 (1), 1180–1188.
Mirowsky, John, Ross, Catherine E., 2002. Measurement for a human science. Journal of Health and Social Behavior 43 (2), 152–170.
Morgan, Stephen L., Harding, David J., 2006. Matching estimators of causal effects: prospects and pitfalls in theory and practice. Sociological Methods and Research 35 (1), 3–60.
Mustillo, Sarah A., Dorsey, Shannon, Conover, Kate, Burns, Barbara J., 2011. Parental depression and child outcomes: the mediating effects of abuse and neglect. Journal of Marriage and Family 73, 164–180.
Osborne, Cynthia, McLanahan, Sara S., 2007. Partnership instability and child wellbeing. Journal of Marriage and Family 69, 1065–1083.
Papp, Lauren M., Mark Cummings, E., Schermerhorn, Alice C., 2004. Pathways among martial distress, parental symptomatology, and child adjustment. Journal of Marriage and Family 66, 368–384.
Proulx, Christine M., Helms, Heather M., Buehler, Cheryl, 2007. Marital quality and personal well-being: a meta-analysis. Journal of Marriage and Family 69 (3), 576–593.
Reichman, Nancy E., Tietler, Julien, Garfinkel, Irv, McLanahan, Sara S., 2001. Fragile families: sample and design. Children and Youth Services Review 23 (4/5), 303–326.
Richters, John E., 1992. Depressed mothers as informants about their children: a critical review of the evidence for distortion. Psychological Bulletin 112 (3), 485–499.
Rosenbaum, Paul R., Rubin, Donald B., 1983. The central role of the propensity score in observational studies for causal effects. Biometrika 70, 41–55.
Royston, Patrick, 2007. Multiple imputation of missing values: further update of ice, with an emphasis on interval censoring. Stata Journal 7, 445–464.
Ryan, Rebecca, Kalil, Ariel, Leinenger, Lindsey, 2009. Low-income mothers' private safety nets and children's socioemotional well-being. Journal of Marriage and Family 71 (2), 279–298.
Schnittker, Jason, 2005. When mental health becomes health: age and the shifting meaning of self-rated health. The Milbank Quarterly 83, 397–423.
Simons, Ronald L., Whitbeck, Les B., Beaman, Jay, Conger, Rand D., 1994. The impact of mothers' parenting, involvement by nonresidential fathers, and parental conflict on the adjustment of adolescent children. Journal of Marriage and the Family 56, 356–374.
Simpson, Sherri M., Krishnan, Laura L., Kunik, Mark E., Ruiz, Pedro, 2007. Racial disparities in diagnosis and treatment of depression: a literature review. Journal of Psychiatric Quarterly 78, 3–14.
Straus, Murray A., 1990. Measuring intrafamily conflict and violence. The conflict tactics (CT) scales. In: Straus, M.A., Gelles, R.J. (Eds.), Physical Violence in American Families. Transaction, New Brunswick, NJ, pp. 29–47.
Thoits, Peggy A., 1984. Explaining distributions of psychological vulnerability: lack of social support in the face of life stress. Social Forces 63 (2), 453–481.
Turley, Lopez, Ruth N., 2003. Are children of young mothers disadvantaged because of their mother's age or family background? Child Development 74, 465–474.
Turney, Kristin, 2011a. Chronic and proximate depression among mothers: implications for child well-being. Journal of Marriage and Family 73, 149–163.
Turney, Kristin, 2011b. Labored love: examining the link between depression and parenting behaviors among mothers. Social Science Research 40, 399–524.
Turney, Kristin, 2011c. Maternal depression and childhood health inequalities. Journal of Health and Social Behavior 52, 314–332.
Tyler, Shannon, Allison, Kelly, Winsler, Adam, 2006. Child neglect: developmental consequences, intervention, and policy implications. Child and Youth Care Forum 35, 1–20.
Weissman, Myrna M., Wickramaratne, Priya, Nomura, Yoko, Warner, Virginia, Pilowsky, Daniel, Verdeli, Helen, 2006. Offspring of depressed parents: 20 years later. American Journal of Psychiatry 163, 1001–1008.
Wethington, Elaine, Kessler, Ronald C., 1986. Perceived support, received support, and adjustment to stressful life events. Journal of Health and Social Behavior 27, 78–89.
Whisman, Mark A., 2001. The association between depression and marital distress. In: Beach (Ed.), Marital and Family Processes in Depression: A Scientific Foundation for Clinical Practice. American Psychological Association, Washington, DC, pp. 3–24.
Whitaker, Robert C., Orzol, Sean M., Kahn, Robert S., 2006. Maternal mental health, substance use, and domestic violence in the year after delivery and subsequent behavior problems in children at age 3 years. Archives of General Psychiatry 63 (3), 551–560.
Wood, Robert G., Goesling, Brian, Avellar, Sarah, 2007. The Effects of Marriage on Health: a Synthesis of Recent Research Evidence. Mathematica Policy Research, Inc., Princeton, New Jersey.
Zill, Nicholas, 1999. Promoting educational equity and excellence in kindergarten. In: Pianta, R.C., Cox, M.J. (Eds.), The Transition to Kindergarten. Paul H. Brookes Publishing Co., Inc., Baltimore, MD, pp. 67–105.