

Major Depressive Disorder, Partner Relationships, and Children's Behavior

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Abstract

It is well known that parental depression, particularly maternal depression, is associated with less favorable behavioral outcomes among children, but little research examines the mechanisms through depression matters. This paper takes a step toward explaining the relationship between parental depression and children's behavior, using data from a subsample of the Fragile Families and Child Wellbeing survey (N = 1,926). I find that maternal and paternal depression weakens partner relationships and co-parenting, particularly when unmarried partners live together. Moreover, both relationship quality and co-parenting partially attenuate the association between parental depression and children's behavioral outcomes. This research extends past literature by using a large, non-clinical, and representative sample; by incorporating reports of both parents; and, importantly, by elucidating mechanisms through which depression matters for children.

Major depressive disorder (MDD) is a serious mental health problem that affects many individuals throughout their life course, many of whom are parents (Kessler and Zhao, 1999). The transition to parenthood may be a particularly stressful time, especially for first-time parents, as the addition of a child can bring substantial financial and emotional challenges. The onset of parenthood, while often a time of exciting changes, is associated with a reduction in the quality of the couple relationship and an increased likelihood of depression and depressive symptoms (Belsky and Kelly 1994; Nomaguchi and Milkie 2003; Cox, Paley, Burchinal, and Payne 1999; Cowan and Cowan 1992). Though parenthood influences the life course of both men and women, women may be particularly vulnerable to this transition. Research suggests, for example, that relationship quality drops more quickly and substantially for new mothers than new fathers (Belsky and Kelly 1994). Additionally, women, on average, are nearly twice as likely as men to suffer from depression (Kessler and Zhao 1999).

Theoretical perspectives suggest that depression can lead to substantial impairments for the sufferer. The interactional theory of depression, for example, posits that depressed individuals experience impaired interactions with others and that this impairment can lead to the maintenance of depression or depressive symptoms (Coyne 1976). Indeed, empirical research has found a host of negative consequences associated with the onset and maintenance of MDD and depressive symptoms. In addition to being associated with lower educational attainment and reduced economic well-being (Kessler, Foster, Saunders, and Stang 1995; Jayakody, Danziger, and Kessler 1998), depressed individuals generally have worse relationship quality with their intimate partners (Dehle and Weiss 1998; Frech and Williams 2007; McLeod and Eckberg 1993; Whisman, Uebelacker, and Weinstock 2004; Johnson and Jacob 1997). Empirical research also suggests that children's behavior suffers when their parents are depressed, although the

mechanisms through which parental depression influences children are not well understood (Downey and Coyne 1990; Gotlib and Lee 1996; Goodman and Gotlib 2002; Kane and Garber 2004).

One potential mechanism that underlies the negative relationship between parental depression and children's behavioral outcomes is the children's parents' relationships with one another (Downey and Coyne 1990; Goodman and Gotlib 1999; Brennan, Hammen, Katz et al. 2002). Depressed mothers, for example, may have less supportive relationships with their children's fathers, and this lack of supportiveness may lead to behavioral problems in young children. Similarly, depression may influence the ability of either or both parents to regularly co-parent, defined as helping each other with tasks related to the child together, and this may facilitate less favorable behavioral outcomes in children. Although researchers have speculated that partner relationships may be one way mechanism through which parental depression is detrimental to children, there exist few empirical tests of this hypothesis. The lack of understanding how parental depression transmits disadvantages to their children is crucial, as children's behavioral outcomes in early childhood have important and lasting implications throughout the life course (McLeod and Kaiser 2004; Knoester 2003; Entwisle and Alexander 1989, 1993).

Thus, this paper uses data from the Fragile Families and Child Wellbeing survey, a longitudinal study of nearly 5,000 new and mostly unmarried parents and their children, to examine the following research questions. First, what is the association between parental depression and children's behavioral outcomes? Second, how does parental depression account for variation in mother's reports of relationship quality and co-parenting? Third, do the consequences of parental depression for relationship quality and co-parenting vary by the

parents' relationship status? Finally, how does relationship quality and co-parenting mediate the negative association between parental depression and children's behavior? This paper extends past literature on parental depression and children's outcomes in three ways: 1.) by using a representative sample of parents and their young children; 2.) by accounting for both maternal and paternal depression; and 3.) most importantly, by examining mechanisms that underlie the association between parental depression and children's behavior.

Background

Consequences of parental depression for partner relationships

Theoretical perspectives on depression suggest that depressed individuals have negative interactions with others (Coyne 1976), and thus it follows that empirical research finds depression to be related to various aspects of relationship quality between intimate partners (Dehle and Weiss 1998; Dush and Amato 2005; Frech and Williams 2007; Kurdek 1990; McLeod and Eckberg 1993; Segrin et al. 2003; Whisman, Uebelacker, and Weinstock 2004; Zlotnick, Kohn, Keitner, and Grotta 2000). Increased negative interactions or negative perceptions of relationship quality are two mechanisms that may explain the association between depression and relationship quality (Downey and Coyne 1990; Goodman and Gotlib 1999), and reduced psychological well-being may even lead to relationship dissolution (Kessler, Walters, and Forthofer 1998; Pevalin and Ermisch 2004). Of course, the relationship between depression and relationship quality is bi-directional; marital harmony (Williams 2003), disagreement (Kim and McHenry 2002), fairness (Kim and McHenry 2002; Mirowsky 1985), and conflict and conflict management (Demo and Acock 1996; Horwitz and White 1991; Kim and McHenry 2002) have been shown to predict psychological well-being in men and women.

Although there is a burgeoning literature that examines the association between intimate partner relations and depression, this literature suffers from several limitations. To begin with, the quality of one's relationship with their partner is rarely operationalized consistently (Finchman 1990). Some studies focus on positive aspects of relationships (i.e., supportiveness, the amount of time spent together) and others focus on the negative dimensions of relationships (i.e., conflict, distress), and research suggests that the correlates and consequences of these positive and negative dimensions may be distinct from each other (Finchman 1990; Frosch and Mangelsdorf 2001). Additionally, most studies of relationship quality are limited to married couples. This is an important omission because many children grow up in unmarried single- or two-parent households and these unmarried families are not captured in most existing research (Sigle-Rushton and McLanahan 2004; Smock 2000). Additionally, among parents who share a child together, their relationship does not end after divorce or separation (Furstenberg 1990). It is also important to consider nonmarital relationships when looking at the association between depression and relationship quality, as those who are depressed may make less desirable marriage partners and, thus, be less likely to select into marriage in the first place (Hope, Rodgers, and Power 1999; Horwitz and White 1991; Mastekaasa 1992; Kim and McHenry 2002; Lamb, Lee, and DeMaris 2003; Marcussen 2005; Wu, Penning, Pollard, and Hart 2003). Finally, on a related note, most of this literature is plagued with small, nonrepresentative samples (for exceptions, see Frech and Williams 2007; Williams 2003).

In this paper, I examine mothers' reports of three aspects of partner relationships: supportiveness, shared responsibility in parenting, and cooperation in parenting. The first measure, supportiveness, measures the mothers' perceptions about the amount of emotional support garnered from her partner. The last two measures, shared responsibility in parenting and

cooperation in parenting, measure co-parenting, which is conceptually distinct from relationship quality (Schoppe-Sullivan, Mangelsdorf, Frosch, and McHale 2004; McHale 2003; Margolin, Gordis, and John 2001; Hayden, Schiller, Dickstein, Seifer, Sameroff, Miller, Keitner, and Rasmussen 1998). Co-parenting, broadly defined, taps the degree to which parents can cooperate and support one another in the joint task of raising their child (for reviews, see Gable, Belsky, and Crnic 1992; Gable, Crnic, and Belsky 1994; McHale 2003). Few researchers have examined the association between co-parenting and depression, though theory suggests that depression would negatively influence one's ability to co-parent similar to the way it influences supportiveness. I use mothers' reports of partner relationships, instead of fathers' reports, as nearly all children in the sample live with their mother. Additionally, mothers, compared to fathers, are more likely to respond to the survey, so this strategy allows me to preserve as much of the sample as possible.

Consequences of parental depression for children

In addition to being associated with lower quality relationships with intimate partners, depression among parents is detrimental for children. Parental depression, particularly maternal depression, is associated with a host of behavioral and social difficulties throughout the life course (Dodge 1990; Downey and Coyne 1990; Goodman and Gotlib 2002; Phares and Compas 1992). Research consistently shows that young children with depressed parents are particularly likely to exhibit less favorable behavioral outcomes in childhood (Brennan, Hammen, Anderson, Bor, Najman, and Williams 2000; Dawson, Ashman, Panagiotides, Hessler, Self, Yamada, and Embry 2003; Lovejoy, Graczyk, O'Hare, and Neuman 2000; Murray and Cooper 1997; Tannenbaum and Forehand 1994; Meadows, McLanahan, and Brooks-Gunn, 2007). Depressed mothers are have more hostile and withdrawn interactions with their young children (Cummings

and Davies 1994; Downey and Coyne 1990; Lovejoy et al. 2000; Lyons-Ruth, Wolfe, Lyubchik, and Bronfman 2002), and these mothers may have difficulty handling the responsibilities associated with parenting (Beardslee, Versage, and Gladstone 1998; Gotlib and Goodman 1999; Lovejoy et al., 2000; Marmorstein, Malone, and Iacono 2004; Oysterman, Mowbray, Allen-Meares, and Firminger 2003; Parker, Gladstone, Wilhelm, Mitchell Hadzi-Pavlovic and Austin 1997).

Despite this large body of literature that links parental depression to children's behavior, researchers are just beginning to understand the mechanisms through which parental depression matters for children (Downey and Coyne 1990; Gotlib and Lee 1996; Goodman and Gotlib 2002; Kane and Garber 2004). Genetics is one mechanism that facilitates the intergenerational transmission of impaired psychological well-being. Children may inherit depression, as well as characteristics associated with the development and maintenance of the condition, from their parents (Downey and Coyne 1990; Goodman and Gotlib 1999). However, the social factors that matter for children are largely unexplored (for exceptions, see Brennan et al. 2002; Turney working paper).

In this paper, I extend prior research by considering how various aspects of the parental relationship mediate the negative consequences of depression among 30-month-old children, a topic only a handful of studies have explored. One study, for example, explored the association between depression and externalizing behaviors of 3.5-year-old children. Contrary to most empirical work, these researchers found no direct relationship between parental depression and children's behavior; instead, the quality of the relationship between the children's parents, along with parenting styles, mediated this association (Miller, Cowan, Cowan, Hetherington, and Clingempeel 1993). Similarly, Leinonen, Solantaus, and Punamaki (2003) found that the

interaction quality between married couples mediated the relationship between parental depression and mental health among 12-year-old Finnish children. On the other hand, others have found that marital conflict does not mediate the relationship between parental psychological problems and youth depression (Brennan et al. 2002). Like many studies that look at the consequences of parental depression for children, these studies are based on small, nonrepresentative samples and include few control variables. Furthermore, only one study considered the behavior of young children, the outcome of interest in this paper.

Consequences of relationship quality and co-parenting for children

Many dimensions of the partner relationship have important consequences for children. For example, relationship quality between intimate partners is a strong and consistent predictor of their children's behavior (Cummings and Davies 2002; Reid and Crigafulli 1990; Grych and Finchman 1990). Social learning theory suggests that children learn how to behave from watching their parents; thus, parents who expose their children to constant conflict may put their children at risk for experiencing behavioral difficulties (Bandura, 1969).

Indeed, poor quality or conflictual relationships are associated with children's internalizing and externalizing behavior (Cummings and Davies 1994; Davies and Cummings 1998; Fomby and Osborne 2008; Jekielek 1998; Katz and Gottman 1993; Ingoldsby, Shaw, Owens, and Winslow 1999; Lindahl and Malik 1999; Najman, Behrens, Anderson, Bor, O'Callaghan, and Williams 1997; Dadds and Powell 1991; Kerig 1998). In fact, conflictual relationships may be more detrimental to children's behavior than family structure transitions (Fomby and Osborne 2008; Jekielek 1998; Najman et al. 1997). Researchers have also considered how positive aspects of relationship quality influence children; children exposed to warm and supportive relationships have fewer behavior problems (Goldberg and Easterbrooks

1984; Cowan 1996; Miller et al. 1993). On the other hand, a minority of scholars have found a weak (Emery and O'Leary 1984) or nonexistent (Belsky, Putnam, and Crnic 1986; Abidin, Jenkins, and McGaughey 1992) relationship between parents' marital quality and parents' reports of their children's behavior.

Although the literature that links co-parenting to children's behavior is less voluminous, findings suggest more supportive and less conflictual co-parenting is positively associated with children's behavior. In short, children seem to benefit when their mother and father work together, regardless of whether their parents are married or not. Children of parents who effectively co-parent have fewer externalizing behaviors (Schoppe, Mangelsdorf, and Frosch 2001; Belsky et al. 1996; Dadds and Powell 1991). In fact, McHale and Rasmussen (1998) suggested that co-parenting may be more important than marital quality in predicting children's outcomes. Co-parenting may also indirectly benefit children. For example, co-parenting keeps fathers involved (Carlson, McLanahan, and Brooks-Gunn 2008; Sobolewski and King 2005), which may positively influence children's outcomes (Cooksey and Fondell 1996; King 1994; Whitaker, Orzol, and Kahn 2006; for contradictory findings, see Baydar and Brooks-Gunn 1994; Furstenberg et al. 1987),

Hypotheses

Thus, based on theoretical perspectives and empirical gaps in the literature, this paper examines four research questions. First, what is the association between parental depression and children's behavioral outcomes? Based on prior research, I hypothesize that parental depression, particularly maternal depression, will be negatively associated with children's behavioral outcomes. I also predict that children with two depressed parents, compared to those with only one depressed parent or two non-depressed parents, will have the least favorable outcomes.

Second, how does parental depression account for variation in mothers' reports of relationship quality, shared responsibility in parenting, and cooperation in parenting)? I expect that depression among either or both parents will be associated with lower reports of all three aspects of partner relationships. I expect these associations to persist once I control for a host of additional other factors that might be associated with depression or relationships.

Third, do the consequences of parental depression for relationship quality and co-parenting vary by the parents' relationship status? I suspect that the consequences of parental depression may be stronger for co-residential parents (those who are married or cohabiting) than parents who are not co-residential. When at least one partner is depressed, it may be that living together poses additional, unique challenges that are not faced when parents live apart. The depressed individual, for example, may be hostile or withdrawn, and this behavior may be more consequential the more time parents spend with each other. Additionally, when only one partner is depressed, the non-depressed partner may be unsure about how to treat the depressed individual, which may cause additional conflict.

Finally, how do aspects of partner relationships mediate the negative association between parental depression and children's behavior? I expect that the three aspects of partner relationships will attenuate this negative association. I expect that once supportiveness, shared responsibility in parenting, and cooperation in parenting are taken into account, children with one or two depressed parents have behavioral outcomes similar to children with two non-depressed parents. Furthermore, I expect the two measures of co-parenting will more strongly attenuate the association between parental depression and children's behavior than relationship quality, as the way parents work together as parents concerns the child is directly .

Data and methods

Fragile Families and Child Wellbeing survey

I use data from the Fragile Families and Child Wellbeing survey, a longitudinal study of nearly 5,000 new and mostly unmarried parents in 20 U.S. cities. Unmarried parents were oversampled; this means the sample over-represents minorities, low-income parents, parents with low education, and non-residential fathers. Mothers completed a 30- to 40-minute in-person interview at the hospital after the birth of their child, between February 1998 and September 2000. Fathers were interviewed as soon as possible after the child's birth. Mothers and fathers were interviewed by telephone when their child was approximately 12, 30, and 60 months old.¹ Response rates varied by marital status and gender, but were still relatively high.²

Additionally, a subsample of families participated in the 36-Month In-Home Longitudinal Study of Pre-School Aged Children. The In-Home survey includes two components: a parent survey questionnaire and an activity booklet. In the parent survey, the child's caregiver (in 96% of observations, the child's mother) answered questions about family functioning and child well-being. The activity booklet includes anthropometric measures of the mother and child, PPVT scores, child care information, and observations about the child's home environment. Data were mostly collected in 2002 and 2003.³

I use the first three waves of the core surveys, as well as the In-Home survey, in my analyses. Fragile Families data are well-suited to answer my research questions. To begin with, these data include a nationally representative sample of nonmarital births, a group of families

¹ See Reichman, Teitler, Garfinkel, and McLanahan (2001) for further information about the study design.

² At baseline, 82% of married and 87% of unmarried mothers completed the survey, as well as 89% of married and 75% of unmarried fathers. Of those who completed the baseline survey, 91% of married mothers, 90% of unmarried mothers, 82% of married fathers, and 70% of unmarried fathers completed the 12-month survey. Additionally, of those who completed the baseline survey, 89% of married mothers, 88% of unmarried mothers, 82% of married fathers, and 68% of unmarried fathers completed the 30-month survey (Bendheim-Thoman Center for Research on Child Wellbeing 2005).

³ Of those families who participated in the 30-month wave of data collection, 79% participated in at least one of the two components of the In-Home survey; of these, 78% completed both components (Bendheim-Thoman Center for Research on Child Wellbeing 2006).

neglected in the literature on parental depression and children's outcomes. Children born to unmarried parents now account for nearly 40% of all children born in the United States, and researchers are only beginning to examine how these children fare (Hamilton, Martin, and Ventura 2006). Additionally, Fragile Families is one of the only representative data sources that include information – notably, on psychological well-being and relationship quality – from both mothers and fathers, as well as information on children's outcomes. Researchers also asked respondents many rich questions that make it possible to control for a host of characteristics associated with depression and children's behavior. Finally, the longitudinal nature of the data allows me to move beyond cross-sectional examinations of the effects of depression on children.

Although the full Fragile Families sample includes 4,898 couples and their children, the analytic sample for this paper consists of 1,926 families. I first excluded 1,610 cases that did not participate in the In-Home survey, and an additional 809 cases in which information on parental depression is not available for both the biological mother and father at the 12-month wave (most often because one parent did not participate in the survey). Finally, I excluded an additional 72 cases missing data on mothers' reports of supportiveness and co-parenting at the 30-month wave, as well as 481 cases missing children's behavioral outcomes.

Thus, it is important to keep the analytic sample in mind when interpreting the findings. The analytic sample is generally more advantaged than the full sample, which means that my estimates are going to be more conservative estimates for the population. To begin with, mothers in the analytic sample are also more likely to be white ($p < 0.001$) and less likely to be Hispanic ($p < 0.001$). On average, mothers are more likely to have education beyond high school ($p < 0.001$ for mothers), and mothers have higher levels of income ($p < 0.001$). Additionally, mothers in the analytic sample are more likely to be married to ($p < 0.001$) and less likely to be separated

from the child's father ($p < 0.001$), and they report higher supportiveness ($p < 0.01$), more shared responsibility in parenting ($p < 0.001$) and more co-parenting ($p < 0.001$). Importantly, mothers and fathers in the analytic sample have similar amounts of depression at both waves as those in the full sample, and children's behavior is similar in both samples.

Measures

Children's developmental outcomes. Children's behavioral outcomes include the following: anxious/depressed, withdrawn, attention deficit hyperactivity disorder (ADHD), aggressive, and oppositional defiant disorder (ODD). Anxious/depressed, withdrawn, and aggressive are subscales from the Child Behavior Checklist 2-3 (CBCL), which is established to use for children under the age of 5 (Achenbach 1992; Achenbach and Rescorla 2000). ADHD and ODD are clinical scales. Respondents were given a list of child behavioral problems and they were asked to rate their child's behavior (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). For consistency across outcomes, and for consistency with prior research using these data, I take the average of responses for each scale and standardize each to have a mean of 0 and a standard deviation of 1. I re-standardize this measure for my analytic sample. Higher scores indicate worse behavior. See Appendix A for a complete description of the five subscales.

Parental depression. Twelve-month DSM-IV diagnoses of major depressive episodes come from responses to the Composite International Diagnostic Interview Short Form (CIDI-SF) Version 1.0 November 1998 (Kessler, Andrews, Mroczek, Ustun, and Wittchen 1998). Mothers and fathers were asked if, at some time during the past year, they had feelings of depression or were unable to enjoy things that were normally pleasurable. Those who experienced one of these two conditions for at least a two-week period were asked additional questions (losing interest in

things, feeling tired, experiencing a change in weight of at least 10 pounds, having trouble sleeping, having trouble concentrating, feeling worthless, or thinking about death), and those who answered affirmatively to three or more of these questions are considered depressed. Individuals who volunteer they take medication for depression are also considered depressed. Mothers and fathers were asked about major depression in the 12- and 30-month waves. These are not lifetime measures but instead refer to depression experienced in the previous year (1 = *presence of major depression*, 0 = *absence of major depression*). Although limitations to the CIDI-SF exist (Link 2002), most researchers agree it is an acceptable measurement tool to diagnose mental illness (Aalto-Setälä, Haarasilta, Marttunen, Tuulio-Henriksson, Poikolanen, Aro, and Lonnqvist 2002). Multivariate analyses consider the emotional resources of both parents, represented by a series of mutually exclusive and exhaustive variables: both parents depressed; only mother depressed; only father depressed; and both parents not depressed (reference category).⁴

Relationship quality. Mothers were asked how often the following statements are true about their partner (1 = *never*, 2 = *sometimes*, 3 = *often*): he/she is fair and willing to compromise when you have a disagreement; he/she expresses affection or love for you; he/she insults or criticizes you or your ideas; and he/she encourages or helps you to do things that were important to you; listens when you need someone to talk to; and understands your hurts and joys.⁵ I reverse code the response to the question about criticism. The final measure of supportiveness is an average of responses to these six questions; higher values indicate more supportive relationships ($\alpha = 0.862$)

⁴ Although some parents may suffer from post-partum depression when their children are 12 months old, I measure depression at the 12-month wave as opposed to the 30-month wave to establish time-ordering between the independent and dependent variables. Parents are more likely to report depression at the later wave, which suggests post-partum depression may not affect many parents when their children are one year old.

⁵ Couples not together at the time of the interview were asked to report about the last month of their relationship.

Co-parenting. Consistent with past research (Carlson et al. 2008; Carlson and Furstenberg 2007), I use two measures of co-parenting from the 30-month wave of data collection: shared responsibility in parenting and cooperation in parenting. First, mothers were asked how often the fathers assisted with the following things (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*): looking after child when you need to do things; running errands for you like picking up things from the store; fixing things around your home, paint, or help make it look nicer in other ways; taking child places he or she needs to go, such as to daycare or the doctor. This final measure of shared responsibility is an average of mothers' responses to the four questions; thus, higher values are associated with greater levels of shared responsibility ($\alpha = 0.889$).⁶

Second, mothers were asked to respond to the following six statements (0 = *never true*, 1 = *rarely true*, 2 = *sometimes true*, 3 = *always true*): when father is with child, he acts like the father you want for your child; you can trust father to take good care of child; he respects the schedules and rules you make for child; he supports you in the way you want to raise child; you and father talk about problems that come up with raising child; you can count on father to help when you need someone to look after child for a few hours. This final measure, cooperation in parenting, is an average of mothers' responses to the six questions; thus, higher values are associated with greater levels of cooperation ($\alpha = 0.928$).

Covariates. The multivariate analyses control for demographic factors that prior research has shown to be associated with depression or children's outcomes, including age, race, and religiosity. Mother's age is a continuous variable measured at baseline, and I include a squared term in the multivariate analyses to account for nonlinearities. Mothers race is represented by a

⁶ Mothers were only asked questions about co-parenting if the father saw the child at least once since the prior survey wave; in this case, I code mothers' responses to 0.

series of dummy variables: white (reference category in my multivariate analyses), black, Hispanic, and other race. Additionally, mothers were asked at baseline how often they attended religious services (values range from 1 to 5): not at all, hardly ever, several times a year, several times a month, and once a week or more.

I also include several controls for family structure. The mother's relationship to her child's biological father is represented by a series of dummy variables: married (reference category), cohabiting, visiting (dating but not living together), and separated. Number of children is also represented with dummy variables: one child (reference category), two children, and three or more children. The mother's own family background is represented by a dummy variable indicating whether her parents were married when she was 15 years old. I also include a dummy variable indicating if a grandparent lives in the household (1 = *grandparent in household*, 0 = *no grandparent in household*), as well as if the mother has a child with another partner (1 = *child with another partner*, 0 = *no child with another partner*). Finally, I include a dummy variable indicating whether or not the father is currently incarcerated or has ever been incarcerated, according to the mother.

Socioeconomic characteristics such as education and income are related to both depression and children's outcomes. Mother's education is represented by a series of dummy variables: less than high school diploma (includes parents with a GED and is the reference category), high school diploma, some college, and college degree. I use a logged measure of household income for mothers and fathers from when the children are about 1 year old.

The multivariate analyses also control for various child characteristics, including gender (1 = *male*, 0 = *female*). The child's overall health, as reported by the mother, is a continuous variable (1 = *excellent*, 5 = *poor*). Child temperament is a subscale taken from the emotionality

and shyness dimensions of the Emotionality, Activity, and Sociability Temperament Survey for Children (Buss and Plomin 1984). Higher scores indicate better temperament ($\alpha = 0.XXX$). I also include two more variables that prior research has shown to be associated with children's behavior. First, a dummy variable indicates if the mother smoked during her pregnancy (1 = *prenatal smoking*, 0 = *no prenatal smoking*). Second, to account for the potential intergenerational transmission of psychological well-being, I include dummy variables indicating whether or not at least one of the mother's and father's biological parents experienced a two-week period of feeling depressed, down in the dumps, or blue.

Finally, the multivariate analyses also control for three measures of baseline relationship quality: supportiveness, companionship, and disagreement.⁷ To begin with, mothers were asked how often the following statement are true about their partner (1 = *never*, 2 = *sometimes*, 3 = *often*): he/she is fair and willing to compromise when you have a disagreement; he/she expresses affection or love for you; he/she insults or criticizes you or your ideas; and he/she encourages or helps you to do things that were important to you. I reverse code the response to the question about criticism. The final measure of supportiveness is an average of responses to these four questions; higher values indicate more supportive relationships ($\alpha = 0.617$). Additionally, at baseline, mothers were asked if, in the past month, they did the following together (1 = *yes*, 0 = *no*): visited with friends; went out to a movie, sporting event, or some other entertainment; ate out in a restaurant; and helped each other solve a problem. The final measure of companionship is an average of answers to these four items; higher values represent greater levels of companionship ($\alpha = 0.654$). Finally, mothers were asked how often they had disagreements about the following (1 = *never*, 2 = *sometimes*, 3 = *often*): money, spending time together, sex,

⁷ For all three measures of baseline relationship quality, couples not together at the time of the interview were asked to report on the last month of their relationship.

the pregnancy, drinking or drug use, and being faithful. The final measure of disagreement is an average of answers to these six items; higher values represent more disagreement ($\alpha = 0.635$). I also attempt to account for selection bias by including a control variable that indicates the degree to which the mother distrusts men. Mothers were asked to respond to the following statements (1 = *strongly disagree*, 4 = *strongly agree*): Men cannot be trusted to be faithful; in a dating relationship, a man is largely out to take advantage of a woman. I averaged mothers' responses to these two questions; higher values indicate more distrust of the opposite gender.

Selection bias

Though prior research suggests that depression influences the quality of one's relationship with their intimate partner (Dehle and Weiss 1998; Dush and Amato 2005; Frech and Williams 2007; Kurdek 1990; McLeod and Eckberg 1993; Segrin, Powell, Givertz, and Brackin 2003; Whisman et al. 2004; Zlotnick et al. 2000), this is likely a reciprocal relationship. Individuals who have a poor quality relationship with their partner – one ridden with conflict, for example – may be more likely to experience a bout of depression. On the other hand, a supportive relationship with one's partner may pre-empt an onset of depression or facilitate recovery from a depressive episode. Indeed, empirical research suggests this may be the case (Demo and Acock 1996; Horwitz and White 1991; Kim and McHenry 2002; Williams 2003), and it is likely that the direction of causality operates in both directions.

I address the issue of selection bias in two ways. First, multivariate analyses include a rich set of covariates, such as mothers' reports of baseline relationship quality with her partner. Although depression and relationship quality can vary over time, they are relatively stable characteristics (CITES). The correlation between mother's depression at 12- and 30-months is 0.334. The correlations between her two reports of supportiveness, shared responsibility in

parenting, and cooperation in parenting are, respectively, 0.461, 0.665, and 0.684. In addition, I establish time order between the independent and dependent variables. Parental depression is measured when the children are 12 months old, and relationship quality and children's behavior are measured when the children are 30 months old. These steps to reduce selection bias, however, do not completely rule out the possibility that low relationship quality or lack of co-parenting causes depression. Thus, it is important to interpret the coefficients in the multivariate analyses as being correlational and not causal.

Analytic approach

I first present descriptive statistics to explore the bivariate association between parental depression and mothers' reports of relationship quality and co-parenting. I compare the means of these outcomes, measured when their children are about 30 months old, by parental depression when the children are 12 months old. I compare couples in which both are depressed, couples where only the mother is depressed, and couples where only the father is depressed to couples in which neither is depressed. I use two-tailed T-tests to determine the statistical significance of the difference of the means between the groups. I also look at how children's behavioral outcomes at 30 months vary by parental depression at 12 months.

The first set of multivariate analyses use ordinary least squared (OLS) regression to predict mothers' reports of relationship quality and two measures of co-parenting – shared responsibility in parenting and cooperation in parenting – when their children are 30 months old. The independent variables of interest are dummy variables indicating MDD among the couple at the 12-month wave: both parents depressed, only mother depressed, only father depressed, and both parents not depressed (reference category). The first set of models looks at the influence of a host of covariates that include mother's age, mother's age squared, race, relationship status,

number of children, whether the mother lived with both parents when she was 15 years old, education, log of household income, multi-partnered fertility, religiosity, father ever incarcerated, distrust of men, supportiveness at baseline, companionship at baseline, disagreement at baseline, and child's temperament. The next set of models adds parental depression. Finally, in the third set of models, I consider the interaction between parental depression and relationship status.

The final set of multivariate analyses, in Table 5, use OLS models to predict the children's behavioral outcomes when they are 30 months old: anxious/depressed, withdrawn, ADHD, aggressive, and ODD. I consider how supportiveness, shared responsibility in parenting, and cooperation in parenting mediate the relationship between parental depression and behavioral outcomes. The first set of models considers the bivariate association between parental depression and behavioral outcomes. The second set of models extends these analyses to include a host of parental characteristics (age, age squared, race, education, household income, relationship status, number of kids in household, grandparent in household, parents' psychological resources, and prenatal smoking) and child characteristics (gender, health, and temperament). The third set of models adds supportiveness into the equation, the fourth set adds shared responsibility in parenting, and the fifth set adds cooperation in parenting. Finally, the last model includes all variables.

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

Sample characteristics

Table 1 contains descriptive statistics of all variables. Importantly, a substantial proportion of mothers and fathers suffer from major depressive disorder (MDD) when their children are young. For example, when their children are about 1 year old, about 13% of mothers and 9% of fathers are depressed. Thus, about 23% of children have at least one depressed parent when they are 1 year old. There is additional evidence that depression plays an important role in these families, as 35% of mothers and 29% of fathers report that at least one of their parents experienced a two-week period of feeling depressed, down in the dumps, or blue.

[Table 1 about here.]

In terms of demographic characteristics, nearly one-half (48%) of mothers are Black. Slightly more than one-fourth (26%) of mothers are white, and more than one-fifth (22%) are Hispanic. Mothers, on average, were about 25 years old when they gave birth to the focal child. By the time their children are about 30 months old, about three-fourths (77%) of mothers are still in a romantic relationship with the child's biological father. About 37% are married, 23% are cohabiting, and 6% are visiting (romantically involved but not living together). Overall, mothers report high levels of supportiveness and co-parenting, though this is not surprising given that the sample is more selective of parents still in a relationship when their children are almost 3 years old. About 14% of households include a grandparent, and mothers are nearly equally divided between having only one child (34%), two children (32%), and three or more children (34%).

Results

Children's behavior, relationship quality, and co-parenting varies by parental depression and relationship status

Table 2 examines the bivariate association between parental depression and various outcomes: children's behavioral outcomes, relationship quality, and co-parenting. To begin with,

parental depression, particularly maternal depression, is associated with worse behavioral outcomes nearly across the board. The exception is that children of depressed mothers do not have more withdrawn behavior than those children with two non-depressed parents. However, when both parents are depressed, children's withdrawn behavior tends to suffer. Additionally, there is a strong bivariate relationship between parental depression and the indicators of relationship quality and co-parenting. When either or both of the parents are depressed, compared to when neither is depressed, mothers report lower levels of supportiveness, shared responsibility in parenting, and cooperation in parenting.

[Table 2 about here.]

Parental depression as a predictor of relationship quality and co-parenting

The first set of models in Table 3 looks at demographic and socioeconomic predictors of supportiveness, shared responsibility in parenting, and cooperation in parenting, and these covariates generally work as expected. The next set of models includes parental depression. Despite the host of covariates theoretically and empirically related to parental depression and relationship quality, parental depression is associated with mothers' reports of relationship quality. When only the mother is depressed, compared to when neither parents are depressed, mothers report 0.122 points lower on the supportiveness scale ($p < 0.001$). When both parents are depressed or only the father is depressed, mothers still report less supportiveness, though the strength of these coefficients are weaker ($-0.163, p < 0.05$; $-0.093, p < 0.05$).

[Table 3 about here.]

The models that predict co-parenting tell a relatively consistent story. Parental depression is negatively associated with mothers' reports of shared responsibility in parenting and cooperation in parenting, even with the inclusion of a host of covariates. One exception persists.

When both parents are depressed, compared to when neither parent is depressed, mothers report similar amounts of shared responsibility in parenting. Interestingly, depression is more detrimental to shared responsibility in parenting when only the father is depressed ($-0.188, p < 0.01$) than when only the mother is depressed ($-0.115, p < 0.05$), compared to when neither parent is depressed. Standardized coefficients (not presented) show that depression of either or both parents more strongly impair the two measures of co-parenting, particularly cooperation in parenting. Although parental depression does predict relationship quality and co-parenting, these variables only explain a small proportion of the variance in the three outcomes.

The final set of models in Table 3 consider how parental depression and relationship status interact to predict relationship quality and co-parenting. To begin with, when both parents are depressed and cohabiting, mothers reports particularly low levels of supportiveness and cooperation in parenting. Additionally, when either parent is depressed and the couple is in a relationship but do not live together, they report higher levels of supportiveness than when the couple is married. Similarly, when only the mother is depressed and the couple is visiting (in a relationship but not living together), mothers report higher levels of shared responsibility. These findings do not hold up when predicting cooperation in parenting; in fact, when both parents are depressed and they are visiting, mothers report less cooperation in parenting.

As mentioned earlier, the covariates predicting relationship quality and co-parenting generally work in the expected direction. Controlling for a host of additional characteristics, Black mothers report more supportive relationships and more co-parenting with the child's father. Mothers who are not married to their child's father report less supportive relationships and less co-parenting with the child's father. However, cohabiting parents report co-parenting to the same degree as married parents. Mothers with more than one child in the household report

more supportive relationships, though number of children is not associated with the two measures of co-parenting. Interestingly, more educated mothers report less supportive relationships and less co-parenting. However, only those with some college have relationships with their child's father that are statistically different from those with less than a high school diploma. Distrust of men is negatively associated with mothers' reports of supportiveness.

Finally, and consistent with expectations, the three aspects of baseline relationship quality (supportiveness, companionship, and disagreement) are associated with the parents' relationship when their children are 30 months. Mothers who report supportive relationships at baseline are also likely to report supportive relationships at 30-months, net of other characteristics. Similarly, disagreement at baseline is negatively associated with supportiveness and cooperation in parenting, and companionship at baseline is positively associated with shared responsibility in parenting and cooperation in parenting. Children's temperament also seems to influence supportiveness and cooperation in parenting; mothers who report their children have more favorable temperaments are also more likely to report favorable relationships with their child's father.

Relationship quality and co-parenting as mechanisms of transmission

The first two sets of models in Table 4 show that parental depression is associated with worse behavioral outcomes in children. Children with two depressed parents are particularly disadvantaged; they are more likely to have worse anxious/depressed, aggressive, and ODD behaviors, compared to their counterparts with two non-depressed parents. These associations persist even when a host of control variables are included into the models. Having two depressed parents is not associated with ADHD behaviors once covariates are included, but children of depressed mothers have more ADHD behaviors than those with two non-depressed parents.

Because parental depression is not associated with withdrawn behaviors, the rest of this paper focuses on the other four behavioral outcomes.

[Table 4 about here.]

Models 3 through 6 consider how relationship quality and co-parenting mediate the negative association between parental depression and children's behavior. When supportiveness is added to the model predicting anxious/depressed behavior, for example, the coefficient for having two depressed parents decreases from 0.376 to 0.362 ($p < 0.05$ for both models). Similarly, the coefficient decreases to 0.367 when shared responsibility in parenting is added in Model 4, and to 0.367 when cooperation in parenting is added in Model 5. These coefficients suggest that general supportiveness from one's partner is slightly more important than co-parenting in mediating the consequences of depression. When all measures are included in the final model, children of two depressed parents score 0.360 points worse on the anxious/depressed score than their counterparts with no depressed parents ($p < 0.05$). Thus, while the inclusion of relationship quality and co-parenting reduce the negative effect of parental depression, it does not completely attenuate the disadvantage that these children face. Children with two depressed parents have anxious/depressed scores more than a third of a standard deviation below children with healthy parents.

Relationship quality and co-parenting have a similar influence on the other three behavioral outcomes. Children with two depressed parents, for example, have worse aggressive behavior than their counterparts with two non-depressed parents, but the coefficient decreases from 0.477 to 0.415 when measures of relationship quality and co-parenting are included in the models ($p < 0.05$). Similar to the models predicting anxious/depressed behavior, supportiveness more drastically reduces the depression coefficients than the two measures of co-parenting. The

inclusion of these variables also reduces the effect of maternal depression on ADHD behaviors and the effect of two depressed parents on ODD behaviors.

Relationship quality and co-parenting are not independently associated with internalizing behaviors (including anxious/depressed and withdrawn scores), but supportiveness is associated with externalizing behaviors. When mothers report less supportiveness from the child's father, net of other factors including co-parenting, children score 0.198 points lower on the ADHD scale ($p < 0.01$). Similarly, supportiveness is negatively associated with aggressive behaviors (-0.247, $p < 0.01$) and ODD behaviors (-0.191, $p < 0.05$).

These models include a host of covariates, though I only present the coefficients of interest for the sake of parsimony. Similar to Table 3, the covariates generally work as expected. Compared to their counterparts with White mothers, children of Black and Hispanic mothers have less favorable anxious/depressed scores but better ODD scores once other factors are held constant. Children with Hispanic mothers also have less favorable withdrawn scores. Post-secondary education is associated with better internalizing behaviors (anxious/depressed and withdrawn scores), and household income is positively associated with anxious/depressed behavior. Once covariates are included in the models, there is only one difference in children's behavior with regard to parents' relationship status. Children with parents who are romantically involved but not living together are more likely to exhibit anxious/depressed behavior. Having more children in the household is associated with less favorable withdrawn and aggressive behaviors, but the presence of a grandparent in the household is not associated with behavioral outcomes. Prenatal smoking is associated with externalizing behaviors (ADHD, aggressive, and ODD scores). Importantly, depression in a maternal grandparent is predictive of worse

behavioral outcomes across the board, but depression in a paternal grandparent does not independently predict outcomes.

Discussion

This research uses the Fragile Families and Child Well-being survey, a birth cohort of children born in urban areas in 1998-99, to look at the consequences of parental depression for both partner relationships and young children. In this sample, about 23% of children have at least one parent suffering from major depressive disorder when they are about 1 year old. This percentage is higher than reported prevalence rates in the general population (Kessler and Zhao 1999); this is likely because the majority of children in the study were born to unmarried parents, a group likely to experience socioeconomic disadvantages (Ellwood and Jencks 2004) and, thus, depression (Kessler and Zhao 1999).

To begin with, I find that major depressive disorder is associated with three aspects of partner relationships: supportiveness, shared responsibility in parenting, and cooperation in parenting. Nearly across the board, when either or both parents are depressed, mothers report less favorable relationships with their child's father. Standardized coefficients suggest that depression is more detrimental to co-parenting, the ability of parents to work together as parents, than to relationship quality that is not directly related to parenting their shared child. This is contrary to my expectations; instead of parents coming together to raise their child even in the face of depression, depressed parents experience particular impairments in this aspect of their relationship. Perhaps the challenges associated with parenthood make it difficult to jointly deal with issues related to the child.

Theory suggests that depressed individuals have more hostile and withdrawn interactions with others (Coyne 1976), and it is possible that these negative interactions are driving the

association between depression and partner relationships. Another explanation is that because mothers are the ones reporting on relationship quality and co-parenting, those who are depressed merely view their relationships to be worse (regardless of whether these relationships are worse or not). Though this explanation is probably true to some degree, it likely only explains part of the story, as mothers report lower relationship quality and less co-parenting when only the father is depressed. Thus, when the father is depressed and the mother is not depressed, the relationship between the two parents suffers.

Generally, the association between depression and partner relationships is consistent with past literature (Frech and Williams 2007; McLeod and Eckberg 1993; Segrin et al. 2003; Whisman et al. 2004; Zlotnick et al. 2000). In addition to looking at relationship quality between partners as an outcome, I consider how depression influences the co-parental relationship, which may have particularly important implications for children (Carlson et al. 2008; Schoppe et al. 2001; Belsky et al. 1998) and may even be more important than marital quality in predicting children's outcomes (McHale and Rasmussen 1998). Though an examination of the mechanisms that underlie the association between depression and co-parenting is beyond the scope of this paper, it is an important avenue for future research.

Additionally, I find that the influence of parental depression varies by the parents' relationship status. Depression is more detrimental to parents' relationships when they are cohabiting instead of married. Perhaps being married gives partners a sense of security in their relationships, so that the withdrawn and hostile interactions characteristic of depressed individuals may not matter as much in terms of relationship quality. It is also possible that married couples have been together longer and have learned to deal with having a depressed partner. On the other hand, depression is less detrimental to parent relationships when they are

dating but not living together. Perhaps these relationships are less serious, with partners spending less time together and feeling less committed to one another, which may lessen the influence of depression. There is also the possibility of self-selection operating here; depression may influence the level of commitment that partners feel to one another. Those who are depressed may make less desirable marriage partners and, thus, be less likely to select into marriage in the first place (Hope et al. 1999; Horwitz and White 1991; Mastekaasa 1992; Kim and McHenry 2002; Lamb et al. 2003; Marcussen 2005; Wu et al. 2003).

I also find that depression among new parents, particularly when both parents or the mother is depressed, is associated with children's behavioral outcomes. Children of depressed parents are more likely to exhibit both internalizing and externalizing behaviors. Children's behavior is most affected when both parents are depressed. These findings are consistent with past literature demonstrating the negative consequences of depression for children (Dodge 1990; Downey and Coyne 1990; Goodman and Gotlib 2002; Phares and Compas 1992).

Additionally, these analyses extend prior research by looking at one mechanism through which parental depression influences children. I find that three aspects of partner relationships – supportiveness, shared responsibility in parenting, and cooperation in parenting – do attenuate the association between parental depression and children's outcomes, though only slightly. Children with depressed parents still fare worse than their counterparts with two healthy parents. Children's anxious/depressed, aggressive, and ODD behavior is worse when both parents are depressed, compared to when neither parent is depressed, and their ADHD behavior is worse when only the mother is depressed. The fact that partner relationships matter but do not completely attenuate the negative consequences of depression is consistent with Brennan et al. (2002), who found that relationship quality does not mediate the association between parents'

psychological problems and youth depression. On the other hand, these findings are inconsistent with two other studies (Leinonen et al. 2003; Miller et al. 1993). The inconsistencies may be the result of three factors: the nonrepresentative sample of the other studies, the different ways that relationship quality and outcomes are operationalized across studies, and different ages of the children being studied. The fact that relationship quality fails to completely explain the negative association between depression and children's behavior in my analyses suggests that other mechanisms, such as genetics (Downey and Coyne 1990; Goodman and Gotlib 1999; Silberg and Rutter 2002) and parenting practices (Turney working paper), exist.

Of course, these analyses cannot speak to causal mechanisms. The time-ordering of the variables suggest that parental depression when their children are about 12 months old is associated with mothers' reports of relationship quality and co-parenting when their children are about 30 months old, but it is likely relationship quality also influences depression. It is also possible that relationship quality influences co-parenting (Katz and Gottman 1996; Belsky and Hsieh 1998), or that co-parenting influences relationship quality (Sobolewski and King 2005; McHale 1995). Another important limitation is that mothers are reporters of relationship quality and children's outcomes, and it is possible that depressed mothers are more likely to view their relationship with the child's father as well as her child through a negative light. In supplemental analyses (not presented), I use fathers' reports of relationship quality and co-parenting and the findings are robust to these model specifications. I ultimately use mothers' reports of relationships because the response rate among mothers is higher. Regarding mothers' reports of children's behavior, other research using these data finds that depressed mothers are accurate reporters of their children's (Meadows et al. 2007; also see Richters 1992). Finally, these data are

only representative of unmarried parents in urban areas, and the results might differ for parents in rural areas or parents of older children.

These findings extend prior research on the consequences of parental depression using a representative sample of new parents and their children. These findings highlight that depression, a mental health problem that afflicts many individuals and families each year, may influence both relationships among parents as well children's behavior. The fact that relationship quality and co-parenting fail to completely attenuate the negative association between parental depression and children's behavior suggests that depression is particularly debilitating for children. These findings may be particularly important to policymakers and clinicians. Clinicians are in a particularly unique position to be able to intervene when parents are depressed, thus allowing these children to circumvent some of the long-lasting problems associated with behavioral problems in childhood.

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Table 1. Descriptive Statistics of Variables Included in Analyses.

Variable	Mean	S.D	Min	Max
Children's behavioral outcomes				
Anxious/depressed (ih) ^a	0.000	1.000	-1.367	4.430
Withdrawn (ih)	0.000	1.000	-0.905	5.068
Attention Deficit Hyperactivity Disorder (ADHD) (ih)	0.000	1.000	-1.934	2.377
Aggressive (ih)	0.000	1.000	-1.713	3.934
Oppositional Defiant Disorder (ODD) (ih)	0.000	1.000	-1.467	3.210
Parental depression (y1)				
Both parents depressed	0.021	n/a	0.000	1.000
Only mother depressed	0.125	n/a	0.000	1.000
Only father depressed	0.086	n/a	0.000	1.000
Both parents not depressed	0.768	n/a	0.000	1.000
Relationship quality and co-parenting				
Supportiveness (1 = <i>never</i> , 3 = <i>often</i>) (y3)	2.402	0.533	1.000	3.000
Shared responsibility in parenting (0 = <i>never</i> , 3 = <i>often true</i>) (y3)	1.891	1.049	0.000	3.000
Cooperation in parenting (0 = <i>never</i> , 3 = <i>often true</i>) (y3)	2.415	0.821	0.000	3.000
Covariates				
Age (b)	25.323	6.111	14.000	44.000
Race (b)				
White	0.262	n/a	0.000	1.000
Black	0.476	n/a	0.000	1.000
Hispanic	0.220	n/a	0.000	1.000
Other race	0.040	n/a	0.000	1.000
Relationship status				
Married	0.372	n/a	0.000	1.000
Cohabiting	0.233	n/a	0.000	1.000
Visiting	0.064	n/a	0.000	1.000
Separated	0.330	n/a	0.000	1.000
Number of children in household (b)				
One	0.342	n/a	0.000	1.000
Two	0.315	n/a	0.000	1.000
Three or more	0.343	n/a	0.000	1.000
Grandparent in household (y3)	0.138	n/a	0.000	1.000
Lived with both biological parents when 15 (b)	0.426	n/a	0.000	1.000
Education (b)				
Less than high school (includes GED)	0.337	n/a	0.000	1.000
High school diploma	0.268	n/a	0.000	1.000
Some college	0.262	n/a	0.000	1.000
College degree or higher	0.133	n/a	0.000	1.000
Log of household income (y1)	9.918	1.293	0.000	13.122
Child with another partner (y1)	0.335	n/a	0.000	1.000
Father ever incarcerated (y1)	0.309	n/a	0.000	1.000
Religiosity (1 = <i>once a week or more</i> , 5 = <i>not at all</i>) (b)	2.922	1.365	1.000	5.000
Either of mother's parents depressed (y3)	0.345	n/a	0.000	1.000
Either of father's parents depressed (y3)	0.294	n/a	0.000	1.000
Prenatal smoking (b)	0.190	n/a	0.000	1.000
Distrust of opposite gender (b)	1.949	0.557	1.000	4.000
Supportiveness (1 = <i>never</i> , 3 = <i>often</i>) (b)	2.670	0.360	1.000	3.000
Companionship (1 = <i>yes</i> , 0 = <i>no</i>) (b)	0.776	0.287	0.000	1.000
Disagreement (1 = <i>never</i> , 3 = <i>often</i>) (b)	1.422	0.374	1.000	3.000
Child characteristics				
Male (b)	0.520	n/a	0.000	1.000
Health (1 = <i>excellent</i> , 5 = <i>poor</i>) (y1)	1.457	0.762	1.000	5.000
Temperament (1 = <i>not like my child</i> , 5 = <i>very much like my child</i>) (y1)	3.439	0.747	1.000	5.000
Age, in months (ih)	38.048	3.068	31.639	53.388
N	1,926			

^a b = baseline survey, y1 = 12-month survey, y3 = 30-month survey, ih = In-Home survey

Table 2. Children's Behavioral Outcomes and Parenting Characteristics, by Parental Depression at 12 Months.

	Both depressed	Mother depressed	Father depressed	Neither depressed
Children's behavioral outcomes				
Anxious/depressed	0.582 ***	0.232 ***	0.139 **	-0.069
Withdrawn	0.345 *	0.055	0.048	-0.024
Attention Deficit Hyperactivity Disorder (ADHD)	0.570 ***	0.269 ***	0.071	-0.067
Aggressive	0.595 ***	0.217 ***	0.162 **	-0.070
Oppositional Defiant Disorder (ODD)	0.558 ***	0.201 ***	0.111 *	-0.060
Relationship quality and co-parenting				
Supportiveness	2.008 ***	2.191 ***	2.204 ***	2.469
Shared responsibility in parenting	1.268 ***	1.593 ***	1.406 ***	2.010
Cooperation in parenting	1.785 ***	2.195 ***	2.058 ***	2.573
N	41	240	165	1,480

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

Table 3. Parental Depression as a Predictor of Relationship Quality and Co-Parenting.

	Supportiveness			Shared responsibility in parenting			Cooperation in parenting		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Age	0.019 (0.015)	0.008 (0.015)	0.009 (0.014)	0.035 (0.025)	0.032 (0.024)	0.033 (0.024)	0.022 (0.022)	0.018 (0.021)	0.021 (0.021)
Age ²	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.000)	0.000 (0.000)	-0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
White (reference)	---	---	---	---	---	---	---	---	---
Black	0.123 *** (0.030)	0.120 *** (0.025)	0.122 *** (0.029)	0.241 *** (0.047)	0.236 *** (0.047)	0.231 *** (0.047)	0.102 * (0.045)	0.097 * (0.045)	0.094 * (0.044)
Hispanic	0.036 (0.031)	0.029 (0.031)	0.026 (0.031)	0.070 (0.049)	0.063 (0.049)	0.064 (0.049)	-0.012 (0.044)	-0.021 (0.044)	-0.023 (0.043)
Other race	0.009 (0.043)	0.007 (0.042)	0.006 (0.042)	0.102 (0.075)	0.103 (0.073)	0.103 (0.074)	0.000 (0.071)	-0.002 (0.070)	-0.005 (0.067)
Married (reference)	---	---	---	---	---	---	---	---	---
Cohabiting	-0.079 ** (0.027)	-0.078 ** (0.027)	-0.087 ** (0.029)	0.022 (0.041)	0.023 (0.040)	0.020 (0.043)	0.010 (0.030)	0.018 (0.029)	0.012 (0.030)
Visiting	-0.162 *** (0.046)	-0.159 *** (0.047)	-0.216 *** (0.055)	-0.474 *** (0.095)	-0.469 *** (0.095)	-0.507 *** (0.106)	-0.098 (0.054)	-0.093 (0.054)	-0.096 (0.061)
Separated	-0.677 *** (0.033)	-0.667 *** (0.033)	-0.658 *** (0.037)	-1.582 *** (0.057)	-1.568 *** (0.057)	-1.542 *** (0.065)	-0.982 *** (0.052)	-0.968 *** (0.053)	0.922 *** (0.060)
One child (reference)	---	---	---	---	---	---	---	---	---
Two children	0.058 * (0.027)	0.058 * (0.027)	0.062 * (0.026)	0.033 (0.042)	0.033 (0.042)	0.032 (0.042)	0.058 (0.040)	0.049 (0.039)	0.049 (0.039)
Three or more children	0.064 * (0.027)	0.060 * (0.027)	0.064 * (0.027)	0.008 (0.047)	0.003 (0.047)	0.008 (0.046)	0.071 (0.043)	0.066 (0.043)	0.067 (0.043)
Lived with both biological parents when 15	-0.014 (0.023)	-0.016 (0.022)	-0.016 (0.022)	-0.037 (0.037)	-0.043 (0.037)	-0.040 (0.037)	-0.033 (0.034)	-0.037 (0.034)	-0.037 (0.034)
Less than high school diploma (reference)	---	---	---	---	---	---	---	---	---
High school diploma or GED	-0.007 (0.030)	-0.015 (0.030)	-0.014 (0.030)	-0.018 (0.049)	-0.029 (0.050)	-0.032 (0.050)	0.045 (0.046)	0.030 (0.046)	0.034 (0.046)
Some college	-0.063 * (0.030)	-0.067 * (0.030)	-0.072 * (0.030)	-0.044 (0.055)	-0.055 (0.055)	-0.060 (0.055)	-0.005 (0.047)	-0.020 (0.046)	-0.022 (0.046)
College	-0.012 (0.042)	-0.019 (0.041)	-0.018 (0.041)	-0.090 (0.072)	-0.098 (0.072)	-0.103 (0.072)	-0.019 (0.057)	-0.030 (0.057)	-0.027 (0.056)
Household income (log)	-0.016 (0.011)	-0.016 (0.011)	-0.016 (0.010)	0.009 (0.024)	0.009 (0.024)	0.011 (0.024)	-0.014 (0.016)	-0.011 (0.016)	-0.011 (0.016)
Child with another partner	0.001 (0.026)	0.003 (0.026)	0.003 (0.026)	-0.010 (0.045)	-0.008 (0.045)	-0.014 (0.045)	0.012 (0.039)	0.017 (0.039)	-0.015 (0.039)
Religiosity	0.000 (0.008)	-0.001 (0.008)	-0.002 (0.008)	0.014 (0.014)	0.014 (0.014)	0.012 (0.014)	0.021 (0.013)	0.021 (0.012)	0.020 (0.013)
Father ever incarcerated	-0.023 (0.026)	-0.018 (0.026)	-0.019 (0.026)	-0.052 (0.044)	-0.045 (0.044)	-0.046 (0.044)	-0.152 *** (0.041)	-0.144 *** (0.041)	-0.146 *** (0.040)
Distrust of opposite gender	-0.046 * (0.019)	-0.044 * (0.019)	-0.044 * (0.019)	0.000 (0.032)	0.002 (0.032)	0.000 (0.031)	-0.019 (0.029)	-0.014 (0.029)	-0.014 (0.030)
Supportiveness	0.325 *** (0.038)	0.315 *** (0.040)	0.306 *** (0.038)	0.306 *** (0.057)	0.297 *** (0.057)	0.299 *** (0.057)	0.231 *** (0.058)	0.195 *** (0.073)	0.189 *** (0.073)
Companionship	-0.002 *** (0.046)	-0.006 *** (0.046)	0.000 *** (0.046)	0.250 (0.076)	0.241 (0.075)	0.234 ** (0.075)	0.208 ** (0.074)	0.200 ** (0.073)	0.194 ** (0.073)
Disagreement	-0.162 *** (0.034)	0.148 *** (0.034)	-0.149 *** (0.034)	-0.091 (0.059)	-0.073 (0.060)	-0.079 (0.060)	-0.181 *** (0.054)	-0.160 ** (0.054)	-0.164 ** (0.053)
Child's temperament	0.014 (0.014)	0.090 * (0.014)	0.011 * (0.014)	0.023 (0.025)	0.017 (0.025)	0.015 (0.025)	0.013 (0.021)	0.006 (0.021)	0.010 (0.021)
Both parents depressed		-0.163 * (0.074)	0.030 (0.076)		-0.180 (0.102)	-0.237 (0.162)		-0.254 * (0.123)	-0.072 (0.133)
Only mother depressed		-0.122 *** (0.034)	-0.168 *** (0.046)		-0.115 * (0.059)	-0.173 * (0.084)		-0.014 ** (0.054)	-0.145 ** (0.054)
Only father depressed		-0.093 * (0.041)	-0.136 * (0.062)		-0.188 ** (0.070)	-0.024 (0.098)		-0.161 * (0.069)	0.038 (0.052)
Both parents not depressed (reference)	---	---	---	---	---	---	---	---	---
Both parents depressed * cohabiting			-0.446 ** (0.166)			-0.065 (0.289)			-0.370 * (0.187)
Only mother depressed * cohabiting			0.128 (0.075)			0.032 (0.127)			0.060 (0.085)
Only father depressed * cohabiting			0.073 (0.112)			0.029 (0.132)			-0.044 (0.097)
Both parents depressed * visiting			-0.410 (0.279)			0.525 (0.321)			-0.627 * (0.290)
Only mother depressed * visiting			0.277 * (0.112)			0.541 * (0.212)			0.131 (0.118)
Only father depressed * visiting			0.266 * (0.110)			-0.475 (0.382)			-0.161 (0.136)
Both parents depressed * separated			-0.169 (0.132)			0.090 (0.218)			-0.174 (0.253)
Only mother depressed * separated			-0.010 (0.076)			0.020 (0.136)			-0.057 (0.131)
Only father depressed * separated			0.013 (0.089)			-0.273 (0.150)			-0.369 ** (0.142)
Constant	2.054 ***	2.141 ***	2.143 ***	0.716	0.810	0.802	1.923 ***	2.037 ***	2.007 ***
N	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926
R ²	0.264	0.262	0.258	0.478	0.478	0.474	0.417	0.413	0.408

* p < 0.05, ** p < 0.01, *** p < 0.001.

Table 4. Relationship Quality and Co-Parenting as Mediators of the Association Between Parental Depression and Children's Behavior.

	Anxious/depressed					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Both parents depressed	0.631 *** (0.172)	0.376 * (0.171)	0.362 * (0.171)	0.367 * (0.171)	0.367 * (0.171)	0.360 * (0.171)
Only mother depressed	0.228 ** (0.079)	0.052 (0.076)	0.042 (0.076)	0.047 (0.076)	0.047 (0.076)	0.042 (0.076)
Only father depressed	0.202 * (0.086)	-0.002 (0.082)	-0.010 (0.083)	-0.010 (0.083)	-0.010 (0.083)	-0.014 (0.083)
Both parents not depressed (reference)	---	---	---	---	---	---
Supportiveness			-0.066 (0.056)			-0.052 (0.063)
Shared responsibility in parenting				-0.038 (0.031)		-0.030 (0.040)
Cooperation in parenting					-0.038 (0.031)	0.008 (0.047)
Constant	-0.082 **	1.320 **	1.473 **	1.404 **	1.374 **	1.474 **
N	1,926	1,926	1,926	1,926	1,926	1,926
R ²	0.027	0.582	0.612	0.590	0.589	0.611

	Withdrawn					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Both parents depressed	0.371 (0.197)	0.194 (0.204)	0.181 (0.205)	0.196 (0.204)	0.184 (0.204)	0.179 (0.205)
Only mother depressed	0.057 (0.080)	-0.047 (0.078)	-0.055 (0.078)	-0.046 (0.078)	-0.046 (0.078)	-0.056 (0.078)
Only father depressed	0.020 (0.086)	-0.126 (0.083)	-0.133 (0.083)	-0.124 (0.083)	-0.124 (0.083)	-0.132 (0.084)
Both parents not depressed (reference)	---	---	---	---	---	---
Supportiveness			-0.056 (0.058)			-0.054 (0.067)
Shared responsibility in parenting				0.010 (0.034)		0.042 (0.041)
Cooperation in parenting					-0.030 (0.0385)	-0.039 (0.050)
Constant	-0.012	1.291 *	1.444 *	1.271 *	1.371 *	1.460 *
N	1,926	1,926	1,926	1,926	1,926	1,926
R ²	0.029	0.625	0.641	0.632	0.636	0.642

	ADHD					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Both parents depressed	0.505 * (0.202)	0.350 (0.212)	0.302 (0.211)	0.332 (0.213)	0.323 (0.211)	0.299 (0.211)
Only mother depressed	0.351 *** (0.086)	0.228 * (0.086)	0.197 * (0.087)	0.218 * (0.086)	0.213 * (0.086)	0.195 * (0.086)
Only father depressed	0.143 (0.087)	0.069 (0.087)	0.043 (0.088)	0.053 (0.087)	0.052 (0.088)	0.039 (0.088)
Both parents not depressed (reference)	---	---	---	---	---	---
Supportiveness			-0.216 *** (0.062)			-0.198 ** (0.072)
Shared responsibility in parenting				-0.073 * (0.033)		-0.027 (0.041)
Cooperation in parenting					-0.082 * (0.041)	0.001 (0.052)
Constant	-0.070 *	0.349	0.939	0.488	0.567	0.944
N	1,926	1,926	1,926	1,926	1,926	1,926
R ²	0.028	0.609	0.625	0.613	0.612	0.623

	Aggressive					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Both parents depressed	0.716 *** (0.213)	0.477 * (0.206)	0.420 * (0.207)	0.469 * (0.206)	0.441 * (0.204)	0.415 * (0.206)
Only mother depressed	0.286 *** (0.086)	0.142 (0.084)	0.103 (0.086)	0.137 (0.085)	0.121 (0.084)	0.101 (0.085)
Only father depressed	0.228 ** (0.087)	0.116 (0.087)	0.084 (0.088)	0.109 (0.087)	0.094 (0.088)	0.085 (0.089)
Both parents not depressed (reference)	---	---	---	---	---	---
Supportiveness			-0.261 *** (0.065)			-0.247 ** (0.074)
Shared responsibility in parenting				-0.035 (0.034)		0.053 (0.044)
Cooperation in parenting					-0.111 *** (0.041)	-0.063 (0.052)
Constant	-0.057 * 1,926	1.306 * 1,926	2.018 ** 1,926	1.373 * 1,926	1.600 ** 1,926	2.047 ** 1,926
R ²	0.028	0.601	0.625	0.605	0.608	0.624

	ODD					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Both parents depressed	0.692 *** (0.209)	0.485 * (0.203)	0.441 * (0.203)	0.481 * (0.203)	0.456 * (0.202)	0.436 * (0.203)
Only mother depressed	0.261 ** (0.090)	0.152 (0.088)	0.122 (0.089)	0.149 (0.088)	0.135 (0.088)	0.120 (0.088)
Only father depressed	0.148 (0.087)	0.074 (0.086)	0.049 (0.088)	0.070 (0.087)	0.056 (0.088)	0.050 (0.088)
Both parents not depressed (reference)	---	---	---	---	---	---
Supportiveness			-0.183 ** (0.063)			-0.191 * (0.073)
Shared responsibility in parenting				-0.018 (0.034)		0.058 (0.044)
Cooperation in parenting					-0.090 * (0.041)	-0.064 (0.052)
Constant	-0.034 1,926	1.482 * 1,926	2.035 ** 1,926	1.517 * 1,926	1.722 ** 1,926	2.064 1,926
R ²	0.028	0.598	0.625	0.602	0.607	0.624

* p < 0.05, ** p < 0.01, *** p < 0.001.

Note: Models 2 through 6 include the following covariates: age, age squared, race, education, log of household income, relationship status, number of children in household, grandparent in household, mother's parent(s) depressed, father's parent(s) depressed, prenatal smoking, child gender, child health, child temperament, and child age.

Appendix A. Description of Key Variables.

Anxious/depressed (*0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true*)

- Clings to adults or is too dependent
- Feelings are easily hurt
- Gets too upset when separated from parents
- Looks unhappy without good reason
- Has nervous movements or is high strung or tense
- Self-conscious or easily embarrassed
- Too fearful or anxious
- Unhappy, sad, or depressed

$\alpha = 0.627^a$

Withdrawn (*0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true*)

- Acts too young for age
- Avoids looking others in the eye
- Does not answer when spoken to
- Refuses to participate in games or activities
- Seems unresponsive to affection
- Shows little attention toward people
- Shows little interest in things around him/her
- Withdrawn or does not get involved with others

$\alpha = 0.651$

ADHD (*0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true*)^b

- Cannot concentrate or cannot pay attention for long
- Cannot sit still, is restless or hyperactive
- Cannot stand waiting and wants everything now
- Demands must be met immediately
- Gets into everything
- Quickly shifts from one activity to another

$\alpha = 0.713$

Aggressive (*0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true*)

- Attacks people
- Cannot stand waiting
- Defiant
- Demands must be met immediately
- Destroys others' things
- Disobedient
- Does not feel guilty after misbehaving
- Easily frustrated
- Gets in many fights
- Hits others
- Hurts animals or people accidentally
- Has angry moods
- Punishment does not change his/her behavior
- Screams a lot
- Selfish or will not share
- Stubborn, sullen, or irritable
- Temper tantrums or a hot temper
- Uncooperative
- Wants a lot of attention

$\alpha = 0.871$

ODD (*0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true*)

Defiant

Disobedient

Has angry moods

Stubborn, sullen, or irritable

Temper tantrums or a hot temper

Uncooperative

$\alpha = 0.762$