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A Longitudinal Study of Fathers' and Children's Depressive Symptoms

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A LONGITUDINAL STUDY OF FATHERS' AND CHILDREN'S
DEPRESSIVE SYMPTOMS

A Dissertation Presented

by

MARIANNE HESLINGTON TICHOVOLSKY

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2015

Clinical Psychology

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ABSTRACT

A LONGITUDINAL STUDY OF FATHERS' AND CHILDREN'S
DEPRESSIVE SYMPTOMS

MAY 2015

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Depression is a common, chronic condition that affects both adults and children and causes significant impairment across a variety of domains. Having a depressed parent puts children at risk for developing depression themselves. While there is considerable research examining the effects of maternal depression, relatively few studies have focused on paternal depression and its relation to child depressive symptoms.

Longitudinal studies of paternal depression are especially scarce, and very few studies have examined both paternal and child depressive symptoms over an extended period of time. The present study examined whether and how paternal and child depressive symptoms covaried over a 3-year period using two analytic approaches: one that evaluated whether year-to-year changes in depressive symptoms were related, and another that evaluated whether depressive symptom trajectories over the 3-year period were related. This study also evaluated whether the relationship between fathers' and children's depressive symptoms differed depending on children's gender. Additional analyses examined whether changes in maternal depressive symptoms might account for the associations between fathers' and children's depressive symptoms. In both sets of

analyses, changes in paternal depression significantly predicted changes in father-reported and mother-reported child depressive symptoms. Findings related to child gender were mixed, and only approached significance. In the analyses that could control for maternal depressive symptom trajectories, only paternal trajectories significantly predicted children's trajectories over the 3-year period. Results suggest that paternal depression has a uniquely important relationship with children's depressive symptoms and underscore the importance of identifying and treating depressed fathers.

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CHAPTER 1

INTRODUCTION

Major depression is one of the most common psychological disorders, affecting men, women, and children. Approximately 10-25% of women and 5-12% of men will experience Major Depressive Disorder (MDD) at some point during their lifetime (American Psychiatric Association, 2000), and many more will experience sub-clinical symptoms that still cause significant distress and impairment. One-year prevalence rates for MDD have been estimated at about 2% for children and 4-7% for adolescents (Costello et al., 2002), and approximately 15-20% of teenagers will experience MDD by the time they reach 18 years of age (Birmaher et al., 1996). Boys and girls experience similar rates of depression until they reach early adolescence, when girls become two to three more times likely to experience depression than boys (Costello et al., 2002).

Depression is typically a chronic, recurrent condition that takes a tremendous toll on individuals in terms of mental suffering, decreased quality of life and productivity, and disability. Globally, major depression has been found to have the third highest disease burden, surpassing heart disease, cerebrovascular disease, malaria, and diabetes (World Health Organization, 2008). When compared to a variety of physical and mental health conditions, depression was found to be associated with the most years of healthy life lost due to disability for men and women (WHO, 2008). In the most recent Global Burden of Disease study, major depressive disorder was found to be the second leading cause of disability worldwide (Ferrari et al., 2013). There is some evidence that depression is starting to develop at an earlier age and rates are increasing with each successive cohort (Birmaher et al., 1996). Early-onset (before age 21) depression tends to

be more recurrent and chronic (Weissman et al., 1999) and is associated with a greater risk of suicide (Weissman et al., 1999; Zisook et al. 2004), underscoring the importance of early identification and treatment. Given the high rates, frequent recurrence, and detrimental effects of this disorder, it is essential that we gain a better understanding of its early development.

Children of Depressed Parents

An extensive body of research has demonstrated that parental depression puts children at risk for a variety of social, emotional, and behavioral difficulties. In particular, maternal depression is associated with insecure attachment, social skills deficits, academic difficulties, internalizing and externalizing problems, and higher rates of psychiatric disorders, especially depression (see Beardslee, Versage, & Gladstone, 1998, and Downey & Coyne, 1990, for reviews). Indeed, children of depressed parents have been found to be at three times greater risk for experiencing a major depressive episode during their lifetime, and the risk is even higher if both parents suffer from mood disorders (Birmaher et al., 1996). Most of the studies examining the relation between parental depression and child outcomes have focused on mothers. Only recently have studies begun to explore the effects of paternal depression on children.

What about Dads?

Historically, there has been a lack of focus on fathers and their effects on child development, especially the development of psychopathology. In their review of the literature examining parental influences on the development of child psychopathology, Phares and Compas (1992) found that nearly half (48%) of the studies between 1984 and 1991 included only mothers, whereas 1% included only fathers. Unfortunately, this

discrepancy continues to exist; a more recent review of this literature revealed that the percentage of studies including only fathers remains at 1% (compared to 55% for mother-only studies; Cassano, Adrian, Veits, & Zeman, 2006). Because fathers have been so rarely the focus of research, our understanding of their mental health issues, as well as how they may influence their children's socioemotional development, is particularly limited. Fortunately, recent studies are beginning to examine depression in men, particularly fathers, and its effects on children.

Prevalence of Paternal Depression

Estimates of the prevalence rate for paternal depression vary considerably depending on how old children were when fathers were assessed, the depression instruments used, and the type of sample (community vs. clinic). Most studies have focused on the postpartum period (up to child age 12 months), where rates of paternal depression have been found to range from 1-25% (see Goodman, 2004). A recent meta-analysis of 43 studies suggested an overall rate of 10.4% during this period (versus a rate of 23.8% for mothers), with the highest rates of paternal depression (25.6%) occurring 3- to 6-months post-birth (Paulson & Bazemore, 2010). In their longitudinal study, Davé, Petersen, Sherr, and Nazareth (2010) found that rates of paternal depression were generally highest during the first year after a child's birth (3.6%) but remained fairly consistent (2-2.7%) when children were 1-12 years of age; however, they also noted that the number of fathers who experienced an episode of depression steadily increased over the course of the study.

Although the percentage of fathers with depression is consistently found to be lower than that of mothers with depression, research suggests that a substantial portion of

fathers will experience depression at some point during their children's lives. For example, Davé et al. (2010) found that by the time children reached 12 years of age, 21% of fathers had experienced a depressive episode. There is also evidence that fathers experience higher rates of depression than their adult male counterparts (Giallo et al., 2012), particularly when their partners are depressed (Goodman, 2008; Wee, Skouteris, Pier, Richardson, & Milgrom, 2011). Indeed, during the postpartum period, 24-50% of fathers with depressed wives experience depression themselves (Goodman, 2004). In addition, unemployment has been found to be a significant predictor of paternal depression in several studies (Davé, Sherr, Senior, & Nazareth, 2008; Davis, Davis, Freed, & Clark, 2011; Rosenthal, Learned, Liu, & Weitzman, 2012). Given the current economic climate, there may be an increase in the number of children exposed to depressed fathers.

Paternal Depression and Child Outcomes

Recent studies have revealed that paternal depression, much like maternal depression, is related to poorer psychosocial and behavioral outcomes for children. Most of these studies have been cross-sectional, though some have measured paternal depression early in a child's life and child outcomes later. Paternal depression has been found to be associated with less prosocial behavior in young children (Cummings, Keller, & Davies, 2005; Davé et al., 2008) as well as greater peer problems, even after controlling for maternal psychopathology and other potential confounding variables (Davé et al., 2008). Herbert, Harvey, Lugo-Candelas, and Breaux (2013) found that paternal depressive symptoms at child age 3 predicted children's concurrent social skills and changes in social skills over time as well as academic achievement and cognitive

ability at age 6. During adolescence, paternal depression has been found to be related to poorer academic performance, decreased social competence, and increased suicide attempts (Lewinsohn, Olino, & Klein, 2005) as well as alcohol dependence and conduct disorder (Ohannessian et al., 2005). In general, studies have demonstrated a consistent relationship between paternal depression and child behavior problems. Paternal depression has been found to be associated with higher levels of externalizing behavior during the preschool period (Hanington, Heron, Stein, & Ramchandani, 2011; Malmberg & Flouri, 2011; Ramchandani, Stein, Evans, O'Connor, & the ALSPAC Study Team, 2005; Velders et al., 2011), early school years (Herbert et al., 2013; Ramchandani et al., 2008), middle childhood (Kane & Garber, 2009; Low & Stocker, 2005), and adolescence (Brennan, Hammen, Katz, & Le Brocque, 2002).

Findings regarding the association between paternal depression and children's internalizing symptoms have been more mixed. Most of the research has been cross-sectional, though a few studies have measured children's depressive symptoms at more than one time point. Researchers have found that paternal depression was associated with concurrent internalizing problems in 4-year-olds (Marchand & Hock, 1998), 5-year-olds (Cummings et al., 2005), 11-year-olds (even controlling for current and past maternal depression; Kane & Garber, 2009), and teenagers (Ohannessian et al., 2005). Paternal depression has been found to predict children's depressive symptoms 2 years later in a sample of preschoolers (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008) and 1 year later in a sample of adolescents (Reeb, Conger, & Wu, 2010). In one longitudinal study, paternal depressive symptoms at age 3 were the strongest predictor of children's internalizing problems 3 years later (Herbert et al., 2013); they were also associated with

changes in children's internalizing symptoms, with lower levels of paternal depression predicting decreases in children's internalizing symptoms over the 3-year period.

However, several researchers have found that paternal depression was not associated with emotional difficulties in children (Davé et al., 2008; Hanington et al., 2011; Malmberg & Flouri, 2011), and others have suggested that the association between paternal depression and child internalizing problems might be accounted for, at least in part, by maternal depression (Ramchandani et al., 2005).

The Course of Paternal Depression

Only a few studies have examined paternal depression over an extended period of time. Using data from the National Longitudinal Study of Adolescent Health, Garfield et al. (2014) found that resident fathers had the lowest depression scores (compared to non-fathers and non-resident fathers) just before the birth of their children, but their depressive symptoms significantly increased (by 68%, on average) across the early fatherhood period (from birth to child age 5). Gross et al. (2008) assessed paternal depression when children were 2-4 years of age. They found that average fathers' depressive symptoms were moderate at child age 2, increased slightly at age 3, and then decreased by age 4. Finally, Giallo et al. (2012) followed a large group of fathers ($N = 3,471$) over a five-year period and assessed their mental health symptoms when children were 0-12 months old, 2-3 years old, and 4-5 years old (in this particular study, paternal depression, anxiety, and symptoms of stress were grouped together to form an overall measure of psychological functioning/distress, so these results are not specific to paternal depression). They found that approximately 30% of fathers who reported moderate symptoms during their child's infancy experienced similar or worsening symptoms across

the toddler and preschool periods. Forty to 60% of fathers who reported clinical distress at time 1 reported continued distress during the following two assessments. About 9% of fathers who did not report distress during their child's infancy developed symptoms at some point during the two follow-up periods. In sum, research suggests that fathers' depressive symptoms generally increase during their children's early development. Additional longitudinal studies are needed to give us a better understanding of the course of paternal depression and how changes in fathers' depressive symptoms may affect children.

Are Changes in Paternal Depression Associated with Changes in Child Symptoms?

In a review of the published literature through 2007, Gunlicks and Weissman (2008) found that only six studies had examined whether improvements (generally treatment-related) in parental depressive symptoms were associated with improvement in child functioning. Of those six studies, four included only mothers, whereas two included mothers and fathers but did not examine effects for each parent separately. In one of the studies that included fathers, reductions in parental depressive symptoms were associated with decreases in children's (age 4-16) emotional and behavioral problems (Byrne et al., 2006). In the other study, children whose parents had fully remitted exhibited fewer behavioral problems and less psychological distress than those whose parents continued to experience depression at 1 and 4 years post-treatment (Timko, Cronkite, Berg, & Moos, 2002). In a more recent study, Garber, Ciesla, McCauley, Diamond, and Schloedt (2011) assessed parents' and children's (age 7-17) depressive symptoms six times over the course of 22 months, beginning when parents first entered treatment and ending 18 months post-treatment. They found that depressed parents and their children showed

similar patterns of change over time, with both experiencing a decrease in depressive symptoms (through six months post-treatment) followed by an increase in symptoms towards the end of the study. Changes in parental depression were associated with changes in children's depressive symptoms. Children of parents whose depression remitted had a more dramatic decrease in symptoms than those whose parents had not remitted during the course of the study (Garber et al., 2011).

Only two studies were located that specifically examined whether changes in paternal depression were associated with changes in children's depressive symptoms. Pilowsky et al. (2014) found that decreases in paternal depression had little effect on children's (age 7-17) symptoms, whereas reductions in maternal depressive symptoms predicted significant decreases in children's depressive symptoms. However, it should be noted that there were very few fathers in this study ($n = 7$), and the children of depressed fathers had significantly fewer symptoms at baseline, so they had little room for improvement. By contrast, in a large longitudinal study of children aged 11-15, Papp (2012) found that changes in mothers' and fathers' depressive symptoms both predicted changes in children's depressive symptoms, but paternal depression was the stronger predictor. Additional studies that explore whether changes in paternal depressive symptoms are related to changes in children's symptoms (particularly during the toddler and preschool periods, when fathers' depressive symptoms generally increase) are sorely needed.

Gender Differences

A handful of studies have examined whether paternal depressive symptoms affect children differently depending on their gender. In two studies (using the same sample),

postnatal paternal depression predicted difficult temperament at age 2 for boys only (Hanington, Ramchandani, & Stein, 2010), and the relationship between postnatal paternal depression and child behavior problems at age 3 ½ was stronger for boys than girls (Ramchandani et al., 2005). In these studies, maternal depression predicted difficult temperament as well as increased behavioral and emotional problems for boys and girls. On the other hand, Cummings et al. (2005) found that paternal depression was associated with less prosocial behavior in boys and greater internalizing problems in boys and girls at age 5, whereas maternal depression was related to increased emotional problems for girls only. In two studies involving adolescents, paternal depression was associated with more school difficulties for boys (Lewinsohn et al., 2005) and increased depressive symptoms for girls (Reeb et al., 2010). Thus, findings regarding gender differences have been mixed. Additional longitudinal studies are needed to clarify whether paternal depression may affect boys and girls differently across time.

The Current Study

Over the past few decades, there has been an increasing awareness of the important role fathers play in their children's development. Recent studies have revealed that a substantial number of fathers experience depression, with potential negative consequences for children's socioemotional development. Unfortunately, our understanding of paternal depression and its effects on children is still relatively limited, and additional research is needed. Longitudinal studies are especially crucial at this stage, as they can provide stronger evidence for a causal link between fathers' psychological well-being and children's outcomes. Very few studies have measured both paternal and child depressive symptoms over an extended period of time. In those that have, analyses

were generally run combining mothers and fathers, as samples included relatively few fathers. Only two studies have examined the effects of paternal depression separately, one of those was limited by a very small sample size, and neither examined children younger than age seven. Additional studies are needed to evaluate whether changes in paternal depression are associated with changes in children's depressive symptoms.

The current study examined the course of paternal depression over a three-year period and evaluated whether paternal depressive symptoms and child depressive symptoms covaried over time. Fathers' and children's symptoms were assessed yearly, beginning when children were 3 years of age. It was hypothesized that fathers' depressive symptoms would covary with children's depressive symptoms over time, such that increases in fathers' symptoms would be associated with increases in children's symptoms. Exploratory analyses evaluated whether child gender moderated the relationship between paternal depression and child depressive symptoms. Given limited research examining gender differences in this area, there were no specific hypotheses relating to gender. Finally, the relationship between paternal and maternal depression was examined as a step towards clarifying whether maternal depression may be playing a role in the association between paternal and child depressive symptoms.

Unfortunately, there are no clear data or theory that inform the time-frame of effects in this area. Because depression is often an episodic disorder, fathers' symptoms may fluctuate during a relatively short period, and resulting changes in child symptoms could occur relatively quickly. Alternatively, depression tends to present a chronic (as opposed to one-time) challenge, and its effects might accumulate gradually, so examining changes in symptoms over a longer time-frame might be more fruitful. Given the dearth

of longitudinal research in this area, it seemed prudent to examine changes in depressive symptoms in more than one way. More specifically, the current study sought to extend the literature by evaluating whether changes in fathers' and children's depressive symptoms were associated in two ways. First, time-varying covariate analyses were used to examine whether shorter-term, year-to-year changes in symptoms were related. Second, parallel process growth curve modeling was used to examine the co-occurrence of changes over the course of the three-year period.

This study examined the relation between paternal and child depressive symptoms in a sample of children with behavior problems. Children with behavior problems are at risk for developing comorbid depression (e.g., Greene et al., 2002; Lahey, Loeber, Burke, Rathouz, & McBurnett, 2002), and parent depression may play a role in the development of comorbid depression among children with behavior problems. In particular, parents of children with behavior problems may be more likely to develop depression, which in turn may contribute to the development of depressive symptoms in children.

This study will contribute to our understanding of the relationship between paternal and child depression. If we are able to determine that changes in paternal depression are associated with changes in children's depressive symptoms, this decreases the likelihood that this link is due to some third variable (such as SES); if fathers' and children's symptoms go up and down together, it makes such background contextual factors less plausible, and suggests that the variables are likely intertwined in a more specific way. Information gained from this study can also aid our intervention efforts. Knowing that changes in paternal depression predict changes in children's symptoms may increase efforts to identify and treat depressed fathers, encourage more fathers to

seek treatment, and encourage experimental studies to clarify causal paths in this relationship. This would not only improve fathers' functioning, but may also help reduce the chances of their children developing depression.

CHAPTER 2

METHOD

Participants

One hundred and fifty three children (84 boys, 69 girls) with behavior problems and their fathers and mothers participated in this study as part of a larger project examining the early development of ADHD and behavioral problems in preschoolers (Harvey, Metcalfe, Herbert, & Fanton, 2011). Children were 3 years of age at screening and were 36–50 months of age ($M = 44.4$ months, $SD = 3.3$) at the first home visit [Time 1 (T1)]. Data were collected from families at 1-year [Time 2 (T2)], 2-year [Time 3 (T3)], and 3-year [Time 4 (T4)] follow-up visits. The sample included European American (60%), Latino American (mostly Puerto Rican; 15%), African American (7%), and multiethnic children (17%). Families came from varied socioeconomic backgrounds. Most fathers lived with their children (79%), but those that did not were invited to participate if they spent at least five hours per week with their children.

Procedure

Children with significant externalizing problems were recruited from 3-year-old children ($n = 1,752$) whose parents completed a screening packet that they received through mail (using state birth records), pediatrician offices, child care centers, and community centers in western Massachusetts. A smaller group of non-problem children were also recruited but were not included in this study. Inclusion criteria were (a) no evidence based on parent report of mental retardation, deafness, blindness, language delay, cerebral palsy, epilepsy, autism, or psychosis; (b) parent-reported concern about the child's activity level, defiance, aggression, or impulse control; and (c) T-scores at or

above 65 on the Hyperactivity and/or Aggression subscales of the Behavioral Assessment System for Children–Parent Report Scale (BASC-PRS; Reynolds & Kamphaus, 1992). Parents were told that the goal of the study was to understand factors that help young children with behavior problems outgrow their difficulties, and they were paid for participating. Fifty-nine percent of the families with children who met the above criteria agreed to participate in the study. Written informed consent was obtained from all parents, and the study was conducted in compliance with the UMass Amherst Institutional Review Board.

Measures

Parental depressive symptoms. Fathers and mothers completed the Millon Clinical Multiaxial Inventory–III (MCMI-III; Millon, Davis, & Millon, 1997), a 175-item self-report questionnaire that measures a wide range of adult psychopathology, including depressive symptoms, at each time point. In the current study, only the Major Depression, Dysthymia, and Depressive Personality subscales from the MCMI-III were used. The internal consistency for these subscales in a clinical population ranged from .88 to .90; test-retest reliabilities ranged from .91 to .95 (Millon et al., 1997). Because the objective of this study is to analyze changes in depression over time, eight of the 33 items contained in the three depression subscales were not included because they assess symptoms over a long time-frame. Responses to the 25 remaining items were summed to create a raw score, with higher scores indicating greater depression. Following instructions from the MCMI-III manual (Millon et al., 1997), the six items considered prototypical for the Major Depression subscale (e.g., “I feel terribly depressed and sad much of the time now”) were double-weighted when raw scores were calculated. Internal

consistency for these 25 items was excellent (α ranged from .90 to .94) for fathers and mothers at each time point.

Child depressive symptoms. Mothers and fathers completed the Behavior Assessment System for Children – Parent Rating Scale (BASC-PRS; Preschool or Child version depending on the child’s age) at all four time points. The BASC-PRS is a widely used comprehensive rating scale that assesses a broad range of psychopathology in children ages 2-6 and older and demonstrates good reliability and validity for children (Reynolds & Kamphaus, 1992). The Depression subscale, which assesses feelings of sadness, loneliness, irritability, and suicidal thoughts, was used in the current study; internal consistency for this subscale in the normative sample was adequate ($\alpha = .75$ for preschoolers and $\alpha = .84$ for children aged 6-7; Reynolds & Kamphaus, 1992). The Depression subscale is comprised of 13 items in the Preschool version and 12 items in the Child version. Each item is rated on a scale from 0 (“Never”) to 3 (“Almost Always”), with higher scores indicating greater depressive symptoms. *T*-scores, rather than raw scores, were used because slightly different items load on these scales in the Child version versus the Preschool version. Fathers’ and mothers’ ratings of child depressive symptoms were evaluated separately in all analyses.

Data Analysis

The course of paternal depression was first examined descriptively to provide a sense of the stability or variability of symptoms across the four time points. Then, two sets of analyses were carried out to examine whether changes in fathers’ depressive symptoms were associated with changes in children’s depressive symptoms. Because depression has both an episodic and a chronic element, one set of analyses examined

changes that may occur relatively quickly (year-to-year fluctuations) and the other examined changes in symptoms that may occur gradually (over the course of the 3-year study).

In the first set, a time-varying covariate approach, using Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 1992), was used to analyze the relation between fathers' and children's year-to-year changes in depressive symptoms. HLM is a multi-level modeling technique that allows one to estimate change over time within individuals (Level 1) as well as the variability in that change across individuals (Level 2). A Level 1 equation models an individual's (j 's) repeated measures of y (y = child depressive symptoms in this study) across multiple time points (from 1 to i) as follows:

$$\text{Level 1 Model: } y_{ij} = \beta_{0j} + \beta_{1j} * \text{Time}_{ij} + r_{ij}$$

The intercept β_{0j} represents person j 's expected value of y when Time = 0, slope β_{1j} represents the expected linear rate of change in person j 's y scores as a function of time, and r represents random error at Level 1. Time can be centered so that the intercept will be meaningful (e.g., the child's depressive symptoms at baseline, the final time-point, etc.). In this study, paternal depression was included as a time-varying covariate at Level 1 ($\beta_{2j} * \text{Paternal Depression}$) to allow us to estimate how year-to-year changes in paternal depression corresponded to year-to-year changes in child depressive symptoms.

Level 2 of the model estimates the average growth trajectory across individuals and indicates whether there is individual variation in trajectory intercepts (β_{0j}) and slopes (β_{1j}):

$$\text{Level 2 model: } \beta_{0j} = \gamma_{00} + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10} + \mu_{1j}$$

In this model, γ represents the average intercept (γ_{00}) and slope (γ_{10}) across individuals and μ represents individual j 's deviations from the average intercept (μ_{0j}) and average slope (μ_{1j}).

In the second set of analyses, parallel process growth curve modeling (using Mplus; Muthén & Muthén, 1998–2010) was used to calculate trajectories of paternal and child depressive symptoms across the course of the study and see if these trajectories were significantly related to each other (see Figure 1). This approach allowed us to determine whether fathers' and children's depressive symptoms followed similar trajectories over the 3-year period. Additional analyses, using each approach, examined whether gender moderated these relationships.

Given concerns raised by other researchers (e.g., Ramchandani et al., 2005) that maternal depression may be playing a role in the relationship between paternal and child depression, additional analyses were run in an attempt to shed some light on this issue. Unfortunately, maternal depression could not be added as a control variable in the time-varying covariate model (because it also varied over time and there were only four time points in this study). Instead, additional HLM analyses were run examining whether mothers' and fathers' depressive symptoms were changing together and whether mothers' and children's depressive symptoms were changing together. If fathers' and children's depressive symptoms vary together, and changes in maternal depression are not related to changes in paternal depression, this would suggest that maternal depression does not account for the relationship between changes in fathers' and children's depressive symptoms. On the other hand, if changes in maternal depression are associated with changes in paternal depression, additional studies will be needed to tease apart whether

changes in mothers' or fathers' symptoms are contributing to changes in children's symptoms. In the parallel process growth curve modeling approach, analyses were run examining the relationship between paternal and child depressive symptom trajectories, controlling for maternal depressive symptom trajectories.

CHAPTER 3

RESULTS

Descriptive Statistics

Means and standard deviations for predictor and outcome variables at each time point (for the whole sample and by gender) are presented in Table 1. Average paternal, maternal, and child depression scores remained fairly stable over the 3-year period. At each time point, fathers reported experiencing fewer depressive symptoms than mothers. Likewise, fathers rated their children as having lower levels of depression than mothers did at each time point, though both parents reported average levels of depression in their children compared to normative groups. Few gender differences were found; however, at Time 2, mothers of daughters endorsed having significantly more depressive symptoms than mothers of sons ($p < .05$). In addition, fathers rated their daughters as having marginally higher levels of depressive symptoms than sons at Time 2 ($p < .10$), and significantly higher levels of depressive symptoms than sons at Time 3 ($p < .05$).

Intercorrelations among parent depression scores and among parent ratings of child depression at each time point are presented in Tables 2 and 3, respectively. Fathers' and mothers' depressive symptoms were moderately to highly positively correlated (all $ps < .001$) across all time points in the study. Similarly, paternal and maternal ratings of child depressive symptoms were generally moderately positively correlated (p values ranging from .07 to $< .001$) across all time points. Correlations between parental depressive symptoms and parent-reported child depressive symptoms across all time points are presented in Table 4. Parent depression scores were significantly correlated

with children's concurrent depressive symptoms (as reported by both parents) at each time point.

Year-to-Year Changes in Paternal and Child Depression: Time-Varying Covariate Models

Before evaluating whether changes in fathers' depressive symptoms predicted changes in children's depressive symptoms, unconditional linear growth models were fit for each rating of depression. On average, fathers' depressive symptoms changed little over the 3-year period ($B = 0.14$, $SE = 0.16$, $p = .37$), whereas children's average depressive symptoms decreased significantly over time based on fathers' ($B = -2.04$, $SE = 0.47$, $p < .001$) and mothers' ($B = -1.82$, $SE = 0.39$, $p < .001$) reports. However, there was significant individual variability in the change in depressive symptoms for fathers [$\chi^2(124) = 169.05$, $p = .005$] and children [$\chi^2(144) = 265.29$, $p < .001$, and $\chi^2(128) = 280.56$, $p < .001$, for maternal and paternal reports, respectively] over the 3-year period. Thus, HLM analyses were conducted to evaluate whether changes in paternal depression predicted changes in child depression. Paternal depressive symptoms were included as time-varying covariates in these models, and analyses were run separately for each rating of child depressive symptoms. Finally, analyses were re-run including gender as a Level-2 predictor to determine whether any gender differences in these relationships exist.

Year-to-year fluctuations in paternal depression were significantly associated with fluctuations in mothers' ratings of their children's depressive symptoms ($B = 0.73$, $SE = 0.13$, $p < .001$) as well as fluctuations in fathers' ratings of their children's depressive symptoms ($B = 0.97$, $SE = 0.13$, $p < .001$). Increases in paternal depressive symptoms predicted increases in children's depressive symptoms based on both parents' ratings.

Gender differences. When gender was entered as a Level-2 predictor, there were no significant differences between boys and girls in the relationship between paternal depression and father-reported child depressive symptoms ($B = 0.30, SE = 0.24, p = .22$). When maternal-report of child symptoms was utilized, the difference in the association between paternal depressive and child depressive symptoms approached significance ($B = 0.42, SE = 0.22, p = .06$); the association between paternal and child depressive symptoms was stronger for girls ($B = 0.91, SE = 0.17, p < .001$) than for boys ($B = 0.53, SE = 0.19, p = .006$), though both were significant.

Trajectories of Paternal and Child Depression Across the Three-Year Period:

Parallel Process Growth Curve Models

Parallel process growth curve modeling was used to evaluate whether trajectories of paternal depressive symptoms were associated with trajectories of children's depressive symptoms over the 3-year period. First, depression trajectories were created for fathers and children. Then, models were created to examine whether fathers' slopes predicted children's slopes. As before, analyses examined paternal and maternal ratings of child depressive symptoms separately. In a second set of mplus analyses, multigroup modeling was utilized to determine whether gender moderated the relation between paternal depression and child depression. Model fit was assessed using root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root-mean-square residual (SRMR). Rules of thumb suggest that to be considered a relatively good fit with the data, RMSEA should be ≤ 0.06 , CFI should be ≥ 0.95 , and SRMR should be ≤ 0.08 (Hu & Bentler, 1998).

Changes in paternal depression were significantly associated with changes in mothers' ratings of their children's depressive symptoms ($B = 2.85$, $SE = 1.34$, $p < .05$) as well as changes in fathers' own ratings of their children's depressive symptoms ($B = 2.43$, $SE = 0.86$, $p < .01$). Both of these linear models fit the data well (using mothers' ratings: RMSEA = 0.058, CFI = 0.962, SRMR = 0.048; using fathers' ratings: RMSEA = 0.066, CFI = 0.951, SRMR = 0.046).

Does gender moderate these relationships? Two models were run: one where boys' and girls' slopes were allowed to vary (gender-free), and another where boys' and girls' slopes were constrained to be the same (gender-fixed). A chi-square difference test was used to determine whether these models were significantly different from each other. These models were run separately for mother-reported child depressive symptoms and father-reported child depressive symptoms.

The models in which slopes were allowed to vary by gender had marginally better fit [$\Delta\chi^2(1) = 3.586$, $p = .06$ and $\Delta\chi^2(1) = 3.061$, $p = .08$, for models using father-reported and mother-reported child symptoms, respectively]. When father-reported child symptoms were used, changes in paternal depression predicted changes in boys' depressive symptoms ($B = 4.64$, $SE = 2.12$, $p < .05$) but not girls' ($B = 3.10$, $SE = 2.20$, $p = .16$). When mother-reported child symptoms were used, the association between fathers' and girls' depressive symptom trajectories approached significance ($B = 3.42$, $SE = 1.96$, $p = .08$), whereas changes in fathers' and boys' depressive symptoms were unrelated ($B = 4.66$, $SE = 4.44$, $p = .29$).

Might Maternal Depression Account for the Relationships between Fathers' and Children's Depressive Symptoms?

Year-to-year changes in depressive symptoms: Time-varying covariate

models. The time-varying covariate HLM models do not allow for maternal depression to be included as a control variable given the four available time points. In order to evaluate whether maternal depressive symptoms might account for the relationship between fathers' and children's symptoms, additional models were run to see if changes in mothers' symptoms were associated with changes in fathers' symptoms as well as changes in children's symptoms. Changes in maternal depression significantly predicted changes in paternal depression ($B = 0.22$, $SE = 0.06$, $p < .001$), such that increases in maternal depressive symptoms were associated with increases in paternal depressive symptoms. Increases in maternal depression were also significantly associated with increases in fathers' ratings of their children's depressive symptoms ($B = 0.55$, $SE = 0.12$, $p < .001$) as well as increases in mothers' own ratings of their children's depressive symptoms ($B = 0.58$, $SE = 0.10$, $p < .001$). Thus, the possibility that maternal depression might account for the father effects in these analyses cannot be ruled out.

Depressive symptom trajectories: Parallel process growth curve models.

When paternal ratings of child depressive symptoms were used, changes in paternal depression significantly predicted changes in children's depressive symptoms, controlling for maternal depressive symptoms ($B = 2.15$, $SE = 0.84$, $p = .01$). The association between fathers' depressive symptom trajectories and children's depressive symptom trajectories based on maternal reports approached significance ($B = 1.98$, $SE = 1.14$, $p = .08$). In both of these analyses, mothers' depressive symptom trajectories were not significantly associated with children's depressive symptom trajectories, controlling for fathers' depressive symptom trajectories.

CHAPTER 4

DISCUSSION

Depression is a common, chronic condition that affects men, women, and children and causes significant distress and impairment across a variety of domains. Although maternal depression has consistently been linked to higher levels of internalizing problems in children, findings regarding the association between paternal and child depressive symptoms have been mixed. Longitudinal studies of children's and both parents' depressive symptoms are especially scarce, and those that exist generally include few fathers. The current study sought to extend the literature by evaluating whether paternal and child depressive symptoms covaried over a 3-year period, beginning when children were 3 years of age. Two analytic approaches were used to examine whether shorter-term, year-to-year fluctuations in father and child symptoms were related and whether paternal and child depressive symptom trajectories over the 3-year period were associated. It was hypothesized that fathers' and children's depressive symptoms would change together, such that increases in paternal depressive symptoms would be associated with increases in children's depressive symptoms.

Results from both sets of analyses supported this hypothesis. Year-to-year increases in paternal depressive symptoms predicted corresponding increases in children's depressive symptoms. Likewise, fathers' and children's depressive symptom trajectories were significantly related to each other, such that increases in paternal depressive symptoms were associated with similar increases in child depressive symptoms over the course of the study. These findings are consistent with the hypothesis that paternal depression, much like maternal depression, has a detrimental effect on

children's emotional health. Depression in any parent, regardless of gender, is likely to affect his/her general behavior in the home, feelings towards family members, and especially interactions and relationships with children and partners; these environmental factors likely interact with genetic vulnerabilities to contribute to the development of depression in children. Although exceedingly few studies have evaluated potential genetic influences (see Natsuaki et al., 2014), a small but growing body of research is beginning to demonstrate that, similar to maternal depression, paternal depression is associated with poorer-quality parenting and parent-child relationships. In particular, paternal depression has been linked to the use of harsh discipline (Davis et al., 2011), higher levels of father-child hostility and conflict (Low & Stocker, 2005; Kane & Garber, 2009), as well as more rejecting and fewer nurturing behaviors (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007). Additional research is needed to further evaluate possible mechanisms through which paternal depression affects the development of depression in children, and whether differences exist across culture and family structure.

Interestingly, paternal depression was found to be a more significant predictor of children's depressive symptoms than maternal depression. When maternal depressive symptom trajectories were taken into account, only paternal depressive symptom trajectories significantly predicted children's depressive symptom trajectories. Although this finding aligns with that from Papp (2012), it is in stark contrast to previous studies that found no relationship between paternal and child depressive symptoms (e.g., Davé et al., 2008; Hanington et al., 2011; Malmberg & Flouri, 2011), as well as those where the relationship between paternal depression and child internalizing symptoms became non-significant after controlling for maternal depression (e.g., Ramchandani et al., 2005;

Cimino, Cernigliis, & Paciello, 2014). One possible reason for this discrepancy may relate to how children's depressive symptoms were measured in each study. In the Papp (2012) study, children rated their own depressive symptoms, and in the present study, both maternal and paternal reports of child symptoms were utilized. Most of the previous studies that found significant effects for mothers but not fathers relied exclusively on maternal reports of children's internalizing symptoms (e.g., Ramchandani et al., 2005; Malmberg & Flouri, 2011); it is possible that some of the relationships between maternal and child depressive symptoms were inflated due to shared method variance in these studies. However, the relationships between paternal and child depressive symptoms in the present study held even when mother-reported child symptoms were used. Another plausible explanation may relate to the use of cross-sectional vs. longitudinal data. The previously mentioned studies were mostly cross-sectional or measured paternal depression early on and child internalizing symptoms a few years later. By contrast, the present study and Papp (2012) measured parents' and children's depressive symptoms multiple times over an extended period of time. These findings illustrate the importance of evaluating longitudinal relationships among variables and including multiple sources of information (whenever possible) to gain a more complete understanding of the development of depression in families.

In the current study, fathers' and mothers' depressive symptoms were moderately to highly positively correlated across all time points. It is quite plausible that paternal depression is particularly damaging when mothers are also depressed. Indeed, Meadows, McLanahan, and Brooks-Gunn (2007) found that preschoolers were more likely to experience anxiety/depression when both parents living in the home had

anxiety/depression. On the other hand, having a non-depressed father may serve as a protective factor when mothers are depressed. For example, Dietz, Jennings, Kelley, and Marshal (2009) found that maternal depression was associated with behavioral and emotional difficulties in toddlers only when fathers experienced mental health problems. Similarly, Gere et al. (2013) found that maternal depressive symptoms were unrelated to children's depressive symptoms when dads reported experiencing few depressive symptoms themselves. It will be important for researchers of parental depression to assess and consider the depressive symptoms of both parents in future studies.

Finally, this study did not provide clear information about whether paternal depression may affect boys and girls differently. Results from three out of the four gender-related analyses approached significance, but they were in different directions depending on reporter of child symptoms. When mother-report of child symptoms was utilized, year-to-year changes in paternal depression had a stronger effect on girls than on boys, and the association between fathers' and daughters' (but not sons') trajectories approached significance. However, when father-report of child symptoms was used, paternal depression trajectories predicted boys', but not girls' depression trajectories. It may be that mothers are more apt to notice depressive symptoms in their daughters, whereas dads are better at recognizing depressive symptoms in their sons. If mother-reported daughter symptoms and father-reported son symptoms are more accurate, this could explain why they were more strongly associated with fathers' reports of their own symptoms. Regardless, changes in paternal depression predicted changes in both girls' and boys' depressive symptoms. Given that other studies have found gender differences when examining the effects of paternal depression at different time points (e.g.,

Cummings et al., 2005; Lewinsohn et al., 2005; Ramchandani et al., 2005; Reeb et al., 2010), it will be important for researchers to continue exploring this issue.

Study Limitations

There are several limitations to this study. First, potential confounding variables such as family conflict or parenting, which may account for the relationship between fathers' and children's depressive symptoms, were not included in this study. However, these longitudinal analyses, by focusing on change rather than only on absolute levels, substantially reduce the plausibility of such alternative explanations. Second, although the sample was ethnically diverse, the sample size was not large enough to examine differences among ethnic groups. It is possible that the relationship between paternal depression and child depressive symptoms may vary depending on families' ethnicity and culture. Third, most participants were experiencing relatively few depressive symptoms. It will be important to evaluate whether similar findings emerge in samples where participants are experiencing moderate and clinical levels of depression. Fourth, this sample only included children with significant behavior problems; results may vary in families where children do not exhibit behavioral difficulties. Finally, although the longitudinal design of this study is a considerable strength, it still does not allow us to determine the direction of causality between paternal depression and child depression. It is plausible that child depression could have at least some influence on paternal depression. Cross-lagged panel analyses of the current data could be one step towards addressing this possibility.

Conclusions/Implications

Despite these limitations, this is one of the few studies that has specifically examined the effects of paternal depression on child depressive symptoms over an extended period of time. It is also the only one that has examined whether fathers' and children's depressive symptoms covary using two analytic approaches. The longitudinal nature of this study combined with the convergence of results across analyses and reporters provides strong evidence that fathers' depressive symptoms have an important, unique relationship with their children's depressive symptoms.

Knowing that fathers' and children's depressive symptoms follow similar patterns and trajectories across time can aid intervention efforts. Although men generally display low rates of help-seeking (see Addis & Mahalik, 2003), fathers may be more willing to seek treatment for their own depressive symptoms if they think it might benefit their children. This knowledge should also prompt researchers to expand efforts to include fathers in research in order to better understand the development of depression in families and how to appropriately treat it. In addition, it may encourage health providers and other professionals who work with children and families to more actively and sensitively reach out to fathers to promote the psychological health of all family members.

Table 1

Means and Standard Deviations for Study Variables for the Entire Sample and by Gender

Variables:	Entire Sample			Boys			Girls		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Paternal									
Depression									
Time 1	132	3.73	5.72	75	3.43	5.30	57	4.12	6.26
Time 2	119	3.56	5.19	68	2.94	4.34	51	4.38	6.08
Time 3	102	3.97	6.69	53	3.21	5.84	49	4.78	7.48
Time 4	102	3.54	6.40	52	2.95	4.91	50	4.16	7.66
Maternal									
Depression									
Time 1	146	5.54	6.35	81	4.92	5.99	65	6.32	6.74
Time 2	141	5.63	6.66	80	4.64 _a	5.93	61	6.93 _a	7.36
Time 3	127	5.66	7.15	69	5.15	6.95	58	6.27	7.39
Time 4	131	5.16	6.75	75	4.53	6.04	56	6.01	7.59
Child Depression (paternal report)									
Time 1	137	56.73	14.98	77	56.18	14.10	60	57.43	16.12
Time 2	121	52.05	11.67	70	50.43 _†	9.16	51	54.27 _†	14.21
Time 3	103	51.72	13.54	54	48.91 _b	12.09	49	54.82 _b	14.47
Time 4	103	49.72	11.14	53	49.75	10.59	50	49.68	11.80
Child Depression (maternal report)									
Time 1	153	59.17	13.44	84	57.92	13.68	69	60.70	13.06
Time 2	144	54.80	11.95	82	53.59	11.70	62	56.40	12.19
Time 3	127	54.79	12.95	68	53.60	13.16	59	56.15	12.67
Time 4	131	53.28	12.37	75	52.60	10.89	56	54.20	14.17

Note. Parents completed the Millon Clinical Inventory at each time point, and parent depression scores were calculated by summing responses to 25 items that assessed depressive symptoms. Six of the 25 items were double-weighted as recommended in the MCMI-III manual. Parents completed the BASC at each time point to assess their child's depressive symptoms. Child Depression scores are *T*-scores on the Depression subscale of the BASC. Independent-samples *t*-tests were used to compare means for boys and girls on each variable. Means with the same subscripts are significantly different from each other at $p < .05$; the difference between those with a † subscript approached significance ($p < .10$).

Table 2

Intercorrelations Among Parent Depression Scores at all Time Points

Variable:	1	2	3	4	5	6	7	8
1. T1 Paternal Depression		.61***	.67***	.70***	.37***	.44***	.33***	.47***
2. T2 Paternal Depression			.80***	.74***	.46***	.54***	.57***	.55***
3. T3 Paternal Depression				.84***	.49***	.54***	.54***	.47***
4. T4 Paternal Depression					.43***	.46***	.49***	.41***
5. T1 Maternal Depression						.82***	.76***	.65***
6. T2 Maternal Depression							.84***	.75***
7. T3 Maternal Depression								.76***
8. T4 Maternal Depression								

Note. T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4.

*** $p < .001$.

Table 3

Intercorrelations Among Parent Ratings of Child Depression at all Time Points

Variable:	1	2	3	4	5	6	7	8
1. PR of Child Depression, T1		.59***	.45***	.32**	.58***	.37***	.44***	.35***
2. PR of Child Depression, T2			.66***	.52***	.45***	.56***	.56***	.48***
3. PR of Child Depression, T3				.72***	.30**	.33**	.58***	.59***
4. PR of Child Depression, T4					.18†	.35***	.43***	.71***
5. MR of Child Depression, T1						.54***	.56***	.36***
6. MR of Child Depression, T2							.65***	.58***
7. MR of Child Depression, T3								.71***
8. MR of Child Depression, T4								

Note. PR = Paternal-Report; MR = Maternal-Report; T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Intercorrelations Among Parent Depression Scores and Parental Ratings of Child Depression at all Time Points

Variable:	Maternal Report – Child Depression			
	Time 1	Time 2	Time 3	Time 4
<hr/>				
Paternal Depression				
Time 1	.27**	.11	.21*	.37***
Time 2	.04	.24**	.30**	.43***
Time 3	.05	.17†	.36***	.55***
Time 4	.00	.07	.27**	.41***
<hr/>				
Maternal Depression				
Time 1	.31***	.30***	.42***	.38***
Time 2	.24**	.36***	.44***	.45***
Time 3	.16†	.34***	.40***	.42***
Time 4	.23**	.46***	.47***	.56***
<hr/>				
	Paternal Report – Child Depression			
	Time 1	Time 2	Time 3	Time 4
<hr/>				
Paternal Depression				
Time 1	.33***	.30***	.42***	.30**
Time 2	.26**	.41***	.46***	.41***
Time 3	.11	.40***	.60***	.55***
Time 4	.14	.46***	.54***	.57***
<hr/>				
Maternal Depression				
Time 1	.30***	.43***	.41***	.41***
Time 2	.29***	.37***	.39***	.38***
Time 3	.30**	.44***	.39***	.36***
Time 4	.46***	.48***	.46***	.50***

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

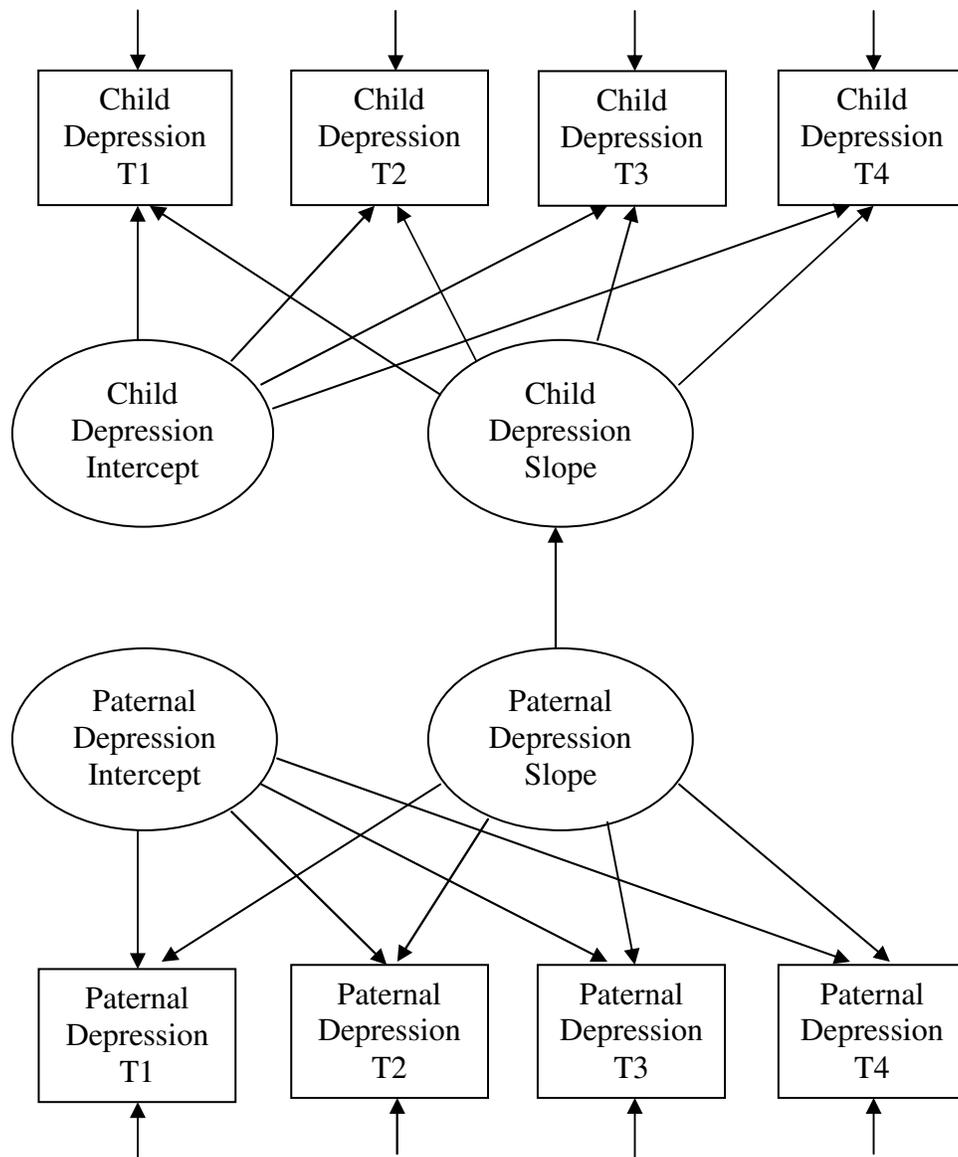


Figure 1. Parallel process latent growth curve model. T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4. Separate models were estimated for father-reported and mother-reported child depressive symptoms.

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