Maternal Depression and Adolescent Wellbeing

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ABSTRACT

Life course theory posits that parents' and children's lives are linked through shared experiences and interdependent contexts. In this paper, we draw on life course theory to examine how maternal depression is linked to adolescent wellbeing, and how several features of the family context explain this association. This study uses data from the Fragile Families and Child Wellbeing Study (N=3,437), taking advantage of the study's multiple measures of adolescent mental health and positive functioning. First, we find that maternal depression is positively associated with adolescent children's depressive symptomology and anxiety and negatively associated with adolescent children's engagement, perseverance, and happiness. Second, we find that the association between maternal depression and adolescent children's depression and anxiety much stronger for girls than for boys. Gender does not moderate the association between maternal depression and positive aspects of adolescent wellbeing, however. Finally, we find that the family environment and parent-child relationships mediate the association between maternal depression and adolescent wellbeing. Taken together, these findings inform our understanding of how parent and child wellbeing is linked at a key point in the life course.

Adolescence is a key period of the life course in which young people begin to develop their sense of self in relation to others and the wider world (Steinberg & Morris, 2001). Young people's positive wellbeing during this period is critical; it shapes the kinds of behaviors they choose to engage in, their plans for the future, and their ability to navigate stressful situations (Larson, 2000; Park, 2004). Prior research has found that the family is an important site in which positive adolescent wellbeing is formed, or threatened (Proctor, Linley, & Maltby, 2009). For example, research shows that living in a household with both married, biological or adoptive parents is positively associated with wellbeing and negatively associated with poor adolescent outcomes such as delinquency, depression, and school disengagement (Brown, 2006; Manning & Lamb, 2003). In addition, research finds that having strong, low-conflict relationships with parents is associated with lower levels of negative indicators of functioning and greater positive adolescent functioning (Harker, 2001; Steinberg & Morris, 2001).

We know, therefore, that families are important sites for understanding adolescent development and wellbeing. However, little research has examined the associations between maternal depression and adolescent functioning at the population level, nor the mechanisms that explain this association. This is important because an estimated 15.6 million children under the age of 18 live with an adult who had a major depressive episode in the prior year (England & Sim, 2009). This number only expands when considering the number who have been exposed to parental depression over time. Identifying and explaining whether and how maternal depression shapes adolescent wellbeing elucidates a pathway through which families operate as ecosystems (Bronfenbrenner, 1977) to promote positive adolescent functioning.

This study uses data from the Fragile Families and Child Wellbeing Study to investigate the association between current and prior maternal depression and adolescent functioning at age

15. Our models use seven outcomes: two important indicators of adolescent mental health, depression and anxiety, and five measures of positive adolescent wellbeing following the EPOCH model: Engagement, Perseverance, Optimism, Connectedness, and Happiness. These indicators are correlated with positive young adult and adult outcomes, and development of these measures followed calls for researchers to focus more attention on adolescent positive functioning (Kern, Benson, Steinberg, & Steinberg, 2016). We examine this association for all adolescents in our sample and separately by gender. Finally, we examine the social contexts by which caregiver depression shapes adolescent wellbeing by testing four sets of mechanisms: the family environment, parental relationship status, economic wellbeing, and parental social support. Our analyses demonstrate how one family member's mental health problems can reverberate into family life, impacting both positive and negative aspects of adolescent functioning. Although prior research in psychology has argued for this association (Goodman, 2007; Goodman et al., 2011), our analyses go further by utilizing large, panel survey data; by accounting for a host of potentially confounding factors including family environment and children's early behavior problems; and by estimating the role of social contextual factors as mechanisms.

THEORETICAL BACKGROUND

Life course theory posits that family members' wellbeing is interconnected through family processes where "The misfortune of one member is shared through relationships" (Elder, 1998, p. 3). In other words, negative events that initially impact just one family member can reverberate to other family members through a series of family processes, including interpersonal relationships, the rearrangement of family resources, and daily routines. Research has

demonstrated this dynamic among couples facing financial hardship (Hardie & Lucas, 2010; Yeung & Hofferth, 1998), families following a job loss (Schneider, Harknett, & McLanahan, 2016), and children whose parents report health problems (Hardie & Turney, 2017). In this paper, we argue that parental depression will reverberate on adolescent wellbeing. Depression affects one's mood, energy, engagement with others, health behaviors, and self-care (Clark & Watson, 1991; Katon, 2003; Oquendo et al., 2004), and these changes can manifest in parents' interactions with their children. Although prior work has demonstrated the impact of maternal depression on children (Minkovitz et al., 2005; Turney, 2011a; Turney, 2011b), our research extends the literature by examining adolescent outcomes, considering positive as well as negative aspects of adolescent functioning, testing mechanisms of this relationship, and considering gender differences in the association between parental depression and adolescent wellbeing.

We also examine whether the impact of parental depression on adolescent wellbeing differs by the child's gender. Some prior research finds that girls and boys respond to disruptions in the home differently. For example, some work finds that boys experience an increase in externalizing behavior problems in response to family disruptions while girls do not (Bertrand & Pan, 2013; Cooper, Beck, Högnäs, & Swanson, 2011). Other research, however, has found no difference in boys' and girls' responses to family disruptions (Amato, 2010; Fosco, Stormshak, Dishion, & Winter, 2012). How this operates in response to maternal depression, however, and how indicators of positive, rather than negative, functioning responds is unclear. Because girls have higher rates of anxiety and depression than boys overall (Bender, Reinholdt-Dunne, Esbjørn, & Pons, 2012; Essau, Lewinsohn, Seeley, & Sasagawa, 2010), they may be more likely to suffer these outcomes in response to their mother's depression. In one study from students at

three high schools, adolescent girls' depression, delinquency, and alcohol problems were associated with maternal depression, while boys' outcomes were not associated (Davies & Windle, 1997). Gender differences in the association between maternal depression and positive aspects of adolescent functioning, however, may be weaker or nonexistent.

Mechanisms

We posit four mechanisms through which maternal depression may shape adolescent functioning: family environment, parent-adolescent relationship, economic wellbeing, and social support. First, the family environment may explain the association between maternal depression and adolescent functioning. We define family environment as consisting of the structural aspects of the home: the presence or absence of romantic partners, the quality of the parental relationship, and daily household characteristics such as noise and patterns of behavior. Prior research finds that parental depression is associated with a higher degree of marital conflict (Cummings et al., 2014), which can lead to breakups and more relationship churning. Depression is also characterized by an inability to complete daily tasks (van Wijngaarden, Schene, & Koeter, 2004), which can lead to greater household disruptions. In turn, poor parental relationships, disruptions to family structure, and a chaotic family environment may impact children's wellbeing.

Second, maternal depression can weaken parent-child relationships. Depression affects one's mood, communicativeness, and hostility (Burke, 2003; Clark & Watson, 1991; Perils et al., 2005), all which can spillover into the parent-child relationship. Mothers may withdraw from interactions with their children, or lash out due to frustration or feeling overwhelmed. Mothers may also experience a greater degree of stress when coping with both depression and the

demands of parenting. Even when maternal depression occurred in the past, it may continue to impact parent-child relationships over time. In turn, poor parent-child relationships have been shown to be associated with negative outcomes for children and youth (Laursen & Collins, 2009; Steinberg, 2001).

Third, family socioeconomic status may suffer when mothers are depressed. Depression is associated with holding a job, work hours, and job performance (Lerner et al., 2004; Lerner & Hencke, 2008). Thus, household finances may suffer when one parent is depressed. Depression may also cost money to treat, or may spur poor financial decisions that drain finances. In turn, concerns over money may impact children directly, through limitations on the kinds of activities they can participate in or resources they have available, or indirectly, through concern over money and long-term stability.

Finally, depression may impact adolescent wellbeing by depleting social support. These two factors—depression and social support—are interrelated, and research has found that social support is a key factor in coping with depression (Lin, Dean, & Ensel, 2013). However, depression may also restrict social support. Because depression disrupts social relationships, mothers suffering from this mental illness may inadvertently deplete their own social networks. By not engaging with friends and families, they also shrink the size and robustness of their personal network. This can reverberate onto adolescents if it deepens the symptoms of depression or restricts youth's connections to potential sources of support.

Current Study

In this study, we examine the relationship between maternal depression and adolescent functioning. We further test whether these associations differ by gender, and whether they can be

explained by family environment, parent-adolescent relationship, economic wellbeing, and social support. Our findings contribute to our understanding of how the life course trajectories of family members are interconnected, and how maternal mental health shapes adolescent wellbeing.

DATA, MEASURES, AND ANALYTIC STRATEGY

Data

To examine the relationship between maternal depression and adolescent wellbeing, we use data from the Fragile Families and Child Wellbeing Study, a longitudinal survey of 4,898 children born to mostly unmarried parents living in urban areas between 1998 and 2000 (Reichman, Teitler, Garfinkel, & McLanahan, 2001). Mothers and most fathers were first interviewed in hospitals, as soon as possible after their child's birth, and parents were re-interviewed when children were 1, 3, 5, 9, and 15 years old (with only the primary caregiver being interviewed at the most recent survey). Children were also interviewed when they were 9 and 15 years old.

The analytic sample includes 3,013 observations. We exclude 1,454 adolescents who did not participate in the 15-year survey and an additional 7 adolescents missing values on any of the seven dependent variables (described below). We also exclude an additional 424 adolescents who had a non-maternal caregiver complete the 15-year survey. Comparisons of baseline characteristics between the analytic and full samples show that mothers in the analytic sample are more likely to be non-Hispanic Black (50% compared to 48%, $p < .05$), less likely to be Hispanic (25% compared to 27%, $p < .05$), and less likely to be foreign-born (14% compared to 17%, $p < .001$). Comparisons also show that mothers in the analytic sample, compared to those in the full sample, are less likely to have less than a high school diploma (31% compared to 35%,

$p < .001$) and are more likely to report employment plans (71% compared to 68%, $p < .01$) at baseline. We use multiple imputation to fill in missing values on independent and control variables.

Measures

Adolescent Wellbeing. The dependent variables include seven indicators of adolescent wellbeing, including depressive symptoms, anxiety, and five measures of positive adolescent functioning. All dependent variables are reported by adolescents at the 15-year survey.

First, the measure of depressive symptoms is drawn from a modified version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). Adolescents are asked to report on the frequency that they experienced the following five statements in the past four weeks (1 = *strongly disagree* to 4 = *strongly agree*): (a) I feel I cannot shake off the blues, even with help from my family and my friends; (b) I feel sad; (c) I feel happy (reverse coded); (d) I feel life is not worth living; and (e) I feel depressed ($\alpha = .76$). Higher values indicate greater depressive symptoms.

Second, the measure of anxiety is drawn from a modified version of the Brief Symptom Inventory 18 (BSI 18) (Derogatis & Savitz, 2000). Adolescents are asked to report on the frequency that they experienced the following six statements in the past seven weeks (1 = *strongly disagree* to 4 = *strongly agree*): (a) I have spells of terror or panic; (b) I feel tense or keyed up; (c) I get suddenly scared for no reason; (d) I feel nervous or shaky inside; (e) I feel fearful; and (f) I feel so restless I can't sit still ($\alpha = .76$). Higher values indicate greater anxiety.

Third, the five measures of positive adolescent functioning are adapted from the EPOCH Measure of Adolescent Wellbeing (Kern et al., 2016), with adolescents asked to report on 20

questions that relate to their functioning (1 = *strongly disagree* to 4 = *strongly agree*). Engagement is measured by averaging responses to the following four statements: (a) I get completely absorbed in what I am doing; (b) when I am learning something new, I lose track of how much time has passed; (c) when I do an activity, I enjoy it so much that I lose track of time; and (d) I get so involved in activities that I forget about everything else ($\alpha = .60$). Perseverance is measured by averaging responses to the following four statements: (a) I finish whatever I begin; (b) I keep at my schoolwork until I am done with it; (c) once I make a plan to get something done, I stick to it; and (d) I am a hard worker ($\alpha = .71$). Optimism is measured by averaging responses to the following four statements: (a) I am optimistic about my future; (b) I think good things are going to happen to me; (c) I believe that things will work out, no matter how difficult they seem; and (d) in uncertain times, I expect the best ($\alpha = .55$). Connectedness is measured by averaging responses to the following four statements: (a) when something good happens to me, I have people in my life that I like to share the good news with; (b) I have friends that I really care about; (c) there are people in my life who really care about me; and (d) when I have a problem, I have someone who will be there for me ($\alpha = .62$). Finally, happiness is measured by averaging responses to the following four statements: (a) I love life; (b) I am a cheerful person; (c) I feel happy; and (d) I have a lot of fun ($\alpha = .75$). Across all five variables, higher values indicate more positive adolescent functioning.

Maternal Depression. At the 1-, 3-, 5-, 9-, and 15-year surveys, maternal depression is measured based on responses to the Composite International Diagnostic Interview Short Form (CIDI-SF), Version 1.0, November 1998 (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998), an instrument that is commonly used in large-scale surveys to measure major depressive disorder (MDD) (Aalto-Setala et al. 2002). Mothers were first asked whether, at some time

during the previous year, they had feelings of depression or were unable to enjoy things they normally found pleasurable. Those who experienced at least one of these two conditions most of the day, every day, for a two-week period were asked an additional seven questions about the following: (a) losing interest in things; (b) feeling tired; (c) experiencing a change in weight of at least 10 pounds; (d) having trouble sleeping; (e) having trouble concentrating; (f) feeling worthless; and (g) thinking about death. Those who answered affirmatively to at least one of the stem questions and three of the additional questions are considered as likely having MDD in the previous year. The independent variables comprise three mutually exclusive measures that capture the timing of maternal depression: current depression, indicating the mother reported depression at the 15-year survey; prior depression, indicating the mother reported depression at the 1-, 3-, 5-, or 9-year surveys (but not at the 15-year survey); and no depression, indicating the mother did not report depression at any of the surveys. About 18% of mothers report current depression, 30% report prior depression, and 52% report no depression.

Mechanisms. We consider four sets of mechanisms that may explain the relationship between maternal depression and adolescent wellbeing, all measured at the 15-year survey: (1) family environment, (2) parent-adolescent relationship, (3) economic wellbeing, and (4) social support.

First, the family environment is measured with five variables. Mother separation is measured with a binary variable indicating the adolescent's biological mother and father are not in a romantic relationship. Parent relationship quality is measured by adolescent reports of the relationship quality between his/her parents (1 = *poor* to 5 = *excellent*). Number of partners is a continuous variable indicating the number of cohabiting partners the mother reported since the last interview. Environmental confusion is measured by averaging adolescent reports to the

following five statements (1 = *not true* to 3 = *often true*): (a) you can't hear yourself think in your home; (b) it's a real zoo in your home; (c) the children have a regular bedtime routine; (d) you are usually able to stay on top of things; and (e) the atmosphere in your house is calm (α = .48). Parenting stress is measured by averaging the mothers' responses to the following four statements (1 = *strongly disagree* to 4 = *strongly agree*): (a) being a parent or guardian is harder than I thought it would be; (b) I feel trapped by my responsibilities as a parent or guardian; (c) I find that taking care of my child(ren) is much more work than pleasure; and (d) I often feel tired, worn out, or exhausted from raising a family (α = .68).

Second, the parent-adolescent relationship is measured with five variables. Mother psychological aggression is a binary variable indicating the adolescent reported the mother sometimes or often shouted, yelled, screamed, swore, or cursed at him/her in the past year. Mother physical aggression is a binary variable indicating the adolescent reported the mother sometimes or often hit or slapped him/her in the past year. Adolescents reported on how close they felt to their mother (1 = *not very close* to 4 = *extremely close*) and father (1 = *not very close* to 4 = *extremely close*). Adolescents also reported on parental monitoring, an average of responses to the following two statements (1 = *never* to 3 = *often*): (a) how often primary caregiver knows what you do during your free time and (b) how often primary caregiver knows what you spend money on (α = .59).

Third, economic wellbeing is measured with three variables. Employment is a binary measure indicating the mother reports being employed. A continuous variable captures the log of household income. Material hardship is measured by summing the following 11 binary indicators of mother-reported hardship in the past year: (a) received free food or meals; (b) was very hungry but didn't eat because couldn't afford enough food in last year; (c) did not pay the full

amount of rent or mortgage payments; (d) evicted from home or apartment for not paying the rent or mortgage; (e) did not pay the full amount of gas, oil, or electricity bill; (f) gas or electric services ever turned off, or the heating oil company did not deliver oil, because there wasn't enough money to pay the bills; (g) borrowed money from friends or family to pay the bills; (h) moved in with other people even for a little while because of financial problems; (i) stayed in a shelter, abandoned building, an automobile, or any other place not meant for regular housing; (j) anyone in your household needed to see a doctor or go to the hospital but couldn't go because of the cost; and (k) telephone service (mobile or land line) cancelled or disconnected by the telephone company because there wasn't enough money to pay the bill.

Finally, social support is measured with two variables. Perceived social support is a sum of the following binary variables indicating the mother can rely on someone for the following: (a) loan for $200; (b) loan for $1,000; (c) place to live; (d) emergency child care; (e) cosigner for $1,000; and (f) cosigner for $5,000. Confidante is a binary variable indicating the mother has a special person he/she is close with (e.g., can share feelings with and depend on).

Control Variables. The multivariate analyses adjust for a number of demographic, socioeconomic, and behavioral characteristics of parents and adolescents. Unless otherwise noted, time-invariant controls are measured at the baseline survey and time-varying controls are measured at the 1-year survey. Therefore, the control variables are measured at or prior to the measurement of maternal depression.

Control variables include parents' race/ethnicity, immigrant status, age, and family structure in childhood (1 = *lived with both parents at age 15*). Family characteristics include relationship status (married, cohabiting, non-residential romantic relationship, separated), repartnership (1 = *partnered with someone besides the child's biological mother or father*),

relationship quality (1 = *poor* to 5 = *excellent*), number of children in the household, and parenting stress. Socioeconomic characteristics include educational attainment (less than high school, high school diploma or GED, some college, and college degree), material hardship, employment, income-to-poverty ratio, and perceived social support. We also adjust for several parent characteristics that might be especially associated with maternal depression and adolescent wellbeing, including binary variables indicating the mother's parent(s) and the father's parent(s) experienced depression (measured at the 3- and 5-year surveys) and continuous variables measuring mother's and father's cognitive skills (measured by the Weschler Adult Intelligence Scale [WAIS] at the 3-year survey). Adolescent child characteristics include gender, temperament (reported by the mother at the 1-year survey), and age (continuous variable, in years, at the 15-year survey).

Analytic Strategy

The analytic strategy proceeds in four stages. First, we examine descriptive differences in adolescent wellbeing, separately for adolescents exposed to maternal depression and adolescents not exposed to maternal depression. We use t-tests to examine statistically significant differences across these groups. Second, we use ordinary least squares (OLS) regression to estimate adolescent wellbeing as a function of maternal depression. These regression models adjust for all control variables described above. Third, we examine the relationship between maternal depression and adolescent wellbeing separately for girls and boys. We examine statistically significant differences in the coefficient for maternal depression across groups (Paternoster, Brame, Mazerrole, & Piquero, 1998). Fourth, we examine four sets of mechanisms that might explain the relationship between maternal depression and adolescent wellbeing: the family

environment, the parent-adolescent relationship, economic wellbeing, and social support. We estimate the relationship between maternal depression and each of the proposed mediators, the relationship between each of the proposed mediators and adolescent wellbeing, the relationship between maternal depression and adolescent wellbeing without the mediator, and the relationship between maternal depression and adolescent wellbeing with the mediator (Baron and Kenny 1986). We also conduct formal Sobel-Goodman tests of mediation.

Sample Description

Table 1 presents descriptive statistics of the sample. The majority of mothers are racial/ethnic minorities, with about half (50.3%) identifying as non-Hispanic Black and one-quarter (24.8%) identifying as Hispanic. On average, mothers are 26 years old and fathers are 29 years old at the 1-year survey. About one-third of mothers (33.1%) and fathers (31.2%) report that at least one of their parents suffered from depression. About two-thirds of adolescents' biological parents are in a romantic relationship at the 1-year survey (with 30.5% of them in a marital relationship, 26.5% of them in a cohabiting relationship, and 10.2% in a non-residential romantic relationship). Adolescents are, on average, 15.6 years old at the 15-year survey.

[Table 1 about here.]

RESULTS

Adolescent Wellbeing, by Maternal Depression

Table 2 presents descriptive statistics of adolescent wellbeing for three groups of adolescents: those with mothers who experienced current depression, those with mothers who experienced prior depression, and those with mothers who had not experienced depression. Adolescents of

mothers who experienced current depression, compared to those of mothers who had not experienced depression, report more depressive symptoms (1.694 compared to 1.532, $p < .001$) and anxiety (1.918 compared to 1.753, $p < .001$). Adolescents with currently depressed mothers also report lower positive adolescent functioning, as measured by perseverance (3.360 compared to 3.458, $p < .001$), optimism (3.378 compared to 3.437, $p < .05$), connectedness (3.749 compared to 3.782, $p < .10$), and happiness (3.518 compared to 3.592, $p < .01$). Contrary to expectations, adolescents with a depressed parent report more engagement (3.049 compared to 2.961, $p < .01$). There are also statistically significant differences in wellbeing between adolescents of mothers who experienced prior depression and adolescents of mothers who had not experienced depression, with the former group of adolescents reporting more depressive symptoms (1.626 compared to 1.532, $p < .001$) and anxiety (1.835 compared to 1.753, $p < . 01$) and less perseverance (3.413 compared to 3.458, $p < .05$), optimism (3.393 compared to 3.437, $p < .05$), and happiness (3.533 compared to 3.630, $p < .001$).

[Table 2 about here.]

Estimating Adolescent Wellbeing as a Function of Maternal Depression

Table 3 presents estimates from OLS regression models estimating adolescent wellbeing as a function of maternal depression. We present only the coefficients of interest, for parsimony, but include full models in Appendix Table 1. Model 1, which presents the unadjusted association, documents findings consistent with the descriptive findings. Current maternal depression is positively associated with adolescent depressive symptoms ($b = 0.161$, $p < .001$), anxiety ($b = 0.164$, $p < .001$), and engagement ($b = 0.088$, $p < .01$) and is negatively associated with perseverance ($b = -0.099$, $p < .001$), optimism ($b = -0.059$, $p < .05$), connectedness ($b = -0.033$, p

< .10), and happiness (b = -0.110, p < .001). Prior maternal depression is positively associated with depressive symptoms (b = 0.094, p < .001) and anxiety (b = 0.081, p < .01) and negatively associated with perseverance (b = -0.045, p < .05), optimism (b = -0.045, p < .05), and happiness (b = -0.095, p < .001).

[Table 3 about here.]

Model 2 adjusts for an array of control variables. By and large, the inclusion of the control variables reduces the magnitude but not statistical significance of the maternal depression coefficients. Current maternal depression remains associated with higher levels of depressive symptoms (b = 0.145, p < .001), anxiety (b = 0.156, p < .001), and engagement (b = 0.074, p < .05) and with lower levels of perseverance (b = -0.097, p < .001), optimism (b = -0.057, p < .05), and happiness (b = -0.098, p < .001). Prior maternal depression remains associated with higher levels of depressive symptoms (b = 0.075, p < .01) and anxiety (b = 0.068, p < .05) and with lower levels of perseverance (b = -0.037, p < .10), optimism (b = -0.039, p < .10), and happiness (b = -0.078, p < .001). In this model, the differences between current maternal depression and prior maternal depression are statistically significant for adolescent depressive symptoms (p = 0.030), anxiety (p = .014), engagement (p = .039), and perseverance (p = .023). Taken together, this table suggests that maternal depression, especially current maternal depression, has harmful consequences for adolescent wellbeing.

Variation in the Relationship between Maternal Depression and Adolescent Wellbeing, by Adolescent Gender

Table 4 presents estimates from OLS regression models estimating adolescent wellbeing as a function of maternal depression, separately for boys and girls. These models adjust for all

covariates. Current maternal depression is associated with adolescent depressive symptoms among both boys ($b = 0.086$, $p < .05$) and girls ($b = 0.224$, $p < .001$). But the magnitude of the association nearly three times larger for girls, and the difference in coefficients across these two groups is statistically significant ($z = -2.19$). The patterns of current maternal depression are similar for adolescent anxiety, with the association being larger in magnitude for girls ($b = 0.268$, $p < .001$) than for boys ($b = 0.057$, *n.s.*) and the difference in coefficients across groups statistically significant ($z = -3.03$). The association between current maternal depression and the five measures of positive adolescent functioning are statistically similar across boys and girls. Furthermore, the association between prior maternal depression and all outcome variables does not vary by adolescent gender. Taken together, these results show that current maternal depression, but not prior maternal depression, is more consequential for adolescent girls than for adolescent boys.

[Table 4 about here.]

Estimating Adolescent Wellbeing as a Function of Maternal Depression, Considering Mechanisms

We next consider how four sets of mechanisms—the family environment, the parent-adolescent relationship, economic wellbeing, and social support—explain the relationship between maternal depression and adolescent wellbeing. To do so, we first examine the relationship between maternal depression and each of the proposed mechanisms (see Appendix Table 2). We find that current and prior maternal depression, net of the control variables, is associated with four aspects of the family environment, including a greater likelihood of separation, lower relationship quality, more environmental confusion, and more parenting stress. We also find that current and,

in some cases, prior, maternal depression is associated with the parent-adolescent relationship including a greater likelihood of psychological aggression, a greater likelihood of physical aggression, less closeness to mothers and fathers, and less parental monitoring). Maternal depression is also associated with all indicators of economic wellbeing (material hardship, household income, and employment) and social support (perceived social support and presence of a confidante).

Table 5 considers how these mechanisms may explain the relationship between maternal depression and adolescent wellbeing. Here we present results for the full sample, since most of the associations are similar for adolescent boys and girls, though supplemental analyses that restrict the sample to adolescent girls produce similar results. We turn first to the estimates of depressive symptoms. In Model 1, the baseline model (and the equivalent to the full model in Table 3), current maternal depression ($b = 0.145$, $p < .001$) and prior maternal depression ($b = 0.075$, $p < .01$) is associated with more depressive symptoms in adolescents. In Model 2, which adjusts for the family environment, the current maternal depression coefficient is reduced in magnitude by 59% ($b = 0.059$, $p < .05$) and the prior maternal depression coefficient is reduced in magnitude by 73% and to statistical non-significance ($b = 0.020$, *n.s.*). In Model 3, which adjusts for the parent-adolescent relationship, the coefficient for current maternal depression is reduced by 40% ($b = 0.087$, $p < .01$) and the coefficient for prior maternal depression is reduced by 35% ($b = 0.049$, $p < .10$). In Model 4, which adjusts for economic wellbeing, the coefficients for current and prior maternal depression are reduced by 17% ($b = 0.121$, $p < .001$) and 7% ($b = 0.070$, $p < .01$), respectively. In Model 5, which adjusts for social support, these coefficients are reduced by 5% ($b = 0.138$, $p < .001$) and 4% ($b = 0.072$, $p < .01$), respectively. In Model 6, which includes all potential mechanisms, the relationship between maternal depression and

adolescent wellbeing is statistically non-significant, with the coefficients for both current and prior maternal depression reduced by 74% from the baseline model. Taken together, this table suggests that the family environment and parent-adolescent relationship, but not economic wellbeing or social support, explains a large share of the association between maternal depression and adolescent wellbeing.

[Table 5 about here.]

These overall patterns persist across the additional outcomes. For example, in the estimates of anxiety, family environment explains 49% and 72% of the coefficients for current and prior maternal depression, respectively. Family environment explains 24% and 100% in the estimates of engagement, 47% and 81% in the estimates of perseverance, 82% and 74% in the estimates of optimism, and 58% and 47% in the estimates of happiness. Additionally, the parent-adolescent relationship explains 32% of the coefficients for both current and prior maternal depression in the estimates of anxiety, 3% and 25% in the estimates of engagement, 35% and 43% in the estimates of perseverance, 61% and 38% in the estimates of optimism, and 48% and 27% in the estimates of happiness. Economic wellbeing and social support explain little of the relationship between maternal depression and adolescent wellbeing.

SUMMARY

Prior research finds that parental depression has deleterious consequences for children (Minkovitz et al., 2005; Turney, 2011a; Turney, 2011b). This paper adds to that research by showing how maternal depression impacts not only depression and anxiety but also positive indicators of adolescent wellbeing. We find that maternal depression is significantly associated with depression and anxiety in teens, and negatively associated with engagement, perseverance,

and happiness, net of a host of other contextual factors. Furthermore, we find that associations between maternal depression and our two mental health outcomes, depression and anxiety, are stronger in girls than boys. Finally, we find that the family environment and parent-child relationships are important mechanisms in the association between parental depression and adolescent wellbeing, while economic wellbeing and social support are not. Thus, we find that interpersonal processes and structural features of the family are particularly important in instigating the cascading impact of the misfortune of one family member on others.

REFERENCES

Aalto-Setälä, Terhi, L. Haarasilta, M. Marttunen, A. Tuulio-Henriksson, K. Poikolainen, H. Aro, and J. Lönnqvist. Major depressive episode among young adults: CIDI-SF versus SCAN consensus diagnoses. *Psychological Medicine* 32, no. 7 (2002): 1309-1314.

Achenbach, T. M. (1992). *Manual for the Child Behavior Checklist/2 – 3 and 1992 profile*. Burlington: University of Vermont Department of Psychiatry.

Amato, P. R. (2010). Research on Divorce: Continuing Trends and New Developments. *Journal of Marriage and Family*, *72*(3), 650–666.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Bender, P. K., Reinholdt-Dunne, M. L., Esbjørn, B. H., & Pons, F. (2012). Emotion dysregulation and anxiety in children and adolescents: Gender differences. *Personality and Individual Differences*, *53*(3), 284–288.

Bertrand, M., & Pan, J. (2013). The Trouble with Boys: Social Influences and the Gender Gap in Disruptive Behavior. *American Economic Journal: Applied Economics*, *5*(1), 32–64.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513–531.

Brown, S. L. (2006). Family structure transitions and adolescent well-being. *Demography*, *43*(3), 447–461.

Burke, L. (2003). The impact of maternal depression on familial relationships. *International Review of Psychiatry*, *15*(3), 243–255.

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, *100*(3), 316–336.

Cooper, C. E., Beck, A. N., Högnäs, R. S., & Swanson, J. (2015). Mothers' Partnership Instability and Coparenting among Fragile Families. *Social Science Quarterly*, *96*(4), 1103–1116.

Cummings, E. M., DeArth-Pendley, G., Du Rocher Schudlich, T., & Smith, D. A. (2001). Parental depression and family functioning: Toward a process-oriented model of children's adjustment. In *Marital and family processes in depression: A scientific foundation for clinical practice* (pp. 89–110). Washington, DC, US: American Psychological Association.

Davies, P. T., & Windle, M. (1997). Gender-specific pathways between maternal depressive symptoms, family discord, and adolescent adjustment. *Developmental Psychology*, *33*(4), 657–668.

Derogatis, L. R. & Savitz, K. L. (2000). The SCL–90–R and Brief Symptom Inventory (BSI) in primary care. In Maruish, M. E. (Ed), (2000). Handbook of psychological assessment in primary care settings, (pp. 297-334). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, xiv, 848 pp.

Elder, G. H. (1998). The Life Course as Developmental Theory. *Child Development*, *69*(1), 1–12.

England, M. J., & Sim, L. J. (2009). *Depression in parents, parenting, and children: Opportunities to improve identification, treatment, and prevention*. Washington, DC, US: National Academies Press.

Essau, C. A., Lewinsohn, P. M., Seeley, J. R., & Sasagawa, S. (2010). Gender differences in the developmental course of depression. *Journal of Affective Disorders*, *127*(1), 185–190.

Fosco, G. M., Stormshak, E. A., Dishion, T. J., & Winter, C. E. (2012). Family Relationships and Parental Monitoring During Middle School as Predictors of Early Adolescent Problem Behavior. *Journal of Clinical Child & Adolescent Psychology*, *41*(2), 202–213.

Goodman, S. H. (2007). Depression in Mothers. *Annual Review of Clinical Psychology*, *3*(1), 107–135.

Goodman, S. H., Rouse, M. H., Connell, A. M., Broth, M. R., Hall, C. M., & Heyward, D. (2011). Maternal Depression and Child Psychopathology: A Meta-Analytic Review. *Clinical Child and Family Psychology Review; New York*, *14*(1), 1–27.

Hardie, J. H., & Lucas, A. (2010). Economic Factors and Relationship Quality Among Young Couples: Comparing Cohabitation and Marriage. *Journal of Marriage and Family*, *72*(5), 1141–1154.

Hardie, J. H., & Turney, K. (2017). The Intergenerational Consequences of Parental Health Limitations. *Journal of Marriage and Family*, *79*(3), 801–815.

Harker, K. (2001). Immigrant Generation, Assimilation, and Adolescent Psychological Well-Being. *Social Forces*, *79*(3), 969–1004.

Katon, W. J. (2003). Clinical and health services relationships between major depression, depressive symptoms, and general medical illness. *Biological Psychiatry*, *54*(3), 216–226.

Kern, M. L., Benson, L., Steinberg, E. A., & Steinberg, L. (2016). The EPOCH Measure of Adolescent Well-Being. *Psychological Assessment*, *28*(5), 586–597.

Kessler, R.C., Andrews, G., Mroczek, D., Ustun, T.B., & Wittchen, H.U. (1998). The world health organization composite international diagnostic interview short-form (CIDI- SF). International Journal of Methods in Psychiatric Research, 7, 171-185.

Larson, R. W. (2000). Toward a psychology of positive youth development. *The American Psychologist*, *55*(1), 170–183.

Laursen, B., & Collins, W. A. (2009). Parent-Child Relationships in Adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of Adolescent Psychology, Volume 2: Contextual Influences on Adolescent Development*. John Wiley & Sons.

Lerner, D., Adler, D. A., Chang, H., Lapitsky, L., Hood, M. Y., Perissinotto, C., … Rogers, W. H. (2004). Unemployment, Job Retention, and Productivity Loss Among Employees With Depression. *Psychiatric Services*, *55*(12), 1371–1378.

Lerner, D., & Henke, R. M. (2008). What Does Research Tell Us About Depression, Job Performance, and Work Productivity? *Journal of Occupational and Environmental Medicine*, *50*(4), 401.

Lin, N., Dean, A., & Ensel, W. M. (2013). *Social Support, Life Events, and Depression*. Academic Press.

Manning, W. D., & Lamb, K. A. (2003). Adolescent Well-Being in Cohabiting, Married, and Single-Parent Families. *Journal of Marriage and Family*, *65*(4), 876–893.

Minkovitz, C. S., Strobino, D., Scharfstein, D., Hou, W., Miller, T., Mistry, K. B., & Swartz, K. (2005). Maternal Depressive Symptoms and Children's Receipt of Health Care in the First 3 Years of Life. *Pediatrics*, *115*(2), 306–314.

Oquendo, M. A., Barrera, A., Ellis, S. P., Li, S., Burke, A. K., Grunebaum, M., … Mann, J. J. (2004). Instability of Symptoms in Recurrent Major Depression: A Prospective Study. *American Journal of Psychiatry*, *161*(2), 255–261.

Park, N. (2004). The Role of Subjective Well-Being in Positive Youth Development. *The ANNALS of the American Academy of Political and Social Science*, *591*(1), 25–39.

Paternoster, R., Brame, R., Mazerolle, P., & Piquero, A. (1998). Using the correct statistical test for the equality of regression coefficients. *Criminology*, *36*(4), 859-866.

Perlis, R. H., Fraguas, R., Fava, M., Trivedi, M. H., Luther, J. F., Wisniewski, S. R., & Rush, A. J. (2005). Prevalence and clinical correlates of irritability in major depressive disorder: a preliminary report from the Sequenced Treatment Alternatives to Relieve Depression study. *The Journal of Clinical Psychiatry*, *66*(2), 159–166; quiz 147, 273–274.

Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth Life Satisfaction: A Review of the Literature. *Journal of Happiness Studies*, *10*(5), 583–630.

Radloff, L. S. (1977). The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. Applied Psychological Measurement, 1(3): 385-401.

Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, *23*(4-5), 303-326.

Schneider, D., Harknett, K., & McLanahan, S. (2016). Intimate Partner Violence in the Great Recession. *Demography*, *53*(2), 471–505.

Steinberg, L. (2001). We Know Some Things: Parent–Adolescent Relationships in Retrospect and Prospect. *Journal of Research on Adolescence*, *11*(1), 1–19.

Steinberg, L., & Morris, A. S. (2001). Adolescent Development. *Annual Review of Psychology*, *52*(1), 83–110.

Turney, K. (2011a). Chronic and Proximate Depression Among Mothers: Implications for Child Well-Being. *Journal of Marriage and Family*, *73*(1), 149–163.

Turney, K. (2011b). Maternal Depression and Childhood Health Inequalities. *Journal of Health and Social Behavior*, *52*(3), 314–332.

van Wijngaarden, B., Schene, A. H., & Koeter, M. W. J. (2004). Family caregiving in depression: impact on caregivers' daily life, distress, and help seeking. *Journal of Affective Disorders*, *81*(3), 211–222.

Yeung, W. J., & Hofferth, S. L. (1998). Family Adaptations to Income and Job Loss in the U.S. *Journal of Family and Economic Issues*, *19*(3), 255–283.

Table 1. Descriptive Statistics of Sample

	Mean or %	SD
Mother race/ethnicity (b)		
White (non-Hispanic)	21.2%	
Black (non-Hispanic)	50.3%	
Hispanic	24.8%	
Other race (non-Hispanic)	3.7%	
Mother and father mixed-race couple (b)	14.6%	
Mother immigrant (b)	14.1%	
Mother age (y1)	26.426	(5.996)
Father age (y1)	28.829	(7.078)
Mother lived with both parents at age 15 (b)	42.5%	
Mother parent(s) depressed (y3, y5)	33.1%	
Father parent(s) depressed (y3, y5)	31.2%	
Mother and father relationship status (y1)		
Married	30.5%	
Cohabiting	26.5%	
Non-residential romantic relationship	10.2%	
Separated	32.9%	
Mother repartnered (y1)	11.5%	
Father repartnered (y1)	11.0%	
Mother relationship quality (y1)	3.293	(1.410)
Father relationship quality (y1)	3.581	(1.233)
Mother number of children in household (y1)	2.283	(1.282)
Father number of children in household (y1)	1.666	(1.412)
Mother parenting stress (y1)	2.176	(0.661)
Father parenting stress (y1)	2.090	(0.678)
Mother educational attainment (y1)		
Less than high school	28.1%	
High school diploma or GED	28.1%	
Some college	31.4%	
College degree	12.5%	
Father educational attainment (y1)		
Less than high school	30.3%	
High school diploma or GED	35.2%	
Some college	23.4%	
College degree	11.1%	
Mother material hardship (y1)	1.144	(1.597)
Father material hardship (y1)	1.034	(1.562)
Mother employment (y1)	55.9%	
Father employment (y1)	76.3%	
Mother income-to-poverty ratio (y1)	1.893	(2.255)
Father income-to-poverty ratio (y1)	2.515	(3.123)
Mother perceived social support (y1)	4.106	(1.787)
Father perceived social support (y1)	4.365	(1.777)
Mother cognitive skills (y3)	6.825	(2.652)
Father cognitive skills (y3)	6.489	(2.715)
Child male (b)	51.0%	
Child temperament (y1)	3.412	(0.761)
Child age, years (y15)	15.572	(0.755)

Mechanisms		
Mother and father separated (y15)	67.7%	
Parent relationship quality (y15)	2.781	(1.490)
Mother number of cohabiting partners (y15)	0.734	(0.610)
Environmental confusion (y15)	1.493	(0.370)
Mother parenting stress (y15)	2.058	(0.697)
Mother psychological aggression (y15)	65.7%	
Mother physical aggression (y15)	12.9%	
Closeness to mother (y15)	3.431	(0.803)
Closeness to father (y15)	2.340	(1.226)
Parental monitoring (y15)	2.700	(0.441)
Mother material hardship (y15)	1.260	(1.791)
Mother household income, logged (y15)	10.544	(1.112)
Mother employment (y15)	71.1%	
Mother perceived social support (y15)	4.271	(1.990)
Mother confidante (y15)	89.6%	
N	3,013	

Notes: b = measured at baseline, y3 = measured at 3-year survey, y5 = measured at 5-year survey, y15 = measured at 15-year survey

Table 2. Means of Adolescent Wellbeing, by Maternal Depression

	Current depression N = 542		Prior depression N = 917		No depression N = 1,554
Depressive symptoms	1.694	***	1.626	***	1.532
Anxiety	1.918	***	1.835	**	1.753
Engagement	3.049	**	2.968		2.961
Perseverance	3.360	***	3.413	*	3.458
Optimism	3.378	*	3.393	*	3.437
Connectedness	3.749	^	3.766		3.782
Happiness	3.518	***	3.533	***	3.630

Note: Asterisks indicate statistically significant differences between groups (comparing current depression and prior depression to no depression). $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3. OLS Regression Models Estimating Adolescent Wellbeing as a Function of Maternal Depression

	Model 1 *unadjusted*			Model 2 *+ controls*		
A. Depressive symptoms						
Current depression	0.161	(0.030)	***	0.145	(0.031)	***
Prior depression	0.094	(0.026)	***	0.075	(0.027)	**
B. Anxiety						
Current depression	0.164	(0.032)	***	0.156	(0.034)	***
Prior depression	0.081	(0.028)	**	0.068	(0.029)	*
C. Engagement						
Current depression	0.088	(0.031)	**	0.074	(0.033)	*
Prior depression	0.007	(0.026)		0.004	(0.028)	
D. Perseverance						
Current depression	-0.099	(0.024)	***	-0.097	(0.025)	***
Prior depression	-0.045	(0.021)	*	-0.037	(0.022)	^
E. Optimism						
Current depression	-0.059	(0.024)	*	-0.057	(0.026)	*
Prior depression	-0.045	(0.021)	*	-0.039	(0.022)	^
F. Connectedness						
Current depression	-0.033	(0.018)	^	-0.024	(0.019)	
Prior depression	-0.017	(0.015)		-0.009	(0.016)	
G. Happiness						
Current depression	-0.110	(0.025)	***	-0.098	(0.026)	***
Prior depression	-0.095	(0.021)	***	-0.078	(0.022)	***

Note: Model 2 adjusts for the following control variables: mother race/ethnicity, mother and father mixed-race couple, mother immigrant, mother and father age, mother lived with both parents at age 15, mother and father parent(s) depressed, mother and father relationship status, mother and father repartnered, mother and father relationship quality, mother and father number of children in household, mother and father parenting stress, mother and father educational attainment, mother and father material hardship, mother and father employment, mother and father income-to-poverty ratio, mother and father perceived social support, mother and father cognitive skills, child male, child temperament, and child age. Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4. OLS Regression Models Estimating Adolescent Wellbeing as a Function of Maternal Depression, by Adolescent Gender

	Boys N = 1,537			Girls N = 1,476			*z*-score
A. Depressive symptoms							
Current depression	0.086	(0.041)	*	0.224	(0.048)	***	-2.19
Prior depression	0.068	(0.037)	^	0.084	(0.040)	*	-0.29
B. Anxiety							
Current depression	0.057	(0.045)		0.268	(0.053)	***	-3.03
Prior depression	0.097	(0.039)	*	0.042	(0.045)		0.92
C. Engagement							
Current depression	0.012	(0.045)		0.129	(0.048)	**	-1.78
Prior depression	-0.031	(0.039)		0.040	(0.040)		-1.27
D. Perseverance							
Current depression	-0.113	(0.034)	**	-0.080	(0.038)	*	-0.65
Prior depression	-0.051	(0.030)	^	-0.026	(0.032)		-0.57
E. Optimism							
Current depression	-0.058	(0.035)	^	-0.058	(0.038)		0.00
Prior depression	-0.056	(0.031)	^	-0.025	(0.032)		-0.70
F. Connectedness							
Current depression	-0.029	(0.027)		-0.019	(0.027)		-0.26
Prior depression	-0.008	(0.023)		-0.010	(0.023)		0.06
G. Happiness							
Current depression	-0.088	(0.034)	*	-0.109	(0.040)	**	0.40
Prior depression	-0.085	(0.030)	**	-0.075	(0.033)	*	-0.22

Note: Models adjust for all control variables in Model 2 of Table 3. Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5. OLS Regression Models Estimating Adolescent Wellbeing as a Function of Maternal Depression, with Mechanisms

	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	Baseline			*+ family environment*			*+ parent-adolescent relationship*			*+ economic wellbeing*			*+ social support*			*+ all mechanisms*		
A. Depressive symptoms																		
Current depression	0.145	(0.031)	***	0.059	(0.029)	*	0.087	(0.029)	**	0.121	(0.032)	***	0.138	(0.032)	***	0.038	(0.030)	
Prior depression	0.075	(0.027)	**	0.020	(0.025)		0.049	(0.025)	^	0.070	(0.027)	**	0.072	(0.027)	**	0.019	(0.024)	
B. Anxiety																		
Current depression	0.156	(0.034)	***	0.079	(0.033)	*	0.106	(0.033)	**	0.136	(0.035)	***	0.154	(0.034)	***	0.064	(0.034)	^
Prior depression	0.068	(0.029)	*	0.019	(0.028)		0.046	(0.028)		0.065	(0.029)	*	0.068	(0.029)	*	0.019	(0.027)	
C. Engagement																		
Current depression	0.074	(0.033)	*	0.056	(0.033)	^	0.072	(0.033)	*	0.063	(0.034)	^	0.077	(0.033)	*	0.051	(0.034)	
Prior depression	0.004	(0.028)		-0.006	(0.028)		0.003	(0.028)		0.003	(0.028)		0.005	(0.028)		-0.006	(0.028)	
D. Perseverance																		
Current depression	-0.097	(0.025)	***	-0.051	(0.025)	*	-0.063	(0.025)	*	-0.091	(0.026)	**	-0.094	(0.026)	***	-0.045	(0.025)	^
Prior depression	-0.037	(0.022)	^	-0.007	(0.021)		-0.021	(0.021)		-0.036	(0.022)	^	-0.036	(0.022)	^	-0.008	(0.020)	
E. Optimism																		
Current depression	-0.057	(0.026)	*	-0.010	(0.025)		-0.022	(0.025)		-0.057	(0.027)	*	-0.055	(0.026)	*	-0.010	(0.026)	
Prior depression	-0.039	(0.022)	^	-0.010	(0.022)		-0.024	(0.021)		-0.038	(0.022)	^	-0.038	(0.022)	^	-0.012	(0.021)	
F. Connectedness																		
Current depression	-0.024	(0.019)		0.011	(0.019)		0.005	(0.018)		-0.021	(0.020)		-0.017	(0.019)		0.018	(0.019)	
Prior depression	-0.009	(0.016)		0.013	(0.016)		0.004	(0.015)		-0.008	(0.016)		-0.007	(0.016)		0.014	(0.015)	
G. Happiness																		
Current depression	-0.098	(0.026)	***	-0.041	(0.025)		-0.051	(0.024)	*	-0.090	(0.027)	**	-0.093	(0.026)	***	-0.031	(0.025)	
Prior depression	-0.078	(0.022)	***	-0.041	(0.021)	*	-0.057	(0.021)	**	-0.076	(0.022)	**	-0.077	(0.022)	**	-0.041	(0.020)	*

Note: Models adjust for all control variables in Model 2 of Table 3. Model 2 adjusts for mother and father separated, parent relationship quality, mother number of cohabiting partners, environmental confusion, and mother parenting stress. Model 3 adjusts for mother psychological aggression, mother physical aggression, closeness to mother, closeness to father, and parental monitoring. Model 4 adjusts for mother material hardship, mother household income, and mother employment. Model 5 adjusts for mother perceived social support and mother confidante. Model 6 adjusts for all mechanisms. Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

APPENDIX

Appendix Table 1. OLS Regression Models Estimating Adolescent Depression and Anxiety as a Function of Maternal Depression

	Depressive symptoms			Anxiety		
Maternal depression						
Current depression	0.145	(0.031)	***	0.156	(0.034)	***
Prior depression	0.075	(0.027)	**	0.068	(0.029)	*
Mother race/ethnicity (reference = White [non-Hispanic])						
Black (non-Hispanic)	-0.045	(0.034)		-0.097	(0.037)	**
Hispanic	0.004	(0.038)		-0.005	(0.041)	
Other race (non-Hispanic)	0.013	(0.066)		-0.020	(0.073)	
Mother and father mixed-race couple	-0.052	(0.030)		-0.045	(0.036)	
Mother immigrant	0.009	(0.039)		-0.022	(0.043)	
Mother age	-0.002	(0.003)		-0.005	(0.003)	
Father age	0.003	(0.002)		0.002	(0.003)	
Mother lived with both parents at age 15	0.053	(0.024)	*	0.041	(0.026)	
Mother parent(s) depressed	0.000	(0.025)		-0.009	(0.027)	
Father parent(s) depressed	-0.032	(0.027)		0.034	(0.029)	
Mother and father relationship status (reference = married)						
Cohabiting	0.031	(0.033)		0.061	(0.037)	^
Non-residential romantic relationship	0.047	(0.048)		0.064	(0.052)	
Separated	-0.013	(0.047)		0.033	(0.051)	
Mother repartnered	0.017	(0.041)		-0.031	(0.045)	
Father repartnered	-0.007	(0.049)		0.025	(0.050)	
Mother relationship quality	0.004	(0.012)		0.024	(0.013)	^
Father relationship quality	-0.030	(0.012)	*	-0.016	(0.013)	
Mother number of children in household	0.003	(0.014)		0.024	(0.015)	
Father number of children in household	0.010	(0.014)		0.004	(0.015)	
Mother parenting stress	0.038	(0.019)	*	0.022	(0.020)	
Father parenting stress	0.001	(0.020)		-0.002	(0.020)	
Mother educational attainment (reference = less than high school)						

High school diploma or GED	-0.011	(0.031)		-0.001	(0.034)	
Some college	0.000	(0.033)		0.068	(0.036)	^
College degree	0.009	(0.053)		0.077	(0.058)	
Father educational attainment (reference = less than high school)						
High school diploma or GED	0.001	(0.029)		0.005	(0.032)	
Some college	-0.070	(0.034)	*	-0.049	(0.038)	
College degree	-0.090	(0.052)	^	-0.087	(0.057)	
Mother material hardship	-0.050	(0.011)		0.001	(0.012)	
Father material hardship	0.006	(0.011)		-0.001	(0.012)	
Mother employment	0.019	(0.023)		-0.011	(0.026)	
Father employment	-0.017	(0.030)		-0.019	(0.034)	
Mother income-to-poverty ratio	-0.005	(0.008)		0.001	(0.009)	
Father income-to-poverty ratio	-0.004	(0.005)		-0.002	(0.006)	
Mother perceived social support	-0.015	(0.007)	*	-0.027	(0.008)	**
Father perceived social support	-0.003	(0.008)		0.000	(0.009)	
Mother cognitive skills	-0.005	(0.005)		-0.008	(0.005)	
Father cognitive skills	0.004	(0.005)		-0.001	(0.005)	
Child male	-0.129	(0.022)	***	-0.101	(0.024)	***
Child temperament	-0.004	(0.015)		-0.018	(0.017)	
Child age	0.002	(0.014)		-0.019	(0.016)	
Constant		1.673			2.303	
N		3,013			3,013	

Note: Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Appendix Table 2. OLS Regression Models Estimating Adolescent EPOCH Measures as a Function of Maternal Depression

	Engagement			Perserverance			Optimism			Connectedness			Happiness		
Maternal depression															
Current depression	0.074	(0.033)	*	-0.097	(0.025)	***	-0.057	(0.026)	*	-0.024	(0.019)		-0.098	(0.026)	***
Prior depression	0.004	(0.028)		-0.037	(0.022)	^	-0.039	(0.022)	^	-0.009	(0.016)		-0.078	(0.022)	***
Mother race/ethnicity (reference = White [non-Hispanic])															
Black (non-Hispanic)	-0.042	(0.035)		0.080	(0.027)	**	0.152	(0.028)	***	-0.009	(0.021)		0.058	(0.028)	*
Hispanic	-0.058	(0.039)		0.079	(0.031)	*	0.068	(0.010)	*	0.021	(0.023)		0.027	(0.032)	
Other race (non-Hispanic)	0.041	(0.069)		0.039	(0.054)		0.014	(0.055)		-0.001	(0.041)		-0.022	(0.055)	
Mother and father mixed-race couple	0.004	(0.035)		0.004	(0.027)		0.033	(0.027)		0.009	(0.020)		0.010	(0.028)	
Mother immigrant	-0.010	(0.041)		-0.121	(0.032)	***	-0.105	(0.032)	**	-0.063	(0.024)	**	-0.097	(0.033)	**
Mother age	-0.001	(0.003)		0.000	(0.002)		0.002	(0.002)		0.002	(0.002)		0.003	(0.003)	
Father age	-0.002	(0.003)		0.000	(0.002)		0.000	(0.002)		-0.002	(0.002)		-0.002	(0.002)	
Mother lived with both parents at age 15	-0.052	(0.025)	*	0.004	(0.020)		-0.022	(0.020)		-0.007	(0.015)		-0.016	(0.020)	
Mother parent(s) depressed	0.001	(0.026)		-0.038	(0.020)	^	-0.013	(0.021)		-0.008	(0.015)		-0.026	(0.021)	
Father parent(s) depressed	-0.010	(0.028)		-0.023	(0.022)		-0.080	(0.022)		-0.002	(0.016)		-0.020	(0.023)	
Mother and father relationship status (reference = married)															
Cohabiting	0.133	(0.035)	***	0.031	(0.027)		-0.018	(0.028)		0.008	(0.021)		0.022	(0.028)	
Non-residential romantic relationship	0.088	(0.049)	^	0.041	(0.039)		-0.038	(0.039)		0.019	(0.029)		-0.013	(0.040)	
Separated	0.088	(0.049)	^	0.034	(0.037)		-0.012	(0.038)		0.039	(0.029)		0.037	(0.040)	
Mother repartnered	0.059	(0.043)		0.028	(0.034)		0.001	(0.034)		-0.007	(0.026)		0.021	(0.034)	
Father repartnered	0.002	(0.047)		0.023	(0.037)		0.035	(0.037)		0.018	(0.027)		0.024	(0.038)	
Mother relationship quality	0.008	(0.013)		0.013	(0.010)		-0.007	(0.010)		0.005	(0.007)		0.012	(0.010)	
Father relationship quality	0.004	(0.014)		-0.004	(0.010)		0.010	(0.010)		0.015	(0.008)	^	0.013	(0.011)	
Mother number of children in household	0.006	(0.014)		0.001	(0.011)		-0.001	(0.011)		-0.011	(0.008)		-0.002	(0.011)	
Father number of children in household	0.006	(0.015)		-0.002	(0.011)		-0.007	(0.011)		0.001	(0.008)		-0.008	(0.012)	
Mother parenting stress	-0.007	(0.019)		-0.021	(0.015)		-0.028	(0.015)	^	-0.013	(0.011)		-0.009	(0.015)	
Father parenting stress	-0.001	(0.021)		0.001	(0.017)		-0.001	(0.016)		0.019	(0.013)		0.018	(0.017)	
Mother educational attainment (reference = less than high school)															
High school diploma or GED	-0.021	(0.032)		0.014	(0.025)		0.001	(0.025)		0.012	(0.019)		0.022	(0.026)	
Some college	0.010	(0.034)		-0.068	(0.027)	*	-0.005	(0.027)		-0.001	(0.020)		0.007	(0.027)	
College degree	-0.087	(0.055)		-0.075	(0.043)	^	-0.053	(0.044)		-0.040	(0.032)		0.021	(0.044)	
Father educational attainment (reference = less than high school)															
High school diploma or GED	-0.026	(0.030)		0.037	(0.023)		0.001	(0.024)		0.009	(0.018)		-0.004	(0.024)	

Some college	-0.026	(0.036)		0.022	(0.028)		0.017	(0.028)		0.051	(0.021)	*	0.036	(0.029)		
College degree	-0.114	(0.055)	*	0.059	(0.043)		-0.010	(0.043)		0.053	(0.032)	^	0.026	(0.043)		
Mother material hardship	-0.006	(0.012)		0.003	(0.010)		0.005	(0.009)		0.008	(0.007)		0.040	(0.010)		
Father material hardship	-0.008	(0.013)		-0.011	(0.010)		-0.018	(0.009)	^	-0.008	(0.007)		-0.011	(0.010)		
Mother employment	-0.042	(0.025)	^	-0.011	(0.019)		-0.015	(0.020)		-0.007	(0.014)		-0.036	(0.019)	^	
Father employment	0.026	(0.034)		0.001	(0.026)		0.027	(0.028)		0.006	(0.021)		0.009	(0.027)		
Mother income-to-poverty ratio	0.017	(0.009)	^	0.000	(0.006)		-0.001	(0.007)		0.005	(0.005)		-0.004	(0.007)		
Father income-to-poverty ratio	-0.003	(0.006)		0.003	(0.004)		0.004	(0.004)		-0.001	(0.003)		0.005	(0.005)		
Mother perceived social support	0.001	(0.008)		-0.007	(0.006)		0.004	(0.006)		0.008	(0.005)		0.012	(0.006)	^	
Father perceived social support	0.006	(0.008)		-0.002	(0.007)		0.003	(0.006)		0.005	(0.005)		0.004	(0.006)		
Mother cognitive skills	-0.002	(0.005)		-0.003	(0.004)		0.001	(0.004)		0.001	(0.003)		-0.003	(0.004)		
Father cognitive skills	0.000	(0.005)		-0.016	(0.004)	***	-0.011	(0.004)	**	-0.003	(0.003)		-0.004	(0.018)		
Child male	0.077	(0.023)	**	0.019	(0.018)		0.024	(0.018)		-0.026	(0.013)	*	0.098	(0.018)	***	
Child temperament	-0.003	(0.016)		0.003	(0.013)		0.003	(0.012)		0.010	(0.009)		0.021	(0.013)	^	
Child age	-0.014	(0.015)		0.027	(0.012)	*	0.019	(0.012)		-0.001	(0.009)		-0.009	(0.012)		
Constant		3.188			3.127			3.105			3.648					3.4
N		3,013			3,013			3,013			3,013					3,0

Note: Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Appendix Table 3. OLS or Logistic Regression Models Estimating Mechanisms as a Function of Maternal Depression

	Model 1			Model 2		
Family Environment						
A. Mother and father separated						
Current depression	0.845	(0.117)	***	0.558	(0.144)	***
Prior depression	0.592	(0.093)	***	0.443	(0.115)	***
B. Parent relationship quality						
Current depression	-0.580	(0.080)	***	-0.346	(0.079)	***
Prior depression	-0.444	(0.067)	***	-0.283	(0.066)	***
C. Mother number of cohabiting partners						
Current depression	0.058	(0.031)	^	0.048	(0.032)	
Prior depression	0.013	(0.027)		0.012	(0.028)	
D. Enviromental confusion						
Current depression	0.095	(0.018)	***	0.086	(0.019)	***
Prior depression	0.065	(0.016)	***	0.057	(0.017)	**
E. Mother parenting stress						
Current depression	0.407	(0.034)	***	0.317	(0.034)	***
Prior depression	0.215	(0.029)	***	0.128	(0.029)	***
Parent-Adolescent Relationship						
F. Mother psychological aggression						
Current depression	0.528	(0.011)	***	0.393	(0.119)	**
Prior depression	0.279	(0.090)	**	0.165	(0.097)	^
G. Mother physical aggression						
Current depression	0.345	(0.014)	*	0.278	(0.016)	^
Prior depression	0.123	(0.132)		0.054	(0.141)	
H. Closeness to mother						
Current depression	-0.148	(0.040)	***	-0.132	(0.042)	**
Prior depression	-0.081	(0.034)	*	-0.056	(0.036)	
I. Closeness to father						
Current depression	-0.316	(0.061)	***	-0.189	(0.060)	**
Prior depression	-0.229	(0.052)	***	-0.128	(0.051)	*
J. Parental monitoring						
Current depression	-0.097	(0.022)	***	-0.077	(0.023)	**
Prior depression	-0.038	(0.019)	*	-0.027	(0.020)	

Economic Wellbeing						
K. Mother material hardship						
Current depression	1.604	(0.085)	***	1.225	(0.085)	***
Prior depression	0.495	(0.074)	***	0.215	(0.074)	**
L. Mother household income, logged						
Current depression	-0.479	(0.055)	***	-0.314	(0.049)	***
Prior depression	-0.184	(0.048)	***	-0.076	(0.042)	^
M. Mother employment						
Current depression	-0.909	(0.106)	***	-0.844	(0.120)	***
Prior depression	-0.355	(0.097)	***	-0.250	(0.109)	*
Social Support						
N. Mother perceived social support						
Current depression	-0.908	(0.100)	***	-0.572	(0.092)	***
Prior depression	-0.494	(0.086)	***	-0.193	(0.078)	*
O. Mother confidante						
Current depression	-0.368	(0.158)	*	-0.381	(0.182)	*
Prior depression	-0.258	(0.143)	^	-0.182	(0.162)	

Note: Logistic regression models estimate parent separated, parent psychological aggression, parent physical aggression, parent employment, and parent confidante. Ordinary least squares (OLS) regression models estimate the other outcomes. Models adjust for all control variables in Model 2 of Table 3. Standard errors in parentheses. ^ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.