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Investigating the Relationship between Teenage Childbearing and Psychological Distress Using Longitudinal Evidence*

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Abstract

The high levels of depression among teenage mothers have received considerable research attention in smaller targeted samples, but a large-scale examination of the complex relationship between adolescent childbearing and psychological distress that explores bidirectional causality is needed. Using the National Longitudinal Study of Adolescent Health (Add Health) and the Early Childhood Longitudinal Study—Birth Cohort, we found that teenage mothers had higher levels of distress than their childless adolescent peers and adult mothers, but the experience of teenage childbearing did not appear to be the cause. Rather, teenage mothers' distress levels were already higher than their peers before they became pregnant, and they remained higher after childbearing and into early and middle adulthood. We also found that distress did not increase the likelihood of adolescent childbearing except among poor teenagers. In this group, experiencing high levels of distress markedly increased the probability of becoming a teenage mother. Among nonpoor teenage girls, the relationship between distress and subsequent teenage childbearing was spurious.

Teenage childbearing continues to be framed as an important social and public health problem in America (Furstenberg 2003). Activists, pundits, and researchers have paid particular attention to the economic and social consequences of adolescent parenthood (Hoffman 1998). There has also been a growing interdisciplinary body of research on teenage mothers' mental health. Most of this work is grounded in the apprehension that high levels of depression in this particularly vulnerable group could have negative consequences for both mother and child. Yet few of the many studies addressing this topic have analyzed nationally representative, longitudinal data.

To improve our understanding of the effects of teenage childbearing, we used two national longitudinal surveys to assess whether adolescent mothers are more distressed than both their childless teenage peers and older mothers (research question 1).¹ We also explored sources of distress in teenage mothers, which have received little direct empirical attention in the past (for important exceptions, see Falci and Mortimer 2007; Kalil and Kunz 2002). In particular, we asked whether the experience of teenage parenting itself, the selection of

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¹While we use the terms “depression” and “psychological distress” in the background section, the mental health construct analyzed in this study measures only psychological distress. Depression is a clinical diagnosis with a specific cutoff, not a continuum like our measure.

distressed girls into motherhood, or a combination of the two accounted for subsequently higher levels of distress among adolescent mothers (research question 2). This study also investigated whether distress increased the likelihood of subsequent teenage childbearing, an idea that has received some empirical support but garnered less attention than the opposite causal direction. We examined whether psychological distress itself influenced adolescent childbearing, or whether any relationship between the two was a spurious artifact of underlying factors such as socioeconomic status, race, or ethnicity (research question 3). Finally, we looked for variation in the relationships between teen childbearing and distress and vice versa across racial-ethnic, socioeconomic, and age groups (research question 4). Our review of previous research and findings are organized on the basis of these four research questions.

Finding preliminary answers to these questions using longitudinal, nationally representative data is important because of the consequences that psychological distress can have for teenage parents and their families. Understanding more about the dynamics of the potentially bidirectional relationship between distress and teenage childbearing would allow for more effective policies targeting vulnerable groups and provide a clearer sense of appropriate research priorities. For example, if becoming a teenage mother increases the probability of psychological distress, then research and interventions targeted at treating adolescent parents may improve the outcomes of both mother and child. If, instead, being distressed makes a teenage girl more likely to have a baby, then a suitable focus for research and policy would be on identifying and reducing distress among adolescent girls.

BACKGROUND AND QUESTIONS

Studies of teenage childbearing often draw insight from life course theory (see Elder and Shanahan 2006 for an overview). This theory posits that the timing and ordering of life transitions, such as the transition to parenthood, have long-term consequences for individuals throughout their life course (see Settersten 2003). Social norms about the appropriate timing and ordering of transitions are expected to regulate whether such consequences are positive or negative for an individual (Neugarten, Moore, and Lowe 1965). However, recent evidence suggests that more diversity in ordering and timing life transitions is being tolerated now than in the past (Rindfuss, Swicegood, and Rosenfeld 1987). Evidence suggests that teenage childbearing is one “off-time” transition that may still be associated with reasonably strong societal norms and negative sanctions for the individuals who violate them (Mollborn 2009). These sanctions can be interpersonal, such as facing explicit disapproval from others, or institutional, such as not receiving maternity leave from high school.

Regardless of the sanctions experienced, it seems possible that teenage parents who violate societal norms about appropriate transitions to parenthood might suffer mental health consequences. Just as experiencing discrimination based on race or sexual orientation in everyday life has been linked to poorer mental health (Mays and Cochran 2001; Williams, Neighbors, and Jackson 2003), experiencing everyday interpersonal or institutional sanctions may cause psychological distress among teenage parents. Violating social norms has been shown to increase negative emotions such as embarrassment or shame (Wooten 2006), which could have implications for mental health. Withdrawing social support as a negative sanction may also increase distress.

While life course theory has anticipated negative long-term consequences of violating transition norms, research has rarely documented these consequences empirically. This lack of substantiation of the theory has led to influential criticisms of the life course perspective (Marini 1984) and a turn away from transition norms toward the idea of an individualized

life course in research (Shanahan 2000). Examining the causal links between teenage childbearing and distress in this study can provide a new opportunity to assess this central tenet of life course theory by examining whether teenage mothers, who may have violated norms about the transition to parenthood, suffer short- and/or long-term mental health consequences.

Despite the compelling theoretical justification for teenage childbearing being associated with elevated depression and the many empirical studies supporting it (reviewed below), it is important to remember that the relationship between adolescent parenthood and psychological distress may be bidirectional. Other related areas of research have explored bidirectional relationships in health more thoroughly. For example, social scientists have worked to demonstrate the various ways in which social factors can cause disease (e.g., Link and Phelan 1995), but these researchers and others have also acknowledged that the opposite causal relationship may exist. Sociological researchers are often interested in psychological distress (often framed as depression) as both a cause and an effect of social phenomena. Extensive research has focused on the links between socioeconomic status (SES) and mental health to examine whether low SES causes depression, or whether those who are depressed are more likely to end up with low SES. While both arguments make intuitive sense, the former relationship has received stronger support than the latter (see Lorant et al. 2003 for a review). However, Lorant et al. (2003) also recognize that these two processes frequently work concurrently and are difficult to disentangle.

In the specific realm of research on teenage childbearing, acknowledgement of the bidirectional nature of the relationship between mental health and adolescent motherhood has been slower to blossom. Instead, studies of socioeconomic consequences of teenage childbearing have led the way on this issue. Selection bias has been a persistent concern in research on the socioeconomic effects of teenage parenthood because many of the perceived problematic “consequences” of adolescent childbearing are largely a function of problems that plagued these teens before they had children, increasing their likelihood of becoming young parents. Studies of teenage parents’ socioeconomic outcomes are a prominent example for which research has worked to disentangle selection effects from teenage childbearing effects (e.g., Geronimus and Korenman 1992; Grogger and Bronars 1993; Hotz, McElroy, and Sanders 2005). While the degree of selection is debated, research has suggested that much or most of the difference between teenage parents’ and childless adolescents’ socioeconomic outcomes is the result of selection rather than childbearing (see Hoffman 1998 for a review). Understanding how much the experience of adolescent childbearing affects socioeconomic status has been a key task for researchers on adolescent parenting; we argue that reaching a similar understanding about mental health should be another.

Question 1: Are Teenage Mothers More Distressed?

Before trying to disentangle the causal pathways between psychological distress and teenage childbearing, we must first investigate the extent to which these phenomena are related. Maternal distress is an important concern for researchers because it has been linked to problematic outcomes for mothers, including repeat pregnancies, low parenting competency, and poor educational outcomes (Eshbaugh 2006; Holub et al. 2007). In addition, maternal distress has detrimental effects for children’s outcomes, including language development, coping skills, social adjustment, and physical health (Hubbs-Tait et al. 1994; Mowbray et al. 2002; Sills et al. 2007; Smith 2004).

The prevalence and severity of adolescent mothers’ distress have spawned a considerable research enterprise examining its correlates and effects (e.g., Brown et al. 2007; Eshbaugh 2006; Hudson, Elek, and Campbell-Grossman 2000; Milan et al. 2004; Turner, Sorenson,

and Turner 2000). Teenage mothers' psychological distress levels have been found to be high in samples of varying size and generalizability (e.g., Schmidt et al. 2006), sometimes with more than half of teenage mothers meeting the criteria for clinical depression (Reis 1988).

Past research on teenage mothers and distress has frequently presented information specific to adolescent mothers without introducing comparisons with other groups such as adult moms or nonpregnant teens (e.g., Eshbaugh 2006; Schmidt et al. 2006). However, some research has introduced a comparison group of older mothers (Deal and Holt 1998). Other studies have compared pregnant teens to nonpregnant peers from similar backgrounds and have found no significant differences in depression (e.g., Milan et al. 2004; Troutman and Cutrona 1990). Research comparing teenage mothers to peers from a variety of social locations is rare, with inconsistent results. Vicary and Corneal (2001) found no differences in depression between teenage mothers and older mothers, while Falci and Mortimer (2007) found that teenage mothers had higher levels of depression than other young women who had children later if at all. Kalil and Kunz (2002) found that teenage mothers were more depressed than adult mothers and nonmothers, but these differences disappeared with background factors and marital status controlled. Our study estimates psychological distress levels among teenage mothers compared to both older mothers and childless peers.

Question 2: Does Teenage Childbearing Lead to Distress?

Most research measuring the effect of adolescent childbearing on depression has relied on relatively small and/or nonrepresentative samples (e.g., Falci and Mortimer 2007; Hudson et al. 2000; Milan et al. 2004; Vicary and Corneal 2001). Some research that has sought to improve generalizability has been limited by an inability to measure depression prior to pregnancy (e.g., Deal and Holt 1998; Eshbaugh 2006; Schmidt et al. 2006), which hinders such studies from establishing causality between adolescent childbearing and depression. Milan et al. (2004) included comparisons between pregnant teens and their peers, but data collection started in the third trimester of pregnancy. One exception is Booth, Rustenbach, and McHale (2008), which used the Add Health survey to analyze change in depressive symptoms before and after early family transitions. However, this study examined becoming a parent before the age of about 23 rather than teenage childbearing. They found that young parents' changes in depressive symptoms did not differ from those of others but did not examine causal linkages between teenage childbearing and depressive symptoms.

Despite a paucity of data concerning women's mental health status prior to pregnancy, the general trend in the literature has been to assume this causal pathway but to mention the lack of established causality between teenage childbearing and distress as a limitation. Despite the intuitive appeal of the idea that teenage childbearing causes distress, available evidence suggests that much of this relationship is instead an artifact of the selection of distressed girls into teenage motherhood. In other words, experiencing adolescent childbearing does not make teenage girls more distressed, but rather teenage girls who were already distressed more often become teenage mothers. Falci and Mortimer (2007) and Vicary and Corneal (2001) found that the selection of distressed girls into adolescent motherhood accounted for most of their higher distress levels compared to peers. Our study compares teenage mothers with both childless adolescents and a "natural" comparison group of future adolescent mothers to explore whether teenage mothers' elevated distress levels are a result of experiencing early childbearing, or whether they result from the selection of distressed girls into adolescent childbearing.

Question 3: Does Distress Lead to Teenage Childbearing?

Several studies have suggested the opposite causal direction, that pre-existing depression could increase the likelihood of women becoming teen parents (Deal and Holt 1998; Eshbaugh, Lempers, and Luze 2006; Milan et al. 2004; Schmidt et al. 2006). Few studies have examined the causal relationship between adolescent parenthood and depression empirically, but existing research suggests that there may be a link. Kessler et al. (1997) identified increased risk for teenage childbearing among those with early onset psychiatric disorders using retrospective data. Adolescent girls who had ever met the DSM-III-R assessment for affective disorders were two times more likely subsequently to become teenage mothers than their peers. Miller-Johnson et al. (1999) found that parental reports of adolescents' depression predicted the timing of parenthood, but adolescents' reports were not significant. In contrast, Yamaguchi and Kandel's (1987) retrospective study of premarital pregnancy reported that depressive symptomatology did not affect premarital pregnancy, but it lowered adolescents' likelihood of having an abortion.

It is also possible that distress itself does not affect the subsequent likelihood of becoming a teenage mother, but rather that underlying factors that increase teenagers' chances of both becoming distressed and bearing children create a spurious relationship. For example, higher depression levels have been reported among African Americans, Hispanics, and mothers with lower socioeconomic status (Belle and Doucet 2003; Howell et al. 2005). These sociodemographic characteristics are also linked to higher adolescent pregnancy and childbearing rates (Furstenberg 2003). Similarly, previous sexual experience in adolescence has been linked both to depression, at least for some groups (Hallfors et al. 2005; Meier 2007), and to teenage pregnancy (Kaufmann et al. 1998). Any or all of these background factors may account for an observed relationship between teens' distress and subsequent childbearing. We estimate the association between these variables, as well as the degree to which their relationship is spurious.

Question 4: Do Relationships between Distress and Teen Childbearing Vary across Groups?

It is not only possible that background factors such as race, ethnicity, and socioeconomic status account for the relationship between distress and teenage childbearing and vice versa, but also that sociodemographic groups may experience these associations differently. For example, Mollborn (2009) found that African Americans and people with lower education levels perceived weaker norms against teenage pregnancy than whites and those with more education. According to life course theory, individuals who face weaker norms should suffer less severe consequences for violating them. This implies that there could be a stronger link between teenage childbearing and subsequent depression for white adolescents and those from high-SES families than for black or low-SES adolescents. Similarly, younger teenage parents may violate stronger age norms against early childbearing, so younger teenage parents may be more distressed than those who are older. We focus on race-ethnicity, socioeconomic status, and age when investigating whether the effect of teen childbearing on distress and the effect of distress on teen childbearing differ across groups.

METHOD**Data**

This study used data from two national surveys. The primary data source addressing each of the research questions was the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative survey of students that began in the mid-1990s (Bearman, Jones, and Udry 1997). Investigators sampled 80 U.S. high schools and 52 middle schools. More than two-thirds of schools agreed to participate in the study, and those

who refused were replaced with schools from the same community. For each school, a subsample of students completed an extensive in-home interview at wave one that was followed up one and six years later. The primary parent (typically the mother) was also asked to complete an interview. The Add Health sample was representative of U.S. schools with respect to urbanicity, region of country, school type, ethnicity, and school size. Some student populations were oversampled, and dropouts were not interviewed, but probability weights allowed researchers to represent the national population of adolescents in grades 7 to 12. Response rates for the three waves ranged from 77 percent to 88 percent.

For analyses of psychological distress, 5,429 female respondents who participated in waves two and three and were not missing weight, region, or school identifier were eligible for analysis. Approximately 3 percent of these cases were deleted listwise because of missing information. For analyses of teenage childbearing, 7,163 female respondents who participated in waves two and three and who were not missing weight, region, or school identifier were eligible for inclusion. Just under 6 percent of these cases were deleted listwise because of missing information on independent variables. This analysis sample was larger than the former one, mostly because respondents who were high school seniors at wave one were not included at wave two, but were re-interviewed at wave three.

The secondary data source for this study was the Early Childhood Longitudinal Study—Birth Cohort (ECLS-B) (National Center for Education Statistics 2006), sponsored and conducted by the U.S. Department of Education’s National Center for Education Statistics. This survey collected detailed data on both children and parents and is representative of the approximately 4 million children born in the United States in 2001. We used information from the first wave of data, collected when the infants were about nine months old, to examine teenage mothers’ distress levels compared to those of former teenage mothers and mothers who never gave birth as adolescents. This provided two different comparison groups that the Add Health did not (adult mothers and former teenage mothers giving birth as adults), as well as allowing us to map teenage mothers’ distress levels into middle adulthood, contributing important answers to research question 1. The primary parent (overwhelmingly the mother) completed an in-home interview and a self-administered questionnaire about sensitive topics such as psychological distress. Some analyses in this study compared mothers under age 20 ($N \sim 1,050$) to older mothers ($N \sim 8,300$), and others split the latter category into those who were teenagers at first birth ($N \sim 1,700$) and those who were age 20 or older ($N \sim 6,600$).² The psychological distress scale used in ECLS-B is similar to the Add Health version. The variables described below are all from our primary data set, Add Health.

Variables

Psychological distress—The measure of psychological distress from both data sets used a subset of questions from the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977). Both scales asked respondents to report the frequency of experiencing specific symptoms in the last week, ranging from “never or rarely” to “most or all of the time.” Item responses are typically summed. However, to create a consistent measure that could be used across scales with different numbers of items, we instead calculated the mean of the response items, ranging from 0 to 3. Waves one and two of the Add Health survey relied on a 19-item modified scale.³ Wave three of the Add Health data used a nine-item version of the scale. ECLS-B used a 12-item version that focused on the negative

²Because of ECLS-B confidentiality restrictions, all unweighted numbers were rounded to the nearest 50.

³Two items from the original scale were dropped (“My sleep was restless” and “I had crying spells”), and one new item was added (“I felt that life was not worth living”). In addition, two of the items on the scale were rephrased (Lehrer et al. 2006).

experiences of distress. For the Add Health data, Cronbach's alpha for the scale was .91 in wave one, .89 in wave two, and .81 in wave three; for ECLS-B it was .87.

In some analyses, we also relied on cut-points to distinguish between discrete levels of psychological distress. Following the approach outlined by other researchers working with Add Health data, we relied on a cut point of 23 (for the summed scale, which corresponds to 1.21 in our mean scale) to designate high levels of distress for girls (Lehrer et al. 2006; Shrier et al. 2001). Those who scored below 23 but at least 11 (.58 in the mean scale) were classified as reporting moderate distress, and those who were below 11 were classified as low-distress. Table 1 reports means for these and other variables, as well as differences between those who would become teenage mothers by wave three and others. Future teenage mothers reported a mean distress level of .73 at wave one (equivalent to moderate distress), compared to .58 for others ($p < .01$). Just 44 percent of future teenage mothers reported low levels of distress compared to 60 percent of others ($p < .01$), and almost twice as many adolescent moms-to-be reported high distress levels as others ($p < .01$).

Teenage childbearing—Analyses included indicators at different time points of teenage childbearing, defined as a respondent having a child before the month of her twentieth birthday. At wave three, respondents reported whether pregnancies had occurred within any ongoing or new romantic and sexual relationships they had experienced since 1995 (wave one). The month and year of each pregnancy's end were used to calculate the mother's age at her first live birth. We compared the month and year of this birth to the month and year of each interview to calculate whether respondents became teenage mothers before or after waves one and two. Booth et al. (2008) pointed out inconsistencies between reports of biological children in the roster of household members and reports of past births within the context of relationships. To address this issue, we identified cases where the respondent reported that her biological child was living with her at wave three. If the oldest biological child's age subtracted from the respondent's age at wave three equaled 19 or less, we considered the respondent a teenage mother. Including information from the household roster increased the count of teenage mothers by about 10 percent in Table 1. When we were interested in those who became pregnant after a certain wave, we excluded respondents who gave birth 10 months or less after the month of interview (for teenage mothers identified in the household roster, the date of birth was an estimate in whole years). There were 808 respondents, or about 13 percent, who were teenage mothers who got pregnant after wave one but before wave three, when respondents were 18 to 27 years old. The nonmothers included those who had experienced teenage pregnancies that did not end in live births because of abortion, miscarriage, or stillbirth, and girls who never experienced a teenage pregnancy.⁴

Control variables—Independent variables, all measured at wave one, were chosen because of possible relationships to teenage childbearing or distress. Family socioeconomic status was measured as parents' education in years ($M = 13.25$) and parent-reported household income.⁵ Following Cubbin et al. (2005), we created dummy variables representing income as a percentage of 1994 federal poverty thresholds that controlled for the number of people in the household (0 to 100%, 101 to 200, 201 to 300, 301 to 400, and > 400), as well as an indicator for missing income information. Teen respondents reported

⁴Supplemental analyses showed that girls who experienced teenage pregnancy but not live birth had significantly higher wave one distress levels than girls who had not become pregnant, but significantly lower than girls who had a live teen birth. Omitting these respondents from analyses reported in Tables 2 and 3 did not change the primary findings.

⁵All responses were coded into approximate years of education. Whenever available, we averaged the education levels of the parent and spouse/partner. If the spouse's education level was missing, the teenage respondent's report of it was substituted, and absent that the mother's education stood in for both. If no parent completed the survey, adolescent respondents' reports of both parents' education levels were averaged.

their race-ethnicity (Latino and non-Latino white, African American, Asian/Pacific Islander, Native American/American Indian, and “other” race).

Two variables measured school-related factors. Student-reported grade point average (GPA) included four subjects, averaged into a four-point scale (A = 4, B = 3, C = 2, D or lower = 1) and recoded into a series of indicator variables (1 to 3, 3 to 3.49, and 3.5 to 4), with an additional indicator for missing GPA information. A school attachment scale averaged five items about feeling close to people at one’s school, feeling part of one’s school, feeling happy to be at school, feeling that teachers treat students fairly, and feeling safe at school. The scale ranged from 1 (weak attachment) to 5 (strong attachment), with a Cronbach’s alpha of .84.

Respondents’ age in months and years at wave one was recoded as a fraction of years. Respondents’ family structure was coded into a series of dummy variables after Harris (1999): living with both biological parents, other types of two-parent families, a single mother, a single father, and other family structures. Religious service attendance was represented by variables indicating frequency, with a combined group of “never” or “no religion” as the reference. Respondents’ status as being born in the United States was reported by the parent (if available), and, if not reported by the parent, those data were obtained from adolescent interviews. Respondents reported satisfaction with their parent-child relationships through their agreement with the statement, “Overall, you are satisfied with your relationship with your mother,” ranging from 1 to 5 (with higher numbers indicating more agreement). When the primary parent was the father, or if a response about the mother was missing, we substituted responses to the same question about the father-child relationship. Finally, respondents’ reports of having ever had penile-vaginal intercourse by wave one were included.

Analysis Plan

First, we used several comparison groups across both data sources to present important information about differences between teenage mothers’ distress levels and those of other women, as well as trends in their distress levels from before pregnancy through middle adulthood. Add Health data covered prepregnancy through young adulthood, and ECLS-B covered the postpartum period through middle adulthood. Subsequent analyses focused only on Add Health. Multivariate analyses controlling for age compared girls who became teenage mothers before and after wave two (because there were too few teenage mothers by wave one) to examine the association between experiencing teenage childbearing and subsequent psychological distress. Next, we estimated logistic regression models of the relationship between distress at wave one and subsequent teenage childbearing by wave three, allowing for a larger sample of future teenage mothers than examining wave two to three would. Finally, we introduced interactions to multivariate models to investigate if the relationships we found differed across sociodemographic groups. All analyses used Stata’s complex survey design commands.

RESULTS

Question 1: Are Teenage Mothers More Distressed?

Comparing teenage mothers’ distress to others’ distress—Bivariate analyses from two data sets addressed our first research question. We first examined whether teenage mothers were more distressed than their childless teenage peers (results not shown in tables). Echoing past research, evidence from the Add Health survey suggested that they were. The mean distress level at wave two of teenagers who were not teenage mothers by wave three was .59, compared to .77 for their peers who had become adolescent mothers by wave two

($p < .01$). This difference represents 7 percent of the observed range of psychological distress scores. Grouping distress levels into three categories instead, we see that only 43 percent of teenage mothers by wave two were classified as having low levels of distress at wave two, compared to 60 percent of their childless peers ($p < .01$). In contrast, teen mothers were severely distressed more than twice as often as their childless peers ($p < .05$).

We then asked whether teenage mothers are more distressed than older mothers (see Figure 1). Analyses from the ECLS-B that used a modified version of the CES-D to measure distress revealed similar comparisons between teenage mothers and older mothers to those between teenage mothers and their childless peers. Teenage mothers' mean distress score at about nine months postpartum was .56, compared to .38 among mothers who had their first birth at ages 20 and older ($p < .01$). This difference corresponds to 6 percent of the observed range of distress scores in the sample.

Assessing differences over time in teenage mothers' distress—Do adolescent mothers' elevated levels of distress compared to childless peers and older mothers continue into adulthood? Wave three distress levels from Add Health measured five years after wave two (not shown in tables) revealed that although all groups became less distressed as they aged, teenagers who became mothers both before and after wave two still had higher continuously measured distress scores in young adulthood than their peers who did not become adolescent mothers ($p < .01$).

Data from ECLS-B assessed teenage mothers' levels of distress well into adulthood (see Figure 1). We identified about 1,700 new mothers who were at least age 20 at the study's focal birth but who first gave birth as teenagers. While distress levels among mothers who were age 20 or older at first birth decreased steadily with age from .48 at ages 20–24 to .34 at age 35–39, postpartum distress levels at the same ages among respondents who were once teenage mothers actually increased from .52 to .57. Former teenage mothers had significantly higher distress levels than adult first-time mothers for all age categories from 20 to 39 ($p < .01$). When we compared average distress levels for current versus all former teenage mothers, they did not differ significantly (.56 and .51, respectively). This finding provides further evidence that adolescent childbearing was not associated with a spike in distress levels, but rather teenage mothers' elevated psychological distress was long-term.

In sum, evidence showed that teenage mothers were more distressed on average than both their childless teenage peers and older mothers. Teenage mothers' higher distress levels continued throughout adolescence, young adulthood, and middle adulthood, suggesting that their distress may be long-term rather than short-term in nature.

Question 2: Does Teenage Childbearing Lead to Distress?

Past research has shown that comparing teenage parents to their childless peers and older parents as we did above frequently results in selection bias, i.e., teenagers who bear children are very different on average than those who do not even before they get pregnant. Because of selection, observed differences in distress levels between teenage mothers and childless peers or older mothers could be the result of underlying factors rather than a result of the experience of teenage motherhood itself. For this reason, comparing teenage mothers with a “control” group of equivalent respondents would most accurately estimate the association between the experience of teenage motherhood and distress. The longitudinal design of the Add Health survey allows for a natural comparison group of future teenage mothers, which can help establish the degree to which selection into adolescent childbearing accounts for observed differences in distress between teenage mothers and childless teenagers. Regression analyses reported in Table 2 compared the wave two distress levels of girls who were teenage mothers by wave two ($N = 239$) with those who were not yet pregnant by wave

two (they gave birth at least 10 months after the month of interview) but who would become teenage mothers by wave three, five years later ($N = 558$). In other words, the former group had already experienced teenage motherhood when psychological distress was measured. The second group had not, but was assumed to be otherwise similar to the first group with the exception of being older. We controlled for age in the regression models. Table 2 shows that there were no significantly different wave two or three distress levels between these groups, suggesting that experiencing teenage motherhood did not increase distress.

If the experience of teenage childbearing was not related to distress, then why were teenage mothers more distressed than their childless peers? We suspect that underlying factors may have caused these girls to be distressed before they became teenage mothers. Analyses reported in Table 2 addressed this question by comparing girls who became pregnant after wave two and who gave birth as teenagers to those who were not teenage mothers by wave three. Wave two distress scores allow us to assess the former group's mental health before they got pregnant. Post hoc tests based on Table 2 show that girls who would eventually become teenage mothers were significantly more distressed at wave two than their childless peers ($p < .01$). The difference between these two groups' distress levels remained similar and significant ($p < .01$) at wave three, after teen childbearing had occurred for the former group.

This evidence suggests that teenage mothers may have been more distressed than their childless peers because they were already distressed before becoming pregnant rather than the experience of adolescent childbearing increasing distress. Does it follow that distress among adolescents was associated with higher odds of becoming a teenage mother? Model 1 in Table 3 addressed this question using a bivariate logistic regression analysis that estimated the association between distress scale scores at wave one and the likelihood of subsequently becoming a teenage mother sometime in the following six years (pregnant at least 10 months after the month of the wave one interview and giving birth by wave three and before age 20). There was a very strong association between these variables: Each one unit increase in the psychological distress scale measured at wave one more than doubled a girl's odds of becoming a teenage mother by wave three ($OR = 2.08, p < .01$).

In sum, using natural comparison groups to establish causality more firmly than in past research, our findings suggest that teenage mothers' higher distress scores were the result of distress prior to childbearing rather than the experience of teenage motherhood itself. In the opposite causal direction, distress was positively related to subsequent teenage childbearing; multivariate analyses reported below explored potential causes of this association.

Question 3: Does Distress Lead to Teenage Childbearing?

Bivariate evidence suggested that psychological distress was associated with subsequent teenage childbearing. But was this relationship causal, or did underlying factors affecting both distress and teenage motherhood explain the relationship between the two? Model 2 in Table 3 added controls to the distress measure to estimate the likelihood of teenage childbearing. The psychological distress coefficient dropped from .73 ($OR = 2.08$) in model 1 to .07 ($OR = 1.07$) in model 2 and lost statistical significance; thus, background factors accounted for the bivariate relationship between distress and subsequent teenage motherhood. Significant wave one risk factors for becoming a teenage mother by wave three included low parental education; low income; being African American or Hispanic; low grades; younger age; single-mother, stepparent, or "other" family structures compared to two biological parents; less satisfying parent-teen relationships; having had penile-vaginal intercourse by wave one; and being in a romantic relationship at wave one.

Supplemental analyses (not shown) revealed that just four control variables in combination eliminated the significance of the distress coefficient: parental education, grade point average, family structure, and having had sexual intercourse. At least one category of each of these measures also significantly predicted distress at wave one. We conclude that the relationship between psychological distress and subsequent teenage motherhood was spurious in this analysis, based on the findings that these four background factors eliminated the significance of psychological distress, and that they each significantly predicted distress. In other words, underlying measures of socioeconomic status, academic achievement, family structure, and sexual experience influenced both teens' psychological distress and their likelihood of becoming adolescent mothers, accounting for what initially appeared to be a strong relationship between teenage motherhood and distress.

Question 4: Do Relationships between Distress and Teen Childbearing Vary across Groups?

We found that, on average, the experience of teenage childbearing did not increase girls' psychological distress. Does this finding vary by race-ethnicity, age, or socioeconomic status?⁶ To address this question, in supplemental analyses we first added interactions between teenage childbearing indicators and each of these factors to model 1 of Table 2. One model included interactions of teenage childbearing with African American and with Latina (reference category was white), another included interactions with ages younger than 16 and ages 18 and older (reference category was 16 to 17 years old), and a third included interactions with each of the poverty indicators from Table 1. None of the interactions between being a teenage mother and these demographic categories was significant, suggesting that teenage childbearing did not increase psychological distress on average for any of these sociodemographic categories.

Next, we investigated whether the relationship between psychological distress and teen childbearing was spurious for all groups. Here, we excluded interactions of distress with age because of the Add Health study design, in which respondents' staggered ages at wave one led to widely varying lengths of time in which they could have become teenage mothers between wave one and wave three. This prohibited attempts to disentangle actual age effects from associations that were artifacts of the study design. In order to allow for the possibility of nonlinear relationships, we used the three-category measure of distress in our interaction models rather than the continuous measure. Models were identical to model 2 in Table 3, except for the categorical distress measure and the addition of terms for interactions between distress and sociodemographic variables.

None of the race-ethnicity interactions was significant, but model 3 in Table 3 revealed a large and significant interaction between high levels of distress and having a household income at or below the poverty line (OR = 4.22, $p < .01$). It is interesting that the main effects of distress and poverty in combination with the interaction showed that high distress did not raise the odds of teen childbearing for wealthy respondents, nor did poverty increase the likelihood of teen childbearing for respondents experiencing low levels of distress. Rather, the combination of poverty and psychological distress was predictive of teenage childbearing, and girls from poor families were the only group we tested for whom psychological distress was associated with the likelihood of subsequently becoming an adolescent mother.

⁶We would have liked to examine gender differences in the relationship between teenage parenthood and psychological distress, but data limitations prevented it.

To interpret this interaction, supplemental analyses relied on predicted probabilities of becoming a teenage mother for a “typical” hypothetical respondent who had average values for all variables in model 3 of Table 3, except for those being manipulated: distress level and poverty level. A poor hypothetical respondent (wave one household income $\leq 100\%$ of the federal poverty threshold, adjusted for household size) was compared to a high income one (income $> 400\%$ of the poverty line) for each of the three categories of wave one psychological distress. At a low level of distress, high-income and poor respondents were both relatively unlikely to become teenage mothers (a 2% chance for the poor respondent, compared to a 1% chance for the rich respondent). The probability for both income categories at moderate levels of distress was 2 percent. At high distress levels, however, the high-income respondent had a 1 percent chance of teenage childbearing, while the poor respondent’s likelihood rose to 5 percent. For poor respondents, then, socioeconomic status, race-ethnicity, family structure, sexual activity, and other factors did not account for the relationship between distress and subsequently becoming a teenage mother; high levels of psychological distress still influenced their childbearing behaviors.

DISCUSSION

Using two nationally representative, longitudinal data sets, we found that teenage mothers were more distressed than both childless adolescent peers and adult mothers. Contrary to common assumptions, however, their increased psychological distress did not appear to be caused by experiencing teenage childbearing. Rather, teenage mothers’ distress levels were already higher than their peers’ before they became pregnant, and they remained more distressed than others after childbearing, and into early and middle adulthood. This is similar to Booth et al.’s (2008) finding that trajectories of depressive symptoms for those who experienced early childbearing did not widen or narrow compared to peers who had not formed families.

Just as we found that teenage motherhood did not increase distress, our results also showed that distress did not raise the likelihood of subsequent adolescent childbearing except among teenage girls from poor families. In this group, high distress levels markedly increased the probability of becoming a teenage mother. Among the other groups we tested, the relationship between distress and subsequent teenage childbearing was spurious and caused by underlying factors related to both, such as socioeconomic background, school performance, family structure, and previous sexual experience.

The analyses reported here have several limitations. First, the ECLS-B allowed us to examine levels of postpartum distress among former teenage mothers, but the upcoming wave four of Add Health will provide information about the distress levels of teenage mothers beyond the postpartum period, a period that often poses unique challenges to mothers’ mental health. Second, as noted above, data constraints prohibited us from extending our conclusions to teenage fathers, who represent another vulnerable population in terms of mental health (Heath, McKenry, and Leigh 1995) but who are currently understudied. Third, although the CES-D scale has been validated across a wide range of populations, there has been considerable debate within the social science community about its and other measures’ utility for investigating mental health as a predictor and outcome (see the June 2002 issue of *JHSB* for an extended discussion). Thus, other facets of mental health besides the CES-D would be useful for measuring the intersection of mental health and social consequences for teen mothers.

This study has implications for the adolescent childbearing literature. Our research suggests a parallel between the teen childbearing-distress relationship and the teen childbearing-education relationship. The rarely-examined assumption that becoming a teenage mother

creates a high risk of distress, which is similar to the largely debunked supposition that adolescent childbearing causes severely compromised educational outcomes, was not supported in this study. Rather, many teenage mothers experienced long-term psychological distress both before and after having a child, similar to (and potentially even partially caused by or causing) their typically worse educational performance both before and after childbearing. Social disadvantage underlies both teenage childbearing and distress, just as it has been shown to underlie both teenage childbearing and educational outcomes (Ribar 1994). Understanding the dynamics of the relationship between teenage motherhood and distress is important, and our study contributes to this body of knowledge.

These findings also speak to the broader literatures on selection and causation in mental health and on the causes of social disparities in health outcomes. Empirical evidence on the salience of social disadvantage for understanding health outcomes is strong (Link and Phelan 1995), and our study provided further support. An array of factors including both socioeconomic status and related phenomena (family structure, school performance, and sexual activity) were important for understanding how social disadvantage is related to psychological distress and teenage childbearing. As researchers from both of these traditions would anticipate, we found that underlying social disadvantage increased psychological distress. Similarly, and as researchers of teenage childbearing have documented in the past, social disadvantage made girls more likely to become adolescent mothers. Our new finding was that the combination of extreme psychological distress and extreme socioeconomic disadvantage was particularly predictive of teenage childbearing. As Lorant et al. (2003) have suggested, then, the relationship between socioeconomic disadvantage and mental health is complicated, and the two factors can work in tandem.

Perhaps surprisingly, our results did not support the prediction from life course theory that individuals who make a precocious transition to parenthood should suffer mental health consequences. Although the theoretical implication was not borne out, our results are in line with some earlier research that did not find negative consequences of violating transition norms (Settersten 1998; Settersten 2003). We do not interpret our findings as identifying a weakness in the theory, especially because our study did not capture other mental health outcomes besides distress that may be affected by violating transition norms. Rather, other processes that have emerged from the life course paradigm besides the violation of transition norms may be more useful for understanding our findings.

For example, two studies that have used the Add Health survey to examine the subjective aspect of aging may be relevant for understanding our findings. Foster, Hagan, and Brooks-Gunn (2008) showed that young people who perceived themselves to have grown up more quickly than their peers experienced increased psychological distress in young adulthood. Johnson and Mollborn (2009) found that early hardships (poverty, unsafe or violent environments, and family structure) increased the likelihood of early childbearing and sped up subjective aging. The authors hypothesized that one mechanism through which this occurred was that young people who experienced hardship violated cultural norms conceptualizing childhood and adolescence as being innocent and free of responsibility. Perhaps to deal with this mismatch between what society expected young people to experience and what they actually experienced, they began to perceive themselves as being older. This kind of subjective aging process could also underlie our study's results, explaining why socioeconomic disadvantage, family structure, and other related factors increased both psychological distress and teenage childbearing. In this account, it would not be the violation of cultural norms about the transition to parenthood, but rather the violation of norms about childhood innocence and freedom from responsibility, that is related to psychological distress.

Our findings suggest that many adolescent girls who reported greater psychological distress were at increased risk of teenage childbearing. Distress was likely a symptom of other underlying problems rather than a direct cause of teenage motherhood, with the exception of poor, highly distressed girls, but it can still be viewed as a “red flag” identifying targets for intervention. Future research should examine whether treating symptoms of distress in teenage girls can decrease rates of subsequent adolescent childbearing, as Kessler et al. (1997) have suggested. Second, it seems that most teenage mothers are not at risk of increased distress due to childbearing. At the same time, though, they typically start out more distressed than their peers before pregnancy and are more likely to have long-term patterns of psychological distress. Because maternal distress can compromise the outcomes of both mother and child regardless of its cause, distress in teenage mothers should be taken seriously and addressed, and teenage mothers should be considered at risk for depression problems.

All in all, the most compelling policy implication of our findings is that ameliorating social disadvantage may decrease both psychological distress and early childbearing for adolescent girls. This suggestion, that remedying the “upstream” socioeconomic root causes of health problems may be the most efficient way to solve those problems, echoes the work of researchers such as Link and Phelan (1995). Reducing socioeconomic disadvantage through policies such as income supports might prevent the complex process we identified of low SES increasing distress, and then compounding the effect of that distress on becoming a teen mother. Future research should explore whether such policy steps could address both of these important public health issues, mental health, and teenage childbearing, simultaneously.

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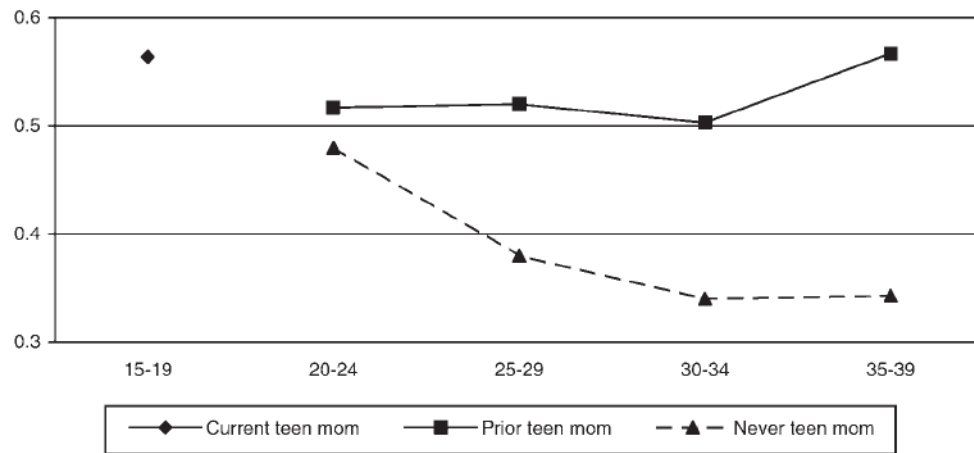


FIGURE 1.

Mean Psychological Distress at about 9 Months Postpartum, by Teen Childbearing Status
Source: Early Childhood Longitudinal Study-Birth Cohort (2001)

Notes: “Current teen mom” was ≤ 19 years old at birth of study’s focal child, “prior teen mom” birth was > 19 years old at birth of focal child but ≤ 19 years old at first birth, and “never teen mom” was > 19 years old at first birth

TABLE 1
 Weighted Means for Variables Used in Analyzing Distress and Teenage Motherhood

<i>Variables Measured at Wave 1</i>	<i>All Respondents (N = 6,391)</i>	<i>Not Teen Mom by Wave 3 (N = 5,583)</i>	<i>Teen Mom Wave 1-3 (N = 808)</i>
Teen mom between Waves 1-3 (1 = yes)	.13 (.01)		
Psychological distress scale (0-3)	.60 (.01)	.58 (.01)	.73 (**) (.02)
Psychological distress categories			
Low	.58 (.01)	.60 (.01)	.44 (**) (.02)
Moderate	.34 (.01)	.33 (.01)	.43 (**) (.02)
High	.08 (.00)	.07 (.00)	.13 (**) (.01)
Parents' mean education (years)	13.25 (.12)	13.41 (.13)	12.12 (**) (.10)
Household poverty status (% FPL)			
0-100 ^a	.13 (.01)	.11 (.01)	.23 (**) (.02)
101-200	.17 (.01)	.16 (.01)	.24 (**) (.03)
201-300	.18 (.01)	.18 (.01)	.16 (**) (.02)
301-400	.12 (.01)	.13 (.01)	.05 (**) (.01)
> 400	.19 (.01)	.21 (.01)	.08 (**) (.02)
Missing information	.21 (.01)	.20 (.01)	.24 (.02)
Respondent's race-ethnicity			
Non-Latino White ^a	.69 (.03)	.71 (.03)	.55 (**) (.04)
Non-Latino Black	.15 (.02)	.13 (.02)	.25 (**) (.04)
Latino	.11 (.02)	.10 (.02)	.17 (**) (.02)
Asian/Pacific Islander	.04 (.01)	.04 (.01)	.02* (.01)
Native American	.01 (.00)	.01 (.00)	.01 (.00)
Other race	.01 (.00)	.01 (.00)	.01 (.00)
Grade point average			
1-3	.30 (.01)	.28 (.01)	.42 (**) (.02)
3-3.49	.23 (.01)	.24 (.01)	.17 (**) (.02)
3.5-4 ^a	.47 (.01)	.48 (.01)	.41* (.03)

<i>Variables Measured at Wave 1</i>	<i>All Respondents (N = 6,391)</i>	<i>Not Teen Mom by Wave 3 (N = 5,583)</i>	<i>Teen Mom Wave 1-3 (N = 808)</i>
Missing information	.14 (.01)	.12 (.01)	.27** (.02)
School attachment scale (1-5)	4.64 (.03)	4.67 (.03)	4.42** (.06)
Age (years)	15.73 (.12)	15.80 (.12)	15.22** (.14)
Family structure			
2 biological parents ^a	.59 (.01)	.62 (.01)	.38** (.02)
2 parents (other types)	.17 (.01)	.16 (.01)	.25** (.02)
Single mother	.19 (.01)	.18 (.01)	.29** (.02)
Single father	.02 (.00)	.02 (.00)	.03** (.01)
Other family structures	.03 (.00)	.02 (.00)	.05** (.01)
Church attendance			
Never/no religion	.21 (.01)	.21 (.01)	.22 (.02)
Less than once a month	.18 (.01)	.18 (.01)	.19 (.02)
≥ Once/month < once/week	.19 (.01)	.19 (.01)	.23* (.02)
At least once a week ^a	.42 (.01)	.43 (.01)	.36** (.02)
Born in the United States (1 = yes)	.94 (.01)	.94 (.01)	.96 (.01)
Satisfaction with parent relationship (1-5)	4.16 (.02)	4.19 (.02)	4.00** (.05)
History of vaginal intercourse (1 = yes)	.32 (.02)	.29 (.02)	.48** (.03)
In a romantic relationship (1 = yes)	.37 (.01)	.36 (.01)	.45** (.03)

Source: National Longitudinal Study of Adolescent Health (1995)

Notes:

^aReference category. Numbers in parentheses are standard errors for weighted means.

Weighted means account for sample design effects (stratification and clustering).

* $p < .05$;

** $p < .01$; adjusted Wald tests comparing means for teen mothers between Waves 1-3 to other female respondents.

TABLE 2

Linear Regression of Distress on Teen Childbearing and Age ($N = 5,261$)

<i>Variables</i>	<i>Wave 2 Distress</i>	<i>Wave 3 Distress^b</i>
Teen childbearing status		
Teen mom by Wave 2 (reference)		
Teen mom pregnant after Wave 2 ^a	.02 (.05)	-.06 (.05)
Never teen mom by Wave 3 ^a	-.14** (.04)	-.15** (.04)
Wave 2 age (years)	.03** (.01)	
Wave 3 age (years)		-.01 (.01)
Constant	.28** (.09)	.92** (.15)
Design-based F test (df)	25.17** (3,128)	6.24** (3,128)
R-squared	.03	.01

Source: National Longitudinal Study of Adolescent Health (1995)

Notes:

^aPregnant after Wave 2 and Never teen mom differ significantly in post hoc tests.^bWave 3 was conducted 5 years after Wave 2, with Wave 3 ages ranging from 18 to 27.

Analyses account for sample design effects (weighting, stratification, and clustering).

* $p < .05$;** $p < .01$; two-tailed tests. Standard errors in parentheses.

TABLE 3
 Logistic Regression Coefficients Predicting Teen Childbearing Using Distress and Controls ($N = 6,737$)

<i>Wave 1 Variables</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Distress scale (0–3)	.73** (.09)	.07 (.13)	
Moderate distress ^a			.11 (.23)
High distress ^a			-.66 (.34)
Parents' education (years)		-.15** (.03)	-.15** (.03)
Household poverty status (% FPL) ^b			
0–100		.60* (.26)	.43 (.35)
101–200		.65* (.26)	.61* (.31)
201–300		.40 (.23)	.37 (.30)
301–400		-.26 (.30)	-.65 (.40)
Missing income		.62** (.24)	.64** (.23)
Race-ethnicity ^c			
Non-Hispanic Black		.33* (.17)	.35* (.17)
Hispanic		.32* (.15)	.34* (.15)
American Indian		.35 (.61)	.39 (.57)
Asian/Pacific Islander		-.02 (.33)	-.00 (.33)
Other race		.47 (.60)	.42 (.61)
Grade point average ^d			
1–3		.79** (.17)	.78** (.17)
3–3.49		.27 (.20)	.27 (.20)
Missing GPA		1.10** (.20)	1.10** (.21)
School attachment scale (1–5)		-.06 (.06)	-.06 (.06)
Age at Wave 1 (years)		-.45*** (.04)	-.45*** (.05)
Family structure ^e			
2 parents (other types)		.71** (.14)	.71** (.14)
Single mother		.46** (.12)	.44** (.13)

<i>Wave 1 Variables</i>	Model 1	Model 2	Model 3
Single father	.36	(.37)	.36 (.36)
Other family structure	.69**	(.23)	.68** (.23)
Church attendance ^f			
Never/no religion	-.08	(.16)	-.08 (.16)
< Once/month	.12	(.15)	.11 (.15)
≥ Once/month and < once/week	.27	(.14)	.28* (.14)
U.S.-born (1 = yes)	.47	(.28)	.47 (.29)
Satisfaction with parent relationship	-.14*	(.06)	-.15* (.06)
Had vaginal intercourse (1 = yes)	.94**	(.13)	.94** (.13)
In a romantic relationship (1 = yes)	.35**	(.12)	.36** (.13)
Distress × poverty interactions ^g			
Moderate × 0–100% FPL			-.00 (.38)
High × 0–100% FPL			1.44** (.53)
Constant	-2.47**	(.11)	5.26** (1.05)
F-test for model fit (df)	65.84**	(1,130)	14.86** (28,103)
F-test compared to previous model	—	—	10.38** —

Source: National Longitudinal Study of Adolescent Health (1995)

Notes: Reference categories:

^aLow distress;

^b> 400% FPL;

^cNon-Hispanic White;

^d3,5–4;

^e2 biological parents;

^fNever/no Religion;

^gInteractions of distress with other poverty categories were not significant and are excluded here.

Analyses account for sample design effects (weighting, stratification, and clustering).

* $p < .05$;

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$p < .01$; two-tailed tests. Standard errors in parentheses.