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Nonmarital Childbearing, Union History, and Women's Health at Midlife*

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Abstract

Despite high rates of nonmarital childbearing in the U.S., little is known about the health of women who have nonmarital births. We use data from the NLSY79 to examine differences in age 40 self-assessed health between women who had a premarital birth and those whose first birth occurred within marriage. We then differentiate women with a premarital first birth according to their subsequent union histories and estimate the effect of marrying or cohabiting versus remaining never-married on midlife self-assessed health, paying particular attention to the paternity status of the mother's partner and the stability of marital unions. To partially address selection bias, we employ multivariate propensity score techniques. Results suggest that premarital childbearing is negatively associated with midlife health for white and black (but not Hispanic) women. We find no evidence that these negative health consequences of nonmarital childbearing are mitigated by either marriage or cohabitation for black women. For other women, only enduring marriage to the biological father is associated with better health than remaining unpartnered.

Nonmarital births have increased both in number and as a share of all births over the past few decades (Hamilton Martin and Ventura 2009; Ventura and Bachrach 2000) and nonmarital childbearing is strongly associated with social and economic disadvantage (U.S. Census Bureau 2007). Despite an explosion of research on socioeconomic disparities in health in recent years, the health consequences of nonmarital childbearing for women's health in the United States has been largely overlooked. Most of what we know comes from European countries (Shouls et al. 1999; Westin and Westerling 2006; Whitehead, Burstrom, and Diderichsen 2000), but there a broader social safety net and different norms likely buffer negative consequences of nonmarital childbearing (Ozawa 2004; Waldfogel 2001). Using

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data from the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79) we compare the midlife self-assessed health of women whose first birth was nonmarital to that of women whose first birth occurred in marriage, giving attention to potential race/ethnic differences. If nonmarital childbearing is associated with less favorable health at midlife, it is then important to identify later life events or transitions that might improve the health of such women. Within the broad array of such possible factors, we focus on one with substantial policy relevance: marriage.

Decades of research has established that, on average, marriage is associated with a range of positive health outcomes (Waite and Gallagher 2000). Findings of marital status differences in health and mortality resonate with cultural beliefs in the importance of marriage and contribute to the view that marriage is a panacea for a range of individual and societal ills. In fact, social science research on marital status differences in health is often cited in support of government policies encouraging disadvantaged single mothers to wed (Nock 2005).

Lacking direct empirical evidence, however, average health advantages conferred by marriage cannot be generalized to particular subgroups. This is especially true for women who have nonmarital births as they are far from average by any number of metrics (e.g., poverty rates, the probability of marrying). In is unclear whether subsequent marriage offers measurable benefits to the health of women who had a premarital birth or if, in some cases, it might pose health risks. Investigating this question is the second and central aim of our study. Focusing on women who had a nonmarital first birth, we compare the midlife health of those who subsequently marry and those who cohabit to that of their continually never-married counterparts. We distinguish unions with the biological father from those with a new partner, and marriages that dissolve from those that endure. Placing these questions within an ecological framework, we specifically consider whether race/ethnicity moderates these patterns. Finally, we employ multivariate propensity score matching to address both the differential selection of women into single motherhood and, among women who had a nonmarital birth, selection into particular union statuses.

Nonmarital Childbearing and Women's Health

Nonmarital childbearing is an increasingly normative pathway to family formation in the United States. In 1979, only 17.1 percent of all births occurred to unmarried women but by 2007 that figure had risen to 39.7 percent (Hamilton, Martin, & Ventura, 2009; Ventura and Bachrach, 2000). The rapid increase and sustained prevalence of nonmarital childbearing in the U.S. highlights the importance of understanding its consequences for adult health and well-being. Further, the consequences of nonmarital childbearing for the production of inequality across multiple domains (McLanahan and Percheski 2008) suggests that it may contribute to the formation and maintenance of social disparities in population health, a topic of considerable interest in recent years. Yet we know surprisingly little about the health of single mothers—a large and particularly vulnerable segment of the U.S. population.

There are several reasons to expect that nonmarital childbearing will be associated with poor health among women in the United States. The economic toll of nonmarital childbearing is well-established and socioeconomic status is, in turn, a fundamental determinant of health (Link and Phelan 1995). Forty one percent of never-married mothers with minor children live below the poverty line (U.S. Census Bureau 2007) and single mothers accounted for 67% of all families receiving Temporary Assistance for Needy Families (TANF) (Administration for Children and Families 2005) in 2001. Economic disadvantages associated with single mothering also persist into later life: women who spend ten or more years raising dependent children outside of marriage are 55 percent more likely to live in

poverty when aged 65 to 75 than are women who were married while raising their children (Johnson and Favreault 2004).

Nonmarital childbearing is associated with exposure to numerous other stressors that may further compromise health. Compared to married mothers, single mothers report higher levels of chronic strain and more stressful life events (Avison, Ali, and Walters 2007; Barrett and Turner 2005; Cairney et al. 2003), fewer health-protective psychosocial resources such as social support (Cairney et al. 2003), and higher levels of psychological distress (Avison et al. 2007; Demo and Acock 1996; Hope et al. 1999; Wang 2004). Stress, social isolation, and psychological distress are, in turn, strongly and negatively associated with *physical* health (Cornwell & Waite 2009; Mulatu & Schooler 2002).

A growing body of European research finds associations between nonmarital births and mothers' poor health. In Britain (Whitehead, Burstrom, and Diderichsen 2000; Benzeval 1998; Shouls et al. 1999), Norway (Elstad 1996), Finland (Martikainen 1995) and Sweden (Whitehead, Burstrom, and Diderichsen 2000; Westin and Westerling 2006), single mothers have significantly worse health than partnered mothers. Many of these countries provide lengthy paid maternity leaves, free or highly subsidized child care up to age 5, and universal access to health care for adults and children (Ozawa 2004; Ray, Gornitt, and Schmitt 2008). In the U.S., only half of women working in the private sector are eligible for 12 weeks of unpaid maternity leave, and subsidized child care is provided only to very low income families (Ozawa 2004; Waldfogel 2001). The relative lack of a social safety net makes it especially likely that nonmarital childbearing has negative health consequences for women in the United States.

Only one study has directly examined the health of never-married mothers in a nationally representative sample of U.S. adults. Using data from the Health and Retirement Study (HRS) 1931-1941 birth cohort, Henretta (2007) found that women whose first birth was nonmarital had a greater hazard of early death (before ages 61-71) and were more likely to be diagnosed with heart disease and stroke than those whose first birth occurred within a marriage. As the author notes, however, these findings may not be generalizable to more recent cohorts for whom nonmarital births are more common and less stigmatized (Henretta 2007). We use data from a nationally representative group of women born in the US between 1957 and 1965 to compare the midlife self-assessed health of women whose first birth was nonmarital to that of women whose first birth occurred within marriage. Because mortality is relatively rare for this more recent birth cohorts, we predict midlife self-assessed health—a measure that strongly predicts mortality later in life (Idler and Benjamini 1997).

We give particular attention to the racial/ethnic background of mothers throughout our analyses. Blacks, whites and Hispanics have starkly varied rates of nonmarital childbearing (Ventura and Bachrach 2000) as well as different ecological and cultural contexts within which they frame their lives and draw support (Heard 2007). Substantial evidence casts doubt on the dominant cultural belief that *early* childbearing has widespread individual and social costs for low income African American women (Geronimus 2003). As Geronimus has shown (1996), early fertility may be an adapative strategy for low income urban African-American women vulnerable to “weathering”-- accelerated declines in health that pose substantial challenges to bearing and raising children at older ages. Although prior research has not considered whether similar considerations apply to *nonmarital* childbearing and its consequences for the physical health of African American women, several studies show that black mothers and their offspring are not as negatively affected by nonmarital childbearing as their white counterparts on other dimensions of well-being (Fomby and Cherlin 2007; Furstenberg 2007; Heard 2007). On the other hand, evidence that African Americans have more difficulty accessing high-quality health care services than whites (Smedley et al. 2003)

could mean that black women may be especially vulnerable to any long-term negative health consequences of nonmarital childbearing. Although this countervailing evidence does not support strong directional hypotheses, both demographic and ecological factors warrant consideration of potential race/ethnic differences.

In sum, if the strains of single motherhood lead to poor health, the increasing prevalence of nonmarital births in the U.S. represents a substantial public health threat that has been largely ignored. Growing numbers of women are entering midlife, when health problems begin to emerge, having experienced cumulative strains associated with nonmarital childbearing. This is especially important because of the linkages of events and transitions across the life course of individuals and across generations (Elder 1988). Specifically, mothers' poor health can have enduring consequences for children by increasing their risk of behavior problems (Rodrigue and Houch 2001), psychological distress (Romer et al. 2002), and delinquency (Forehand, Biggar, and Kotchick 1998). For these reasons, it is important not only to understand the long term consequences of single motherhood for health but also to identify factors that might further improve or worsen the health of women who had a nonmarital birth. Among the range of possible factors, we focus on marriage and union formation, in part because of their implications for family policy in the U.S. and in light of government efforts to promote marriage among single mothers.

Nonmarital Childbearing, Union History, and Women's Health

Decades of evidence establish that married individuals have better health and lower rates of mortality than their unmarried counterparts (Waite and Gallagher 2000). Despite debate over the causal nature of this association and the potential role of selection, there is general consensus that marriage provides many potentially salubrious benefits, including financial resources and access to social security, public pensions, and spousal health insurance (Oppenheimer 2000). Marriage can also function as an institution of social control, encouraging healthy behaviors and providing social integration and emotional support, which are strongly linked to health (Umberson and Montez 2010). Cohabitation appears to offer some but not all of the advantages of marriage; empirical evidence suggests cohabitors have better health than unpartnered individuals but worse health than the married (Wu et al. 2003).

Understanding the impact of marriage on the health of single mothers has substantial relevance for family policy in the U.S. The 1996 welfare reform bill, reauthorized in 2006, expanded the role of federal and state governments in promoting marriage, particularly among low-income single mothers. Federal funding has since been used to support hundreds of marriage promotion efforts including public advertising campaigns emphasizing the importance of marriage and programs providing relationship skills training. The average benefits of marriage in the general population are commonly referenced in support of government efforts to promote marriage among single mothers (Nock 2005) but it is a tall order to expect that marriage can counteract the cumulative strains of nonmarital childbearing and their eventual negative impact on health later in the life course. Despite the important role that social research can play in guiding social policy across myriad domains, it is critical that the empirical evidence relate specifically to the subpopulations most directly affected by such initiatives. In this case, the paucity of research on never married mothers, per se, means that we do not know whether marriage protects their health or if it might in some cases pose health risks. Even if women who have had a nonmarital birth do not receive the same health benefits from marriage as other women, a more fundamental question is whether marriage enhances their health at all compared to remaining unpartnered. Focusing on women who had a nonmarital birth, then, our second central aim is to compare the midlife health of women who subsequently marry or cohabit with those who remain continually unpartnered.

There are several reasons to expect that the benefits of marriage may not accrue to women who had a nonmarital birth. First, they experience more conflict and receive less companionship in marriage than those who entered marriage without children (Timmer and Orbuch 2001) and they are more likely than other married women to anticipate potential divorce (Williams, Sassler and Nicholson 2008). Strained marriages undermine health and well-being--in some cases, more so than remaining unmarried or divorcing (Hawkins and Booth 2005; Williams 2003). Women with nonmarital births are also less likely to receive economic benefits from marriage, despite being in greater need of them. Compared to childless women, single mothers tend to marry men with lower levels of income and education (Lichter, Graefe and Brown 2003). They may also have children from several fathers, increasing the risk of union dissolution (Carlson and Furstenberg 2006; Lichter and Qian 2008) and concomitant financial strains. For these reasons, we distinguish single mothers who subsequently marry and then divorce from those who remain married until age 40.

Despite the high prevalence of cohabitation among single mothers (Lichter and Qian 2008), evidence of its effects on their health and well-being is lacking. We hypothesize that women who have had a nonmarital birth will have a lower than average likelihood of sharing any health benefits of cohabitation as they are more likely than are childless women to form cohabiting unions with men who already have children (Goldscheider and Sassler 2006). Growing evidence indicates that cohabiting father figures earn substantially less than do married biological fathers (Hofferth and Anderson 2003; Lichter and Qian 2008) and given the additional challenges of integrating new father figures and step- or half-siblings into children's lives (Cherlin 1978), cohabiting unions may offer few positive and perhaps some negative consequences for the health and well-being of single mothers. Exiting cohabiting unions is also associated with increased psychological distress and single mothers are more likely to end their cohabiting relationships than are other women (Williams et al. 2008).

Nonmarital Childbearing, Union History, and Women's Health: Existing Evidence

Only one prior study has considered how subsequent unions affect the health of women who have had a nonmarital birth compared to remaining unpartnered. Analyzing data from the National Survey of Families and Households, Williams, Sassler and Nicholson (2008) found that entering marriage was not associated with improved self-assessed health across the 5-8 year study period for mothers, even when the marriage endured. Entrance into cohabiting unions was also not associated with improved health. However, due to sample limitations, this study combined divorced mothers and those who had experienced nonmarital births into a single category and was unable to consider the paternity status of the spouse. We address this issue in the present study by focusing on women who have had a nonmarital first birth and by distinguishing such mothers not only by whether they subsequently marry or cohabit, but also by whether they do so with the biological father of their first child or with a different partner.

Our study builds upon extant research in several additional ways. First, we focus specifically on potential race/ethnic variations in the health consequences of subsequent union experiences of single mothers. Black mothers are far more likely than white or Hispanic women to bear children outside of marital unions (Hummer and Hamilton 2010) and they are less likely to marry following a nonmarital birth (Graefe and Lichter 2002). Some evidence suggests that many low-income and Black single mothers face considerable barriers to marriage, including a shortage of economically attractive men (Lichter and Graefe 2007), as well as gender distrust (Anderson 1992; Edin and Kefalas 2005; Edin and Reed 2004) that arises in part from multi-partner fertility and the threat this represents to new partners (Mincy 2002). The likely impact of these barriers on the health consequences of marriage among Black single mothers is, however, difficult to predict. In one view, Black

single mothers who overcome challenges to wed may have particularly strong relationships and supportive partners, suggesting that they may be especially likely to benefit from their marriages. However, the likelihood that a healthy marriage selection effect exists among Black single mothers is undermined by evidence that the marriages of African American mothers who wed are more likely than those of their Hispanic and white counterparts to end in divorce (Graefe and Lichter 2002). Overall, we expect that because black single mothers, on average, face greater barriers to healthy enduring marriages than their white and Hispanic counterparts, marriage will provide them with fewer health benefits.

Second, prior research has taken a short-term view of the potential benefits or costs of subsequent marriage for single mothers' health, typically investigating outcomes within five years of union entry. Placing this question within a life course framework instead draws attention to the importance of considering more enduring consequences of single mothers' union histories. Spurred in part by the growing availability of longitudinal data, recent studies across a range of disciplines have demonstrated that negative social conditions experienced early in life can be associated with a diverse array of poorer health outcomes many years later (Kuh and Ben-Shlomo 1997, Hayward and Gorman 2004, Palloni 2007). Similarly, the integration of a life course perspective with the study of social stress has produced mounting evidence that transitions and strains experienced at one life course stage have cumulative effects on health that can result in the emergence of chronic illness decades later (Pearlin et al. 2005). This lag occurs in part because many chronic illnesses have long latency periods (Lynch and Smith 2005) and because stressful life events produce chronic secondary strains that, by definition, accumulate over time (Pearlin et al. 2005).

A short-term perspective in which health outcomes are measured contemporaneously with influential life course transitions may therefore grossly underestimate true long-term associations between the two. Furthermore, from both policy and public health perspectives, it is especially important to identify events and conditions with enduring consequences for health compared to those with short-lived effects. We focus on estimating the association of single mothers' subsequent union transitions with their health in midlife, a time when health problems are beginning to emerge and when chronic strains associated with union transitions (or the lack thereof) have likely accumulated over time. A third contribution of this study, which we address in greater detail below, is our use of multivariate propensity score matching to partially address selection bias.

Selection into Nonmarital Childbearing and Marriage

Studies examining the average association of marriage with health generally indicate that differential selection into marriage accounts for some but not most of the association (Waite and Gallagher 2000). However, health-based selection into nonmarital childbearing and marriage may be more prominent among women who have had a nonmarital birth than in the average population because nonmarital births are most prevalent among the less advantaged, and marriage is less common among single mothers (Goldscheider and Sassler 2006; Lichter, Graefe and Brown 2003; Lichter and Qian 2008). Our data allow us to control for a range of background characteristics predictive of entry into nonmarital parenting and of single mothers' subsequent union pathways. We also employ multivariate propensity score matching in two ways to partially address bias due to selection. First, we determine whether significant observed associations of nonmarital parenting with midlife health exist when women who had a nonmarital first birth are matched with those who have a similar estimated propensity of having a nonmarital first birth. Second, among women who had a nonmarital first birth, we determine whether significant observed associations of union histories with midlife health persist when those who enter unions are matched with those who have a similar predicted propensity of sharing that union history.

Data and Measures

Data

The 1979 National Longitudinal Survey of Youth (NLSY79) data are uniquely suited to investigating long-term consequences of nonmarital childbearing and subsequent family transitions. The NLSY79 is an ongoing survey of a nationally representative sample of 12,686 young men and women ages 14-22 in 1979; it originally included oversamples of black, Hispanic, military and poor white respondents. Although the military and economically disadvantaged white oversamples were dropped prior to 1991, the remaining respondents were interviewed annually through 1994 and biennially since. By 2008, data on detailed union histories had been continuously collected over a 29 year period, and measures of health and well-being ascertained at age 40, a time when health problems begin to emerge. As of 2006, all NLSY79 mothers were over age 40.

For our first set of analyses (reported in Table 3), a total of 3,986 women had given birth prior to age 40, and 3,471 (89.3%) of them completed the age 40 health assessment. We further limit this sample to the 3,896 women whose first birth took place prior to age 36 and who therefore had sufficient time to enter a union prior to reaching age 40; of this sub-sample, 3,391 (89.1%) completed the self-assessed health measure. Our second primary analyses (reported in Table 5) focus on the 1,275 women who had a nonmarital first birth prior to age 36 (including 246 white, 799 black, and 230 Hispanic women). Of these 1,275 women, 1,150 (90.2%) completed the age 40 health module. The amount of data missing was most sizable for the measure of self-reported health (reported above), followed by maternal years of education (6.2%), poverty status (6.0%), AFQT score (5.0%), and health limitations (3.1%). In order to maintain maximum sample size, all regression models were estimated using multiple imputed data created from the imputation chained equations (ICE) program for STATA (Royston 2006).1 Propensity score matching was implemented using the psmatch2 program created for STATA by Leuven and Sianesi (2003). Bootstrapped standard errors were calculated for all matching estimations.

Measures

Self-assessed Health—Self-assessed Health is measured at age 40 with a single question: “In general, would you say your health is excellent, very good, good, fair, or poor?” Responses are coded 1-5 with higher values indicating better health. Self-assessed health is highly predictive of subsequent morbidity and mortality (Idler and Benjamini 1997) and is widely recognized as a valid and reliable indicator of health status in the general population (Ferraro and Farmer 1999).

Single Motherhood Status—We define a single mother as a woman who had a first birth while never-married, and lived with that child in her household.

Marital and Cohabitation History—Six dummy variables distinguish the following marital and cohabitation histories by age 40 for women who had a nonmarital first birth at age 35 or younger: (1) entered a single enduring marriage with the biological father of the first child (n=203), (2) entered a single enduring marriage with a new partner (n=168), (3) entered and exited a marriage with the biological father of the first child (n=129) (4) entered and exited a marriage with a new partner (n=123) (5) never married but cohabited with the biological father (n=104) and (6) never married but cohabited with a new partner (n=43).

[1]Results were substantively identical when non-imputed variables for the dependent outcome were used. We therefore elected to present results for the fully imputed sample so as to maximize the sample size.

The reference category consists of continually never-married & unpartnered women (n=187).

Control Variables—Control Variables include race/ethnicity (non-Hispanic black, Hispanic and non-Hispanic non-black or "white"), US nativity (1=foreign born), age at first birth, cohabitation status at first birth (1=cohabiting), cognitive ability (1980 AFQT score, which ranges from 1-99), poverty status at baseline (1 = in poverty, based on whether the family income was below the federal poverty income guidelines for the particular family size in 1978), the mother's family composition at age 14 (1=lived with both biological parents), her own mother's years of education as a proxy for the socioeconomic status of her family of origin, and the existence of health conditions in 1979 that limit the respondent's ability to work for pay (1 = yes). Because both nonmarital childbearing and health differ for Hispanics depending on their nativity status, we also control for the interaction of Hispanic X U.S. nativity.

Although the number of biological children a woman has by age 40 and her marital status at age 40 likely influence health, they are consequences rather than causes of nonmarital fertility and subsequent union history. Controlling for these potential mechanisms would underestimate the true total effect of single motherhood or subsequent union history on midlife health and they are, therefore, excluded from the models presented. However, supplementary analyses revealed that their inclusion did not change the overall pattern of findings, suggesting their role as potential mediators is negligible.

Analysis

Our analyses address two basic questions: (1) Does nonmarital parenthood undermine health and well-being? and (2) Among women who had a nonmarital first birth, is subsequent marriage or cohabitation associated with better health at midlife than remaining never married? We first employ ordinary least squares (OLS) and ordered probit regression to address these questions.2

Selection into nonmarital childbearing and subsequently forming unions is a nonrandom process. In order to identify the effect of nonmarital childbearing and later union transitions on mother's health, we minimize the potential bias due to nonrandom selection, by conditioning on pre-treatment observable characteristics (Rosenbaum and Rubin 1983) theoretically derived from the literature on nonmarital childbearing and union formation following nonmarital births. Propensity score matching then allows us to match women in our sample based on the predicted probability they had a nonmarital birth or experienced a particular union history (the propensity score) as a non-parametric feature of these pre-treatment (or predetermined) observed characteristics (Dehejia and Wahba 2002). PSM models thus estimate the average effect of having a nonmarital birth (or, in later models, union history) among women similarly likely to engage in such behaviors. Thus, in the second stage of each part of our analysis, we determine whether significant associations identified in the first-stage OLS models are robust to a propensity score matching specification. As Morgan and Harding (2006) argue, the use of matching techniques provides a sizable advance over merely conceding that selection bias may be present in some form and speculating on the sign of the bias.

We use one-to-one nearest neighbor matching with replacement (Morgan and Harding 2006; Rosenbaum and Rubin 1983). Nearest neighbor matching (with and without replacement)

[2]Because we obtained similar results with both techniques, we present the OLS results for ease of interpretation. Results of the ordered probit analyses are available upon request.

and other approaches (interval matching, kernel matching) are closely related. There are not yet standardized guidelines for choosing a matching procedure (Gangl 2010; Morgan and Winship 2007), though nearest neighbor matching estimates have been shown to produce lower standard errors, compared with caliper matching, and are preferred when there is a large overlap in propensity scores between treatment and control groups (Black & Smith, 2004; Dehejia & Wahba, 2002). Matched observations from the treatment and control groups are used to compute differences in health at age 40, and the average difference is then computed across all matches. Where necessary, we trim the sample to ensure common support (i.e., that the range of propensity scores is the same for treatment and control groups). We use bootstrapped standard errors ($n = 50$) to ensure the most robust outcomes for our PSM results.

Descriptives

Table 1 shows descriptive statistics (means and standard deviations [in parentheses] or percentages) for all variables by race/ethnicity and marital status at first birth. Bivariate differences between women with a nonmarital first birth and women with a marital first birth within race/ethnicity are assessed with independent sample t-tests or chi-square tests. Consistent with our hypothesis, women who had a nonmarital first birth have lower levels of self-assessed health at age 40 than their same race/ethnicity counterparts who had a marital first birth. Several background differences are also evident, some of which vary by race/ethnicity. Women with a nonmarital first birth were younger than married mothers at their first birth, their mothers had lower levels of education, they were less likely to have lived with both parents at age 14, they were much more likely to be living in poverty at baseline, and they had lower cognitive ability scores. White women with a nonmarital first birth were more likely to report a health limitation at baseline than their counterparts with a marital first birth. Among black women, those with a nonmarital first birth were less likely to be foreign born than those with a marital first birth.

Table 2 shows the distribution of women who had a nonmarital first birth prior to age 36 according to their subsequent union history and their cohabitation status at birth by race/ethnicity. Among women with a nonmarital first birth, black women are the most likely to be in the “never married never cohabited” group, followed by Hispanic, and then white mothers. Hispanics are more likely than whites and blacks to cohabit with the biological father without marrying, and Hispanics and whites are more likely than blacks to enter an enduring marriage with the biological father. White single mothers are more likely than their black or Hispanic counterparts to marry and subsequently divorce the biological father and are more likely than black mothers to marry and divorce a new partner. Overall, black women's relatively low probability of marriage and high probability of remaining unpartnered substantially distinguishes them from Hispanic and white women.

We also examined bivariate associations of union history with age 40 self-assessed health by race/ethnicity for the same sample of women as in Table 2. Results are available in Appendix A. At the bivariate level, neither marriage nor cohabitation is positively associated with the health of white and Hispanic women who had a nonmarital birth. However, black single mothers who subsequently enter an enduring marriage with the biological father have better midlife self-assessed health than black women who remain unpartnered.

Results

Midlife Health of Women with a Nonmarital First Birth

Table 3 presents results from OLS regression models comparing the health at age 40 of women who had a nonmarital first birth to that of their counterparts who had a marital first

birth prior to the age of 36.2 As shown in Model 1, even when controlling for a range of background characteristics (including highly significant predictors such as AFQT score, mother's education level and health limitations at baseline), women who had a nonmarital first birth report lower levels of self-assessed health at age 40 than women who had a marital first birth.

In Model 2, we enter interaction terms to test for race/ethnic differences in the estimated effect of nonmarital childbearing on midlife health. The health disadvantage associated with having had a nonmarital birth does not differ for white and black women, but it is smaller for Hispanic women. Supplementary analysis indicates that the estimated effect of nonmarital parenthood on midlife health is negative for white women and black women but not distinguishable from zero for Hispanic women. Nonmarital parenting appears to have few long term negative consequences for the health of Hispanic women, as their midlife health is similar to that of their counterparts who had a marital first birth (.226-.266 = -.04).

We next employ multivariate propensity score matching to determine whether the significant associations presented in Table 3 are robust to an approach that better accounts for the differential selection of women into premarital parenthood This analysis estimates the likelihood of experiencing a nonmarital first birth for the total sample of women who became mothers, by conditioning on characteristics observable prior to conception that are associated with entrance into nonmarital childbearing (Rosenbaum and Rubin 1983).3 Covariates used to estimate the propensity for nonmarital birth include mother's family structure at age 14, health limitations and cognitive abilities, poverty status at baseline, self-efficacy, gender role orientations, and expectations for future education, family, and fertility as ascertained in 1979. These measures are described in detail in Appendix B and marked with the following symbol: †. Significant predictors of nonmarital first births for the total sample included baseline measures of mothers' AFQT score, health limitations, family structure at age 14, nativity, race, poverty status, and educational expectations.

Table 4 presents coefficients obtained from the OLS models and the average treatment effects for the treated, estimated from the PSM models. The results in the first panel (total sample) reveal little difference in the estimated effect of nonmarital first births on self-reported health at age 40 across the two sets of analyses and both coefficients are statistically significant. Because our OLS analysis indicated that having had a nonmarital birth was associated with poorer health for white and black women, but not for Hispanic women, we estimate a separate propensity score matching model that is limited to black and white women (second panel of Table 4). As expected, the ATT is significant and greater for the black and white subsample than for the total sample, which includes Hispanic women. In sum, the PSM increases confidence in our OLS results by showing that among black and white women with similar propensities to have nonmarital first births, those who actually have one report substantially worse midlife health than those whose first birth occurred in marriage. We find no evidence of negative health consequences of nonmarital childbearing for Hispanic women.

[3]An abundance of research documents that the highest rates of nonmarital childbearing are found among women in their teens and twenties (Hamilton, Martin, & Ventura, 2009), that minority women have higher rates of nonmarital childbearing than do non-Hispanic whites and the foreign-born (Hamilton et al., 2009; see also McLanahan, 2009; Hoffman, 2008; Lichter and Qian, 2004; Lichter, Graefe, and Brown, 2003; Wildsmith and Raley, 2006), and that factors shaping youths' social class position (such as maternal educational attainment or family structure while growing up) are strongly associated with premarital birth (Pearson, Muller, and Frisco 2006; Wu and Martinson 1993). Other studies have found strong associations between gender role orientation and educational and family expectations on the likelihood of union formation (Clarkberg 1995; Sassler and Goldscheider 2004). Many of these same variables are associated with entrance into coresidential unions (both cohabitation and marriage).

Nonmarital Childbearing, Subsequent Union History and Health at Midlife

In the second part of the analysis, we limit the sample to women who had a nonmarital first birth before age 36 and use OLS regression and, in supplementary analyses (available upon request), ordered probit to examine whether those who later marry or cohabit have better midlife health than those who remain unpartnered through age 40, giving attention to the paternity status of their partners and the stability of the union.2 Results for both the total sample (all race/ethnic groups combined) and the black subsample are shown in Table 5. Sample sizes do not allow us to estimate separate models for white and Hispanic women.

With a few notable exceptions, the results suggest that most subsequent union experiences neither offer health benefits nor pose health risks in midlife to women who have had a nonmarital birth. Marriage to the biological father of the first child, however, in some cases appears to benefit women's health. For the total sample and the black subsample, single mothers who subsequently marry the biological father of their first child report better midlife health than those who remain unpartnered, but this difference reaches significance only for those whose marriages to the biological father endure. In addition, black single mothers who subsequently marry and then divorce a new partner report better midlife health than their continually unpartnered counterparts. The midlife health of single mothers with all other union experiences does not significantly differ from that of those who remain unpartnered.

We also considered that cohabitation might offer differential benefits to health compared to some types of marital unions. In supplementary analyses (available upon request), we varied the reference category to compare mothers who subsequently cohabited without marrying to those who entered each type of marital union. Results suggest that marrying a new partner offers no greater health benefits than cohabiting with either the biological father or with a new partner. Marriage to the biological father (whether it endures or not) is not significantly associated with better health than is cohabiting with him. However, single mothers who subsequently enter an enduring marriage to the biological father have better midlife health than those who cohabit with a new partner. For the black subsample, there were no significant differences in health for single mothers who subsequently cohabited and those who entered a marital union, either with the biological father or with a new partner.

Finally, because marriage promotion policies commonly target low income single mothers, we estimated supplementary models that included an interaction term for baseline poverty status X union history. We found no significant differences by poverty status in the estimated effect of subsequent union history on the health of women who had a nonmarital birth, either in the total sample or the black subsample.

We next use PSM to determine whether the significant associations of union history with the midlife health of single mothers shown in Table 5 are robust to a consideration of differential selection into marriage with the biological father of the child among women with a nonmarital birth. We first estimate the likelihood of a marriage to the child's biological father (relative to remaining never married and not cohabiting), further refining the measure to include only those marriages that endure up to age 40 for the total sample of mothers whose first birth was nonmarital. We also undertake a separate analysis of black women who had a nonmarital first birth, examining marriages to the biological father that endured, as well as marriages to other men that dissolved. The covariates used to predict entrance into marital unions are marked with Ω in Appendix B. For the total sample, significant predictors of entering an enduring marriage with the biological father were the respondent's AFQT score, the mother's age at the birth of her child, whether she was foreign-born, and if she was cohabiting (with the biological father or another man) at the birth of the child. For the analysis limited to black women with a nonmarital first birth, the variables significantly associated with an enduring marriage to the biological father included the woman's age at

the birth of the child and whether she was cohabiting at the time the child was born; only age at first birth was significantly associated with the likelihood of subsequently entering a marriage with a new partner that resulted in divorce.

Table 6 presents comparisons of the coefficients obtained from OLS models shown in Table 5 and the average treatment effects from the PSM models. In the total sample, the PSM model predicts that the age-40 self-assessed health of single mothers who later enter an enduring marriage with the biological father of the child is significantly better than what it would have been if they had remained unmarried and unpartnered, hence underscoring our OLS results. However, when we limit the analysis to black women, we find that the better health of those who remain wedded to the biological father of their child compared to those who remain unpartnered is no longer statistically significant. Similarly, whereas the coefficients for black women who married a new partner and experienced the dissolution of that marriage was significant in the OLS model, it no longer reaches conventional levels of significance in the PSM analysis. In sum, the PSM results indicate health benefits of subsequently entering an enduring marriage with the biological father of the child for white and Hispanic but not black single mothers.

Discussion

The growing prevalence of nonmarital childbearing coupled with the aging of the population draws attention to the importance of understanding the midlife health of women who have had a nonmarital birth, and of identifying the role of subsequent marriage in shaping these health outcomes. We used panel data from the 1979-2006 NLSY79 to assess differences in midlife self-assessed health between women who had a nonmarital first birth and those whose first birth occurred in marriage. We tracked the subsequent union histories of women who had a nonmarital first birth to estimate the effect of marrying or cohabiting versus remaining never-married on self-assessed health, giving particular attention to the paternity status of the mother's partner as well as the stability of a marriage.

Our empirical results lead to two central conclusions. First, on average, having a nonmarital first birth in the U.S. is negatively associated with white and black women's health at midlife and this is not due solely to negative selection into nonmarital childbearing. There is substantial evidence that single mothers experience high levels of stress, psychological distress, and social isolation (Avison, Ali, and Walters 2007; Barrett and Turner 2005; Cairney et al. 2003; Hope 1999; Wang 2004). However, ours is the first U.S. study to document long term negative health consequences of nonmarital childbearing among a recent cohort of women who are just entering midlife and for whom the cumulative strains of single motherhood should be most evident. These findings underscore the importance of the life course perspective in highlighting potential cumulative effects and hence enduring consequences of occurrences earlier in life that may have ramifications in later years.

Although we find that nonmarital births equally undermine the health of black and white women, single motherhood appears to have no negative long-term consequences for the health of Hispanic women. This may reflect the fact that Hispanic women's nonmarital births are more likely than those of other race/ethnic groups to occur in long-term cohabiting unions that resemble marriage (Oropesa and Landale 2004; Wildsmith and Raley 2006). Hispanic single mothers may also be embedded in larger and more close-knit family networks, which can provide emotional and instrumental support resources that are protective of health and facilitate coping with the strains of single parenthood (Osborne, Manning, and Smock 2007). Relevant to our findings for Hispanics is Geronimus' (2003) warning that dominant cultural scripts that stigmatize early or nonmarital births among

minority groups ignore the cultural, structural, and ecological contexts that sometimes make alternative fertility patterns adaptive or at least benign.

Second, for most women, negative long-term health consequences of having a nonmarital first birth are unlikely to be mitigated by subsequently entering a cohabiting or marital union. Across all race/ethnic groups, single mothers who marry or cohabit with a new partner, cohabit with the biological father, or marry and divorce the biological father report no better health at age 40 than those who remain unpartnered. These results are consistent with research showing few *short term* health benefits of marriage or cohabitation for those who enter unions with children (Williams et al. 2008) or after having a nonmarital birth (Meadows et al. 2008). We extend this literature by examining longer term consequences and by distinguishing women by the nature of the relationship of their husbands to their child, and whether or not these unions endure.

We do find evidence of health benefits for women in the full sample who enter and remain in a marriage with the biological father of the child. These weaken but remain significant after adjusting for differential selection into such a marriage. Our findings are consistent with Williams et al.'s (2008) observation that the short term mental health benefits of marriage for single mothers are limited to those whose marriages endure. The present study further clarifies this pattern by showing that any long-term physical health benefits of subsequent union formation are limited to enduring marriages *with the biological father of the first child* and, as we discuss below, are further limited by race/ethnicity. Blended and step-families face a unique set of stressors related to family boundary ambiguity (in which family members do not perceive the stepparent to be a full member of the family) (Brown and Manning 2009) and a lack of cultural norms and supports to guide interaction (Cherlin 1978). Moreover, fathers are less involved in parenting nonbiological compared to biological children (Hofferth and Anderson 2003). Given gendered roles in interpersonal relationships, mothers who marry a new partner likely assume much of the responsibility for forging interpersonal bonds and resolving conflicts between members of the new “blended family” (Nielson 1999). Stress associated with this process may undermine any health benefits that marriage would otherwise offer to such women.

For black single mothers, once differential selection is taken into account, even an enduring union with the biological father appears to offer no health benefits. This is consistent with our hypothesis that the challenges faced by African-American single mothers in forming healthy lasting relationships may lead them to receive few health benefits from marriage. The constrained marriage markets of black single mothers likely play an important role (Harknett and McLanahan 2004; Wilson 1987). Black single mothers are more likely to marry men who are also unwed fathers (Lichter and Graefe 2007), have few economic resources (Graefe and Lichter 2008), lack a high school diploma (Lichter, Graefe, and Brown 2003), or who have been incarcerated or have substance abuse problems (Lopoo and Carlson 2008). In sum, marriage market constraints that stem largely from inequality and economic disadvantage likely result in black single mothers receiving fewer of the resources of marriage—economic resources and emotional support-- through which its health advantages are conferred (Waite and Gallagher 2001).

Our observation that even marriage to the biological father offers no health benefits for black women is important for several reasons. Black women have far higher rates of nonmarital fertility than white women (72/1000 versus 32/1000 respectively) (Ventura 2009) and black single mothers are more likely to be economically disadvantaged. Black single mothers are, therefore, disproportionately affected by government marriage promotion programs for low income populations. To the extent that our results can be generalized to more recent cohorts of single mothers, a point to which we turn next, they

suggest that even marriage promotion strategies leading to enduring unions are unlikely to be successful in protecting the health of those most likely to be affected by them.

Our analyses have several limitations. First, the relatively small numbers of white and Hispanic women who had a nonmarital birth prevented us from identifying the possibly distinct health consequences of union history for women in these two groups. An important implication is that we cannot know if our observation that marriage to the biological father of the child is associated with better health is limited to white or Hispanic women. Because our first set of analyses indicates no negative consequences of nonmarital childbearing for the health of Hispanic women, long-term health benefits of subsequent marriage to the biological father may in fact be limited to White women. A related issue is our inability, due to small sample sizes, to disaggregate our analyses by time since the union transition. Unions (especially marriages) that occur shortly after the nonmarital birth may be more effective than later unions in improving health. Unfortunately, more direct empirical investigation of these questions requires data that, to our knowledge, are not currently available.

Second, despite our observation that marriage to the biological father is associated with better midlife health for the combined group of white and Hispanic women than remaining unpartnered, we cannot conclude that this is a causal relationship. Our propensity score models enable us to limit our comparisons to those who have a similar propensity to enter such a union based on observable characteristics, and the NLSY79 data allow us to employ a wider range of background characteristics than are typically used. Nevertheless, it is possible that unobserved characteristics associated with health differentially select white and Hispanic single mothers into marriage with their child's biological father. A lack of comparable measures of baseline and midlife health prohibited using fixed-effects models and we hope future data collection efforts will enable this.

Third, we urge caution in generalizing these results to more recent cohorts of women for whom nonmarital childbearing is more common. It is possible that long term negative health consequences of nonmarital childbearing will wane among cohorts for whom the experience has become more normative. On the other hand, if the normative status of nonmarital childbearing mitigates its negative health consequences, black women's health should be less strongly affected than white women's and we found no evidence of this. Moreover, the 1996 welfare reform legislation sharply curtailed the social safety net available to low income single mothers and could result in more negative outcomes in future years.

A related consideration is the large shift in the age distribution of nonmarital fertility in the past 30 years (Hamilton et al. 2009). Therefore, our sample contains a greater proportion of teen single mothers than exist in more recent cohorts. Recent research that disentangles the extent to which adverse outcomes of teen motherhood are attributable to the teen birth, itself, versus the disadvantaged backgrounds of many teen mothers suggests that consequences of adolescent childbearing are not always as negative as have been portrayed in the media or by politicians (Furstenberg 2007). However, teen mothers do have lower high school graduation rates and post-secondary educational achievements than their older counterparts (Hoffman 2008). This shift in the age distribution may result in fewer negative health consequences of single motherhood in future years.

In spite of these caveats, our study may have relevance for the debate about the consequences of government efforts to promote marriage among low income single mothers. On the positive side, our results suggest no long term *negative* effects of marriage on the health of women who have had a nonmarital first birth, even among those whose marriages subsequently dissolve. Taken together with prior research, then, marriage promotion efforts

are unlikely to have immediate or long term negative effects for single mothers' self-assessed health.

Nevertheless, our results also suggest that nonmarital childbearing itself undermines midlife health for black and white (although not Hispanic) women and even enduring marriages are unlikely to mitigate this outcome for black women. Although we found no evidence in ancillary analyses (available upon request) that the health benefits of subsequent marriage to the biological father differ depending on the poverty status of single mothers at baseline, it is clear that black single mothers are more likely than their white counterparts to be economically disadvantaged and, hence, they are disproportionately targeted by marriage promotion efforts. In other words, the group most likely to be affected by marriage promotion efforts—black single mothers--is least likely to benefit from them, at least in terms of their self-assessed health at midlife. More generally, our findings imply a cautionary tale about succumbing to a “tyranny of averages,” and highlight the importance of ensuring, to the extent possible, that policy is informed by research on the targeted subpopulations. In this case, the empirical evidence does not support axiomatic assumptions about the universal benefits of marriage.

Our approach and findings also underscore the importance of using a life course perspective to understand the long-term consequences of stressful life events and conditions on health and well-being decades later (Pearlin et al. 2005). As the population ages, a growing number of women will enter midlife and older ages—a time when health problems begin to emerge —having experienced the cumulative strains associated with single motherhood. Marriage promotion efforts, even those that focus on creating healthy lasting unions, are unlikely to be sufficient to address this growing public health problem for black women. For other women, they may be effective only to the extent that they result in healthy, lasting unions to the biological father. More research is needed on the mechanisms through which single motherhood undermines the health of U.S. women and on the way that these processes unfold over the life course and, possibly, across generations. Chronic financial strain likely plays an important role. Some evidence suggests that marriage only minimally alleviates the poverty and economic strain that accompany nonmarital childbearing (Sigle-Rushton and McLanahan 2002) and this may partly explain why it appears to offer few benefits to single mothers' long term health.

Appendix A

Mean age 40 self-assessed health by union history and race/ethnicity among women with a nonmarital first birth at age 35 or younger (imputed data)

	White	Black	Hispanic	Total
Union history after nonmarital first birth				
Never married never cohabited	3.418	3.159	3.229	3.177
Never married; cohabited with biological father	3.334	3.363	2.994	3.268
Never married; cohabited with new partner	3.111	3.182	2.507	3.104
Married biological father and it endured	3.329	3.352*	3.447	3.365*
Married & divorced biological father	3.326	3.297	3.365	3.317
Married new partner and it endured	3.288	3.250	3.251	3.258
Married & divorced new partner	3.365	3.329	3.402	3.350
n	246	799	230	1275

***Notes*:** +p=0.0578;
*
p < .05;
**
p <.01;
***
p < .001 (two tailed within race/ethnicity independent sample t-tests of difference in self-assessed health between single mothers with a specific union history compared to those who never married and never cohabited).

Appendix B

Variables used in propensity score models as predictors of treatment

Variable	Question	Survey years	Values
Health limitations†,Ω	Does health limit (a) the kind or (b) the amount of work R can do?	1979	1=yes, 0=no
Poverty status†,Ω	Family income for the family size is below the federal poverty income guidelines for the prior year.	1979	1=In poverty
Rotter scale score†,Ω (sum of all pairs of questions of the Rotter scale)	What happens to me is my own doing… Sometimes I feel that I don't have enough control over the question my life is taking	1979	1=in control, 2=not in control
	When I make plans, I am almost certain that I can make them work…or it is not always wise to plan too far ahead, because many things turn out to be a matter of good or bad fortune anyhow	1979	1=R's plans work, 2=matter of luck
	In my case, getting what I want has little or nothing to do with luck…many times we might as well decide what to do by flipping a coin	1979	1=luck not factor, 2=flip a coin
	Many times I feel that I have little influence over the things that happen to me…or it is impossible for me to believe that chance or luck plays an important role in my life	1979	1=luck big role, 2=luck no role
AFQT score†,Ω (summed raw scores sections of the Armed Services Vocational Aptitude Battery (ASVAB) test Race †,Ω	The AFQT assesses verbal, math, and reading skills (NLSY79 User's Guide).	1980	Continuous scale from 1-99
	In what country were you born?	1979	1=Non-Hispanic Black; 0=Non-Hispanic White; 1=Hispanic; 0=Non-Hispanic White.
Nativity†,Ω		1979	0=US native; 1 = Foreign born
Maternal Education†,Ω	What is the highest grade or year of regular school that your mother ever completed?	1979	Continuous scale from 0 (none) to 20 (eighth year college or more)
Marital Status of parents†,Ω	Please take a look at this card and tell me with whom you (are/were) living (when you were 14 years old).	1979	1=lives with biological mother and father; 0=some other arrangement
Age at first birthΩ	Calculated using mother's and first child's birthdays.	1979-2008	Rounded down to nearest integer.
Sex of first childΩ	NLS-created variable from “Fertility and Relationship Histories” files	1979-2008	1=male, 0=female
Gender role orientation†	1) A woman's place is in the home, not the office or shop.2) A wife with a family has no time for outside	1979	Scores range from 1-4, where 1=strongly disagree, and 4=strongly agree (*

Variable	Question	Survey years	Values
	employment.3) A working wife feels more useful than one who doesn't hold a job.*4) Employment of wives leads to more juvenile delinquency.5) Employment of both parents is necessary to keep up with the high cost of living.*6) It is much better if the man is the achiever outside the home and the woman takes care of the home and family.7) Men should share the work around the house with women.*8) Women are much happier if they stay home and take care of children.		indicates measures were reverse coded). Measures were summed, with higher values indicating more traditional attitudes. Cronbach's Alpha = 0.68.
Expectations†	Do you expect to be in school 5 years from now?	1979	1=yes, 0=no
	Altogether, how many (more) children do you expect to have?	1979	Continuous scale from 0 (no children) to 10 children, recoded so that 1=no children, and 0=all others.
	What is the highest grade or year of regular school, that is, elementary school, high school, college, or graduate school that you would like to complete?	1979	Scale ranges from 1=1st grade to 18=6th+ year college, scale is recoded so that 1=4th year college or more, and 0=all others.
	What would you like to be doing when you are 35 years old?	1979	1=Marriage/Family, 0=Present job, some occupation, or other.
Cohabitation Status (at birth of child,Ω	Single mother cohabits with biological father at birth of child	All	1=yes, 0=no
	Single mother cohabits with someone other than biological father at birth	All	1=yes, 0=no

†Variable used in propensity score matching analysis in Table 4;

ΩVariable used in propensity score matching analysis in Table 6.

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Table 1

Descriptive statistics by marital status at first birth and race/ethnicity among women whose first birth occurred prior to age 36 (imputed data)[a]

	Women with a nonmarital first birth (single mothers)				Women with a marital first birth (married mothers)			
	White	**Black**	**Hisp.**	**Total**	**White**	**Black**	**Hisp.**	**Total**
Dependent variable								
Self-assessed health age 40	3.29*** (1.10)	3.29*** (1.08)	3.33* (1.16)	3.30*** (1.10)	3.79 (1.05)	3.56 (1.06)	3.50 (1.13)	3.69 (1.08)
Control variables (1979/80)								
Foreign born								
Yes	1.78%	1.21%***	21.07%	4.87%***	2.64%	5.77%	27.78%	8.57%
No#	98.22%	98.79%	78.93%	95.13%	97.36%	94.23%	72.22%	91.43%
Age at first birth	20.37*** (4.79)	19.65 *** (4.34)	20.05*** (4.26)	19.86 *** (4.41)	24.74 (5.23)	23.61 (5.40)	22.88 (5.22)	24.17 (5.31)
Mother's education (years)	10.82*** (2.61)	10.33*** (2.76)	7.16* (4.30)	9.86*** (3.30)	11.84 (2.63)	10.94 (3.12)	7.83 (4.28)	10.84 (3.61)
Lived with both biological parents at age 14								
Yes	61.48%***	43.69%***	53.32%***	48.80%***	79.98%	55.74%	69.66%	74.12%
No#	38.52%	56.31%	46.68%	51.20%	20.02%	44.26%	30.34%	25.88%
In Poverty								
Yes	29.09%***	57.09%***	48.77%***	50.26%***	8.57%	33.35%	32.60%	17.48%
No#	70.91%	42.91%	51.23%	49.74%	91.43%	66.65%	67.40%	82.52%
Cognitive ability (AFQT) in 1980	35.88*** (26.49)	18.76*** (18.63)	20.32*** (20.49)	22.30*** (21.07)	53.68 (27.82)	25.65 (21.39)	28.14 (25.60)	43.95 (29.64)
Health Limitation	6.14 %* 93.86%	4.79% 95.21%	3.32% 96.68%	4.78%** 95.22%	3.35% 96.65%	3.46% 96.54%	1.58% 98.42%	2.98% 97.02%
n	186	626	159	971	1,355	305	450	2,110

Notes: Hisp. = Hispanic; Means and standard deviations (in parentheses) shown for continuous variables; Percentages shown for categorical variables.

* p < .05;

** p <.01;

*** p < .001 (two-tailed independent sample t-tests or chi-square tests of difference between single and married mothers within race/ethnicity);

[a] Statistics presented for analytic sample used in Table 3.

#Omitted reference category

Table 2

Distribution of post-birth union histories and cohabitation status at birth by race/ethnicity and poverty status among women with a nonmarital first birth at age 35 or younger (imputed data)

	White	Black	Hispanic	Total
Union history after nonmarital first birth				
Never married never cohabited	5.05%[ac]	26.61%[ab]	10.14%[bc]	19.67%
Never married; cohabited with biological father	10.09%[c]	10.08%[b]	14.98%[bc]	10.95%
Never married; cohabited with new partner	4.13%	5.24%	2.42%	4.53%
Married biological father and it endured	24.40%[a]	19.27%[ab]	25.02%[b]	21.25%
Married & divorced biological father	23.76%[ac]	10.03%[a]	15.56%[c]	13.57%
Married new partner and it endured	14.59%	17.42%	18.55%	17.09%
Married & divorced new partner	17.98%[a]	11.34%[a]	13.33%	12.93%
Cohabitation status at birth				
Cohabiting with biological father at birth	31.19%[a]	16.13%[ab]	24.15%[b]	20.36%
Cohabiting with new partner at birth	8.26%[a]	4.57%[ab]	7.25%[b]	5.73%
Not cohabiting at birth	60.55%[a]	79.30%[ab]	68.60%[b]	73.91%
n	426	799	158	953

Notes:

[a]Difference in union history or cohabitation status between black and white single mothers is significant atp < .05;

[b]Difference between black and Hispanic single mothers is significant at p < .05;

[c]Difference between Hispanic and white single mothers is significant at p < .05.

Table 3

OLS regression coefficients estimating the effect of a nonmarital first birth on age 40 self-assessed health: Women who had a first birth at age 35 or younger (imputed data)

	Age 40 Self-Assessed Health	
	1.	**2.**
Nonmarital first birth (0 = first birth while married)	-0.142** (0.047)	-0.266*** (0.071)
Control Variables measured in 1979		
Foreign born (0 = U.S. native born)	0.172 (0.117)	0.174 (0.117)
Age at first birth	0.013** (0.004)	0.013** (0.004)
Mother's years of education	0.023** (0.007)	0.022** (0.007)
Lived with both biological parents at age 14 (0 = no)	-0.044 (0.037)	-0.045 (0.037)
Poverty (0 = no)	-0.109* (0.042)	-0.112** (0.042)
Cognitive ability (AFQT)	0.008*** (0.001)	0.007*** (0.001)
Hispanic (0 = White)	0.057 (0.055)	0.006 (0.060)
Hispanic X foreign born	-0.071 (0.140)	-0.064 (0.140)
Black (0 = White)	0.064 (0.049)	0.0198 (0.066)
Health limitation	-0.333*** (0.092)	-0.333*** (0.091)
Interactions		
Premarital birth X Hispanic	---	0.226* (0.105)
Premarital birth X black	---	0.160 (0.099)
Constant	2.844*** (0.109)	2.871*** (0.110)
n	3,896	3,896

Notes: + p< .10;

* p < .05;

** p <.01;

*** p < .001 (two-tailed tests); Unstandardized OLS regression coefficients (standard errors in parentheses)

Table 4

Comparison of OLS and propensity score matching results estimating the effect of a nonmarital birth on age 40 self-assessed health (imputed data)

	Age 40 Self-Assessed Health	
	OLS	**Propensity Score Matching**
		ATT
TOTAL SAMPLE		
Nonmarital first birth (0 = first birth while married)	-.142* (.047)	-.158* (.067)
Treatment observations	---	1,287
Control observations	---	2,609
Total n	3,896	3,896
BLACK AND WHITE WOMEN ONLY		
Nonmarital first birth (0 = first birth while married)	-.181*** (.053)	-.212*** (.065)
Treatment observations	---	1055
Control observations	---	2,031
Total n	3,086	3,086

Notes:

* p < .05;

** p <.01;

*** p < .001 (two-tailed tests);

Standard errors in parentheses;

ATT = average treatment effect for the treated.

Table 5

OLS regression coefficients estimating the association of union history with age 40 self-assessed health: Women who had a nonmarital birth at age 35 or younger (imputed data)

	Age 40 Self-Assessed Health	
	Total Sample	**Black Women**
	1.	**2.**
Union history		
Never married but cohabited with biological father	0.088 (0.126)	0.298 (0.192)
Never married but cohabited with new partner	-0.172 (0.171)	-0.022 (0.199)
Married biological father and it endured	0.327** (0.104)	0.341* (0.141)
Married biological father and it ended	0.220+ (0.126)	0.333+ (0.185)
Married new partner and it endured	0.082 (0.096)	0.008 (0.120)
Married new partner and it ended	0.168 (0.111)	0.318* (0.148)
(Never married and never cohabited = Ref)	---	---
Constant	2.438*** (0.257)	2.349*** (0.294)
n	1,275	799

Notes: + p< .10;

* p < .05;

** p <.01;

*** p < .001 (two-tailed tests);

Unstandardized OLS regression coefficients (standard errors in parentheses);

Models control for US nativity, age and cohabitation status at first birth, r mother's educational attainment, poverty status, cognitive ability, health limitations in 1979, and family composition at age 14. Model 1 also controls for race/ethnicity and Hispanic X U.S. nativity status.

Table 6

Comparison of OLS and propensity score matching results estimating the effect of union transitions with age 40 self-assessed health among women who had a nonmarital first birth (imputed data)

	Age 40 Self-Assessed Health			
	Total Sample		Black Women	
	OLS	Propensity Score Matching	OLS	Propensity Score Matching
		ATT		ATT
PANEL A				
Union history[a]				
Married biological father and it endured	.327 (.104)**	.273 (.131)*	.341 (.141)*	.154 (.148)
Treatment observations	---	261	---	150
Control observations	---	1,014	---	649
Total n	1,275	1,275	799	799
PANEL B				
Union history[a]				
Married new partner and it ended	NA	NA	.318 (.148)*	120 (.206)
Treatment observations	NA	NA	--	90
Control observations			--	709
Total n			799	799

Notes:

* p < .05;

** p <.01;

*** p < .001 (two-tailed tests);

Variance of the MI estimator in parentheses;

ATT = average treatment effect for the treated;

[a] Compared to continually never-married and unpartnered women.