HHS Public Access

Author manuscript

Demography. Author manuscript; available in PMC 2018 May 16.

Published in final edited form as:

Demography. 2016 December ; 53(6): 1693–1715. doi:10.1007/s13524-016-0510-x.

Midpregnancy Marriage and Divorce: Why the Death of Shotgun Marriage Has Been Greatly Exaggerated

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Abstract

Conventional wisdom holds that births following the colloquially termed “shotgun marriage”—that is, births to parents who married between conception and the birth—are nearing obsolescence. To investigate trends in shotgun marriage, we matched North Carolina administrative data on nearly 800,000 first births among white and black mothers to marriage and divorce records. We found that among married births, midpregnancy-married births (our preferred term for shotgun-married births) have been relatively stable at about 10 % over the past quarter-century while increasing substantially for vulnerable population subgroups. In 2012, among black and white less-educated and younger women, midpregnancy-married births accounted for approximately 20 % to 25 % of married first births. The increasing representation of midpregnancy-married births among married births raises concerns about well-being among at-risk families because midpregnancy marriages may be quite fragile. Our analysis revealed, however, that midpregnancy marriages were more likely to dissolve only among more advantaged groups. Of those groups considered to be most at risk of divorce—namely, black women with lower levels of education and who were younger—midpregnancy marriages had the same or lower likelihood of divorce as preconception marriages. Our results suggest an overlooked resiliency in a type of marriage that has only increased in salience.

Keywords

Midpregnancy; Shotgun marriages; Birth rates; Divorce; Preconception marriages

Introduction

The rising share of U.S. nonmarital births, particularly among disadvantaged groups, has received much attention among both researchers and policymakers. Whereas the proportion of nonmarital births is 29 % among whites (as of this writing) and 11 % among the college-educated, it is 75 % among African- Americans and 68 % among those without a high school diploma (Manning et al. 2015). What has received less attention, however, are disparities in the type of marriage in which married births occur. This study documents that in addition to being less likely to be born to married parents, children of disadvantaged mothers who are born to married parents are more likely to be born into a type of marriage

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that is typically assumed to be relatively fragile: midpregnancy marriages (sometimes colloquially referred to as "shotgun marriages"[1]).

According to conventional wisdom, births in which the parents married between conception and birth have declined over time and are nearing obsolescence in the United States. Recent estimates have suggested that only 4 % to 8 % of births occur to couples who had a midpregnancy marriage (Rackin and Gibson-Davis 2012). However, if, among a given group, overall births to married parents have declined faster than midpregnancy-married births, then the share of married births that are midpregnancy-married births will increase. In turn, such an increasing representation of midpregnancy-married births among married births may have implications for child and family well-being if—as seems plausible—marriages formed midpregnancy are less stable and have higher odds of divorce than marriages formed prior to conception.

In this study, we examined how the prevalence of midpregnancy-married births has changed over time, both as a share of all births and as a share of married births, and the relative likelihood of divorce for parents who formed marriages at different points relative to pregnancy. To do so, we created a unique matched data set using population-level data on births, marriages, and divorces that occurred in North Carolina between 1990 and 2012. These administrative data are free from recall bias and are the first to provide sufficient sample size to study subgroups of parents that are of demographic interest, including analysis of education and age subgroups within race.

This study provides the first estimates of midpregnancy-married births as a fraction of married births among demographically important subgroups as well as the first estimates of the hazard of divorce among preconception and midpregnancy marriages. We found that midpregnancy-married births made up a stable share of all married births over the last quarter-century but have actually increased as a driver of marital births among disadvantaged first-time mothers (blacks, those under age 25, and the less-educated). Although we found that overall, midpregnancy marriages were more likely to end in divorce than were preconception marriages, we also showed that (conditional on demographics) this is not true for blacks and is less true for other disadvantaged groups—the groups among whom midpregnancy marriages were increasingly relevant.

Our findings demonstrate the contemporary salience of a largely dismissed model of marriage for vulnerable groups of mothers and their children. Our results suggest, however, that midpregnancy marriages have different, less adverse implications for these families than for their more advantaged counterparts. Our research highlights the importance of understanding not only how family formation patterns vary across groups but also how the implications of those patterns for child well-being vary by family context.

[1]As a phrase, "shotgun-married births" is outdated and does not accurately represent the context under which these marriage decisions are made. We prefer the term "midpregnancy-married births."

Background

The Meaning of Midpregnancy Marriage

The share of children born to parents who married between conception and the birth has dropped dramatically over the past half-century and accounts for only a small fraction of births (Akerlof et al. 1996; Bachu 1999; Raley 2001). Estimates from the 2000s indicated that between 4 % and 8 % of births were midpregnancy-married births (Lichter 2012; Rackin and Gibson-Davis 2012). This drop in midpregnancy-married births can largely be accounted for by the decreasing proportion of couples with a nonmarital conception who choose to marry before the birth. From the 1930s to the 1990s, the fraction of women with a nonmarital conception who married before the birth fell by more than one-half, from 54 % to 23 % (Bachu 1999).

The decline in midpregnancy-married births as a share of all births has been taken to reflect a growing separation between marriage and fertility. In the America of 50 years ago, when abortion was illegal, contraception was difficult for unmarried women to obtain, and societal norms censured out-of-wedlock sexual activity and childbearing, marriage and fertility were closely linked. Individuals who desired to live in a romantic relationship with an opposite-sex partner, or who faced an unplanned pregnancy that they could not or did not abort, had little option but to marry. Today, the landscape of family formation is quite different, and behaviors that were once considered the sole province of marriage (e.g., sexual intimacy, childbearing) are now normative outside its bounds. All these changes have led to increased discretion over parental union context and have undermined the perceived necessity of realizing a nonmarital conception as a marital birth (Cherlin 2009; Gibson-Davis 2009).

The separation between marriage and fertility is unequally concentrated among traditionally disadvantaged groups, such as African Americans and the less-educated (Smock and Greenland 2010). Black men, particularly those in urban settings, have disproportionately suffered from high rates of unemployment and incarceration, resulting in few men who are economically attractive candidates for marriage (Wilson 1987; Wilson and Neckerman 1986). Faced with a shrinking pool of eligible men to marry, black women eschew marriage. They do not forgo childbearing, in part because the twin forces of economic marginalization and social isolation from conventional family forms has weakened the connection between marriage and childbearing (Jencks and Peterson 2001; Wilson 1987).

Consistent with this perspective, poor economic circumstances also act as a barrier to marriage but not to childbearing (Edin and Kefalas 2005). Marriage has become associated with meeting an “economic bar”—a set of financial prerequisites, such as steady employment and substantial savings, that are perceived as necessary to ensure the success of a marriage (Gassman-Pines et al. 2006; Smock et al. 2005). Fertility, on the other hand, is largely governed by nonpecuniary factors, such as the desire for meaning. This separation between the economic expectations for marriage and fertility may explain the loosened temporal connection between marriage and fertility found among African Americans and those with less education (Gibson-Davis 2009).

Regardless of why racial and class differences occur, traditionally disadvantaged groups have sharply different patterns of marriage *vis-à-vis* childbearing than do more advantaged groups. The number of African- American children born to unmarried parents in 2013 was 71 %, relative to 29 % for whites and 52 % for Hispanics (Martin et al. 2015). Moreover, conditional on having a child, African American mothers are less likely to marry and are less likely to move from cohabitation to marriage (Kennedy and Bumpass 2008; Lichter 2012). Less-educated women, relative to those with more education, also have much higher shares of nonmarital births and are less likely to marry after the child is born (Manning et al. 2015; Smock and Greenland 2010).

Racial and class differences in marriage and fertility are also reflected in the trends of midpregnancy-married births. Declines in midpregnancy-married births, as a fraction of all births, have been most pronounced for women of color and those with the lowest levels of education (England et al. 2013). Further, conditional on having a nonmarital conception, whites and those with more education are more likely to have a midpregnancy-married birth than are blacks or those with less education (England et al. 2012; Gibson-Davis and Rackin 2014). Overall, then, traditionally disadvantaged groups are less likely to have a midpregnancy-married birth; conditional on a premarital conception, they are also less likely to marry midpregnancy. However, because traditionally disadvantaged groups, relative to the more advantaged, are less likely to have a married birth, they may have a higher fraction of married births that are midpregnancymarried births.

Midpregnancy Marriage and Divorce

The share of married births that are midpregnancy-married births is of importance not least because midpregnancy marriages may be more likely to dissolve than preconception marriages. Relationship dissolution is associated with a host of negative economic and psychological outcomes for both parents and children (Amato 2010; Kim 2011). We propose three reasons why midpregnancy marriages, relative to preconception marriages, may have higher odds of divorce. First, a midpregnancy marriage may reflect a child-based, rather than partner-based, decision. Couples who respond to a conception by marrying may be increasing their level of commitment beyond what they would have desired in the absence of pregnancy because they wish to have the other parent sharing their living space to help with child-rearing (Rackin and Gibson-Davis 2012). Of course, couples could also respond to a conception by cohabiting—or, if already cohabiting, continue to cohabit. (Our data set does not contain data on cohabitation.)

Second, couples who marry between conception and birth may not have built up enough “relationship capital” to withstand caring for a newborn. Marriage quality decreases quite dramatically after the birth of a child (Belsky et al. 1985; Dew and Wilcox 2011), and new marriages, relative to more established marriages, may be more likely to dissolve in the face of such deterioration. Declines in relationship quality may be particularly pronounced for couples who were cohabiting at conception, relative to those who were married at conception. Cohabiting parents who marry before the birth, relative to couples who were married prior to the conception, have more fragile and unstable marriages (Rackin and Gibson-Davis 2012).

Third, couples in midpregnancy marriages, relative to those in preconception marriages, may be negatively selected in that they have lower levels of education, are younger at the time of first birth, and are more often minority (Lichter et al. 2014; Rackin and Gibson-Davis 2012). This negative selection could, in turn, be associated with higher odds of divorce (Amato 2010).

A countervailing explanation suggests that midpregnancy marriages may have similar odds of divorce as preconception marriages. Couples who have a midpregnancy marriage may have been planning to marry before the conception, but because an unplanned pregnancy occurred, they did not actually marry until after the conception. Couples may have also planned both the conception and the marriage, and had some reason to plan the marriage after the conception. In either case, the timing of the marriage is not a response to a conception. If midpregnancy marriages are marriages that could have just as likely occurred before conception, then presumably they have similar odds of divorce as preconception marriages.

The divorce likelihood of midpregnancy marriages, relative to preconception marriages, may also differ by demographic characteristics. Among positively selected subpopulations where marital births are still the norm, nonmarital conceptions may be more likely to lead to midpregnancy marriages that reflect child-based marriage decisions. These marriages may be at increased risk of dissolution. By contrast, among negatively selected subpopulations for whom nonmarital births are the norm, midpregnancy marriages may more often be marriages that would have occurred even in the absence of pregnancy, and these marriages may have similar odds of divorce as preconception marriages.

Scant literature has examined divorce and midpregnancy marriage. A study with 1970s data found similar odds of divorce for midpregnancy and preconception marriages (Ginther and Zavodny 2001). In contrast, more recent data have suggested that midpregnancy marriages were more likely to dissolve than preconception marriages but only if the couple cohabited prior to marriage (Rackin and Gibson-Davis 2012). However, the same study found race differences in unadjusted hazards of divorce: among blacks, but not whites, the hazard of divorce for midpregnancy marriage was lower than the hazard of divorce for preconception marriages.

The Present Study

Based, no doubt, on the well-established decline of midpregnancy marriages as a share of nonmarital conceptions, demographic scholars have paid relatively little attention to midpregnancy-married births (for an exception, see Su et al. 2015), and conventional wisdom holds that midpregnancy marriages are obsolete. However (with apologies to Mark Twain), reports of the death of midpregnancy marriage may have been greatly exaggerated. We argue that by one key metric—specifically, the proportion of married births that are midpregnancy-married births—midpregnancy marriages may have actually increased in relative importance. These increases will occur among those groups for whom the decline in preconception marriages outweighs the decline in midpregnancy marriages. Given that declines in preconception marriage have been particularly steep among disadvantaged groups, we hypothesize that their share of married births that are midpregnancy has

increased. We further test whether the shift in marriage type from preconception to midpregnancy means that these at-risk subgroups are proportionally more likely to be in fragile marriages.

Data and Methods

In this study, we use three North Carolina administrative data sources for the years 1990–2012. First, long-form birth certificate data contain information on the date of birth, gestational age, and parents' names for all births. Second, marriage license data have the parties' names and the date of marriage. Third, divorce records data include the names and dates of all legal divorces. Using mothers' and fathers' names from the birth certificate data, and brides' and grooms' names from the marriage license data, we first matched birth and marriage records in order to identify when parents married relative to the child's conception date (determined using gestational age) and birth date. With this matched data set, we then matched mothers' and fathers' names to the plaintiff and defendant names found in the divorce data to analyze the prevalence and timing of divorce.

Matching was conducted using Data Ladder, which uses a fuzzy logic algorithm to match names from different sources and can account for typos and misspellings (e.g., it can match "Smithh" to "Smith"). Our matching process included six permutations: as examples, one iteration would match mother's last name to bride's last name; another iteration matches mother's maiden name to bride's last name. In each permutation, matches required a minimum of six fields (e.g., mother's first name, mother's last name, mother's maiden name, father's first name, father's last name, and father's suffix). For the matching of marriage to divorce record, each matching permutation was done twice (for a total of 12 permutations) given that mother's or father's names could match either the plaintiff's or the defendant's name on the divorce record.

Data Ladder scores all matches on a scale ranging from 1 (no match) to 100 (exact match). We combined results from matching permutations; for birth records that were matched to more than one marriage record, and for marriage records that were matched to more than one divorce record, we kept the match with the highest score. We matched births to marriages at any point across our period: for example, a birth that occurred in 2003 could be matched to any marriage between 1990 and 2012. We matched marriages to divorce records for the year of the marriage and the subsequent years until our period of observation ended; we were able to identify only divorces, not separations.

From the 2.4 million births observed in North Carolina over 1990–2012, the sample was restricted to first births (n = 1,118,791 first births). We limited the sample to first births because we may not be able to observe midpregnancy marital behavior for all births to women with higher-order births and because mothers may have a midpregnancy-married birth for one birth but not another. From the sample of first births, we eliminated 351 cases because the mother did not live in North Carolina at the time of the birth; 6,478 because the mother's age at birth was younger than 15; and 34,411 because the conception date was earlier than January 1, 1990. (Marriage records for 1989 were not available, so 1989

midpregnancy marriages were not observed.) The final sample size was 1,077,551 births (97 % of all first births).

Because our focus was on biological—rather than stepfather—marriages, matching was done with the 952,062 of the 1,077,551 births for which the father's name was on the birth certificate. Identifying stepfather marriages would force matching to be done on the mother's name only (the stepfather's name would not be on the birth certificate), and we were not confident that accurate matching could be done using only the mother's name.

Of these 952,062 first births, 641,938 were to non-Hispanic white and 187,661 were to non-Hispanic black mothers (829,599 births total, 87 % of all first births). Hispanic mothers, who were originally included in the sample, were subsequently discarded because their names were not recorded consistently across administrative data sources, resulting in unacceptably high rates of mismatches. We identified matches for 244,753 of the 829,599 first births (n = 205,109 white, 32 % of white first births; n = 39,644 black, 21 % of black first births). These matched marriage-births were then matched to divorce records. The 244,753 matched marriage-births were matched to 46,772 divorces (n = 40,807 white, 20 % of marriages; n = 5,965 black, 15 % of marriages). Matching rates and quality are discussed later herein.

Using the pool of unmatched and matched births, we identified two analytical populations. The first was the universe of North Carolina first births that met our sample restrictions as explained earlier. Using matched first births that occurred between conception and birth as the numerator and the population of first births as the denominator, we calculated the proportion of first births that were midpregnancy-married births. Limiting the denominator to married births, we then calculated the proportion of married first births that were midpregnancy-married births.

The second population was derived from the first, but the unit of the analysis was the marriage rather than birth. Using every divorce that was matched to both a marriage and a birth as the numerator and every marriage matched to a birth as the denominator, we calculated the proportion of matched marriages that ended in divorce over the observed period.

For both analytical populations, we identified the timing of the marriage *vis-à-vis* the conception by comparing the marriage date with the conception date. Conception dates were calculated by taking the child's date of birth and subtracting gestational age at birth. We then identified a marriage as being either a preconception marriage (a marriage observed before conception) or a midpregnancy marriage (a marriage observed between conception and birth). All analyses separately examined mothers by race, education (terminal high school diploma or less, or bachelor's degree or higher), and age (younger than age 25 or age 25 and older). Our initial sample included postbirth marriages (see Tables 1 and 2). However, estimates of divorce for this type of marriage were too low relative to estimates generated from national data; results were likely inaccurate because of out-migration, an insufficient postbirth observation window, or other right-censoring issues.

To calculate the hazard of divorce for preconception and midpregnancy marriages, we used both life table estimates and Cox models. Marriages were at risk of divorce from the date of

the child's birth and were observed either until they divorced or the study period ended. The Cox models included the following controls: father being of different race or ethnicity than mother; father's age; father's education (no high school diploma (omitted category), terminal high school diploma, some college, and bachelor's degree or more); child's sex; and year of marriage. Models that were not stratified by maternal age and education controlled for these measures in addition to the aforementioned variables.

Matching Rates and Quality

We took several steps to ensure that we had not incorrectly identified matches. First, we manually matched cases where the match was ambiguous: for example, in cases where a birth record matched to more than one marriage record, and the matches were all given the same score. In those cases, if we could not identify a match, we considered that birth unmatched. Second, after all matching permutations were completed, we manually checked a random sample of 800 matched birth and marriage records—400 each for white and black mothers. Using personnel who had not been involved in the original matching, we found an extremely low rate (<1 %) of erroneous matches.

To examine Type II error (matches that were missed), we considered five sources of missing data: the mother moved to North Carolina after her marriage; the mother lived in North Carolina at the time of her marriage, but the wedding occurred out of state; common surnames generated match ambiguity; the mother incorrectly indicated that she was married on the birth certificate; or data entry error. Of course, some fraction of birth records will never be matched to a marriage record because the mother never married the father or because she married outside our observation period. In the following sections, we discuss each of these sources of matching error for the sample of parents married at the time of the birth.

The mother moved to North Carolina after her marriage—Using 2000 census data on mobility, we estimated that 20 % of mothers of North Carolina–born children under age 5 migrated to the state within the last five years and would therefore be unlikely to have a North Carolina marriage record. The share of mothers migrating to the state was similar for both blacks and whites but was higher among mothers with a college degree relative to those with a high school diploma or less.

The mother lived in North Carolina at the time of her marriage, but the wedding occurred out of state—Market data from popular wedding planning websites, such as The Knot (theknot.com), indicate that approximately 20 % of women have a "destination wedding" (away from their current residence; exact definitions of a destination wedding vary across sites). Although demographic differences in destination weddings are not available, presumably those with more education have a higher proportion of destination weddings because they can better afford it. Out-of-state weddings may also reflect weddings in distant hometowns, and college graduates live, on average, farther from their birthplace (Compton and Pollak 2015).

Common surnames generated match ambiguity, resulting in unmatched married births—We considered a surname as common if it appeared more than 1,000 times in the birth record data. (Results changed little if we lowered or raised this threshold.) Thirty-four surnames appeared more than 1,000 times; the most common name—Smith—occurred more than 6,000 times. Common surname among both mothers and fathers accounted for 10 % of the unmatched married births among whites and 16 % of the unmatched married births among blacks.

Mother incorrectly indicated that she was married on the birth certificate—Either reporting error or social desirability motivations could lead to unmarried couples listing themselves as married on the birth certificate. For 2 % of the unmatched married birth records for whites and 3 % for blacks, we found a postbirth marriage record, suggesting that the couple had not, in fact, been married at the time of the birth despite reporting themselves as such.

Data entry errors—Given the sources of nonmatching discussed earlier, we would expect to match 48 % of white married births to a marriage record; the remaining 52 % would not be matched because of after-marriage in-migration (20 %), an out-of-state wedding (20 %), common surnames (10 %), and an incorrect marital status on the birth certificate (2 %).We matched 33 % of white married births, suggesting that only 15 % of records were not matched because of data error. For blacks, we would expect to match 41%of married births to a marriage record; we matched 39 %, suggesting that 2 % were not matched because of data error. Records not matched because of data error likely include some marriages that occurred outside the observation period, so the data error rate is likely lower. The larger set of unexplained nonmatches for whites than for blacks is likely due to longer latency between marriage and first birth for whites (Ellwood and Jencks 2004).

Taken together, the previous explanations suggest that we have done a good job of matching marriage and birth records and that data error accounted for a small fraction of unidentified records. Moreover, the overall pattern of match rates conformed to our expectations given the identified causes of nonmatches (results not shown but available upon request). We had higher match rates for births occurring later in our sample period: we were more likely to observe both the marriage and the birth in our time frame. We also had higher match rates among less-educated mothers, presumably because they are less likely to move across state lines, and among mothers born in North Carolina relative to those born outside the state.

Moreover, we believe that the issues that limited our match rate overall are minimal for the population of midpregnancy-married births—our population of greatest interest. First, couples with a midpregnancy-married birth are unlikely to migrate into North Carolina between the marriage and the birth given that the time between marriage and birth is quite short. Second, couples with a midpregnancy marriage may also be less likely to have a destination wedding. Finally, unlike preconception marriages, midpregnancy marriages cannot have occurred prior to the start of our observation period.

Matching to Divorce Records

For all matched marriage and birth records that were matched to a divorce record, we manually checked a random sample of 800 matches: 400 each for white mothers and black mothers. Using personnel who had not been involved in the original matching, we again found a rate of erroneous matches of less than 1 %, suggesting a very low Type I error rate. Moreover, two types of Type II error that were likely in the marriage-birth matches should not be a factor in divorce matching: “destination divorces” are probably unlikely, and couples with common surnames have already been dropped.

Thus, our Type II error rate for divorce should result mainly from out-migration after the birth but before divorce, and from matching error. To estimate our Type II error rate, we leveraged the National Survey of Family Growth (NSFG) and the American Community Survey (ACS) to estimate the “true” share of marriages in our sample that likely have ended in divorce. (For marriages, we observed the true share on the birth certificate, but we have no parallel observation of the truth for divorce.) Estimates were generated from periods comparable to our observation period.

NSFG data indicated that among ever-white married mothers with a first birth after 1989, 17.4 % divorced. Based on ACS estimates, North Carolina has a 50 % higher incidence of divorce among white women than the national average, such that the “true” share of divorces among white women in our sample is 26.1 %. Of those 26.1 % divorced white mothers, 13 % will move out of state within five years of the birth, and hence only 87 % will be observed—assuming that the probability of out-migration is constant by year, in which case, 13 % will be the mean share who out-migrate prior to divorce among those observed for 10 years. This suggests that in the absence of matching error, we would observe divorce for 22.7 % (87 % of 26.1 %) of white matched marriages. In fact, we observed divorce among 19.0 % of white matched marriages, suggesting that our residual error rate for white divorce matches is 16 %, commensurate with our 15 % error rate for white marriage matches.

Using a similar procedure for blacks, we estimate the “true” share of divorces in the data to be 23.5 %. We derived this estimate from the national share of ever-married black mothers with a first birth who have divorced (23.1 %) and the difference between the national and North Carolina divorce prevalence among blacks (16.4 % vs. 16.7 %). Of these 23.5 %, 16 % will not be observed because of out-of-state migration. This suggests that in the absence of matching error, we would observe divorce for 19.7 % (84 % of 23.5 %) of black matched marriages. We, in fact, observed divorce among 17.1 % of black matched marriages, suggesting that our residual error rate for black divorce matches is 13 %, commensurate with our error rate for whites.

The overall pattern of divorce match rates conformed to our expectations (results available upon request). Match rates were higher for marriages that occurred earlier rather than later if the mother had a high school diploma than if she had some postsecondary training, and if she was born in North Carolina. Right-censoring is more likely to occur for marriages formed later in the observation period, and out-migration is more likely for more highly educated mothers and those born outside the state. Moreover, out-migration after giving birth appears substantially lower (13 % to 16 %, depending on race) than in-migration prior

to birth (20 %), and other sources of error (destination events, common names that we have already dropped) are less of a problem for divorce matches; thus, overall, the divorce match sample has comparable match quality to the marriage sample.

In sum, we have matched a reasonable fraction of birth records to marriage records, and for both birth-marriage and marriage-divorce record comparisons, our match results conform to our expectations as to what the matching pattern should be. Additionally, as described earlier, we believe that we have matched nearly all instances of midpregnancy marriages, which is the key marriage type under consideration. Nevertheless, for marriage matches other than midpregnancy, and also for divorce matches, our sample does not reflect the universe of North Carolina marriages and divorces.

Results

Demographic Differences Across Match and Marriage Type

A comparison of the demographic characteristics of parents by presence and type of match is of both methodological and substantive interest. Tables 1 and 2 show descriptive statistics of mother's and father's education and age for first births to white and black mothers, respectively. Marital status at the time of the birth reflects the marital status indicated on the birth certificate and is, therefore, available for all births regardless of whether a marriage match was found.

Among births to both white and black mothers, those in which the parents had an unmatched marriage (Tables 1 and 2, column 1) were most positively selected: they had the highest levels of educational achievement and the highest average age at birth. (We refer to these births as "unmatched preconception marriages" because we believe we have identified most midpregnancy marriages, as discussed earlier, and therefore that unmatched marital births are likely to be preconception marriages.) Births in which the parents were observed through the matched birth-marriage record with a preconception marriage (column 2) were the next most positively selected, again in terms of maternal and paternal age and education. Midpregnancy-married births (column 3) were the median type of match in terms of maternal and paternal age and education. Those who were unmarried at first birth—both the matched (column 4) and unmatched (column 5)—were negatively selected relative to all prebirth marriage types, in that they were both younger and had less education. The modal category for whites was an unmatched preconception marriage (column 1), whereas for blacks, the modal category was a nonmarital birth that was unmatched (column 5).

From a methodological perspective, these results conform to our expectations as to who was most likely to be matched. Within the married birth category (columns 1–3), those who were married but not matched (column 1) were the most positively selected, in large part because three sources of error that lead to an unmatched married birth—migration, out-of-state weddings, and data error due to long intervals between marriage and birth—were likely to be more common among those with more education. As expected, unmatched marriages were far more similar demographically to matched preconception marriages than to midpregnancy marriages, suggesting that unmatched marriages mostly consisted of preconception rather than midpregnancy marriages.

Among those with prebirth marriages (columns 1–3), whites and blacks had similar distributions of marriage, with unmatched preconception marriages being the most common and midpregnancy marriages being the least common. Notably, relative to whites, blacks had much lower prevalence of prebirth marriage (29 % vs. 78 %). Among those with a prebirth marriage, however, the demographic selection into each type of marriage was remarkably consistent across racial groups.

Although not our focus, we found interesting demographic differences by race in postbirth marriages. Conditional on a nonmarital birth, whites were more likely to marry than blacks (26.7 % vs. 13.6 %). As a fraction of all births, however, blacks were more likely to be observed with a postbirth marriage than whites (9.6 % vs. 5.8 %) because proportionally more blacks had an unmarried birth (70 % vs. 22 %). Notably, blacks with a matched postbirth marriage[2] (Table 2, column 4) were more positively selected, in terms of age and education, relative to both blacks who did not marry postbirth (Table 2, column 5) and whites who did marry postbirth (Table 1, column 4). In contrast, minimal demographic differences existed between whites who did and those who did not marry postbirth (columns 4 and 5). These differences suggest that among blacks with a nonmarital first birth, those who married represented a small, positively selected subgroup, whereas whites with a nonmarital first birth appeared equally disadvantaged regardless of subsequent marital status.

A comparison of the demographic characteristics of the matched marriage-divorce records (results available upon request) indicated that the divorce sample was negatively selected. Whites and blacks, relative to those with a marriage record with no matched divorce record, had lower levels of education and were younger at the time of first birth. Negative selection is consistent with the demographics of those who divorce (Amato 2010).

Trends in Midpregnancy-Married Births as a Share of All Births

The next set of results presents the percentage of all births that were midpregnancy-married (Table 3). Results are presented for two points in time, 1992 and 2012, and are shown separately by maternal race, age, and education. In 2012, the overall share of all first births that were midpregnancy-married births was 5.2 %, indicating a 29 % decline since 1992 (results not shown). Overall, whites were more likely to have had a midpregnancy-married birth than blacks.

Across racial subgroups, the group with the highest percentage of midpregnancy-married births as a share of all births, in both 1992 and 2012, were white women under 25 (13.6 % and 9.5 %, respectively). Black women without a high school diploma had the lowest percentage of midpregnancy-married births as a share of all births in both periods (1.7 % and 1.3 %). During both periods, midpregnancy births were positively correlated with education among blacks and negatively correlated for whites. Younger black women were less likely to have had a midpregnancy-married birth; for whites, the opposite was true.

[2]Results for postbirth marriages were right-censored; nevertheless, demographic characteristics were consistent with previous studies on couples who marry after a child is born (Rackin and Gibson-Davis 2012).

With a few exceptions, the prevalence of midpregnancy-married births declined as a share of all births over the period. For all whites, midpregnancy-married births declined by 29 %, from 8.8 % in 1992 to 6.3 % in 2012; among all blacks, midpregnancy-married births also declined, albeit quite modestly (4 % over the observed period). Some of the largest declines came among disadvantaged groups: among whites and blacks with a high school diploma or less, midpregnancy married births declined by 28.9 % and 23.8 %, respectively. Subgroups that experienced increases, rather than decreases, included better-educated whites and older whites and blacks. These increases were generally smaller than the decreases experienced by other groups.

Trends in Midpregnancy-Married Births as a Share of Married Births

The next set of results presented over-time changes in the share of married births that were midpregnancy-married births (Fig. 1). The results, in contrast to the general trend of declining prevalence of midpregnancy-married births among all births, indicated increases in the share of married births that were midpregnancy-married births to blacks and vulnerable subgroups of whites.

For both races, among young and less-educated mothers, midpregnancy-married births accounted for a sizable fraction of married births, and these fractions have increased over time. In 2012, among white mothers under age 25, midpregnancy-married births represented 24 % of married births; for young black mothers, they were 26 % of married births. The percentage of married births that were midpregnancy-married births also substantially increased among less-educated mothers across races.[3] For white mothers with a high school diploma or less, the percentage rose by more than 43 % (from 16 % to 23 % of married births). For black mothers with a high school diploma or less, the percentage rose by more than 50 % (from 12 % to 19 % of married births). Even though less-educated blacks and whites had very large declines in midpregnancy marriages as a percentage of all births (Table 3), they experienced even larger declines in preconception marriage, resulting in a substantial increase in the proportion of married births that were midpregnancy-married (Fig. 1).

In contrast, across races, midpregnancy-married births constituted a much smaller fraction of married births among older and better-educated women. For example, in 2012, midpregnancy-married births represented approximately 10 % of married births among more-educated and older black mothers. Moreover, the prevalence of midpregnancy-married births changed relatively little between the two time points for these subgroups. For white mothers with at least a bachelor’s degree and white mothers age 25 or older, the share of births that were midpregnancy-married births remained about 5 % during the observation period.

Hazard of Divorce by Marriage Type

The final set of results presented the hazard of divorce, for preconception and midpregnancy marriages. Panels A and B of Fig. 2 present the unadjusted cumulative hazard of divorce for

[3]Results for women with some college fell between results for the low- and high-education groups (results available upon request).

white and black mothers, respectively. Among women from both racial groups, relative to matched preconception marriages, midpregnancy marriages dissolved more quickly and had higher cumulative hazard of divorce. For whites, the gap in the hazard of divorce between midpregnancy and preconception marriages became significant quite early—by the baby's first birthday. By age 5, the cumulative percentage divorced was 15 % for midpregnancy marriage and 8 % for preconception; by 10 years, the percentages were 30 % and 19 %, respectively.

Among blacks, the cumulative hazard of divorce for midpregnancy marriage was much lower (23 %) than for whites (30 %). Moreover, for blacks, differences between midpregnancy marriage and preconception marriage divorce hazards were smaller and emerged later. For midpregnancy marriages, the cumulative percentage divorced was significantly higher for midpregnancy marriages only after six years. By 10 years after the birth, 23 % of midpregnancy marriages and 20 % of preconception marriages had ended in divorce. Given how much more negatively selected blacks who enter midpregnancy marriages are, the small difference in the hazard of divorce is striking. These differences within and across race provides our first indication that midpregnancy marriage may operate differently among blacks than among whites.

Figure 3 presents the conditional odds ratio for midpregnancy marriage among different demographic groups in a Cox proportional hazard model. These models let us address selection on observables into different marriage types and determine the association between midpregnancy marriage and divorce conditional on those observables. Controlling for education, age, and other demographics, midpregnancy marriage was still associated with 17 % higher odds of divorce than preconception marriage among whites overall; the relationship was statistically significant at $p < .001$. By contrast, after controlling for demographics, midpregnancy marriage was not associated with differential odds of divorce among blacks (odds ratio = .97, $p = .359$).

For whites, these higher odds of divorce held across age and education groups. Notably, however, the association was always significantly stronger among more advantaged whites (those with a bachelor's degree and those 25 or older at first birth) than less advantaged whites (those with a high school diploma or less and those under 25 at first birth).

For blacks, by contrast, no group exhibited a statistically significant positive association between midpregnancy marriage and divorce. Notably, among the most disadvantaged group in our sample—namely, blacks with a high school diploma or less—midpregnancy marriage was actually associated with significantly *lower* odds of divorce than preconception marriage (odds ratio = .87, $p < .01$).

Discussion

Using rich administrative data of matched birth, marriage, and divorce records from North Carolina, we examined the relevance of midpregnancy marriage for contemporary patterns of family formation. Overall, we found that midpregnancy-married births declined as a share of all first births over time for both whites and blacks. As a fraction of married first births,

however, midpregnancy-married births were relatively stable overall and increased among disadvantaged groups. For less-educated first-time mothers, midpregnancy-married births accounted for approximately 25 % of married births among black women and 20 % of married births among white women.

We draw two main conclusions from our results. First, in contrast to much conventional wisdom (for an exception, see Hayford et al. 2014), midpregnancy marriage continues to be a relevant type of family formation. The relevance of midpregnancy-married births arises not because they are increasing as a fraction of all births. Ours, like past studies (England et al. 2012, 2013), found a decline in the fraction of all births that were midpregnancy-married births. Rather, as the proportion of women who married before conception fell, midpregnancy-married births increased as a fraction of married births, particularly for those who were younger and less educated. These results suggest that the demise of midpregnancy-married births has been exaggerated.

Second, the relevance of midpregnancy marriage as a share of marital births varied by mothers' levels of disadvantage. For white and black mothers with high levels of education, the share of marital births following a midpregnancy marriage stayed relatively stable over the two decades under study. In contrast, across racial groups, for mothers with lower levels of education and those who were younger, the share of marital births that followed a midpregnancy marriage increased markedly over the same period. The driver of these diverging patterns is the changing prevalence of nonmarital conceptions between the two groups. Because disadvantaged mothers have become much more likely than their economically advantaged counterparts to have a nonmarital conception, they have much higher shares of married births that are midpregnancy-married births.

Although midpregnancy marriages are now a substantial share of marital births among disadvantaged groups, we also found that midpregnancy marriage did not imply the same level of marital fragility among disadvantaged groups that it did among more advantaged groups. We anticipated and found, confirming other literature (Rackin and Gibson-Davis 2012), that midpregnancy marriages had higher odds of divorce overall than preconception marriages; however, the relationships were weaker among the younger and less-educated and were nonsignificant or even negative conditional on demographics among blacks.

The lack of strong relationships between midpregnancy marriage and divorce among blacks was notable because, like the white mothers with midpregnancy marriages, black mothers with midpregnancy marriages were negatively selected on observables relative to those with preconception marriages. Although negative selection was one potential reason why midpregnancy marriages might have a higher hazard of divorce than preconception marriages, midpregnancy marriages for blacks (conditional on demographics) were no more likely to dissolve than preconception marriages. In contrast, among whites, midpregnancy marriages were associated with higher odds of divorce. Perhaps because nonmarital births are so common among black couples, norms to marry "for the sake of the child" are weaker among blacks than among whites. Thus, blacks who married either preconception or midpregnancy may have married for relationship-focused, rather than child-focused, reasons.

Uncovering these important relationships for different subgroups would not have been possible without a large administrative data set, which provides many advantages. First, our administrative data set is free from many sources of error that attend survey data. Second, because our data set provides the exact timing of events and does not rely on retrospective data collection, it is not subject to recall bias, which can be a problem when trying to estimate the exact timing of marriages *vis-à-vis* births. Finally and most importantly, we have sufficient sample size to provide estimates for race-by-education and race-by-age subgroups; these groups are of substantial demographic and policy interest, but they are often overlooked in surveys because of insufficient sample size. We also note that in a "big data" world, administrative data sets will become increasingly available, and we hope that by illustrating the strengths of such an approach, other demographers will be encouraged to use administrative data in their work.

Limitations to our study should be noted. First, our results come from North Carolina and thus may not be generalizable to the rest of the United States. North Carolina's levels and trends in fertility, marriage, and divorce behavior, however, closely mirror those of the United States as a whole (results available upon request). Second, we could not observe cohabitation, which has increased tremendously as a family formation context and accounts for the majority of nonmarital births (Manning et al. 2015). Many of the observed midpregnancy marriages were likely among cohabiting parents because cohabiting parents, relative to those who are living apart, are more likely to marry (Carlson et al. 2004). Cohabiting parents have been found to have particularly fragile relationships (Rackin and Gibson-Davis 2012; but for an exception, see Musick and Michelmore 2015). Although untestable with our data, the greater prevalence of divorce among midpregnancy marriages among whites could reflect a disproportionately high fraction of midpregnancy-married births to cohabiting white parents. Third, as discussed earlier, we have a low Type I error rate but a higher Type II error rate. Importantly, however, we believe that we accurately capture the prevalence of midpregnancy marriage. Our overall estimate (5 %) was within the range provided by other scholars (Gibson-Davis and Rackin 2014; Lichter 2012). As a final caveat, the use of administrative data limits the available information about parents that is typically collected in surveys (e.g., we did not observe relationship quality). Nevertheless, as discussed earlier, we believe that the strengths of our matched administrative data set outweigh these limitations.

Many researchers and policymakers have expressed concern about the growing number of children born to unmarried parents, especially among economically disadvantaged groups, because children born to unmarried parents have worse outcomes, on average, than children born to married parents (Brown 2010; Ribar 2015). An increasing share of disadvantaged children born to married parents were born following a nonmarital conception, and among whites, those midpregnancy marriages were more likely to dissolve. Given that these marriages did not appear to confer additional risk to black couples, however, policy and programmatic efforts that seek to intervene among black couples with a nonmarital conception may promote midpregnancy marriage without concerns that these marriages are at higher risk of divorce. In contrast, because we find that among whites, midpregnancy marriages were less stable than marriages formed before conception, the increasing share of all married births that result from midpregnancy marriages among disadvantaged groups of

whites suggests that marriage may not be as strong an indicator of stable family environment among these groups as it has been in the past. These findings suggest caution in applying the overall predictors of divorce to specific groups for whom the marital context may be very different and indicate that understanding family formation requires detailed consideration of different patterns for groups defined by race, education, and age.

Acknowledgments

Support for this project was provided by grants from the Duke Population Research Institute and the Duke Social Science Research Institute's Education and Human Development Incubator. We are grateful to the North Carolina Department of Vital Statistics for the provision of the data.

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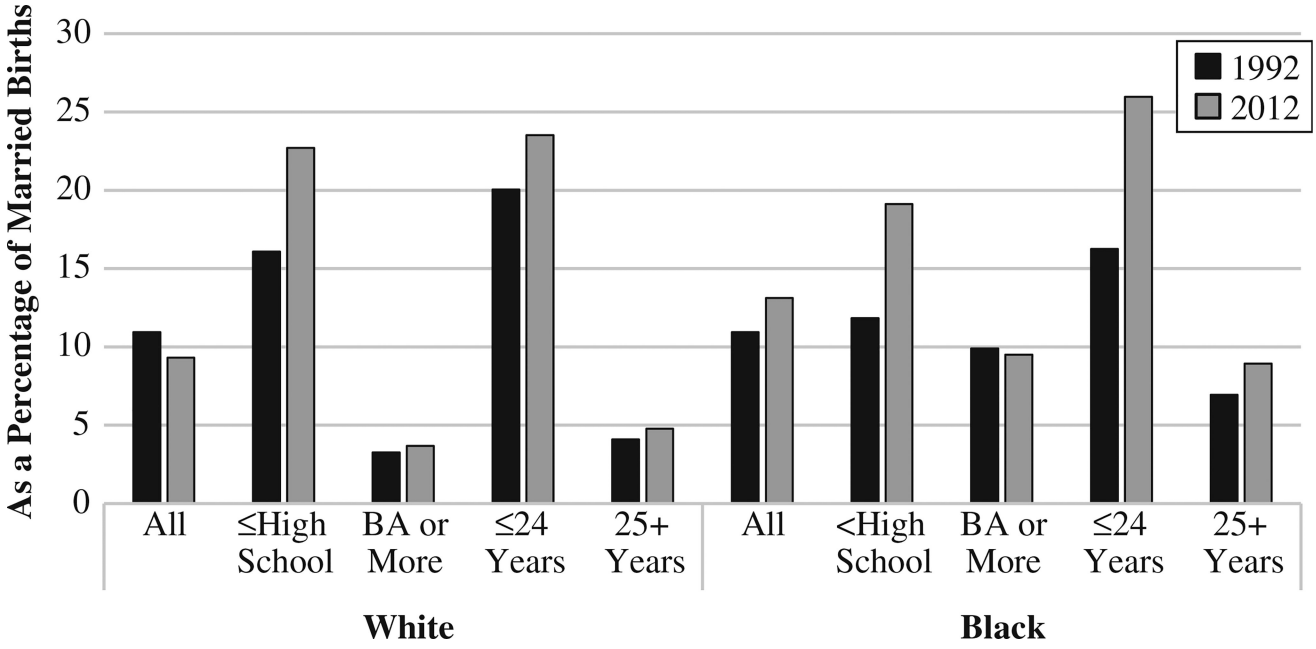

Fig. 1.

Midpregnancy-married births as a share of married first birth, by maternal demographics. Within group, all year estimates are significantly different at $p < .001$. Standard error bars are not presented because they are too small to be visible

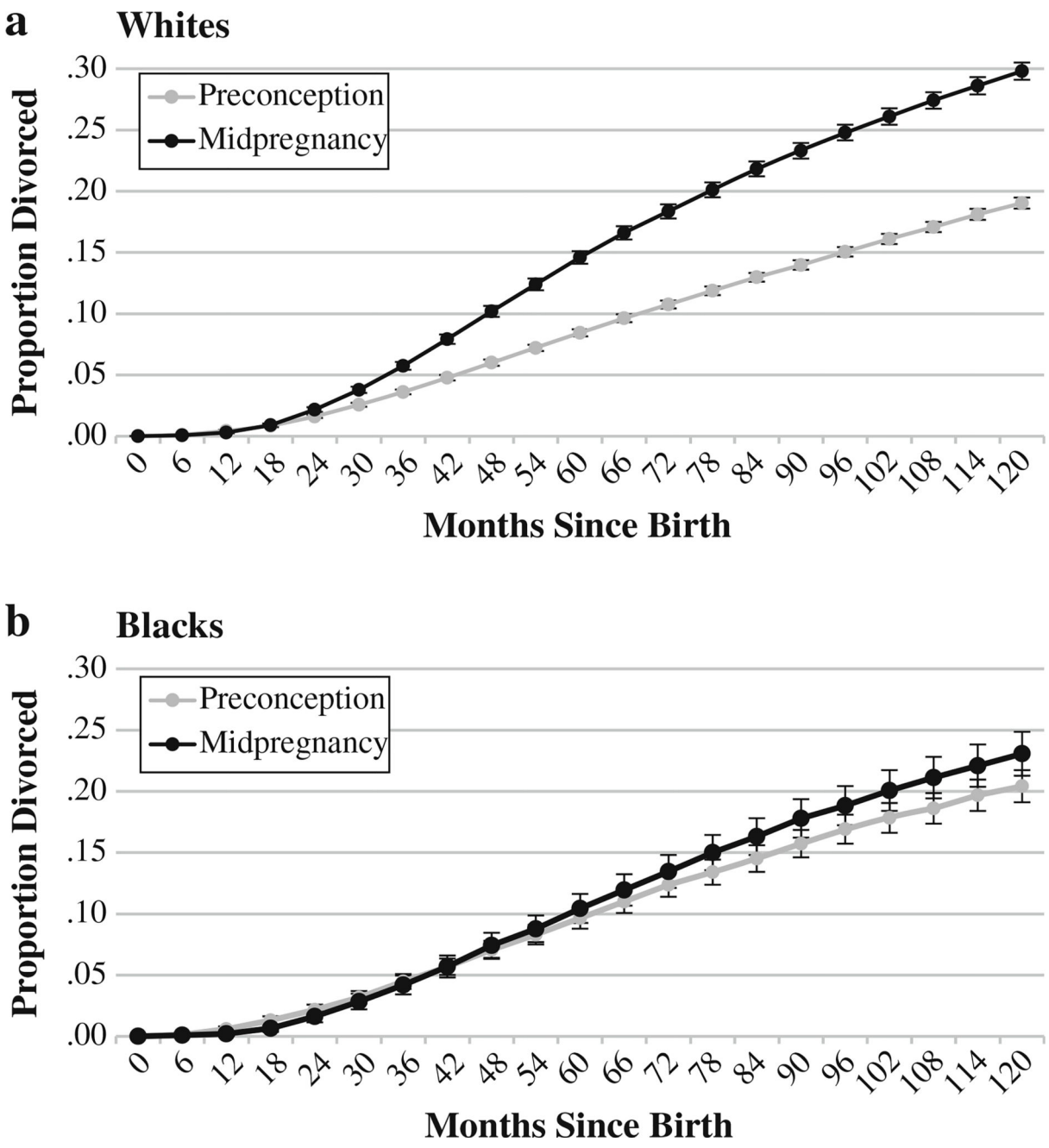

Fig. 2.

Cumulative hazard of divorce for whites (panel A) and blacks (panel B). Sample sizes are 205,109 for whites and 39,644 for blacks

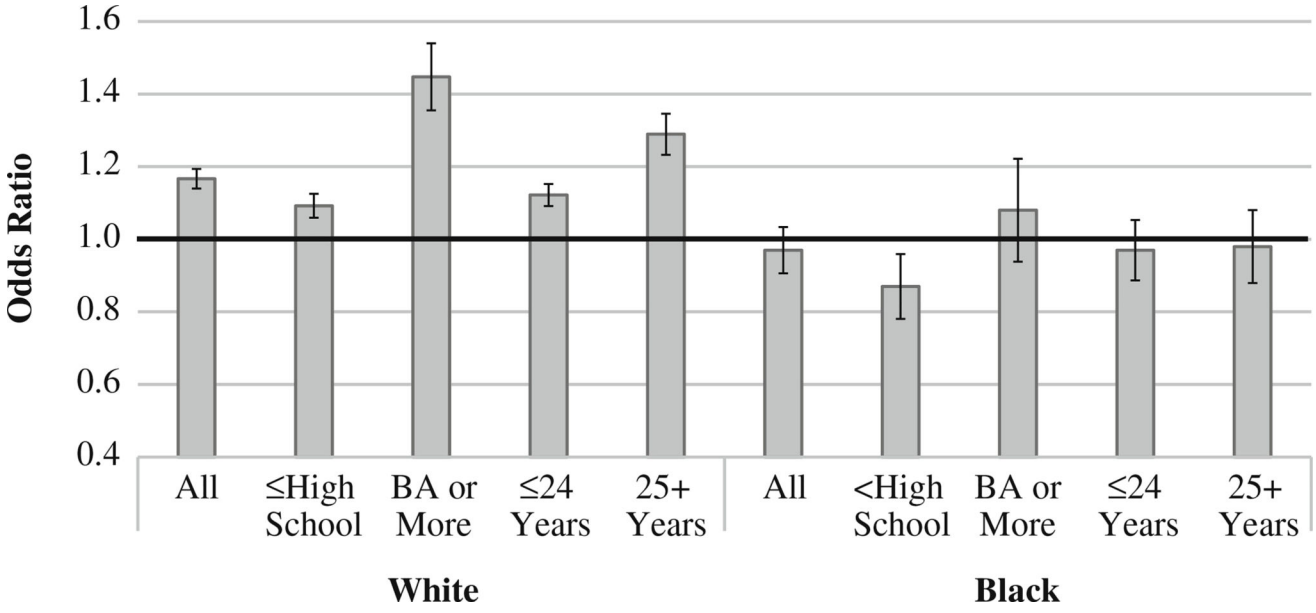

Fig. 3.

Difference in proportional hazard of divorce between midpregnancy and preconception marriages, with error bars indicating 95 % confidence intervals

Demography. Author manuscript; available in PMC 2018 May 16.

Table 1

Descriptive statistics of NC records of first births by presence and type of matched marriage record: White mothers

		Married at Birth			Unmarried at Birth	
			Matched		Matched	
	All	Married Preconception, No Match (1)	Married Preconception (2)	Married Midpregnancy (3)	Married Postbirth (4)	No Marriage Observed (5)
Father's Name Missing	6.4	1.1	n/a	n/a	n/a	28.0
Education						
Mother						
High school diploma or less	41.3	25.4	30.7	55.5	72.0	74.1
Some college	24.7	24.6	29.4	29.5	21.7	19.9
Bachelor's degree or more	34.0	49.9	39.9	15.0	6.3	6.0
Father						
High school diploma or less	46.3	33.5	42.0	63.9	76.5	78.1
Some college	22.0	22.2	25.6	23.8	17.6	16.9
Bachelor's degree or more	31.8	44.3	32.4	12.3	5.8	5.0
Age at Birth (years)						
Mother	25.6 (5.75)	28.1 (4.97)	26.3 (5.07)	22.8 (5.06)	21.1 (4.33)	21.4 (4.88)
Father	28.4 (6.36)	30.3 (5.73)	28.7 (5.89)	25.4 (6.04)	24.1 (5.69)	24.6 (6.28)
Father Different Race	7.3	3.8	3.9	6.3	11.4	23.0
Birth Year	2001	2001	2002	2001	2001	2003
Percentage of Married Births		66.6	22.4	11.0	—	—
Percentage of Unmarried Births		—	—	—	26.7	73.3
Percentage of All Births		52.0	17.5	8.6	5.8	16.0
Number of Observations	641,938	333,992	112,330	55,376	37,403	102,837

Notes: "Matched" indicates that mother's birth record was matched to a marriage record. All numbers represent percentages unless otherwise indicated. Standard deviations for age are shown in parentheses. Father's characteristics are presented for fathers who had a valid observation on variable.

Table 2

Descriptive statistics of North Carolina records of first births by presence and type of matched marriage record: Black mothers

		Married at Birth			Unmarried at Birth	
			Matched		Matched	
	All	Married Preconception, No Match (1)	Married Preconception (2)	Married Midpregnancy (3)	Married Postbirth (4)	No Marriage Observed (5)
Father's Name Missing	25.0	2.6	n/a	n/a	n/a	35.5
Education						
Mother						
High school diploma or less	61.7	28.8	27.6	36.6	58.6	72.3
Some college	23.6	29.3	31.3	34.4	28.2	20.9
Bachelor's degree or more	14.6	41.9	41.1	28.9	13.1	6.7
Father						
High school diploma or less	61.4	40.9	43.5	51.4	65.3	74.1
Some college	23.5	26.9	28.8	30.3	24.8	20.0
Bachelor's degree or more	15.1	32.2	27.7	18.2	10.0	5.9
Age at Birth (years)						
Mother	22.4 (5.46)	28.5 (5.34)	27.0 (5.06)	24.5 (5.00)	21.8 (4.31)	20.8 (4.47)
Father	25.9 (6.77)	30.9 (6.44)	29.2 (6.15)	26.9 (6.31)	24.4 (5.64)	23.9 (6.08)
Father Different Race	10.7	6.8	6.3	8.7	5.0	14.1
Birth Year	2001	2001	2002	2001	1999	2002
Percentage of Married Births		61.0	25.4	13.6	—	—
Percentage of Unmarried Births		—	—	—	13.6	86.4
Percentage of All Births		18.1	7.5	4.0	9.6	60.8
Number of Observations	187,661	33,914	14,115	7,541	17,988	114,103

Notes: "Matched" indicates that mother's birth record was matched to a marriage record. All numbers represent percentages unless otherwise indicated. Standard deviations for age are shown in parentheses. Father's characteristics are presented for fathers who had a valid observation on variable.

Table 3

Midpregnancy married births as a percentage of all first births, 1992 and 2012, by maternal race/ethnicity, education, and age

				Sample Sizes[a]	
	1992	2012	Percentage Change	1992	2012
White	8.8	6.3	–28.9	30,678	28,549
High school diploma or less	11.0	7.8	–28.9	16,189	7,854
Some college	9.8	8.4	–14.3	7,007	9,376
Bachelor's degree or more	3.2	3.4	7.1	7,434	11,311
24 or younger	13.6	9.5	–30.4	15,619	11,544
25 or older	3.8	4.1	6.7	15,053	17,005
Black	2.7	2.6	–4.1	11,480	11,261
High school diploma or less	1.7	1.3	–23.8	8,054	5,283
Some college	4.0	2.9	–27.6	2,282	4,054
Bachelor's degree or more	6.8	5.3	–22.8	1,128	1,916
24 or younger	2.2	1.8	–16.6	8,517	7,650
25 or older	4.0	4.1	2.0	2,961	3,611

[a]Sample sizes refer to the number of first births in that year for that subgroup that meet sample criteria.