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Cohabitation and U.S. Adult Mortality: An Examination by Gender and Race

*This study is the first to explore the relationship between cohabitation and U.S. adult mortality using a nationally representative sample. Using data from the National Health Interview Survey-Longitudinal Mortality Follow-up files 1997–2004 (*N = *193,851), the authors found that divorced, widowed, and never-married White men had higher mortality rates than cohabiting White men, and never-married Black men had higher mortality rates than cohabiting Black men. In contrast, the mortality rates of nonmarried White and Black women were not different from those of their cohabiting counterparts. The results also revealed that mortality rates of married White men and women were lower than their cohabiting counterparts and that these mortality differences tended to decrease with age. The authors found no significant mortality differences when they compared married Black men or women to their cohabiting counterparts. The identified mortality differences were partially—but not fully—explained by income, psychological, or health behavior differences across groups.*

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The prevalence of nonmarital cohabitation in the United States has steadily increased, from 0.4 million cohabiters in 1960 to 7.6 million in 2011 (U.S. Census Bureau, 2011). Given a substantial literature showing that participation in marriage may protect health and longevity (for a review, see Carr & Springer, 2010), one central concern related to this rising rate is that cohabiters may not receive the same health and longevity benefits as married individuals. In general, research suggests that married people are healthier and live longer than nonmarried people (Waite & Gallagher, 2000), yet studies tend to analyze nonmarried individuals as one homogeneous group that includes cohabiting, never-married, divorced, and widowed people. Thus, very little is known about how the mortality of cohabiters differs from other union status groups (Carr & Springer). At least on some dimensions, recent research suggests that cohabitation is similar to marriage: Intimate partners in both married and cohabiting unions share a home; engage in emotional and sexual intimacy; and act as a potential confidant, caregiver, and financial supporter (Musick & Bumpass, 2012). Therefore, cohabitation and marriage may promote health and longevity in analogous ways. Alternatively, some research suggests that cohabitation is dissimilar to marriage: Compared to married individuals, cohabiters are more likely to engage in risky health behaviors (Horwitz & White, 1998), report strain in their relationships (Skinner, Bahr, Crane, & Call, 2002), experience more

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psychological distress (Brown, 2000), and have shorter relationship durations (Heaton, 2002). Thus, cohabiting partners may not receive the same longevity benefits as married spouses.

The present study is the first to explore the relationship between cohabitation and adult mortality in the United States using a nationally representative sample. We compared the mortality rates of cohabiters to the mortality rates of married, unpartnered never-married, divorced/separated, and widowed individuals. We further examined whether family income, psychological distress, and health behavior—the most frequently documented mechanisms linking union status and health (Waite & Gallagher, 2000)—explain union status differences in mortality. Given the long-standing observations about gender and racial differences in family and mortality processes (Brown, Van Hook, & Glick, 2008) we, for the first time, pay special attention to the intersections of gender and racial differences in the link between cohabitation and mortality.

Background

Cohabitation and Mortality: Empirical Evidence

Empirical evidence on the link between cohabitation and mortality is sparse and based on data from European populations. European studies suggest that individuals who cohabit with others face a higher mortality risk than married people but a lower mortality risk than those who live alone (e.g., Koskinen, Joutsenniemi, Martelin, & Martikainen, 2007). In their study of a Danish population, Lund and colleagues (2002) found that the lower mortality rate of those who live with someone in comparison to those who live alone cannot be explained by differences in health behaviors such as smoking, diet, or physical activity. Researchers have explored the link between cohabitation and other measures of well-being in the United States and Canada, but this literature provides inconsistent evidence. For example, some studies have found that cohabiters report higher levels of psychological distress and lower levels of self-rated health than married individual but report better health than unpartnered single people (Brown, 2000; Wu, Penning, Pollard, & Hart, 2003). In contrast, Fuller (2010) found that, compared to both married and unpartnered single people, cohabiters tend to have poorer self-rated health and higher levels of psychological distress and spend a longer time recovering from a health problem. Still other studies have found no significant difference between married individuals and cohabiters on a range of health outcomes (Musick & Bumpass, 2012; Wu & Hart, 2002). Overall, these studies provide little consistent insight into how mortality rates may be similar or different for U.S. cohabiters versus other union status groups.

Cohabitation and Mortality: Theoretical Predictions

Despite a paucity of empirical evidence on the link between cohabitation and mortality, a long-standing literature linking marital relationships with health offers theoretical insight into this research area. Some studies suggest that people who marry are the healthiest of the population—leaving unhealthy people selected outside the bounds of marriage into other union types, such as cohabitation (Horwitz & White, 1998; Kenney & McLanahan, 2006). Additional research, however, suggests processes beyond selection, wherein involvement in a marital relationship is related to unique economic, psychological, and social resources, which in turn promote longevity, are at play (Ross, Mirowsky, & Goldsteen, 1990; Waite & Gallagher, 2000). Whether these resources are present, however—and, if so, to what degree—in cohabiting relationships is unclear. To build our hypotheses on the relationship between cohabitation and mortality, we focused on three primary resources that are believed to accrue in marriage : (a) economic resources, (b) psychological well-being, and (c) the social control of health behavior.

Economic resources. Economic resources are a key reason hypothesized to account for the better health and lower mortality rates of married people (Waite & Gallagher, 2000). A substantial literature suggests that marriage leads to an increase in economic resources through specialization in the division of labor, economies of scale, and the pooling of wealth (Becker, 1981; Waite & Gallagher). These economic resources may promote longevity by, for example, enhancing one's financial capability to buy fruits and vegetables and thus improving nutrition, providing or easing access to health insurance, and increasing the probability of access to

professional care in the event of illness or injury (Ross et al., 1990). Cohabiters share living space with a partner and may, to some degree, benefit from economies of scale in ways similar to married people, yet, cohabiters are less likely than married individuals to pool their income (Brines & Joyner, 1999) or to specialize between household and paid work (Gupta, 1999), which may result in diminished economic returns (Becker, 1981). Moreover, some research suggests that marriage becomes a financial ''capstone'' (Cherlin, 2004), whereby cohabiters delay marriage in order to obtain the financial stability they believe is necessary to achieve before marriage (Edin & Kefalas, 2005). In this sense, cohabiters may not accrue the financial benefits of marriage—or may benefit only incrementally—and in turn have higher mortality rates than married people, although lower rates than unpartnered single people.

Psychological well-being. The marital relationship also provides access to psychological resources, such as social support (i.e., providing love, advice, and care) and social integration (i.e., feeling connected to others), which in turn promote psychological and physical well-being (Ross et al., 1990). Cohabiting partners provide at least some emotional and social support for one another and therefore may promote health in ways similar to married spouses (Musick & Bumpass, 2012). In contrast, however, cohabitation is often a short-term state; most cohabiters either break up or marry within 5 years, although the duration of cohabitation has increased in recent years (Kennedy & Bumpass, 2008). Moreover, cohabiters are less likely to receive support from friends or relatives (Eggebeen, 2005) and are more likely to report relationship strain (Horwitz & White, 1998), express concern about their relationship dissolving (Brown, 2000), and have higher levels of psychological distress (Brown; Wu et al., 2003) than their married counterparts—all factors that have been shown to contribute to higher mortality rates (Tower, Kasl, & Darefsky, 2002). Because of these differences, cohabitation may not provide the same psychological benefits as marriage (Bumpass & Lu, 2000; Waite & Gallagher, 2000). We expect that, if this is the case, then cohabiters would have higher mortality rates than married people, although lower rates than unpartnered never-married, divorced, and widowed individuals.

Social control of health behavior. One of the significant social resources spouses accrue in marriage is the social control of health behaviors. Social control processes shape health habits indirectly through the internalization and self-enforcement of appropriate health habit norms. For example, entrance into the role of husband brings a set of health-related norms (e.g., decreased alcohol use) that become internalized. Social control also operates directly when spouses attempt to regulate their partners' health behaviors (Umberson, 1992). The social control of health behaviors promotes healthier habits, such as exercise, eating more fruits and vegetables, and drinking and smoking cessation, which in turn shape mortality (Umberson). Because of varying levels of social control, cohabiters are more likely to engage in risky behavior compared to married people (Horwitz & White, 1998) but less likely to engage in risky behavior compared to single individuals (Kenney & McLanahan, 2006). We expected that cohabiters would have higher mortality rates than married individuals but lower mortality rates than single individuals because of different levels of social control regarding health behavior.

Gender, Cohabitation, and Mortality

Empirical evidence on gender differences in the link between cohabitation and mortality is inconsistent and mostly based on data gathered outside the United States, yet this body of work suggests that important gender dynamics may be at play. A 10-year follow-up study of a 65- to 84-year-old Italian population found that the mortality rate of cohabiting men was lower than the rate of men who lived alone but that women's survival was not related to cohabitation status (Scafato et al., 2008). In contrast, a mortality study of a Danish elderly population age 75 and above found that continuously living alone was a stronger predictor of the mortality of women than of men (Lund, Modvig, Due, & Holstein, 2000). Still other European studies have reported no significant gender difference in the relationship between cohabitation status and mortality (e.g., Lund et al., 2002). Significantly more research has examined gender differences in the link between marriage and mortality. This body of work suggests that the economic, social, and psychological aspects of marriage differentially benefit men's and women's health and longevity and that, overall, men's health benefits more

from marriage than women's (Ross et al., 1990; Umberson, 1992). Married men receive higher levels of social control of health behaviors and greater psychological benefits (e.g., emotional support) than married women (Umberson). In contrast, married women tend to benefit from increased economic resources as a result of marriage to a typically higher earning spouse; this income boost has been highlighted as the key mechanism linking marriage and mortality for women (Lillard & Waite, 1995).

In line with the research on gender, health, and marriage, Duncan, Wilkerson, and England (2006) found that young men who transition to cohabitation are more likely than young women to reduce their marijuana use and binge drinking, perhaps because of women's greater social control efforts. Similarly, cohabiting men—just like married men—earn more than their female partners (Brines & Joyner, 1999). This research suggests that cohabiting relationships are, to some extent, gendered in similar ways as the marital tie, wherein cohabiting men may receive higher levels of social and psychological resources from their female partners and cohabiting women may receive greater economic resources from their male partners. Such dynamics may in turn shape mortality rates for cohabiting men and women in similar ways as marriage, yet cohabiting partners are more egalitarian than married couples, and they are less likely to pool their income (Brines & Joyner). Thus, cohabiting women may not gain the same economic benefits that married women do (Waite & Gallagher, 2000). In addition, research suggests that there are overall fewer social and psychological resources found in cohabiting unions compared to marriages (Bumpass & Lu, 2000). Therefore, although cohabiting men may receive similar types of social and psychological resources compared to married men, they may not receive these resources to the same degree (Waite & Gallagher), effectively leveling the gender gap in mortality for cohabiting men and women.

Race, Cohabitation, and Mortality

In the United States, cohabitation is more prevalent among Blacks than Whites (U.S. Census Bureau, 2011). Mortality rates are also higher for Blacks than Whites until around age 80, when the mortality rates of Blacks become lower than Whites; this crossover pattern is possibly due to selection processes (Rogers, Hummer, & Nam, 2000). Despite research suggesting that both cohabitation and mortality vary across race, we know of no studies that have examined how cohabitation shapes mortality differently across racial groups. The prevalence rates of cohabitation across racial groups suggest that cohabitation may have different meanings and dynamics—and therefore provide different social, psychological, and economic resources—for Blacks and Whites. Such resources may in turn differentially shape mortality across racial groups. For example, Whites are more likely to marry their cohabiting partner than Blacks are (Brown et al., 2008), and therefore cohabitation for Whites may be more of a trial marriage (Thornton, Axinn, & Xie, 2007). In contrast, cohabitation tends to be an alternative to marriage, or ''marriage-like,'' for Blacks (Brown et al., 2008; Thornton et al.). A trial marriage may have dynamics similar to those of dating couples—including lower levels of shared social, psychological, and economic resources—whereas marriage-like cohabitation may have dynamics more similar to married couples (Heuveline & Timberlake, 2004), including higher levels of these shared resources. This suggests that cohabitation may mirror the dynamics of marriage in ways that shape mortality more for Blacks than for Whites. Alternatively, researchers contend that married Black men and women benefit less from marriage than do their White counterparts because of Black men and women's higher levels of marital strain (Liu & Umberson, 2008). Moreover, the economic consequences of marriage and cohabitation differ between Blacks and Whites. The earning premium of married men relative to unmarried men is greater for Whites than for Blacks (Cohen, 1999), and Black women are less likely than White women to increase their financial capital from relationship unions (Edin & Kefalas, 2005). This body of work suggests that cohabitation, like marriage, may bring fewer economic benefits and have a smaller protective effect on mortality for Blacks than for Whites in comparison to being single.

Additional Sociodemographic Covariates

Theoretical and empirical evidence suggests that both union status and mortality are associated with other sociodemographic characteristics. Mortality rates certainly vary by age: Younger individuals are more likely to be never married

and view cohabitation as a precursor to marriage, whereas older individuals are more likely to be previously married and view cohabitation as an alternative to marriage (King & Scott, 2005). Both cohabitation and mortality rates are higher among groups with lower levels of education than those with higher levels of education (Bumpass & Lu, 2000; Rogers et al., 2000). Cohabitation is less prevalent, and mortality is higher, in less economically developed regions (e.g., the South) in comparison to more economically developed regions (e.g., the Northeast; Rogers et al.). Individuals in poorer health, a strong predictor for mortality, are less likely to get married than enter into cohabitation or remain single (Horwitz & White, 1998).

Method

Data and Sample

We used data from the public use version of the National Health Interview Survey—Longitudinal Mortality Follow-Up (NHIS-LMF). The National Health Interview Survey (NHIS) is a cross-sectional household interview survey conducted annually by the National Center for Health Statistics (NCHS). The NHIS sampling follows a multistage probability design and is representative of the civilian noninstitutionalized population of the United States (NCHS, 2004). Through statistical matching techniques, all NHIS survey respondents age 18 and over with sufficient identifying information who were interviewed between 1986 and 2004 are eligible for mortality follow-up and linked to death records in the National Death Index (NDI) through the end of 2006 (NCHS). The NDI is a national file of deaths that occur each year in the United States. In this study, we used the pooled NHIS-LMF files from 1997 to 2004, because the NHIS did not collect information on cohabitation status prior to 1997. We excluded 11,782 respondents (i.e., 5.72%) who had insufficient identifying information and were thus ineligible for mortality follow-up. Those ineligible respondents were more likely to be nonmarried and to have a lower socioeconomic status, and thus more likely to die. Therefore, our estimates of mortality rates are likely to be conservative. The NHIS collected sociodemographic and health information for all individuals in the household. One sample adult was randomly selected from each NHIS family in order to collect more detailed health information (e.g., health behaviors, psychological distress). The present study is restricted to the Sample Adult Core files: those data that include measures of health behaviors and psychological distress. The NHIS-LMF provides a unique opportunity to investigate the cohabitation–mortality link because it includes a large number of deaths among cohabiters across gender and racial subgroups. These data also provide high-quality measures for the key variables (e.g., socioeconomic status, psychological distress, health behaviors) that are central to the present study.

Only sample adults age 18 and above who were identified as non-Hispanic White (hereafter *White*) and non-Hispanic Black (hereafter *Black*) were included in the analysis. We excluded 48,070 (20%) individuals from other racial/ethnic groups because they are highly heterogeneous, and the focus of our study was comparing Whites and Blacks. We further excluded 476 (i.e., 0.24%) observations with missing values on cohabitation and marital status when the surveys were conducted. In the final analysis, we included 193,851 respondents who were interviewed in the NHIS from 1997 to 2004; 7,113 of these individuals died within 3 years after the survey was conducted. All analyses presented are weighted to adjust for the complex sampling design, and we used robust standard errors for tests of significance.

Measures

Mortality. We estimated the mortality rate from the date when the survey was conducted to the subsequent 3-year follow-up (i.e., those interviewed in 1997 were followed up until 2000, those interviewed in 1998 were followed up until 2001, etc.). We truncated the mortality follow-up to a 3-year period, rather than using the full mortality follow-up data (i.e., until the end of 2006), because NHIS did not follow up the union status of the respondents, and the 3-year mortality follow-up reduces the exposure of union transitions. Our additional analyses (not shown but available on request) with 1-, 2-, or 5-year mortality follow-up reveal results similar to those with the 3-year mortality follow-up.

Union status was the primary independent variable used to predict the mortality risk of participants up to 3 years after the respondent was interviewed. Because NHIS-LMF data provide no information on union status at death,

we used union status information collected at the baseline NHIS survey. Union status was divided into five categories: (a) currently married, (b) cohabiting (i.e., nonmarried and living with a partner), (c) nonpartnered never married, (d) divorced/separated, and (e) widowed. We used cohabiting as the reference group in the analysis to better understand mortality differences between cohabiters and other union status groups. Transitions into and out of marital and cohabiting unions were not identifiable in the data because NHIS did not follow the union status of the respondents.

Family income. We followed previous studies (e.g., Liu & Umberson, 2008) to measure family income and used the midpoint of each income category, converted into 2004 U.S. dollars based on the consumer price index. We used the logarithmic transformation of family income to address the skewed distribution, which is further centered at the mean value. About 5% of respondents ($n = 9{,}814$) had missing reports on family income in the total analyzed sample. We imputed those missing data using a single-imputation method based on age, gender, race, geographic region, education, marital status, health status, and survey year. Although a multiple-imputation method is more methodologically sophisticated, researchers contend that single imputation is a reasonable approach when the proportion of missing data is small (Allison, 2001). We also examined an additional measure of economic resources by using the ratio of family income to poverty threshold, which considers the size of family. The results (not shown but available on request) revealed patterns similar to those reported when the family income measure was used.

Psychological distress. We used the Kessler-6 scale (K6; Kessler et al., 2002) to measure psychological distress. The K6 scale has demonstrated internal consistency and reliability (Cronbach's $\alpha = .86$) in measuring psychological distress. It is widely used to screen for mental illness in large-scale surveys by asking about the presence of six mental health symptoms: ''During the past 30 days, how often did you feel: (a) *So sad that nothing could cheer you up* (factor loading = .7365), (b) *Nervous* (factor loading = .6850), (c) *Restless or fidgety?* (factor loading = .6819), (d) *Hopeless* (factor loading = .7914), (e) *That everything was an effort* (factor loading = .7155), or (f) *Worthless* (factor loading = .7440).'' The responses range from *None of the time* (coded 0) to *All of the time* (coded 4). About 1.5% of respondents ($n = 2{,}837$) had missing responses to these items. We used the single-imputation approach to impute those missing values based on age, gender, race, geographic region, education, family income, marital status, health status and survey year. The psychological distress score was constructed as a latent variable, with higher values indicating higher levels of distress.

Health behaviors. We included three measures of health behaviors: (a) smoking, (b) drinking, and (c) vigorous exercise. Smoking was measured as a categorical variable: *never smoked* (the reference), *current smoker*, *former smoker*, and *unknown smoking status*. Drinking also was measured as a categorical variable: *lifetime abstainer* (the reference), *current drinker*, *former drinker*, and *unknown drinking status*. Exercise was measured on the basis of the survey question that asked about frequency of vigorous activities longer than 10 min every week. We recoded the response into six categories: (a) *no exercise* (the reference), (b) *less than once a week*, (c) *once a week*, (d) *two or three times a week*, (e) *more than three times a week*, and (f) *unknown exercise status*.

Other covariates included age at the baseline survey (in years), age at the baseline survey squared, education (*no high school diploma*, *high school graduate*, *some college*, and *college graduate*, with *college graduate* as the reference), and geographic region (*Northeast*, *Midwest*, *South*, and *West*, with *Northeast* as the reference). We also controlled for survey year (centered at 1997) to take into account the pooled multiple years of NHIS. To control for the possibility that people in poorer health are more likely to be selected into cohabitation rather than marriage, we included a measure of self-rated health with five categories: (a) *excellent*, (b) *very good*, (c) *good*, (d) *fair*, and (e) *poor* (the reference). In addition, previous research suggests that the meaning of the term *cohabitation* varies by age (Chevan, 1996; King & Scott, 2005). To control for the potential age variations in the mortality links with cohabitation, we further included interaction terms of Union status × Age in the models. Because the NHIS is a cross-sectional survey, all analyzed variables were drawn from the baseline survey conducted between 1997 and

2004 except mortality data, which were taken from the mortality follow-up files.

Statistical Methods

Because the meanings and processes of cohabitation are fundamentally different across gender and racial groups (Thornton et al., 2007), we conducted analyses separately for White men, White women, Black men, and Black women. Within each gender and racial subgroup, we estimated a set of Cox proportional hazards models. In the first model, we examined the general relationship between cohabitation and mortality, controlling for only the basic sociodemographic covariates (i.e., age at baseline survey, age at baseline survey squared, age interactions with union status, survey year, education, and geographic region). We then added family income, psychological distress, and health behaviors separately as additional covariates to examine whether such factors explain mortality differences by union status. A reduction in the significance level and/or magnitude of the effect of union status across models would suggest that the potential mechanism variables explain the association between cohabitation and mortality.

We used age at death as the analysis time scale to best control for the effect of age on mortality rates (see Singer & Willett, 2003). Age at death is measured in ¼-year units—the smallest unit available in the public versions of the NHIS-LMF data. The mortality hazard function in our models reflects the mortality rate across age. Cox models assume that the hazard function has a constant shape for all individuals, although there is no assumption about the exact shape of the shared hazard function. Results (not shown but available on request) from the chi-square test based on scaled Schoenfeld residuals revealed little variation of this proportional hazards assumption. The Cox model we estimated can be specified as follows:

$$\log \frac{h_i(t)}{h_0(t)} = \sum \beta_j M_j + \sum \pi_k X_k, \qquad (1)$$

where t represents the analytic time metric—the participants' age; $h_i(t)$ is the resultant death hazard of the ith individual at age t; $h_0(t)$ is the baseline hazard at age t; M_j represents the set of union status dummy variables; and β_j represents the corresponding coefficients (*cohabiting* is the reference group); X_k stands for the other covariates included in the model; and π_k represents the corresponding coefficients. The β_j values are of greatest interest for this study because they reflect mortality differences between cohabiters and other union status groups.

Results

We first report, in Table 1, descriptive statistics of all analyzed variables for White men, White women, Black men, and Black women. The results in Table 1 suggest that Black men had the highest proportion of deaths and were more likely to cohabit than other gender and racial subgroups. Black men and women were less likely to be married and more likely to live in the South than White men and women. White men were the most likely to be college graduates, followed by White women, Black women, and Black men. White men and women were older, were less likely to report poor health, and had higher levels of family income than Black men and women. In comparison to their female counterparts, White men and Black men were more likely to be current smokers and drinkers, more likely to exercise, and tended to report lower levels of psychological distress.

General Relationship Between Cohabitation and Mortality Across Gender and Race

We now turn to the results from the Cox regression models. The results in Tables 2 and 3 show the estimated regression coefficients for mortality by union status from five Cox models for White men, White women, Black men, and Black women separately. We first discuss the results from Model 1 of Tables 2 and 3 that controlled for the basic sociodemographic covariates. The results from Model 1 in Table 2 suggest that married White men and White women had lower mortality than their cohabiting counterparts; specifically, the mortality hazard was 79.42% (i.e., $[1 - e^{1.5808}] \times 100$) and 58.89% (i.e., $[1 - e^{-0.8888}] \times 100$) lower for married White men and married White women, respectively, in comparison to their cohabiting counterparts. For both White men and women, the significant age interaction effects with married individuals suggest that the mortality differences between married people and cohabiters tended to decrease with age. The gap converged around age 75 (i.e., 1.5808/0.0211) for White

Table 1. *Weighted Descriptive Statistics*

Variable	White Men	White Women	Black Men	Black Women
Total no. observations	71,617	89,294	12,503	20,437
Total no. deaths	2,903	3,023	558	629
% of deaths	4.05	3.39	4.46	3.08
Union status (%)				
Cohabiting	5.49	5.21	8.13	5.21
Married	62.88	58.83	42.87	29.89
Widowed	2.81	11.14	3.05	10.68
Divorced/separated	9.43	11.5	14.43	20.22
Never married	19.38	13.32	31.52	34.00
Region (%)				
Northeast	19.95	20.75	15.42	17.05
Midwest	29.18	28.73	18.20	19.37
South	34.32	34.04	58.44	56.97
West	16.55	16.47	7.94	6.61
Education (%)				
College graduate	27.79	23.98	13.23	14.49
Some college	29.12	31.17	30.64	31.53
High school graduate	29.88	31.73	32.53	30.18
No diploma	13.21	13.12	23.60	23.80
Self-rated health (%)				
Poor	2.69	2.93	4.06	4.55
Fair	7.65	8.52	11.96	14.30
Good	22.89	24.81	25.80	29.72
Very good	32.87	33.27	28.80	28.38
Excellent	33.90	30.47	29.38	23.05
Smoking (%)				
Never smoked	44.58	55.29	54.01	67.78
Current smoker	25.66	22.51	27.62	19.83
Former smoker	29.25	21.77	17.5	11.79
Unknown	0.50	0.44	0.87	0.61
Drinking (%)				
Lifetime abstainer	12.50	22.86	23.74	41.10
Current drinker	70.68	60.91	56.72	41.44
Former drinker	15.36	15.05	17.36	16.06
Unknown	1.46	1.18	2.18	1.40
Exercise (%)				
No exercise	53.30	64.71	57.87	74.71
Less than once a week	3.44	2.39	2.59	2.12
Once a week	6.98	4.72	6.21	3.49
Two or three times a week	16.31	14.11	15.81	10.66
More than three times a week	18.82	13.17	16.43	8.23
Unknown	1.15	0.92	1.08	0.78
Mean age at the baseline survey	45.67	47.38	41.45	42.64
Median family income	46,355.83	41,065.22	34,015.61	30,798.91
Mean of psychological distress	−0.10	0.03	−0.10	0.08

Note: Total numbers of observations and deaths are unweighted. All other statistics are weighted.

men and 77 (i.e., 0.8888/0.0116) for White women. Age interactions with other union status were not significant and thus are not included in the final reported models.

The results from Model 1 in Table 2 further suggest that, in comparison to cohabiting White men, the mortality hazard was 42.12% (i.e., $[e^{0.3515} - 1] \times 100$) higher for

Table 2. *Estimated Regression Coefficients of Mortality by Union Status From Cox Models for White Men (*N = *71, 617) and White Women (*N = *89, 294)*

	White Men					White Women				
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Union status (0 = *cohabiting*)										
Married	−1.5808***	−1.5449***	−1.5332***	−1.4132***	−1.3618***	−0.8888**	−0.8719**	−0.8328*	−0.7291*	−0.6801*
Widowed	0.3045†	0.2882†	0.2904†	0.3536*	0.3315*	0.3298	0.3136	0.3261	0.3826†	0.3735†
Divorced/separated	0.3515*	0.3277*	0.3372*	0.3682*	0.3425*	0.1934	0.1720	0.1850	0.1855	0.1731
Never married	0.3706*	0.3403*	0.3682*	0.4522**	0.4314*	0.3057	0.2870	0.3133	0.4017†	0.4000†
Married × Age	0.0211***	0.0208***	0.0206***	0.0200***	0.0194***	0.0116**	0.0115**	0.0110**	0.0109**	0.0103*
Age at baseline survey	0.0930	0.0898	0.0895	0.0847	0.0809	0.0047	0.0042	0.0079	−0.0096	−0.0070
Age at baseline survey squared	−0.0006	−0.0006	−0.0006	−0.0006	−0.0006	0.0001	0.0001	0.0001	0.0002	0.0002
Survey year	−0.0215*	−0.0218*	−0.0203*	−0.0161†	−0.0153†	−0.0201*	−0.0203*	−0.0191*	−0.0193*	−0.0187*
Region (0 = *Northeast*)										
Midwest	−0.0475	−0.0489	−0.0432	−0.0635	−0.0616	0.0846	0.0813	0.0891	0.0908	0.0931
South	−0.0537	−0.0589	−0.0541	−0.0734	−0.0772	0.0890	0.0864	0.0975	0.0857	0.0909
West	−0.0781	−0.0782	−0.0804	−0.0737	−0.0787	0.0681	0.0680	0.0703	0.0734	0.0753
Education (0 = *college graduate*)										
Some college	0.1074	0.0881	0.1039	0.0085	−0.0004	0.0779	0.0670	0.0709	0.0111	0.0031
High school graduate	0.1987**	0.1679**	0.1924**	0.0591	0.0443	0.1175	0.1020	0.1053	0.0086	−0.0039
No diploma	0.1934**	0.1434*	0.1698*	0.0101	−0.0267	0.1374†	0.1089	0.1156	0.0108	−0.0138
Self-rated health (0 = *poor*)										
Fair	−0.9688***	−0.9569***	−0.8776***	−0.9072***	−0.8255***	−0.7462***	−0.7452***	−0.6937***	−0.6790***	−0.6385***
Good	−1.5133***	−1.4912***	−1.3807***	−1.3953***	−1.2760***	−1.3987***	−1.3927***	−1.3119***	−1.2675***	−1.2001***
Very good	−2.0023***	−1.9739***	−1.8475***	−1.8170***	−1.6773***	−1.7966***	−1.7872***	−1.6952***	−1.6141***	−1.5345***
Excellent	−2.2203***	−2.1860***	−2.0551***	−1.9681***	−1.8194***	−2.2280***	−2.2156***	−2.1160***	−1.9779***	−1.8897***
Family income		−0.0825*			−0.0372		−0.0440†			−0.0156
Psychological distress			0.1222***		0.1020***			0.0776***		0.0598**
Smoke (0 = *never-smoker*)										
Current smoker				0.6602***	0.6362***				0.7029***	0.6902***
Former smoker				0.2201***	0.2171***				0.4810***	0.4783***
Unknown				−0.2094	−0.2105				0.2503	0.2462

Table 2. *Continued*

Variable	White Men Model 1	White Men Model 2	White Men Model 3	White Men Model 4	White Men Model 5	White Women Model 1	White Women Model 2	White Women Model 3	White Women Model 4	White Women Model 5
Drink (0 = *lifetime abstainer*)										
Current drinker				−0.0388	−0.0364				−0.2783***	−0.2769***
Former drinker				0.1681**	0.1662*				0.0335	0.0287
Unknown				0.2044	0.1908				0.0238	0.0178
Exercise (0 = *no exercise*)										
Less than once a week				−0.0621	−0.0506				−0.2824	−0.2815
Once a week				−0.6664***	−0.6507***				−0.5227*	−0.5185*
Two or three times a week				−0.6065***	−0.5959***				−0.4850***	−0.4793***
More than three times a week				−0.4682***	−0.4605***				−0.4561***	−0.4523***
Unknown				−0.3119	−0.3300				−0.4798	−0.4753

Note: Age interactions with other union status were not significant in the preliminary analysis and thus not included in the final reported models.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

divorced/separated White men and 44.86% (i.e., $[e^{0.3706} - 1] \times 100$) higher for nonpartnered never-married White men, respectively, after controlling for the basic sociodemographic covariates. The mortality hazard of widowed White men was also marginally significantly higher than that of cohabiting White men net the effects of sociodemographic characteristics ($b = 0.3045$, $p < .1$). In contrast, the mortality hazard of widowed, divorced, and never-married White women was not significantly different from that of their cohabiting counterparts net the effects of basic covariates.

We report the Cox regression results for Black men and women in Table 3. The results from Model 1 in Table 3 suggest that the mortality hazard of never-married Black men was 78.43% (i.e., $[e^{0.5790} - 1] \times 100$) higher than that of their cohabiting counterparts, whereas there was no significant difference in the mortality hazard of married, widowed, and divorced Black men in comparison to that of cohabiting Black men net the effects of basic sociodemographic covariates. For Black women, none of the coefficients for union status variables were significant, suggesting that the mortality hazards of married, widowed, divorced, and never-married Black women were not significantly different from those of cohabiting Black women.

Estimated effects of other covariates were primarily in the expected direction; specifically, for most gender and racial subgroups, individuals with less education had higher mortality rates than college graduates. Those who reported better health were less likely to die than those in poor health. We used age as the analysis time scale in estimation of the Cox models; therefore, the hazard function in our models reflected the mortality rate across age. The nonsignificant regression coefficients of age at the baseline survey in Tables 2 and 3 do not contradict previous literature but instead suggest that the age effect was ''absorbed entirely into the baseline hazard function'' (see Singer & Willett, 2003, p. 605).

Do Family Income, Psychological Distress, and Health Behavior Explain Mortality Differences by Union Status?

Next, we assessed whether the mortality differences by union status identified in Model 1 can be explained by family income, psychological distress, and health behaviors. We added these risk factors in three separate models (Models

Table 3. *Estimated Regression Coefficients of Mortality by Union Status From Cox Models for Black Men (N = 12, 503) and Black Women (N = 20, 437)*

	Black Men					Black Women				
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Union status (0 = *cohabiting*)										
Married	−0.0497	−0.0202	−0.0351	0.0498	0.0752	−0.2159	−0.2075	−0.2167	−0.0470	−0.0475
Widowed	0.3611	0.3408	0.3612	0.4310	0.4135	0.1672	0.1525	0.1673	0.2831	0.2824
Divorced/separated	0.1036	0.0598	0.1061	0.1606	0.1286	0.0717	0.0526	0.0720	0.1661	0.1656
Never married	0.5790*	0.5347*	0.5788*	0.6222*	0.5894*	0.3780	0.3530	0.3781	0.4776	0.4764
Age at baseline survey	−0.1478	−0.1477	−0.1493	−0.1763	−0.1759	0.1591	0.1588	0.1589	0.1516	0.1512
Age at baseline survey squared	0.0007	0.0007	0.0008	0.0010	0.0010	−0.0012	−0.0012	−0.0012	−0.0011	−0.0011
Survey year	−0.0068	−0.0078	−0.0074	0.0060	0.0044	−0.0387†	−0.0388†	−0.0388†	−0.0312	−0.0313
Region (0 = *Northeast*)										
Midwest	−0.0055	−0.0067	−0.0039	−0.0498	−0.0481	0.1600	0.1566	0.1608	0.1686	0.1694
South	0.0332	0.0198	0.0361	0.0099	0.0050	0.0680	0.0618	0.0683	0.0830	0.0832
West	−0.0631	−0.0712	−0.0698	−0.1286	−0.1382	−0.0850	−0.0896	−0.0837	−0.0682	−0.0668
Education (0 = *college graduate*)										
Some college	0.2390	0.2063	0.2389	0.1361	0.1163	0.4384*	0.4188†	0.4383*	0.3244	0.3234
High school graduate	0.2402	0.1901	0.2409	0.0825	0.0532	0.3751†	0.3463	0.3753†	0.2181	0.2172
No diploma	0.1529	0.0702	0.1460	−0.0426	−0.0997	0.5018*	0.4630*	0.5027*	0.3222	0.3217
Self-rated health (0 = *poor*)										
Fair	−0.5322***	−0.5157***	−0.4910***	−0.5381***	−0.4986***	−0.5593***	−0.5534***	−0.5630***	−0.5141***	−0.5182***
Good	−1.0625***	−1.0202***	−1.0002***	−1.0442***	−0.9745***	−0.9434***	−0.9280***	−0.9499***	−0.8504***	−0.8577***
Very good	−1.5985***	−1.5404***	−1.5308***	−1.5358***	−1.4531***	−1.3837***	−1.3641***	−1.3907***	−1.2546***	−1.2624***
Excellent	−1.3375***	−1.2784***	−1.2634***	−1.2226***	−1.1370***	−1.6912***	−1.6678***	−1.6993***	−1.5396***	−1.5485***
Family income		−0.1189			−0.0815		−0.0488			−0.0022
Psychological distress			0.0665		0.0454			−0.0063		−0.0079
Smoke (0 = *never smoker*)										
Current smoker				0.4871***	0.4698**				0.6601***	0.6599***
Former smoker				0.2296†	0.2323†				0.1759	0.1751
Unknown				−0.8797	−0.8898				−0.0020	−0.0022
Drink (0 = *lifetime abstainer*)										
Current drinker				0.1032	0.1032				−0.3624*	−0.3603*

Table 3. *Continued*

Variable	Black Men					Black Women				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Former drinker				0.0152	0.0046				0.0190	0.0207
Unknown				−0.2167	−0.2054				0.4125	0.4127
Exercise (0 = *no exercise*)										
Less than once a week				0.5115	0.5209				−1.3231	−1.3243
Once a week				−0.7124	−0.7072				−1.4069*	−1.4069*
Two or three times a week				−0.5407†	−0.5256†				−1.2912***	−1.2906***
More than three times a week				−0.5128†	−0.5002				−0.2887	−0.2889
Unknown				−0.8586	−0.8604				−0.4934	−0.4928

Note: Age interactions with union statuses were not significant in the preliminary analysis, and thus not included in the final reported models.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

2–4) as additional covariates in Tables 2 and 3 for each gender and racial subgroup. These results suggest that, for both White men and women, family income was negatively related to mortality (Model 2) and psychological distress was positively related to mortality (Model 3). For all gender and racial subgroups, those who exercised more often tended to have lower mortality; and both current and former smokers had higher mortality than never-smokers (Model 4). Former drinkers had higher mortality than lifetime abstainers among White men, whereas current drinkers had lower mortality than lifetime abstainers among White women and Black women (Model 4).

All of the union status differences in mortality identified in Model 1 remained statistically significant after these potential mechanism variables were controlled for separately in Models 2 through 4. This suggests that family income, psychological distress, and health behavior did not fully explain the identified mortality differences, yet we did find some partial reductions in the significance of these differences once we controlled for these factors. We controlled for all covariates (including sociodemographic, family income, psychological distress, and health behavior variables) in our final model, Model 5, in Tables 2 and 3. These results suggest that after all covariates were controlled for, the mortality hazards of widowed, divorced, and never-married White men and of never-married Black men were significantly higher than that of their cohabiting counterparts; the mortality hazards of married White men and White women were significantly lower than that of their cohabiting counterparts.

Table 4 summarizes results for comparisons of union status effects on mortality from Models 2 through 4 versus Model 1. As summarized in Table 4, after family income was added (Model 2), the coefficient for married individuals decreased by 2.27% (i.e., [1.5808 − 1.5449]/1.5808) for White men and 1.90% for White women in comparison to their cohabiting counterparts. Moreover, after family income was added (Model 2), the coefficients for widowed, divorced, and never-married White men, as well for never-married Black men, decreased by 5.35%, 6.77%, 8.18%, and 7.65%, respectively. These results suggest that cohabiters had different mortality rates in comparison to other union status groups in some part because they had different levels of family income. Similarly, the addition of psychological distress (Model 3) also

Table 4. *Model Comparisons to Explain the Significant Mortality Differences by Union Status Identified in Model 1 of Tables 2 and 3*

Comparison of Models	Adjustment of Covariates	Gender and Race Groups	Significant Union Status Effects Identified in Model 1[a]	Magnitude Change in Coefficient	Significance Level Change
Models 1 vs. 2	Family income	White men	Married	↓ 2.27%	unchanged
Models 1 vs. 2	Family income	White men	Widowed	↓ 5.35%	unchanged
Models 1 vs. 2	Family income	White men	Divorced/separated	↓ 6.77%	unchanged
Models 1 vs. 2	Family income	White men	Never married	↓ 8.18%	unchanged
Models 1 vs. 2	Family income	White women	Married	↓ 1.90%	unchanged
Models 1 vs. 2	Family income	Black men	Never married	↓ 7.65%	unchanged
Models 1 vs. 3	Psychological distress	White men	Married	↓ 3.01 %	unchanged
Models 1 vs. 3	Psychological distress	White men	Widowed	↓ 4.63%	unchanged
Models 1 vs. 3	Psychological distress	White men	Divorced/separated	↓ 4.07%	unchanged
Models 1 vs. 3	Psychological distress	White men	Never married	↓ 0.65 %	unchanged
Models 1 vs. 3	Psychological distress	White women	Married	↓ 6.30 %	** → *
Models 1 vs. 3	Psychological distress	Black men	Never married	↓ 0.03%	unchanged
Models 1 vs. 4	Health behavior	White men	Married	↓ 10.60%	unchanged
Models 1 vs. 4	Health behavior	White men	Widowed	↑ 16.12%	† → *
Models 1 vs. 4	Health behavior	White men	Divorced/separated	↑ 4.75%	unchanged
Models 1 vs. 4	Health behavior	White men	Never married	↑ 22.02%	unchanged
Models 1 vs. 4	Health behavior	White women	Married	↓ 17.97%	** → *
Models 1 vs. 4	Health behavior	Black men	Never married	↑ 7.46%	unchanged

[a]0 = *cohabiting*.

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

led to a small reduction in the magnitude of some significant mortality differences by union status identified in Model 1; specifically, psychological distress explained 3.01% and 6.30% of mortality differences between the married and cohabiters for White men and White women, respectively. It also explained 4.63% and 4.07% of mortality differences of widowed and divorced White men, respectively, in comparison to their cohabiting counterparts. Adding psychological distress resulted in little change in the size of estimated mortality difference of never-married White or Black men in comparison to their cohabiting counterparts, as shown in Table 4.

In terms of health behavior, the results in Table 4 show that, after controlling for the health behavior variables (Model 4), the coefficients of married White men and married White women decreased by 10.60% and 17.97%, respectively. In contrast, after the health behavior variables were controlled for, the size of coefficients for widowed, divorced, and never-married White men, as well as never-married Black men, all increased. These results suggest that health behaviors partially explained the mortality differences of married White men and White women in comparison to their cohabiting counterpart, but they did not explain the higher mortality rates of widowed, divorced, or never-married White men or never-married Black men in comparison to their cohabiting counterparts.

Discussion

Despite the bourgeoning scholarly and policy interest in the rapid growth of cohabitation in the United States, very little is known about how this emerging union type is related to mortality. The present study is the first to investigate U.S. adult mortality differences between unmarried cohabiters and individuals in other union statuses across gender and racial groups. Our results reveal important gender and racial variations in the patterns that link cohabitation and mortality. In the following paragraphs, we outline four major findings and implications from our study.

First, one of the central questions of scholarship on union status and health is whether cohabitation is related to health and longevity to the same degree as marriage is (Carr & Springer, 2010). Our results suggest that answer to this question depends on race. Consistent with our

hypothesis regarding race differences, we found that the mortality of married White men and women was lower than that of their cohabiting White counterparts, but there were no significant mortality differences between married Black men and women in comparison to their cohabiting Black counterparts. This finding is consistent with research suggesting that cohabitation and marriage have very different meanings for Whites and Blacks, whereby marriage confers different social, economic, and psychological experiences across racial groups (Brown et al., 2008; Thornton et al. 2007). Whites are more likely to see cohabitation as a trial marriage (Brown et al., 2008; Thornton et al.), which may mean lower levels of shared social, psychological, and economic resources. In contrast, cohabitation is more prevalent and is perceived as an alternative to marriage for Blacks (Brown et al., 2008; Thornton et al.); thus, cohabitation may mirror the dynamics of marriage and promote health in capacities similar to marriage. It is also likely that, because of lower levels of earnings for both Black men and Black women compared to their White counterparts, marriage may not confer the same degree of social and economic benefits for Blacks as for Whites (Edin & Kefalas, 2005). Therefore, Black cohabiting men and women may more easily match their married counterparts on these social and economic components that promote health. Alternatively, because cohabitation is more common among Blacks, it is possible that the selection of people in poorer health into cohabitation, rather than marriage, is less relevant for Blacks compared to Whites.

Second, we found that the mortality advantage of married White men and women in comparison to their cohabiting counterparts decreased with age. This finding is consistent with previous research suggesting that marital status is a stronger predictor of mortality at younger ages, when marital roles are more central (Gove, 1973; Mineau, Smith, & Bean, 2002). Researchers have suggested that the meaning, context, and motivations for cohabitation vary by age (Chevan, 1996; King & Scott, 2005). Older cohabiters (i.e., age 50+) report higher levels of stability and relationship quality and are more likely to have been previously married than younger cohabiters (Brown, Lee, & Bulanda, 2006; Bumpass & Lu, 2000; King & Scott). This suggests that having been previously married changes the expectations for intimate relationships; older individuals who do not wish to remarry after an earlier divorce may view cohabitation as a marriage-like union (King & Scott) and thus receive a marriage-like boost in mortality. In contrast, younger couples are more likely to see their cohabiting unions as a precursor to marriage (King & Scott), suggesting that the processes of cohabitation will be less likely to promote health and longevity. The decreasing mortality difference between the married and cohabiters may also, however, reflect selection processes. Cohabiters face higher mortality rates than married individuals, and this process of mortality selection would leave a more robust cohabiting subpopulation at older ages.

Third, although cohabitation was related to higher mortality in comparison to marriage among Whites, our results suggest that White and Black cohabiting men tended to have lower mortality compared to their unpartnered counterparts. Previous studies on health and family status typically combine cohabiters within other union status groups—such as the never-married, divorced, or widowed—without distinguishing cohabiting and unpartnered individuals (Liu & Umberson, 2008), yet there is reason to believe that there are important differences among these groups and that these differences shape mortality risk (Carr & Springer, 2010). In line with a growing body of research highlighting the diversity of the unmarried category (Liu, 2009), our results revealed higher mortality for White and Black single men—but, notably, not White and Black single women—in comparison to their cohabiting counterparts. This finding is consistent with previous research that suggests any union—cohabiting or married—is more important for men's mortality than women's (Gove, 1973; Liu). Our results suggest that cohabitation may promote longevity for men in similar ways as marriage, albeit to a lesser degree. These results also call for family researchers to seriously consider the heterogeneity of the nonmarried group across race and gender in their future research.

Fourth and finally, our results provide previously unexplored evidence on the role of key psychological, social, and economic mechanisms through which cohabitation is linked to mortality. Past research suggests that cohabiters tend to live less healthy lifestyles (Fuller, 2010; Horwitz & White, 1998), enjoy fewer economic benefits (Brines & Joyner, 1999), and

experience more relationship strain and psychological distress (Brown, 2000)—all factors that may lead to higher mortality—than married individuals. Our results suggest that, in our study, these economic, social, and psychological factors operated together to explain part of the mortality differentials across gender and race, yet these factors failed to fully explain any of the significant mortality differences between cohabiters and other union status groups. We expected economic resources to explain the mortality differentials by union status for White women more than for White men or Black men because of differential earnings across racial and gender groups (Cohen, 1999; Edin & Kefalas, 2005), yet we found that family income explained a part, but not all, of mortality differences by union status in similar ways for White women, White men, and Black men. With an increase in women's labor force participation, it is possible that women's roles in contributing to family income—and, in turn, mortality—have become more important over time (Oppenheimer, 1997). This suggests that women's socioeconomic status may become more important to their spouses' health and mortality now than in the past.

Given previous research indicating that marriage confers important psychological resources to men, but not to women (Ross et al., 1990), we expected that social psychological factors would be one major variable that would explain the relationship between union status and mortality for both White and Black men but not for women. We found that psychological distress explained only a small portion of the mortality differences for White married, divorced, and widowed men compared to their cohabiting counterparts but explained virtually none of the effect for White or Black never-married men compared to their cohabiting counterparts. Surprisingly, we found that psychological distress explained a portion of the mortality difference between White cohabiting and married women. This finding may reflect the fact that women are more likely to report depressive symptoms than men (Rosenfield, 1999). It may also be the case that cohabiting White women wish to marry but do not have access to a willing partner, causing strain and psychological distress; such strain may in turn affect their mortality (Edin & Kefalas, 2005). It may also be that women with lower levels of psychological distress, and thus lower mortality risk, are more likely to select into marriage. Future research should explore these possibilities.

In line with previous research indicating that men's health behavior is more strongly shaped by union status, we expected that health behaviors would explain another major part of the relationship between cohabitation and mortality for men, but not women (Umberson, 1992). We found this to be the case for married White men in comparison to their cohabiting counterparts, yet health behaviors did not explain the mortality differences of White widowed, divorced, and never-married men in comparison to their White cohabiting counterparts, or the differences of Black never-married men in comparison to their Black cohabiting counterparts. Moreover, we surprisingly found that health behaviors explained a significant portion (about 18%) of mortality differences between married and cohabiting White women. With rapid changes in gender ideology and social norms, women now tend to partake in risky health behaviors to a greater extent than in the past (Preston & Wang, 2006). It is possible that with the increase in women's risky behaviors, marriage has become a more important source of social control to regulate women's health behaviors in ways that have been historically found for men. Future research should explore the potential changes in social control of health behaviors provided by marriage for men and women.

Taken together, our results suggest that none of the examined economic, social, and psychological factors can fully explain the identified mortality differences by union status across gender and racial groups. Various social, biological, psychological, and behavioral mechanisms work together to forge links between cohabitation and mortality. Future studies should examine other social psychological factors, such as social and emotional support, relationship quality, and relationship duration to assess the relative importance of other potential explanations for the cohabitation links with mortality.

Limitations and Conclusions

This study has several limitations. First, we were unable to identify union status transitions using data from the NHIS-LMF. The truncation of a mortality follow-up to a 3-year period (or 1 or 2 years in our unreported additional analysis) should lower the chance of union status transitions; however, we cannot exclude

the possibility that some respondents may not have stayed in the same union status within the mortality follow-up period. Second, the NHIS-LMF links eligible adults in the NHIS survey through probabilistic record linkage to the NDI to obtain follow-up data on mortality. Issues such as incorrect matches may have introduced bias into the data. The effect of false matches increases with the length of the follow-up period (Ingram, Lochner, & Cox, 2008). Nevertheless, the NHIS-LMF provides a unique opportunity to study how the link between cohabitation and mortality differs by social groups. In general, the mortality estimation from the NHIS-LMF is quite consistent with that of the U.S. population (Ingram et al.). A third limitation is that, although we attempted to tease out some selectivity effects of cohabitation on mortality by controlling for baseline health and socioeconomic status, we were not fully able to deal with selection issues with the NHIS data because these data are based on cross-sectional surveys. To fully explore how different selection and causal processes contribute to mortality differences by union status, future studies should use longitudinal data with adequate measures of potential selection factors. In addition, the NHIS is limited by a lack of information on cohabitation experiences prior to the survey, which may affect mortality. Although we grouped all cohabiters into one category, family scholars should consider the heterogeneity among cohabiters in future research (Heuveline & Timberlake, 2004). For example, never-married cohabiters versus previously married cohabiters, or short- versus long-term cohabiters, may live in different social contexts that influence mortality. Future studies should consider the duration and histories of union status in examining cohabitation and mortality by using alternative data sets.

Despite these limitations, this study makes an important contribution to the literature on union status and mortality. This is the first study to document U.S. adult mortality differences between cohabiters and other union status groups across gender and racial groups. With the rapid growth of cohabitation in the United States, policymakers and scholars continue to question whether cohabitation and marriage promote well-being in equivalent ways. Although some researchers emphasize the similarity between cohabitation and marriage (e.g., Musick & Bumpass, 2012), others view the rising trend of cohabitation as a threat to population health (e.g., Waite & Gallagher, 2000). Our results on mortality differences by union status add to the mixed evidence on these debates. Cohabitation may not be as protective as marriage for longevity, but it may provide some degree of benefit in comparison to being single. The complexity of this issue is further highlighted by our findings across gender and racial subgroups, suggesting that involvement in any intimate union—in comparison to singlehood—is more important for men's mortality than women's. Moreover, we emphasize that the type of union (e.g., marriage vs. cohabitation) may be more important in affecting health and longevity for Whites than for Blacks as well as more important for younger individuals than for older individuals.

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