

Sexual Frequency Decline from Midlife to Later Life

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Objective. To examine sexual frequency decline among American men and women between the ages of 44 and 72 born from 1933 to 1948.

Methods. Using data from the National Health and Social Life Survey (NHSL) and the National Social Life, Health, and Aging Project (NSHAP), the decline in sexual frequency is decomposed into declines due to changes in marital status, physical health, and happiness. We examine the contribution of both changes in the composition of the population with respect to these factors as well as changes in the association between these factors and sexual frequency by age.

Results. For women, change in the proportion widowed is a significant factor in sexual frequency decline, as is change in the association between happiness and sexual frequency. Among men, both poorer physical health at older ages and a decrease in its association with frequency are significant factors in the decline. A change in the association between happiness and frequency is also a significant factor for men. Reverse causality may explain the happiness–frequency findings for both men and women.

Discussion. Results provide evidence for gendered experiences in the sexual life course.

Key Words: Cohort analysis—Gender—Health—Linear decomposition—Sexual activity.

THE relationship between sexual activity and aging has been studied extensively (e.g., Laumann, Gagnon, Michael, & Michaels, 1994; Lindau et al., 2007) and is important for identifying pathways for successful aging as well as for vulnerability to illness. Advances in the study of the sexual life course, however, have been limited by an absence of analyses on birth cohorts as they pass from middle to older ages. In addition, most research utilizes an individual-level regression approach that neglects changes in population composition associated with aging. These studies focus on the association between individual and partner characteristics and frequency of sex but neglect how changes in the composition of the population affect population-level changes in sexual frequency (e.g., DeLamater & Moorman, 2007; Eisenberg, Schindel, Smith, Breyer, & Lipschultz, 2010; Lindau et al., 2007). Changes in population composition may have much larger effects on men's and women's average sexual frequency than changes in associations. For example, widowhood may have a relatively constant negative association with sexual frequency as men and women age, but large increases in the numbers of widows in the population with age may account for a large fraction of the decline in sexual frequency in the population. Thus, although typical regression approaches identify important changes that may be relevant for frequency of sex among particular individuals, they miss important compositional factors that may explain declines at the population level. This article uses data from an actual birth cohort and regression decomposition techniques to examine the roles of changes in both associations between covariates and changes in population composition in sexual frequency decline among men and women. To our knowledge, no

previous study has quantified the potential impacts of changes in population composition and changes in associations to sexual frequency decline by age.

In addition, previous studies (e.g., Laumann et al., 1994; Lindau et al., 2007) have relied on synthetic cohort approaches to study aging and sexuality, using cross-sectional data on age patterns of sexual frequency in mid- and later-life to make inferences about decline in sexual frequency as people age. This approach, however, is limited as change in sexual behavior (and many other phenomena) across actual cohorts may be quite different from change in synthetic cohorts (Preston, Heuveline, & Guillot, 2001). Our article contributes to the literature by examining the decline in the frequency of partnered heterosexual sex using an actual birth cohort, which is particularly important since several of the factors associated with sexual frequency (marital status, physical health, and emotional well-being) vary by age.

Using data from the National Health and Social Life Survey (NHSL) and the National Social Life, Health, and Aging Project (NSHAP), this article uses a regression decomposition method (Blinder, 1973; Oaxaca, 1973) to divide the decline in sexual frequency between the ages of 44 and 72 among a cohort of American men and women born between 1933 and 1948 into two main parts: (a) changes in the demographic and health characteristics of this cohort as they age (changes in *composition*) and (b) changes in the association between this cohort's demographic and health characteristics and their frequency of sexual activity (changes in *associations*).

Our analysis focuses on population-level factors (changes in marital status, physical health, and emotional well-being with age) associated with partnered heterosexual sex. Both

changes in the composition of a birth cohort (e.g., a higher proportion of widows at older ages) and changes in the association between these characteristics and sexual frequency (e.g., changes in the association between widowhood and sex by age) can affect differences in mean sexual frequency between age groups. Our decomposition allows us to identify and quantify the components of declining sexual frequency by age separately for men and women.

FACTORS AFFECTING SEXUAL ACTIVITY

Several factors may impact partnered sexual activity among individuals in their mid-40s and older, and the relationship between these factors and sexual activity may vary by age. These factors can be organized into four interrelated domains: mortality and the availability of potential sexual partners, physical health, emotional well-being, and other factors.

Mortality and Availability of a Sexual Partner

Differential gendered mortality affects partnered heterosexual sexual activity through the availability of potential partners. In the United States, women live about 5 years longer than men (Austad, 2006). Age-specific sex ratios reveal that women begin to outnumber men starting around age 40. By age 85, there are more than two women for every man in the United States (U.S. Census Bureau, 2006). The effect of this shortage of men on the availability of monogamous sexual partners for women is exacerbated by the typical sexual partnering patterns of older men with younger women. In an analysis of NSHAP data (women and men aged 57–85 years), Lindau and colleagues (2007) found that men were about 3 years older than their female partners, on average.

Physical Health

Although mortality affects the availability of sexual partners, physical health affects the capacity of individuals and their partners to engage in sexual activity. Specific illnesses are associated with declines in sexual function, including diabetes (Lindau et al., 2007). Medications used to treat conditions are also linked to impaired sexual function, including medications for hypertension (DeLamater & Sill, 2005). On the other hand, there is a large class of medications that specifically target sexual dysfunction, mostly among men.

In addition, gender asymmetries in physical health exist over the life course and have important implications for sexual activity. Although women live longer than men, women have poorer physical health and greater disability days than men at almost all ages across the life course (Austad, 2006). These differences may be particularly pronounced in middle and later life, periods when conditions emerge that are more likely to befall women, such as arthritis, which may

compromise functional capacity. Health profiles may not only differ between men and women but also may have different impacts on sexual function by gender. Laumann, Das, and Waite (2008) found that physical health is more strongly associated with sexual problems among older women than among older men. In addition, a given health condition may have a different effect on sexual function for men and women. For example, hypertension, which is associated with vascular problems, may compromise the mechanics of vaginal intercourse for men through erectile dysfunction, but the same condition in a woman may not interfere with her capacity for vaginal intercourse. On the other hand, experiencing the menopausal transition may negatively impact the mechanics of sexual intercourse for women (Dennerstein, Alexander, & Kotz, 2003). For example, production of principal estrogen (estradiol) declines during menopause, which could lead to vaginal atrophy and decreased lubrication (DeLamater & Sill, 2005). Hormone replacement therapy and artificial lubrication can amend these problems, but if treatment is not obtained, sexual function may be compromised. Menopause is a nearly universal experience for middle-aged women: The majority of women have experienced menopause by the mid-50s (Nichols et al., 2006). However, there are mixed results (Dennerstein, Smith, Morse, & Burger, 1994; Hallstrom, 1977) as to the role of age in the relationship between menopause and sexual function.

Previous studies have also found gender differences in the role of partner health on sexual frequency. Waite, Laumann, Das, and Schumm (2009) reported the reasons given by NSHAP respondents who said that they had not had sex in the three months preceding the interview. Men were twice as likely to report their own health limitations as their female partner's limitations, and women were two to three times as likely to report partner's health limitations as the reason. Hyde and colleagues (2010) reported the results of a longitudinal study of 3,274 men aged 75–95 years. Men who said that they had not had sex in the preceding three months were twice as likely to cite their own health problems or limitations as the reason rather than their partner's.

Psychological Well-being

Psychological factors are also associated with sexual frequency and may be as or more important than physiological factors for sexual function in both men and women (Bancroft, 2007; Kingsberg, 2002). Psychological well-being includes both positive and negative dimensions. Happiness is associated with sexual function (Laumann, Paik, & Rosen, 1999), and Rosen and Bachmann (2008) also find sexual activity and satisfaction are positively associated with emotional well-being, though causal order cannot be established. Declines in mental health and cognitive function associated with aging (Cole & Dendukuri, 2003) can affect sexual expression. For example, depression, a condition one become

increasingly susceptible to at older ages (Alexopoulos et al., 2000), is associated with declines in function and well-being comparable to those experienced by individuals with chronic health conditions (Wells & Burman, 1991). In addition, antidepressant medication use, particularly selective serotonin reuptake inhibitors, is linked to declines in sexual desire (DeLamater & Sill, 2005). As for physical health, both partners' psychological well-being influence partnered sexual activity (Laumann et al., 2008).

Other Factors

Social context is also related to partnered sexual frequency. Among the most important of these is relationship duration. One of the most-discussed phenomena associated with the decline in frequency of marital sex over time is the "honeymoon effect" (James, 1981). Specifically, the honeymoon effect is characterized by a sharp drop in sexual frequency over the first year of marriage. After the first year, frequency of sex declines a much lower rate. Prior research has had difficulties differentiating between decline due to relationship duration, age, and physical health, as all three are correlated.

Individual demographic characteristics are also important aspects to consider when examining sexual frequency. Important variations exist by gender, race and ethnicity, and education. Previous research has found differences by race and ethnicity in sexual frequency and the occurrence of oral and anal sex (Laumann et al., 1994). Education is also associated with sexual activity. DeLamater and Sill (2005) found that education is positively associated with sexual desire for older men and women, though the relationship becomes weaker for men and nonsignificant for women when attitudes are included.

METHODS

Numerous factors are associated with sexual frequency. This article attempts to decompose the relative contributions of three of these factors: marital status, self-rated physical health, and happiness. These three factors proxy the roles of mortality and partner availability (marital status), changes in the physical desire and ability to have sex (self-rated physical health), and psychological well-being (happiness) on sexual frequency. Relationship duration and partner health are not included because of data constraints and because these characteristics are only applicable to individuals in relationships—we aim to examine factors applicable to all individuals in the population. Analyses are conducted separately for men and women, using a linear decomposition method (Blinder, 1973; Oaxaca, 1973) and controlling for race/ethnicity and education. Race/ethnicity and education function as controls for data set composition: If longitudinal data were available, self-reported race/ethnicity and education characteristics would not change much at these older ages, though their associations might.

The decomposition contains three components: (a) changing composition of the cohort by age such as increases in proportion of older adults widowed at specific ages or declining physical health; (b) changing associations between the covariates and frequency of sex by age—changes in the differences in sexual frequency between groups, for example, by marital status or physical health; and (c) interactions between differences in population characteristics and differences in the associations of covariates with frequency between age groups. Results from regression models are used to select an appropriate model.

Data

Analyses are based on two data sets: the National Health and Social Life Survey (NHSLs) and the NSHAP. Conducted in 1992 (NHSLs) and 2005–2006 (NSHAP), these data sets allow for the examination of changes in individuals' sexual frequency between the ages of 44 and 72 among those born from 1933 to 1948.

This cohort was born shortly before/during World War II. Its members became adults between 1955 and 1969. In those years, two thirds of men and women were married by age 25. This is the first cohort to have access to the birth control pill, which provides safe, reliable, and convenient contraception. This is widely thought to have led to an increase in the frequency of heterosexual vaginal intercourse in this cohort. Cohort members generally benefited from economic and social stability during their adult years. During the 1970s and 1980s, increasing percentages of all women entered full-time employment, improving household economic status. By the time HIV infections and AIDS became a concern in the late 1980s, the youngest members of the cohort were 40 years old. Viagra was introduced 10 years later, when the youngest men were 50 years. Comparison of monthly sexual frequency for men 44–59 years in the sample in 1996 and in 2000 and men 57–72 years in 1996 and in 2000 indicate no significant change, suggesting that Viagra did not have large effects on men's sexual frequency (authors' calculations from General Social Survey data).

The NHSLs is a national probability sample of 3,432 non institutionalized American men and women aged 18–59 years, collected in 1992 (Laumann et al., 1994). The final response rate was almost 80% (Laumann et al., 1994). The survey is representative of about 97% of Americans in this age range (Laumann et al., 1999). The NHSLs collected information on sexual behavior, attitudes, personal histories, and demographic characteristics in a 90-min in-person interview.

The NSHAP is a nationally representative study of non institutionalized older adults, collected from summer 2005 to spring 2006. The NSHAP data contain information on the demographic characteristics; romantic, sexual, and social relationships; and physical and mental health of 3,005

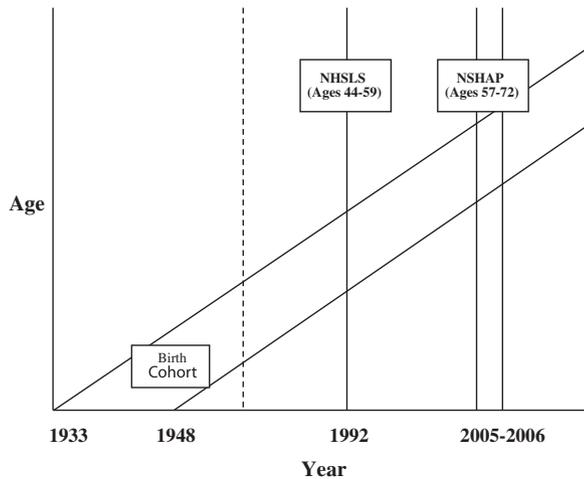


Figure 1. Lexis diagram of birth cohort, cohort age, and data source collection. NHLS = National Health and Social Life Survey; NSHAP = National Social Life, Health, and Aging Project.

Americans aged 57–85 years. The final response rate was 74.8% (O’Muircheartaigh, Eckman, & Smith, 2009). Most data were collected in an in-home interview. Data were also collected via take-home questionnaire that respondents completed and mailed back to researchers. Although NSHAP oversampled on characteristics of interest (race/ethnicity, age, and gender) to increase cell sizes, NHLS did not. Analyses presented use unweighted data from NSHAP and NHLS. Weighted results differ little from those presented here.

It should be noted that while these two surveys have information on the same birth cohort, the data sets do not include the same respondents. Although longitudinal data would be ideal, these two surveys represent the first nationally representative surveys of sexual activity in the United States for ages 18–59 (NHLS) and 57–85 (NSHAP) and allow for an examination of a cohort born from 1933 to 1948 across part of middle and later life. Figure 1 displays a Lexis diagram of the analytic samples used to create cross sections of the 1933–1948 birth cohort at ages 44–59 in 1992 (NHLS data) and at ages 57–72 in 2005–2006 (NSHAP data).

A key advantage of cohort analysis is the ability to examine age effects controlling for cohort, as differences by age among synthetic cohorts may be affected by cohort differences. For example, synthetic cohort data may show that sexual activity declines with age, but this could occur if earlier birth cohorts had lower sexual frequencies throughout their lives. Indeed, there is some evidence from Finland that successive cohorts have increased their sexual frequency, particularly in later life (Kontula, 2009).

Dependent Variable

Our dependent variable is sexual frequency per month. “Sexual activity” and “sex” are defined in the NHLS

questionnaire as “any mutually voluntary activity with another person that involves genital contact and sexual excitement or arousal, that is, feeling really turned on, even if intercourse or orgasm did not occur.” “Sexual activity” or “sex” is defined in the NSHAP questionnaire as “any mutually voluntary activity with another person that involves sexual contact, whether or not intercourse or orgasm occurs.” This variable reflects sexual frequency in respondent’s relationship with a spouse or romantic partner if the respondent reports being married or having a romantic partner and reflects sexual frequency in his or her primary sexual relationship for those who are not married. Respondents who did not report a spouse or romantic/sexual partner were coded as zero sexual frequency. Only 23 respondents in the combined sample report having a same-sex current sexual partner.

A small percentage (less than 10% of respondents aged 44–59 years and less than 3% of respondents aged 57–72 years) of respondents reported two or more current sexual relationships, in which sexual frequency with spouse is calculated if respondent reports being married, or sexual frequency with respondent’s primary sexual partner is calculated if the respondent is not married. The NHLS did not collect information on cohabiting relationships, so cohabiting couples from the NSHAP are omitted (a loss of 49 cases, 26 men and 23 women).

Independent Variables

Marital status.—Marital status is a key variable of interest for two important reasons. First, marital status is a good (though imperfect) proxy for sexual partner availability. Second, many persons experience changes in marital status over the mid- and later-life course. We classify respondents’ marital status into four categories: (a) married (both first and later marriages), (b) divorced or separated, (c) widowed, (d) and never married.

Self-rated physical health.—Self-rated physical health was used to measure physical health. Participants in NHLS responded to the following question: “In general, would you say your health is excellent, good, fair, or poor?” Following a prompt indicating the focus of the questions to follow pertained to physical health, all NSHAP respondents were asked: “Would you say your health is excellent, very good, good, fair, or poor?” Because the response categories were not identical for NHLS and NSHAP respondents, the categories “very good” and “good” were collapsed for NSHAP respondents and relabeled as “good.” Higher values indicate better health.

Self-rated physical health is established as a reliable predictor of numerous health-related outcomes relevant for sexual activity, such as comorbidity (Goldberg, Gueguen, Schmaus, Nakache, & Goldberg, 2001) and functional

health (Lee, 2000). In addition, the predictive power of this measure is robust to other aspects of health status, sociodemographic factors, health behaviors, and psychosocial characteristics (Mackenbach, Simon, Looman, & Joung, 2002), increasing its attractiveness for survey research.

Although partner health is also an important contributor to sexual frequency (Hyde et al., 2010; Waite et al., 2009), data limitations prevent us from including these measures (measures of partner health are not available in NHSLs). Nevertheless, because we examine changes in sexual frequency for both men and women, gender differences in the role health play in sexual frequency decline can be explored.

Happiness.—Respondents also reported their happiness. Happiness is used as a rough proxy for mental health because no other mental health measures (e.g., self-rated mental health, depression, anxiety) were available for NHSLs respondents. In a study examining the relationship between happiness, depression, and life events, Valiant (1993) found that happiness was independent of life events, unlike depression. This suggests that happiness may more closely reflect psychological well-being than depression, which may be affected by current surroundings, including sexual activity, which complicates the identification of causal order. In addition, Valiant found that within a short time frame (about six weeks), happiness is more stable than depression and thus may better measure global emotional well-being. Other research, however, has found that happiness is sensitive to life events, including sexual activity (Blanchflower & Oswald, 2004). To assess whether the inclusion of additional measures of psychological well-being may affect our results, in sensitivity analyses not shown here, we included a measure of depressive symptoms (Center for Epidemiological Studies–Depression scale scores) in our analysis of the NSHAP data, for which these measures are available. We find that happiness and depression are correlated at $|r| = .49$ and that depression is not significantly related to sexual frequency when happiness is included in the models. This suggests that happiness captures a broader array of psychological well-being dimensions than merely happiness per se and that our analyses are likely to be robust to the inclusion of these measures, such as depression. Nevertheless, because happiness is associated with sexual activity, we remain concerned about reverse causality—that sexual frequency predicts happiness rather than vice versa.

Our measure of happiness from the NHSLs is based on the question: “Generally, how happy have you been with your personal life during the past 12 months? Have you been extremely happy; very happy most of the time; generally satisfied, pleased; sometimes fairly unhappy; or unhappy most of the time?” NSHAP respondents were given the following prompt before the beginning of the questionnaire section on happiness and life satisfaction: “Now we will turn to thoughts and feelings you may have about your life or yourself. By asking about your thoughts and feelings in

addition to your physical health, we can paint a more complete picture of your life.” Then, NSHAP respondents answered the following question: “If you were to consider your life in general these days, how happy or unhappy would you say you are on the whole . . . extremely happy; very happy; pretty happy; unhappy sometimes; or unhappy usually?” Although the response categories were slightly different between data sources because the responses represented the same continuum of happiness, one scale was constructed from each data source where higher values indicate higher happiness levels.

Can We Trust Respondents' Reports?

The agreement of sexual partners' responses to questions of frequency about sex has also been evaluated. Using a self-administered questionnaire, Call, Sprecher, and Schwartz (1995) found that over 70% of married couples had matching sexual frequency reports or reports that differed by only one or two times per month. This finding provides some evidence that men's and women's reports are comparable. On a population level, men and women in the same age group can still report different sexual frequencies because, as noted above, men tend to partner with younger women. Nevertheless, the decomposition is primarily concerned with the *change* in sexual frequency between age groups. If sex differences in respondents' reporting biases do not change as they age, then our analyses of age variation in sexual frequency will be unaffected by gender differences in reporting bias. Although there may be age variation in these biases, we expect that they will be less problematic in our analysis than in studies that examine cross-sectional sex differences in sexual frequency.

Missing Cases

Missing and refused cases comprised a small minority of sexual frequency responses. Among NHSLs men (aged 44–59 years old), 3 of the 326 eligible cases were classified as “refused,” “don't know,” or “missing” (less than 1% of eligible cases). Among NHSLs women (aged 44–59 years old), 4 of the 422 eligible cases were classified as “refused,” “don't know,” or “missing” (less than 1% of eligible cases). Among NSHAP men (aged 57–72 years old), 35 of the 978 eligible cases were “don't know” or “refused” (about 7% of eligible cases). Among NSHAP women (aged 57–72 years old), 28 of the 907 eligible cases were “don't know or “refused” (about 3% of eligible cases).

Data Analysis

The Blinder–Oaxaca decomposition was developed to decompose differences in means using ordinary least squares (OLS) regression models (Blinder, 1973; Oaxaca, 1973). OLS regression methods are appropriate for our analyses because monthly sexual frequency (the dependent

variable) can be considered a continuous variable. As a sensitivity test, we also performed our analyses using negative binomial regressions, which are appropriate for count data (sexual frequency) with an overrepresentation of zero values (those who reported not having sex in the past year; Long, 1997). Our results were substantively similar to those presented here.

Mean sexual frequency in each age group can be estimated using a regression model predicting sexual frequency for the “younger” (aged 44–59 years) and “older” (aged 57–72 years) age groups separately (subscripts y and o , respectively),

$$Y_j = X'_j\beta_j + \varepsilon_j \quad j \in \{y, o\} \quad (1)$$

where X is a vector containing our independent variables and the constant, and β are the parameters to be estimated. The difference in means evaluated using the regression models is therefore,

$$D = \bar{Y}_y - \bar{Y}_o = \bar{X}'_y\hat{\beta}_y - \bar{X}'_o\hat{\beta}_o \quad (2)$$

Rearranging terms, the difference in means can be written as

$$D = (\bar{X}_y - \bar{X}_o)'\hat{\beta}_o + \bar{X}'_y(\hat{\beta}_y - \hat{\beta}_o) + (\bar{X}_y - \bar{X}_o)'\hat{\beta}_y \quad (3)$$

(Jann, 2008; Winsborough & Dickinson, 1971). Equation 3 is expressed from the older group’s “perspective,” that is, this term supplies the expected effect on sexual frequency for the older group if these individuals had the characteristics/coefficients of the younger group. The first component, $(\bar{X}_y - \bar{X}_o)'\hat{\beta}_o$, represents contribution of changes in the composition of the cohort by age to sexual frequency decline. Substantively, these terms tell us “how much of the decline in sexual frequency as this cohort ages is due to changes in men’s and women’s characteristics, that is, to changes in their physical and mental health and to their marital status?” The second component, $\bar{X}'_y(\hat{\beta}_y - \hat{\beta}_o)$, represents the contribution of changes in the associations between the covariates and sexual frequency by age. These terms tell us “how much of the decline in sexual frequency is due to change in the relationship between men’s and women’s characteristics and sexual frequency, for example, a strengthening of the association between sexual frequency and physical health?” Finally, the third component, $(\bar{X}_y - \bar{X}_o)'\hat{\beta}_y$, represents the interaction between the contribution of changes in population characteristics and changes in the associations. These terms tell us “how much of the decline in sexual frequency is due to the interaction between the changing characteristics of this cohort and to the changing association men’s and women’s characteristics and their sexual frequency?” This third component is difficult to interpret, and because of this, half is often arbitrarily allocated to the first and second components (Canudas Romo, 2003). We have decided to retain the interaction components in our analysis because doing so provides more conservative estimates of the contributions of compositional and associational components.

We estimate standard errors for our decomposition using the Stata command “Oaxaca,” following a procedure outlined by Jann (2008), which is based on the combined parameter vector and variance–covariance matrix of population means and model-derived coefficients. These standard errors estimate the precision of our decomposition, that is, they provide an estimate of how confident we can be that a given factor explains a given fraction of the decline in sexual frequency in this cohort.

RESULTS

How Much Does Sexual Frequency Decline?

Is the decline in mean sexual frequency with age due to lower sexual frequency among continually sexually active individuals (a decline in frequency) or due to an increase in the proportion of individuals who are not sexually active (a decline in the prevalence of sexual activity)? Table 1 displays mean sexual frequency calculated both with and without sexually inactive (zero frequency) individuals. Almost 90% of younger men reported having sex in the past year, whereas 72% of older men report having sex in the past year. By contrast, a lower percentage of younger women reported having sex in the past year (72%)—the same percentage sexually active as among older men—and less than half of older women were sexually active in the year prior to the survey (46%). These results show that while many older respondents report no sexual activity, there is substantial variation in sexual experience both between age groups and between genders. A comparison of mean frequency of sex including and excluding those who were sexually inactive shows that sexual frequency declines by age regardless of whether those who were not sexually active are included. t Tests for differences in means indicate that these declines are statistically significant for both men and women both with and without zero frequency included. These findings are not only substantively important but suggest that regression models that treat the decline in sexual frequency at older ages as a (roughly) continuous measure, rather than as a binary outcome (sexually active vs. not active), are appropriate.

Differences in Composition and Associations

Composition.—Table 1 displays changes in marital status, physical health, and happiness between middle and older ages by gender. The majority of men and women are married at both younger and older ages, though more men are married than women in both groups. This fact, combined with sex ratios that favor men’s access to female sexual partners, suggests that men in general have more regular access to (monogamous) sexual partners compared with women, particularly at older ages. A lower proportion of men are separated or divorced at older ages—a difference that

Table 1. Descriptive Statistics

	Men		Women	
	Ages 44–59 years	Ages 57–72 years	Ages 44–59 years	Ages 57–72 years
Mean sexual frequency (times per month)				
Including zero frequency	6.18 (0.36)	3.13 (0.16)***	4.68 (0.29)	1.74 (0.13)***
Excluding zero frequency	7.04 (0.38)	4.35 (0.20)***	6.51 (0.34)	3.83 (0.25)***
Sexually active (%)	87.8	72.0	71.9	45.5
Marital status (%)				
Married	74.9	79.1	63.4	58.8
Separated/divorced	18.8	11.6**	18.9	17.9
Widowed	1.6	5.8**	8.0	20.1***
Never married	4.7	3.5	9.7	3.2***
Mean self-rated physical health	3.20 (0.05)	2.84 (0.03)***	3.15 (0.04)	2.82 (0.03)***
Mean self-rated happiness	3.60 (0.05)	3.70 (0.03)	3.60 (0.05)	3.58 (0.03)
Non-White and/or Hispanic (%)	18.2	30.1***	19.7	33.0***
At least some college (%)	45.1	58.8***	40.8	53.8***
<i>N</i>	319	920	402	866

Sources: Data for those Ages 44–59 years are from the National Health and Social Life Survey; data for those Ages 57–72 years are from National Social Life, Health, and Aging Project.

Notes: Standard deviations shown in parentheses. *N* includes those with zero sexual frequency. Significance levels for two-tailed *t* tests of differences in means or *z* tests for differences in proportions by age group within sexes: **p* < .05; ***p* < .01; ****p* < .001.

is statistically significant. Similar proportions of women are separated/divorced in each age group. The discrepancy in proportion widowed between men and women is found in both age groups but is particularly pronounced at older ages. About 20% of women in the older age group are

widowed compared with about 8% in the younger age group. The change in proportion widowed between age groups is statistically significant for both men and women. Very small proportions of men and women have never been married, which are even lower at older ages—a difference that is statistically significant for women. Self-reported health is poorer at older ages for both men and women. This decline in physical health is statistically significant for both genders. Mean levels of happiness are quite similar between age groups and between genders.

Table 2. Ordinary Least Squares Regression of Sexual Frequency on Marital Status, Demographic, Health, and Happiness for Men and Women

	Men		Women	
	Ages 44–59	Ages 57–72	Ages 44–59	Ages 57–72
Marital status				
Married (omitted)	—	—	—	—
Separated/divorced	0.61	0.40	-2.07**	-0.90*
Widowed	-4.43	0.16	-3.40**	-1.69***
Never married	-0.27	-2.04*	-0.74	-1.84*
Physical health	-0.41	0.83***, †††	-0.37	0.29
Happiness	1.69***	0.47*, ††	1.13***	0.34*, ††
Race/ethnicity				
White (omitted)	—	—	—	—
Non-White and/or Hispanic	0.66	0.97**	-1.66*	-0.19†
Education				
Less than some college (omitted)	—	—	—	—
At least some college	0.60	-0.31	0.40	0.26
Constant	0.98	-1.05	2.67	0.21
<i>N</i>	319	920	402	866
<i>F</i> -statistic	3.28**	5.89***	6.41***	8.03***
<i>df</i>	7, 311	7, 912	7, 394	7, 858
<i>R</i> ²	.07	.04	.10	.06
Adjusted <i>R</i> ²	.05	.04	.09	.05
Root MSE	6.25	4.65	5.49	3.70

Sources: Data for those Ages 44–59 years are from the National Health and Social Life Survey; data for those Ages 57–72 years are from National Social Life, Health, and Aging Project.

Note: Significance levels for two-tailed tests of coefficients: **p* < .05. ***p* < .01. ****p* < .001. Significance levels for two-tailed tests of differences by age within sexes: †*p* < .05; ††*p* < .01; †††*p* < .001. Two-tailed tests for differences by sex within age groups where *p* < .05 are indicated by bold font.

Associations.—Changing associations reflect how covariate characteristics are related to sexual frequency. Table 2 displays the coefficients of our OLS regressions. Among younger men, happiness has a statistically significant and large positive association with frequency. Happiness is positive and significant among older men, but the magnitude is smaller. The decline in the association between happiness and sexual frequency by age is statistically significant. Among older men, the never married have sex significantly less often than married men. The never married are the only marital status that have notably less sex compared with the married. Older men (but not younger men) with better physical health also tend to report having more sex than men in worse health. The increase in the association between physical health and sexual frequency by age for men is statistically significant.

Differences in the association between individuals' characteristics and sexual frequency are also observed as women age. Although women who are divorced/separated and widowed have less sex than married women when they are younger, this association is weaker at older ages. The association between marital status is weaker among women at older ages largely because all women are less likely to have sex at older ages, regardless of marital status (not shown).

Among both younger and older women, happiness is associated with more frequent sex. The difference in the association between happiness and sexual frequency is statistically significant, however, the association declines markedly with age.

Table 2 also displays differences in associations between men and women in the same age group. The difference in the association between being divorced/separated and sexual frequency between men and women is statistically significant, suggesting that gendered experiences of sexuality are present in middle age not only in the differences in partner availability (see Table 1) but also in the association between these characteristics and sexual frequency (though these differences in associations could still be due to partner availability). Specifically, it appears that women who are divorced or separated have significantly less sex compared with those who are married than do men who are divorced or separated.

Linear Decomposition

Table 3 shows the results of the linear decomposition of differences in mean sexual frequency as a product of three components: (a) compositional changes between age groups, (b) associational changes between age groups, and (c) interactions between components (a) and (b). The “associations” component is a function of the regression coefficients shown in Table 2. The decomposition first tests whether differences between composition, associations, and interactions at younger and older ages explain a significant part of the decline and then calculates the proportion of the total difference between age groups that is attributable to each of these three components in total, as well as by specific covariates. Results are presented both as an absolute number (sexual frequency per month) and as a proportion of the total decline. Positive values in the “times per month” column indicate that changes in composition or association contribute to the observed decline, whereas negative values mean that changes offset the observed decline.

Marital status.—Among men, neither differences in marital status composition nor differences in the association of marital status with sexual frequency explain a significant portion of the decline in sexual frequency by age. A plausible explanation is that both married and nonmarried men in both age groups have similar access to female sexual partners—the married men with their spouses and the nonmarried men with the larger population of available women.

Among women, the higher proportion of widowed women at older ages accounts for a decline in sexual frequency of 0.21 times per month or about 7% of the total decline between age groups. In addition, a lower proportion of women are never married at older ages. Because being never married is associated with lower sexual frequency compared with being married (Table 2), a lower proportion

Table 3. Decomposition of Sexual Frequency Decline of Men and Women

	Men		Women	
	Times per month	Proportion total difference	Times per month	Proportion total difference
Differential				
Ages 44–59	6.18***		4.68***	
Ages 57–72	3.13***		1.74***	
Difference	3.05***		2.94***	
Compositions				
Separated/divorced	0.03	0.01	–0.01	0.00
Widowed	–0.01	0.00	0.21***	0.07
Never married	–0.02	–0.01	–0.12*	–0.04
Physical health	0.30**	0.10	0.10	0.03
Happiness	–0.05	–0.02	0.01	0.00
Non-White and/or Hispanic	–0.12*	–0.04	0.03	0.01
At least some college	0.04	0.01	–0.03	–0.01
Total	0.17	0.06	0.17	0.06
Associations				
Separated/divorced	0.02	0.01	–0.21	–0.07
Widowed	–0.26	–0.09	–0.34	–0.12
Never married	0.06	0.02	0.04	0.01
Physical health	–3.52*	–1.16	–1.85	–0.63
Happiness	4.53**	1.49	2.85*	0.97
Non-White and/or Hispanic	–0.09	–0.03	–0.48	–0.17
At least some college	0.53	0.18	0.08	0.03
Constant	2.03	0.67	2.46	0.84
Total	3.30***	1.08	2.53***	0.86
Interaction				
Separated/divorced	0.01	0.00	–0.01	0.00
Widowed	0.19	0.06	0.21	0.07
Never married	0.02	0.01	0.07	0.02
Physical health	–0.44*	–0.14	–0.22	–0.07
Happiness	–0.13	–0.04	0.01	0.00
Non-White and/or Hispanic	0.04	0.01	0.20	0.07
At least some college	–0.12	–0.04	–0.02	–0.01
Total	–0.43	–0.14	0.24	0.08
N	1,239		1,268	

Sources: Data for those Ages 44–59 years are from the National Health and Social Life Survey; data for those Ages 57–72 years are from National Social Life, Health, and Aging Project.

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

of never married operates to offset the decline in sexual frequency by age. If the proportion of never married women had not declined, sexual frequency would have declined by an additional 0.12 times per month (an additional 4%). Although nonmarried men have an abundance of nonmarried women to partner with, single men are relatively scarce for women and increasingly so as women age.

Physical health.—For men, poorer physical health at older ages accounts for about 10% of the total decline. At the same time, the association between physical health and sexual frequency changed for men between these two age groups, going from a negative and insignificant association to a positive significant association (Table 2). Holding compositional changes in men’s physical health constant, a change from a negative to a positive association predicts an increase in sexual frequency for men by age. In other words, if the association between physical health and sexual

frequency had not changed, sexual frequency would have declined an additional 3.5 times per month or more than double the observed difference.

Why is physical health associated with sexual frequency at older but not younger ages among men? A possible explanation is that the measure used, self-reported physical health, may mean one thing to men aged 44–59 years and something else to them when they are aged 57–72 years. “Excellent” health for men at older ages may mean an absence of comorbidities particularly salient for sexual frequency but not when they are younger. The interaction effect for physical health accounts for an additional decline of 0.44 times per month, though the relative contributions of population-level changes in physical health versus the association between physical health and frequency cannot be precisely identified (Horiuchi, Wilmoth, & Pletcher, 2008). For women, neither changes in physical health nor in the association between physical health and sexual frequency are significant in accounting for sexual frequency decline.

Happiness.—For men, the slight increase in self-rated happiness (Table 1) does not explain a significant portion of the decline in sex frequency by age. This is not surprising because mean happiness does not differ significantly between age groups. Happiness is more weakly (but still positively) associated with frequency at older ages compared with younger ages (Table 2). Holding constant changes in happiness levels by age, this change implies that happiness “boosts” sexual frequency less at older ages than at younger ages and therefore predicts a decline in sexual frequency by age. As shown in Table 3, this change in association accounts for a decline in frequency of more than 4.5 times per month, greater than the observed average decline for men. Such a result may reflect reverse causality—that sexual frequency explains happiness. More frequent sex could certainly make individuals happier, but why this would occur more at older ages is unknown. One possible explanation is that because older adults may have lower expectations for sexual frequency, individuals feel especially happy when these expectations are exceeded.

Similarly, the positive association between happiness and sexual frequency is smaller at older than younger ages for women (Table 2). The weaker association between happiness and frequency at older ages accounts for almost the entire decline in sexual frequency (2.85 of 2.94 times per month total). The concerns about reverse causality discussed for men also apply to women.

DISCUSSION

A linear decomposition allows us to quantify which factors—both their composition in populations as well as their associations—are particularly salient in explaining sexual frequency declines at older ages. Understanding how sexual activity unfolds at older ages is particularly important

given the size of America’s baby boomer cohort—the first members of which turned age 65 on January 1, 2011. The use of a real cohort allows us to more precisely observe and quantify how changes in composition and in associations shape sexual activity as cohorts age. Furthermore, because we conduct analyses separately for men and women, we are able to highlight how the sexual life course varies by gender. Among men, changes in marital status explain very little of the decline. Among women, increases in the proportion of women who are widowed explain a nontrivial part of the decline in sexual frequency relative to other factors. Marital status may matter for women but not for men due to lower heterosexual partner availability for women because of higher male mortality. These results parallel those reported by Lindau and colleagues (2007) and Waite and colleagues (2009), using NSHAP data (ages 57–85); the proportion of women in a relationship declined dramatically with age and was paralleled by a substantial decline in the percentage reporting partnered activity in the past 12 months. These previous studies also report a much smaller but statistically significant decline in the percentage of men with partners (Waite et al., 2009). Our findings complement past studies by showing that changes in marital status among men cannot explain a substantial fraction of the decline in sexual frequency as they age. The significance of marital status for women may reflect the effect of belonging to a cohort whose members were socialized to believe that women’s sexual intimacy should be limited to marital relationships. Marital status may lose its power as a predictor of women’s sexual frequency in younger cohorts as sex outside marriage is more acceptable.

Among men, declines in physical health contribute to declining sexual frequency. However, this is offset somewhat by the increasing association between men’s health and sexual frequency as they age. By contrast, women’s declining physical health and the changing association between women’s health and their frequency of sex does not account for a significant portion of sexual frequency decline. This finding suggests that men’s physical health is more important for partnered heterosexual sexual activity than women’s physical health.

Lindau and colleagues (2007) compared men and women whose self-reported health was excellent/very good versus good versus fair/poor, controlling for age group but not partner availability. Their bivariate analysis indicates that the percentage reporting any sexual activity in the past 12 months decreases for both genders with poorer health. Our decomposition goes further by accounting for both health status and partner availability both in terms of age group composition and associations, allowing us to determine the contribution of each factor to the decline. Our results indicate that women’s declining physical health does not account for a significant portion of population-level decline in women’s sexual frequency. This is consistent with the results reported earlier, that both men and women agree that

men's health limitations are more important reasons for not engaging in sexual activity.

Analyses also identify commonalities between the later sexual life course of men and women. Most broadly, although the roles of marital status and physical health differ in relative importance by gender, the absolute decline in frequency is similar for both men and women (about three times per month between ages 44–59 and ages 57–72). Furthermore, differences in the association between happiness and sexual frequency by age accounted for large portions of the decline in sexual frequency for both men and women, as the association between happiness and sexual frequency remained positive but became weaker at older ages. However, our happiness results should be interpreted cautiously due to concerns of reverse causation—that sexual frequency explains happiness rather than or in addition to happiness explaining sexual frequency.

This article's approach provides a description of the factors associated with mean sexual frequency decline from a population perspective. An analysis of complex individual-level dynamics is beyond its scope. For example, factors such as the presence of children at home, the age at widowhood/divorce, and relationship duration have not been included here but could be included in more in depth analyses of individual-level correlates. Furthermore, measures of respondent's health and happiness were available from both surveys, but the NHLS lacks these measures for the partners of respondents, thus limiting the identification how partner characteristics are associated with partnered sexual frequency. Partnered sexual frequency cannot be reduced to the characteristics of one partner. However, our analysis shows that, at the population level, sexual frequency decline is gendered—with physical health impacting men's decline but not women's and marital status impacting women's and not men's. Future research should investigate the role of partner health.

These findings use an actual birth cohort to identify both common and different experiences for men and women during the transition from mid- to later life with regard to sexuality. This work also provides some evidence for potential asymmetries in the factors important for changes in partnered sexual frequency for men and women as they age, highlighting the different consequences of changing population characteristics for men and women, as well as the dynamic nature of factors associated with partnered sexual activity across the mid- to later-life course. Researchers should pay particular attention to differences in the associations of characteristics with sexual frequency between men and women, as well across age groups within gender, as well as the important role that changes in population composition can play for determinants of partnered sexuality, such as partner availability.

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