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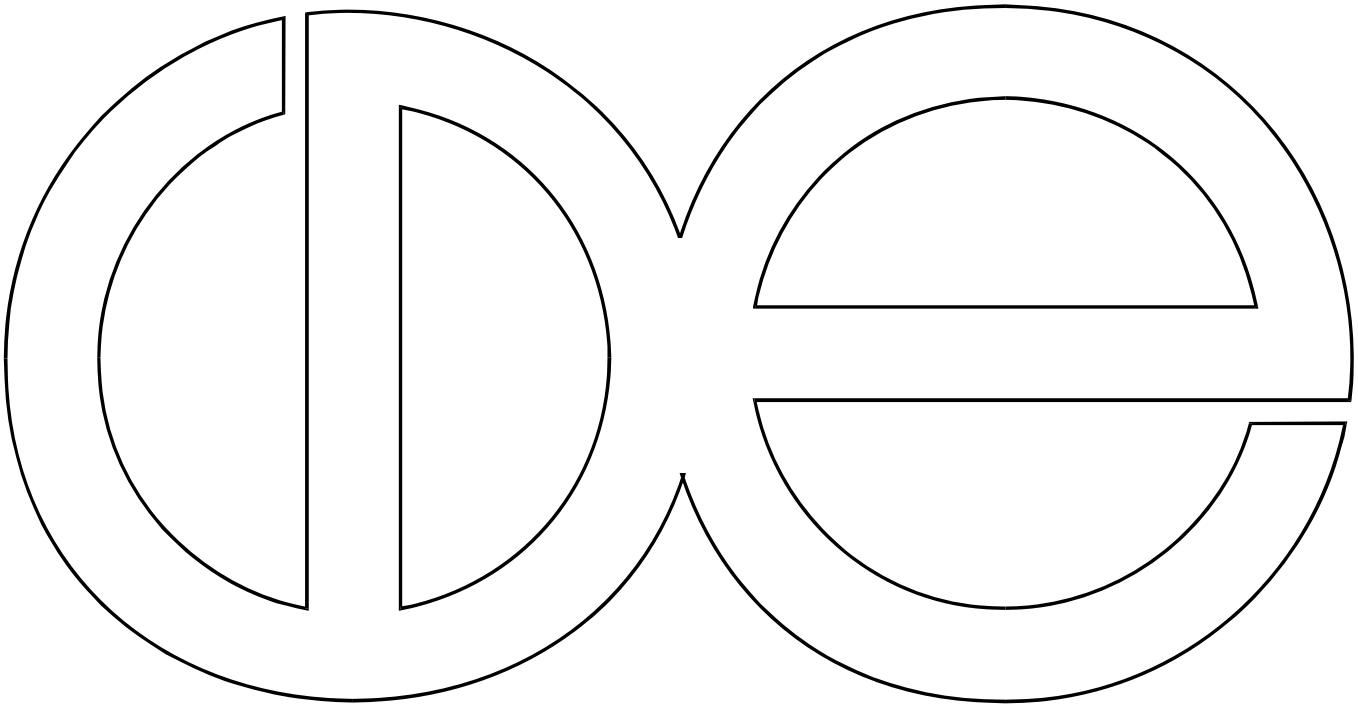

SEXUAL FREQUENCY DECLINE FROM MID- TO LATER-LIFE

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ABSTRACT

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 Study (NHSLS) and the National Social Life, Health, and Aging Project (NSHAP), the decline in sexual frequency is decomposed into declines due 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, changes in proportion widowed and never married are significant factors 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: Sexual activity—Cohort analysis—Linear decomposition—Gender—Health.

The relationship between sexual activity and aging has been studied extensively (e.g., Laumann, Gagnon, Michael, & Michaels, 1994; Lindau, Schumm, Laumann, Levinson, O'Muircheartaigh, & Waite, 2007), but advances in the study of the sexual life course 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., Eisenberg, Shindel, Smith, Breyer, & Lipschultz, 2010; Lindau et al., 2007; DeLamater and Moorman, 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 may account for a large fraction of the decline in sexual frequency in the population. Thus, while 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 paper 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 paper 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 Study (NHSLS) and the National Social Life, Health, and Aging Project (NSHAP), this paper uses a regression decomposition method (Blinder, 1973; Kitagawa, 1955; 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: 1) changes in the demographic and health characteristics of this cohort as they age (changes in *composition*), and 2) 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 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 impacts 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 U.S. (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 to 85), Lindau et al. (2007) found that men were about 3 years older than their female partners, on average.

Physical Health

Beyond mortality, physical health has been associated with sexual frequency. 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 which specifically target sexual dysfunction, mostly among men.

In addition, gender asymmetries in physical health exist over the life course. While 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. Laumann, Das, & Waite (2008) found that physical health is more strongly associated with sexual problems among older women than among older men.

Physical health can impact sexual activity in many ways, which also may be gender-specific. For example, physical conditions usually indicative of poorer physical health (such as hypertension, which is associated with vascular problems) may compromise the mechanics of vaginal intercourse for men through erectile dysfunction. The same condition in a woman, however, 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 (Hallstrom, 1977; Dennerstein, Smith, Morse, & Burger, 1994) as to the role of age in the relationship between menopause and sexual function.

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). Declines in mental health and cognitive function associated with aging (Cole & Dendukuri, 2003) can impact sexual expression. For example, depression, a condition one becomes 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 (SSRIs), is linked to declines in sexual desire (DeLamater & Sill, 2005). Happiness is also associated with sexual function (Laumann, Paik, & Rosen, 1999). Rosen & Bachmann (2008) also find sexual activity and satisfaction are positively associated with emotional well-being, though causal order cannot be established.

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, occurrence of oral and anal sex (Laumann et al., 1994). Education is also associated with sexual activity. DeLamater & Sill (2005) found that education is positively associated with sexual desire

for older men and women, though the relationship becomes weaker for men and non-significant for women when attitudes are included.

METHODS

Numerous factors are associated with sexual frequency. This paper 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 is not included because it is only applicable to individuals in relationships, and 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; Kitagawa, 1955; 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, the compositional characteristics of race/ethnicity and education would not change much at these older ages, though their associations might.

The decomposition contains three components: 1) changing composition of the cohort by age such as increases in proportion of older adults widowed at specific ages, or declining physical health, 2) changing associations between the covariates and frequency of sex by age—changes in the differences in sexual frequency between groups, e.g., by marital status or physical health, and 3) 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 National Social Life, Health, and Aging Project (NSHAP). Conducted in 1992 (NHSLS) and 2005 to 2006 (NHSAP), 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.

The NHSLS is a national probability sample of 3,432 non-institutionalized American men and women aged 18 to 59, 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, Paik, & Rosen, 1999). The NHSLS collected information on sexual behavior, attitudes, personal histories, and demographic characteristics in a 90-minute 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 contains information on the demographic characteristics; romantic, sexual, and social relationships; and physical and mental health of 3,005 Americans aged 57 to 85. 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. While NSHAP oversampled on characteristics of interest (race/ethnicity, age, and gender) to increase cell sizes, NHSLS did not. Analyses presented use unweighted data from NSHAP and NHSLS. 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. While longitudinal data would be ideal, these two surveys represent the first nationally representative surveys of sexual activity in the United States for ages 18 to 59 (NHSLS) and 57 to 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 to 1948 birth cohort at ages 44 to 59 in 1992 (NHSLS data) and at ages 57 to 72 in 2005 to 2006 (NSHAP data).

[Figure 1 about here]

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” is defined in the NHSLS 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. 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 to 59 and less than 3% of respondents aged 57 to 72) 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 NHSLS did not collect information on cohabiting relationships, so cohabitating 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: (1) married (both first and later marriages), (2) divorced or separated, (3) widowed, (4) and never married.

Self-rated physical health.—Self-rated physical health was used to measure physical health. Participants in NHSLS 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 NHSLS and NSHAP respondents, the categories "very good" and "good" were collapsed for NSHAP respondents and relabeled as "good." Higher values indicate better health.

Happiness.—Respondents also reported their happiness. Happiness is used as a rough proxy for mental health because neither self-rated mental health nor a measure of depression or anxiety were available for NHSLS respondents. In a study examining the relationship between happiness, depression, and life events, Valiant (1992) 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 reflect current surroundings. In addition, Valiant (1992) finds that within a short time frame (about six weeks), happiness is more stable than depression, and thus may better measure global emotional well-being. Because happiness is associated with sexual activity, we remain concerned about reverse causality—that sexual frequency predicts happiness rather than vice versa.

NHSLS respondents answered 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?” While 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 about frequency of sex has also been evaluated. Using a self-administered questionnaire, Call, Sprecher, & 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. While 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 sex responses. Among NSHSLS men (aged 44 to 59 years old), three out of 326 eligible cases were classified as "refused," "don't know," or "missing" (less than 1% of eligible cases). Among NHSLS women (aged 44 to 59 years old), four out of 422 eligible cases were classified as "refused," "don't know," or "missing" (less than 1% of eligible cases). Among NSHAP men (aged 57 to 72 years old), 35 out of 978 eligible cases were "don't know" or "refused" (about 7% of eligible cases). Among NSHAP women (aged 57 to 72 years old), 28 out of 907 eligible cases were "don't know or "refused" (about 3% of eligible cases).

Data Analysis

We use ordinary least squares regression in our analyses, which is appropriate because monthly sexual frequency (the dependent variable) can be considered a continuous variable. This approach allows for an analysis of the relative impact of independent variables. Separate models are estimated for men and women.

Following regression analyses, differences in mean sexual frequency between ages 44 to 59 in 1992 and ages 57 to 72 in 2005 to 2006 by gender are decomposed using a regression decomposition of differences in means (Blinder, 1973; Oaxaca, 1973). This method allows the age variation in sexual frequency to be divided into three parts: (1) differences in the characteristics of the cohort at younger and older ages, (2) differences in the association between the covariates and the frequency of sex at younger and older ages, and (3) interactions between differences in population characteristics and differences in associations between age groups. Two primary strategies are utilized for dealing with the interaction of composition and association: retaining the interaction term, which is difficult to interpret, or assigning half of the interaction

term to the compositional changes component, and the other half to the associational changes component (Canudas Romo, 2003). We have decided upon the former because it provides more conservative estimates of the contributions of compositional and associational components.

The difference (D) in means between age groups is expressed as:

$$\mathbf{D = Y_y - Y_o} \qquad \mathbf{(1)}$$

where subscripts y and o represent the "younger" (age 44 to 59) and "older" (age 57 to 72) age groups. The decomposition equation can be expressed as:

$$\mathbf{D = [\{E(X_y) - E(X_o)\}^* \beta_y] + [E(X_y)^*(\beta_y - \beta_o)] + [\{E(X_y) - E(X_o)\}^* (\beta_y - \beta_o)]} \qquad \mathbf{(2)}$$

(Jann, 2008). $\mathbf{\{E(X_y) - E(X_o)\}^* \beta_y}$ represents differences in the characteristics of the cohort (i.e. "endowments") by age. $\mathbf{E(X_y)^*(\beta_y - \beta_o)}$ represents differences in the association between the covariates and sexual frequencies (i.e. "coefficients") by age (including differences in the intercept). $\mathbf{\{E(X_y) - E(X_o)\}^* (\beta_y - \beta_o)}$ represents the interactions between differences in population characteristics and differences in the associations, though the relative contributions of differences endowments and coefficients cannot be precisely identified (Horiuchi, Wilmoth, & Pletcher, 2008). Equation 1 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. Standard errors are also estimated 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.

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 (frequency=0) individuals. Almost 90% of younger men reported having sex in the past year, while 72% of men in the older age group 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 (not shown). 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 versus not active), are appropriate.

[Table 1 about here]

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, suggest that men in general have more regular access to (monogamous) sexual partners compared to women, particularly at older ages. Very small proportions of men and women have never been married. 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. Self-reported health is poorer at older ages for both men and women, with little difference between genders. Similarly, mean levels of happiness are quite similar between age groups and between genders.

*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 signficant among older men, but the magnitude is smaller. The decline in the association between happiness and sexual frequency by age is statistically signficant. 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 assocation between physical health and sexual frequency by age for men is statistically significant.

[Table 2 about here]

Differences in the association between individuals' characteristics and sexual frequency are also observed as women age. While 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 signficant, suggesting that gendered experiences of sexuality are present in middle-age not only in the differences in partner availability (see Table 1), but in the association between these characterstics and sexual frequency (though these differences in associations could still be due to partner availability). Specifically, it appears that women who are divorced/separated have significantly less sex compared with those who are married than do men who are divorced/separated.

Linear Decomposition

Table 3 shows the results of the linear decomposition of differences in mean sexual frequency as a product of three components: 1) compositional changes between age groups, 2)

associational changes between age groups, and 3) interactions between components 1) and 2). 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 mean that changes in composition or association contribute to the observed decline, whereas negative values mean that changes offset the observed decline.

[Table 3 about here]

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. Since being never married is associated with lower sexual frequency compared with being married (Table 2), a lower proportion 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%). While 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 to 59, and something else to them when they are aged 57 to 72. "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 et al. 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 increase in self-rated happiness (Table 1) does not explain a significant portion of the decline in sex frequency by age. 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 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.

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 all of the decline in sexual frequency (2.85 out 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 are particularly salient in explaining sexual frequency declines at older ages. 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 excess male mortality.

Among men, declines in physical health do contribute to declining sexual frequency. However, this is offset somewhat by the declining association between men's health and sexual frequency as they age. In other words, men's health makes less of a difference for sexual frequency at younger ages than at older ages. If the association between men's physical health and their sexual frequency remained as it was between the ages of 44 and 59, then given men's deteriorating physical health, the decline in sexual frequency would have been even greater than was observed. 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 sexual activity than women's physical health.

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 paper'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 NHSLS lacks these measures for the partners of respondents, thus limiting the identification of how partner

characteristics are associated with partnered sexual frequency. Naturally, partnered sexual frequency cannot be reduced to the characteristics of one partner. The linear decomposition method is intended as a starting point for further research.

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 regards 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. 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.

REFERENCES

Alexopoulos, G.B., Meyers, B., Young, R., Kakuma, B., Hull, J., & Kakum, T. (2000). Executive dysfunction increases the risk for relapse and recurrence of geriatric depression. *Archives of General Psychiatry, 57,* 285-290.

Austad, S.N. (2006). Why women live longer than men: sex differences in longevity. *Gender Medicine, 3,* 79-92.

Bancroft, J.H.J. (2007). Sex and aging. *The New England Journal of Medicine, 357,* 820.

Blinder, A.S. (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources, 8,* 436-455.

Call, V., Sprecher, S., & Schwartz, P. (1995). The incidence and frequency of marital sex in a national sample. *Journal of Marriage and the Family, 57,* 639-652.

Canudas Romo, V. (2003). *Decomposition Methods in Demography*. Amsterdam: Rozenberg Publishers.

Cole, M.G. & Dendukuri, N. (2003). Risk factors for depression among elderly community subjects: A systematic review and meta-analysis. *American Journal of Psychiatry, 160,* 1147-1156.

DeLamater, J. & Moorman, S. (2007). "Sexual behavior in later life." *Journal of Aging and Health, 19,* 921-945.

DeLamater, J. & Sill, M. (2005). Sexual desire in later life. *Journal of Sex Research, 42,* 138-149.

Dennerstein, L., Alexander, J.L., & Kotz, K. (2003). The menopause and sexual functioning: A review of the population-based studies. *Annual Review of Sex Research, 14,* 64-82.

Dennerstein, L., Smith, A., Morse, C., & Burger, H. (1994). Sexuality and the menopause. *Journal of Psychosomatic Obstetrics and Gynecology, 15,* 59-66.

Eisenberg, M.L., Shindel, A.W., Smith, J.F., Breyer, B.N., & Lipschultz, L.I. (2010). Socioeconomic, anthropomorphic, and demographic predictors of adult sexual activity in the United States: Data from the National Survey of Family Growth. *Journal of Sexual Medicine,* 7, 50-58.

Hallstrom, T. (1977). Sexuality in the climacteric. *Clinics in Obstetrics and Gynaecology, 4,* 227-239.

Horiuchi, S., Wilmoth, J.R., & Pletcher, S.D. (2008). A decomposition method based on a model of continuous change. *Demography, 45,* 785-801.

James, W.H. (1981). The honeymoon effect on marital coitus. *Journal of Sex Research, 17,* 114-123.

Jann, B. (2008). The Blinder-Oaxaca decomposition for linear regression models. *Stata Journal, 8,* 453-479.

Kingsberg, S.A. (2002). The impact of aging on sexual function in women and their partners. *Archives of Sexual Behavior, 31,* 431-437.

Kitagawa, E. (1955). Components of a difference between two rates. *Journal of the American Statistical Association, 50,* 1168-1194.

Kontula, O. (2009). *Between Sexual Desire and Reality: The Evolution of Sex in Finland*. Helsinki: Väestöliitto.

Laumann, E.O., Das, A., & Waite, L.J. (2008). Sexual dysfunction among older adults: Prevalence and risk factors from a nationally-representative U.S. probability sample of men and women 57-85 years of age. *Journal of Sexual Medicine, 5,* 2300-2311.

Laumann, E.O., Gagnon, J.H., Michael, R.T. & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States*. Chicago: The University of Chicago Press.

Laumann, E.O., Paik, A., & Rosen, R.C. (1999). Sexual dysfunction in the United States. *JAMA, 281,* 537-544.

Lindau, S.T., Schumm, L.P., Laumann, E.O., Levinson, W., O'Muircheartaigh, C.A., & Waite, L.J. 2007. A study of sexuality and health among older adults in the United States. *New England Journal of Medicine, 357,* 762-774.

Nichols, H.B., Trentham-Dietz, A., Hampton, J.M., Titus-Emstoff, L., Egan, K.M., Willett, W.C., & Newcomb, P.A. (2006). From menarche to menopause: Trends among US women born from 1921 to 1969. *American Journal of Epidemiology, 164,* 1003-11.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review, 9,* 693-709.

O'Muircheartaigh, C., Eckman, S., & Smith, S. (2009). Statistical design and estimation for the National Social Life, Health, and Aging Project. *Journal of Gerontology: Social Sciences, 64B,* i12-i19.

Preston, S.H., Heuveline, P. & Guillot, M. (2001). *Demography: Measuring and Modeling Population Processes*. Malden, MA: Blackwell Publishers.

Rosen, R.C. & Bachmann, G.A. (2008). Sexual well-being, happiness, and satisfaction, in women: The case for a new conceptual paradigm. *Journal of Sex and Marital Therapy, 34,* 291-297.

U.S. Census. (2006). Women's history month: March 2006. US Census Press Release, first released 22 February 2006. Available on-line: http://www.census.gov/Press-

Release/www/releases/archives/facts_for_features_special_editions/006232.html. Accessed 23 January 2010.

Valiant, G.L. (1992). Life events, happiness and depression: The half empty cup. *Personality and Individual Differences, 15,* 447-453.

Wells, K.B. & Burman, M.A. (1991). Caring for depression in America: Lessons learned from early findings of the medical outcomes study. *Psychiatric Medicine, 9,* 503-519.

Table 1. Descriptive Statistics

	Men		Women	
	Aged 44-59	Aged 57-72	Aged 44-59	Aged 57-72
Mean Sexual Frequency (Times Per Month)				
Including Zero Frequency	6.18	3.13	4.68	1.74
Excluding Zero Frequency	7.04	4.35	6.51	3.83
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	2.84	3.15	2.82
Mean Self-Rated Happiness	3.60	3.70	3.60	3.58
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
N	319	920	402	866

Sources: Data for those aged 44-59 are from the National Health and Social Life Survey (NHSLS); Data for those aged 57-72 are from the National Social Life, Health, and Aging Project (NSHAP).

Table 2. Unstandardized Coefficients from OLS Regression of Sexual Frequency on Marital Status, Demographic, Health, and Happiness of 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		
N	319		920			402		866		
F-statistic	3.28	**	5.89	***		6.41	***	8.03	***	
df	(7, 311)		(7, 912)			(7, 394)		(7, 858)		
R^2	0.07		0.04			0.10		0.06		
Adjusted R^2	0.05		0.04			0.09		0.05		
Root MSE	6.25		4.65			5.49		3.70		

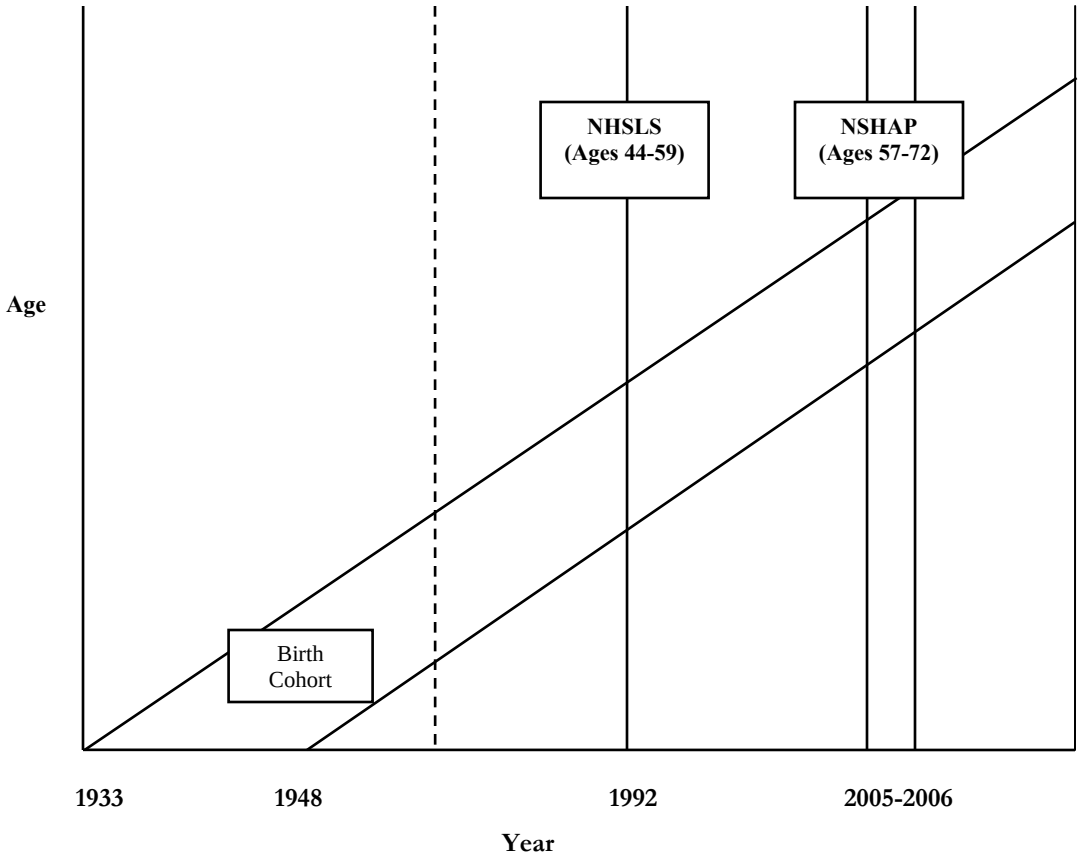
Sources: Data for those aged 44-59 are from the National Health and Social Life Survey (NHSLS); Data for those aged 57-72 are from National Social Life, Health, and Aging Project (NSHAP).
Notes: Significance levels for two-tailed tests of coefficients: * p<0.5; ** p<0.01; *** p<0.001. Significance levels for two-tailed tests of differences by age within sexes: † p<0.5; †† p<0.01; ††† p<0.001. Two-tailed tests for differences by sex within age groups where p < .05 are indicated by bold font.

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	***	
Difference Due to Changes in 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
Difference Due to Changes in 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
Difference Due to Interactions Between Composition and Associations						
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	1239			1268		

Sources: Data for those aged 44-59 are from the National Health and Social Life Survey (NHSLS); Data for those aged 57-72 are from the National Social Life, Health, and Aging Project (NSHAP).
Notes: *p<0.5; **p<0.01; ***p<0.001.

Figure 1. Lexis Diagram of Birth Cohort, Cohort Age, and Data Source Collection



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