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# Sexual Behavior in Later Life

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**Objectives:** This research tests the influences of age, biological, and psychosocial factors on sexual expression in later life. **Method:** The American Association of Retired Persons Modern Maturity Sexuality Survey collected data on diagnosed illnesses, treated illnesses, sexual desire, sexual attitudes, partner circumstances, and sexual behavior from 1,384 persons ages 45 and older. Ordered logistic regression models estimate the associations of age, biological, and psychosocial factors with the frequency of five sexual behaviors. **Results:** Diagnosed illnesses and treatments are generally unrelated to frequency of sexual activity. Sexual attitudes are related to frequency of partnered behavior and sexual desire is related to frequency of masturbation among both women and men. Satisfaction with the physical relationship with a partner is strongly related to behavior. Age remains significant after all other factors are controlled. **Discussion:** The authors conclude that the nature of sexual expression in later life reflects the interplay of body, mind, and social context.

**Keywords:** *biopsychosocial; sexual intercourse; masturbation; attitudes; relationship satisfaction*

If a social scientist from an alien planet wished to learn about Earthling behavior from reading our scientific research literature, she might well conclude that sexuality is not important to humans older than 50. Remarkably few scientific studies address sexual behavior in mid- and later life or the ways in which sexuality changes over the life course. In this article, we seek to narrow this gap in knowledge: We examine the biological

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and psychosocial factors associated with frequency of sexual behavior in adults aged 45 and older.

Cross-sectional surveys report that the frequency of sexual behavior declines in successively older age groups. This finding holds in nationally representative samples (e.g., Call, Sprecher, & Schwartz, 1995; Marsiglio & Donnelly, 1991; National Council on Aging, 1998) as well as in large nonrandom samples (e.g., Brecher & the Editors of Consumer Reports Books, 1984; Matthias, Lubben, Atchison, & Schweitzer, 1997; Starr & Wiener, 1981), and samples from outside the United States (e.g., Kontula, 2002). The largest of these studies (Call et al., 1995) included 6,785 married persons aged 19 and older (mean age 46 years) who were participants in the National Survey of Families and Households. Although 96% of married persons aged 19 to 24 had engaged in sexual intercourse at least once in the past month, as had 83% of those aged 50 to 54, only 27% of those aged 75 or older had. Noncelibate couples in this oldest age group had sex an average of 3 times per month.

Three explanations for these findings have been forwarded. First, age may be a proxy for duration of relationship. Monotony or habituation to sex with a long-term partner may lead to a decline in frequency of sexual behavior (Call et al., 1995). In a review of the literature, however, Burgess (2004) concludes that although duration has effects on frequency, the effects of age are strong and independent.

Second, the cross-sectional finding that older adults engage in sex less frequently than do younger adults may be the result of cohort, rather than age, effects. Reviewers of the literature have concluded that both factors are at work. Noting dramatic changes in attitudes about sexuality since World War II, as well as increases in healthy life expectancy, Burgess (2004) predicts that future cohorts of older adults will be more sexually active than are current cohorts. Edwards and Booth (1994) conclude that although members of later cohorts enjoy more sexual variety and frequency than do members of earlier cohorts, sexual activity becomes less frequent with age for all cohorts.

Third, increasing age may represent increasing problems with physical health. A sizeable literature suggests that chronic illnesses (e.g., Marumo & Murai, 2001) or common medications (e.g., Trudel, Turgeon, & Piche, 2000) interfere with sexual function. Most sex research on older adults focuses on illness (Burgess, 2004).

A much smaller literature emphasizes psychosocial factors, such as self-image, religious values, psychological well-being, social connectedness, and relationship satisfaction (Marsiglio & Donnelly, 1991; Matthias et al., 1997). In this article we seek to unite the two emphases, using the

biopsychosocial perspective, to contribute a much-needed theoretical basis to the literature on sexuality and aging (DeLamater & Hyde, 2004). In addition, most research is based on limited measures of sexual functioning; the data presented here include measures of sexual desire as well as partnered and unpartnered sexual behavior.

We argue for a broad biopsychosocial perspective on health, as presented by Lindau, Laumann, Levinson, and Waite (2003). This perspective is characterized by seven core principles: (a) Researchers should attend to health rather than illness but (b) retain the capacity to study health or illness as outcomes; (c) biological, psychological, and social domains contribute equally to health outcomes; (d) causality is bidirectional (i.e., biopsychosocial factors influence health outcomes and vice versa); (e) health depends not only on the individual but also on interactions with family and ties to other social networks; (f) life-course trajectories influence health; and (g) biopsychosocial influences can be helpful or harmful to health.

*Hypothesis 1:* Age will be negatively associated with frequency of sexual behavior, but the association will be greatly reduced following the addition of measures of biological and psychosocial influences.

## **Biological Aspects of Sexuality**

Although the biopsychosocial model emphasizes good health, prior research has focused on sexuality and poor health. This literature suggests that we cannot ignore the effects of illness and its treatment on sexual behavior. Moreover, because the effects of psychological and social variables on sexuality in later life have not been tested before, we can draw conclusions about their relative importance only through comparison with the effects of biological variables. The biological information available to us is concerned with illness and its treatment.

## **Aging and Chronic Illness**

Most of the research on health in the aging population has measured incidence of illness. Chronic illnesses, such as cardiovascular disease, diabetes, arthritis, depression, benign prostate conditions, and cancers of the reproductive organs, are commonly associated with sexual problems in older people (e.g., Blake, Maisiak, Kaplan, Alarcon, & Brown, 1988; Feldman, Goldstein, Hatzichristou, Krane, & McKinlay, 1994; Johannes

et al., 2000; Masters, Johnson, & Kolodny, 1994; Schiavi, 1999; Schover et al., 2004; Stead, 2004; Thors, Broeckel, & Jacobsen, 2001). For instance, in a study of 120 women with diabetes and 180 age-matched healthy controls, women with diabetes were significantly more likely to report sexual dysfunction than were nondiabetic women (Enzlin et al., 2002). Diabetes was associated with pain during sex, decreased desire, and decreased arousal. Schiavi, Stimmel, Mandeli, and Rayfield (1993) found that diabetic men, in comparison with aged-matched healthy controls, showed large decrements in sexual activity and satisfaction. Furthermore, the diabetic men reported decreased penile sensitivity and a range of ejaculatory and orgasmic difficulties, which are well-established complications of diabetes (Veves, Webster, Chen, Payne, & Boulton, 1995).

### **Aging and Medication Use**

Medications used to treat chronic illnesses also interfere with sexual functioning. Many medications prescribed today slow the autonomic nervous system, reducing responsiveness and sensitivity to stimulation. For instance, antiandrogen treatment for prostate cancer can reduce sexual drive and cause erectile dysfunction (Marumo & Murai, 2001). Medications may also interfere with capacity for sustained sexual thought or fantasy. Antihypertensive drugs represent the single largest medication group implicated in the development of sexual side effects, including difficulties in attaining orgasm for both women and men (Masters et al., 1994).

*Hypothesis 2:* In the biological domain, chronic illnesses and their medical treatment will be negatively associated with frequency of sexual activity. A participant's self-reported physical or emotional sexual limitations will also be negatively associated with sexual frequency.

Lindau, Laumann, Levinson, and Waite (2003) call attention to the role of social ties in determining healthy functioning, and many sexual behaviors require a partner. If a respondent's physical or emotional sexual limitations are negatively related to frequency of sexual behavior, any limitations of his or her partner can also be expected to have negative effects on the couple's sexual frequency. The greatest decrements in functioning would be expected when both respondent and partner are limited.

*Hypothesis 3:* Participant and partner sexual health limitations will have interactive effects on frequency of sexual behavior.

## Psychosocial Aspects of Sexuality

The meaning and significance of sexuality in individual lives—that is, *sexual attitudes*—are important determinants of reactions to sexual changes associated with aging (Schiavi, 1999). Many older persons do not believe that sexual expression is natural and healthy for elderly people (Trudel et al., 2000). Many older persons look to the “middle-aged” or the “young” as a reference group. Comparison to either reference group creates dissatisfaction with changing appearance and abilities, which in turn can lead to sexual dissatisfaction. A survey of older women found that those who endorsed statements such as “romantic involvement between older people looks foolish” reported significantly lower levels of sexual activity (Johnson, 1998).

Sexual desire is a prerequisite for enjoyable sexual activity (DeLamater & Sill, 2005). Desire is defined here as conscious thought about or interest in sexual activity. Desire is the psychological manifestation of an interaction between biological factors, cognitive factors, learned behavior, and past experience. An important premise of the biopsychosocial model is that characteristics of the person’s social network influence sexual expression (Lindau et al., 2003). The presence or absence of a sexual partner is extremely important in understanding differing levels of sexual activity among aging women and men. Many older people consider sexual intimacy to be only or most appropriate in marriage; thus death and divorce leave many older Americans without a sexual partner. Single women are particularly disadvantaged because the sex ratio becomes increasingly imbalanced with age. Among persons 55 to 64, the sex ratio is 92 (men for every 100 women), among those 65 to 74 it is 83, and among those 75 to 84 it is 67 (Smith, 2003).

Many older people who are without a sexual partner for an extended amount of time drift into a state of sexual disinterest. Masters et al. (1994) suggest that women “turn off” their interest as a coping mechanism: Not wanting sex prevents frustration and depression. In Schiavi’s (1999) study sexual interest and behavior in men decreased greatly when a sexual partner was either not available or without sexual desire. **AU: MEANING IS UNCLEAR. PLEASE REPHRASE**

For those who do have a sexual partner, satisfaction with the relationship is an important influence on sexuality. Laumann, Gagnon, Michael, and Michaels (1994) measured how physically pleasurable and emotionally satisfying the relationship with one’s partner was. These factors, in addition to duration of relationship (as noted above, see Burgess, 2004), may affect the frequency and quality of sexual activity.

*Hypothesis 4:* In the psychosocial domain, negative attitudes toward sexual activity in later life and low sexual desire will be negatively associated with frequency of sexual activity. Having a healthy sexual partner and being satisfied with that relationship will be positively associated, and long relationships, negatively associated, with frequency of sexual activity.

## Methods

### Participants

We analyze secondary data provided to us by the American Association of Retired Persons (AARP). The AARP Modern Maturity Sexuality Survey was a mail survey completed by 1,384 women and men ages 45 and older. The survey was designed by the editorial staff of Modern Maturity and the AARP Research Group with the assistance of Dr. John McKinlay of the New England Research Institute and NFO Research. A commercial data collection agency, NFO maintains a consumer panel of 565,000 individuals who are broadly representative of the population of the United States and who have agreed to participate in surveys. From this consumer panel, NFO drew a representative sample of 3,450 persons ages 45 and older. This sample was balanced to nationally representative quotas using the Current Population Survey. Of these, 2,206 eligible persons were contacted by telephone and informed about the survey. Potential respondents were told that “the purpose of the study is to better understand the role of sexuality in the lives of mid-life and older persons,” and assured of the confidentiality of the study. On March 8, 1999, surveys were mailed to 1,709 individuals (not couples) who agreed to participate (77% of those contacted)**AU: MEANING UNCLEAR. PLEASE INDICATE IF THE 1,709 INCLUDES ALL WHO AGREED TO PARTICIPATE OR SOME PROPORTION OF THEM.** Each questionnaire was sent with a \$1 cash incentive to encourage completion and return of the questionnaire. By March 22, 1999, 1,384 returned completed surveys (81% of those who were sent the survey, 62% of those contacted). These final data were weighted to reflect United States Census Bureau estimates for age and gender of the population over age 45, resulting in a sample of 745 women and 639 men. The margin of potential sampling error for the final sample of 1,384 women and men is  $\pm 2.6\%$ .

### Independent Variables

*Age.* Age in years was available from NFO’s database. Male participants ranged in age from 45 to 89 years old, female participants from 45 to 94.

**Table 1**  
**Means and Standard Deviations for Variables Used in the Analysis**

	Men		Women	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Independent variables</b>				
Age (years)	60.14	11.06	61.25	11.78
Diabetes diagnosis <sup>a</sup> (0 = <i>no</i> , 1 = <i>yes</i> )	0.15 <sup>a</sup>	—	0.13 <sup>a</sup>	—
Hypertension diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	0.38 <sup>a</sup>	—	0.37 <sup>a</sup>	—
Arthritis diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	0.20 <sup>a</sup>	—	0.32 <sup>a</sup>	—
Depression diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	0.06 <sup>a</sup>	—	0.11 <sup>a</sup>	—
Benign prostate diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	0.16 <sup>a</sup>	—	—	—
Prostate cancer diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	0.05 <sup>a</sup>	—	—	—
Gynecological cancer diagnosis (0 = <i>no</i> , 1 = <i>yes</i> )	—	—	0.07 <sup>a</sup>	—
Diabetes treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.11 <sup>a,b</sup>	—	0.11 <sup>a,b</sup>	—
Hypertension treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.34 <sup>a,b</sup>	—	0.34 <sup>a,b</sup>	—
Arthritis treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.10 <sup>a,b</sup>	—	0.17 <sup>a,b</sup>	—
Depression treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.04 <sup>a,b</sup>	—	0.07 <sup>a,b</sup>	—
Benign prostate treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.07 <sup>a,b</sup>	—	—	—
Prostate cancer treatment (0 = <i>no</i> , 1 = <i>yes</i> )	0.02 <sup>a,b</sup>	—	—	—
Gynecological cancer treatment (0 = <i>no</i> , 1 = <i>yes</i> )	—	—	0.02 <sup>a,b</sup>	—
Participant sexual restrictions	0.29 <sup>a</sup>	—	0.14 <sup>a</sup>	—
Sexual attitudes: Self (higher = positive)	4.42	0.69	3.79	0.98
Sexual attitudes: Relationship (higher = negative)	2.56	0.81	2.98	0.87
Sexual desire (1 = <i>not at all</i> , 8 = <i>more than once per day</i> )	5.37	1.91	3.29	1.96
Participant has partner (0 = <i>no</i> , 1 = <i>yes</i> )	0.79 <sup>a</sup>	—	0.60 <sup>a</sup>	—
Long relationship (0 = $\leq 20$ yrs, 1 $\geq 20$ yrs.)	0.67 <sup>a,c</sup>	—	0.74 <sup>a,c</sup>	—
Emotionally satisfied (1 = <i>not at all</i> , 5 = <i>extremely</i> )	3.78 <sup>c</sup>	1.02	3.65 <sup>c</sup>	1.13
Physically satisfied (1 = <i>not at all</i> , 5 = <i>extremely</i> )	3.70 <sup>c</sup>	1.08	3.59 <sup>c</sup>	1.16
Partner sexual restrictions (0 = <i>no</i> , 1 = <i>yes</i> )	0.25 <sup>a,c</sup>	—	0.32 <sup>a,c</sup>	—
<b>Dependent variables</b>				
Kissing/hugging (1 = <i>not at all</i> , 6 = <i>daily</i> )	5.15	1.31	5.09	1.40
Sexual touching (1 = <i>not at all</i> , 6 = <i>daily</i> )	4.36	1.44	4.25	1.51
Oral sex (1 = <i>not at all</i> , 6 = <i>daily</i> )	2.07	1.33	2.04	1.36
Sexual intercourse (1 = <i>not at all</i> , 6 = <i>daily</i> )	3.41	1.36	3.47	1.39
Masturbation (1 = <i>not at all</i> , 6 = <i>daily</i> )	2.21	1.48	1.40	0.81

a. Expressed as proportions; standard deviations not estimated.

b. Although only participants who had been diagnosed were asked about treatment, we assume that no participant was receiving treatment without diagnosis. Therefore, this number represents the proportion of the entire sample receiving treatment.

c. Statistics conditional on having a partner.

The average age of the men was 60 years, the women, 61 years. Additional descriptive statistics for age and other variables are presented in Table 1.

*Illnesses.* All participants were asked to indicate 0 (*no*) or 1 (*yes*) if they had been diagnosed with eight chronic conditions **AU: ANY OF EIGHT OR ALL EIGHT?**. More than 10% of the men and of the women reported being diagnosed with diabetes, hypertension, arthritis, or depression. Other conditions (e.g., HIV/AIDS) were reported by fewer persons. Male participants were asked if they had ever been diagnosed with benign and/or malignant prostate problems, and female participants were asked if they had ever been diagnosed with gynecological (breast, cervical, and/or ovarian) cancer (0 = *no*, 1 = *yes*).

*Treatment.* Participants who had been diagnosed with an illness were asked to indicate (0 = *no*, 1 = *yes*) whether or not they were receiving treatment for that illness. Although participants without diagnoses for a condition were not asked about receipt of treatment for that condition, we assume that no participants were receiving treatment without diagnosis. Comparison of diagnosis with two items not used in analysis here provides some information about the validity of this assumption. Only three individuals who reported no diagnosis of diabetes reported taking insulin in the last 2 weeks, and 29 individuals who reported no diagnosis of high blood pressure reported taking medication for high blood pressure in the last 2 weeks.

*Sexual restrictions.* Participants were asked, "Do you have any physical or emotional limitations or illnesses which restrict your sexual activity?" Responses included 0 (*no*) and 1 (*yes*).

*Attitudes toward sex.* Attitudes toward sex were measured with a series of nine items. Potential responses for each item ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). We conducted exploratory factor analyses (maximum likelihood extraction, varimax rotation, pairwise deletion) of the responses to these nine items separately for women and for men. In each analysis, three factors attained eigenvalues greater than one, but the third had no items loading at 0.50 or greater. For both men and women, Factor 1 consisted of three items assessing respondents' attitudes about sex for the self. Items included, "I do not particularly enjoy sex," "I would be quite happy never having sex again," and "Sex is only for younger people." Higher scores (disagreement) on these items indicate positive attitudes about sex for the self. We created a mean score for each participant, provided that the participant answered at least two out of three items (? = .83 for women, ? = .83 for men). Again, for both men and women, Factor 2 included three items: "Sexual activity is important to my overall

quality of life,” “Sexual activity is a critical part of a good relationship,” and “Sexual activity is a duty to one’s spouse/partner.” These items assess attitudes toward sex in relationships. Higher scores on these items indicate negative attitudes about the role of sex in relationships. We created a mean score for each participant, provided that the participant answered at least two out of three items ( $\alpha = .75$  for women,  $\alpha = .79$  for men) **AU: CAN ALPHAS BE GREATER THAN 1? IF SO, NEED LEADING ZEROES**. A complete list of items and results from the factor analysis are available from the authors on request or can be found in DeLamater and Sill, 2005, Table 1.

*Sexual desire index.* Level of sexual desire was measured by two questions: “How frequently do you feel sexual desire? This feeling includes wanting to have sexual experiences, planning to have sex, and feeling frustrated due to lack of sex,” and “How frequently do you have sexual thoughts, fantasies, or erotic dreams?” Each question was answered using a 8-point scale (8 = *more than once a day*, 7 = *once a day*, 6 = *2 or 3 times per week*, 5 = *once a week*, 4 = *2 or 3 times per month*, 3 = *once per month*, 2 = *less than once per month*, 1 = *not at all*). The two items were highly correlated (for women,  $r = .77$ ,  $p < .001$ ; for men,  $r = .76$ ,  $p < .001$ ) **AU: CAN r VALUES BE > 1? IF SO, NEED LEADING ZEROES**. Therefore, we created an index of desire by computing the mean score for each participant, provided that the participant answered at least one of the two items ( $\alpha = .87$  for women,  $\alpha = .86$  for men).

*Characteristics of the sexual partner.* Participants were asked if they currently had a sexual partner (0 = *no*, 1 = *yes*). Seventy-nine percent of the men and 60% of the women had partners. In more than 96% of the cases, the partner was a spouse. Less than 1% of participants reported a same-sex partner; these participants were excluded from analyses. If a participant had a partner, he or she responded to a series of questions that were not asked of participants without partners. Length of relationship could range from 1 to 7 (1 = *less than 6 months*; 2 = *6 to 11 months*; 3 = *1 to 2 years*; 4 = *3 to 5 years*; 5 = *6 to 10 years*; 6 = *11 to 20 years*; to 7 = *more than 20 years*). This item was highly skewed as 70% of participants were in partnerships of 20 years or more, and none reported a partnership shorter than 3 to 5 years. Therefore we dichotomized the variable into a measure of long relationships: 0 = *20 years or fewer*, 1 = *more than 20 years*. Two items assessed facets of sexual satisfaction. The participant answered the questions, “In the past 6 months, how emotionally satisfying was your relationship with your

partner?" and "In the past 6 months, how physically pleasurable was your relationship with your partner?" The alternatives were 1 (*not at all*), 2 (*slightly*), 3 (*moderately*), 4 (*very*), and 5 (*extremely*). Finally, participants were asked whether the partner had any physical or emotional limitations that restricted the couple's sexual activity (0 = *no*, 1 = *yes*).

## Dependent Variables

Five sexual behaviors (four partnered, one nonpartnered) were assessed. Participants were asked, "During the past 6 months, how often, on average, have you engaged in the following sexual activities?" The behaviors included kissing or hugging, sexual touching or caressing, oral sex, sexual intercourse, and masturbation. Response alternatives for all items were 1 = *not at all*, 2 = *less than once a month*, 3 = *once or twice a month*, 4 = *about once a week*, 5 = *more than once a week*, and 6 = *daily*.

### *Analytic Strategy*

*Statistics.* We conducted ordinal logistic regressions (proportional odds model) on all five outcomes because of the categorical nature of the response options and because of skew in the distributions of responses. Analyses were run separately for men and women. The regressions on the four partnered behaviors were restricted to the subset of participants (503 men and 446 women) who reported having sexual partners, because few participants reported having no regular partner but engaging in partnered behaviors. Note that limiting these regressions to participants with partners affects the age distribution of the sample, especially for women. The median age of partnered women is 55, whereas the median age of women without partners is 69. The median age of partnered men is 57, whereas the median age of men without partners is 66.

The regressions on masturbation included all participants, given that masturbation does not require having a sexual partner. Still, we wished to estimate the effects of having a partner and the various aspects of partnership on the frequency of masturbation. We conducted a dummy variable adjustment. The dummy variable indicating partner/no partner also indicates "missingness" on long relationship, emotional satisfaction with partner, physical satisfaction with partner, and partner's limitations on sex. For those four variables, participants without partners were assigned the observed means, by gender, for participants with partners.

*Modeling.* For each outcome, Model 1 tests the effects of age alone, Model 2 tests the effects of age and biological variables, and Model 3, age and psychosocial variables. Model 4 tests the effects of all variables. Model 5 tests the effects of all variables plus the interaction term Respondent's Sexual Limitations x Partner's Sexual Limitations.

## Results

Table 1 contains descriptive statistics for all variables used in the analyses. Tables 2 through 5 contain ordinal regression results for sexual touch, oral sex, intercourse, and masturbation, respectively, for men and for women. Because of largely null results, we discuss results for kissing and hugging and for Model 5 in the text but do not include tables; they are available from the authors on request.

*Hypothesis 1:* Age negatively associated with frequency of sexual behavior, association reduced following the addition of measures of biological, psychological, and social influences.

Age was negatively associated with the frequency of all five sexual behaviors for both men and women. Age had the largest effect on frequency of oral sex for both men and women (Model 1). Second, following the addition of biological, psychological, and social variables (Model 4), the effect size of age was reduced for all five outcomes across gender; however, in 7 of the 10 analyses, the effect remained statistically significant.

*Hypothesis 2:* Chronic illnesses and their treatment negatively associated with frequency of sexual activity. Self-reported sexual limitations negatively associated with sexual frequency.

Although we predicted that illnesses and their treatments would be negatively associated with frequency of sexual activity, very few of the coefficients were significant (Model 2). Readers will note that the standard errors (*SEs*) are large; the correlations between diagnosis and treatment are large, creating colinearity. Given that treatments often have effects independent of illness itself, however, both diagnosis and treatment belong in the model. We ran additional analyses eliminating highly correlated variables, and the patterns of significance—although not the effect sizes—remained the same. These results are not shown but may be obtained from the authors on request. Several significant effects were opposite to the hypothesis: Treatment for

*(text continued on p. 20)*

**Table 2**  
**Ordinal Logistic Regression Models Predicting Sexual Touch**

<i>Regressors</i>	Men			Women				
	<i>Age</i>	<i>Bio</i>	<i>Psy·Soc</i>	<i>All</i>	<i>Age</i>	<i>Bio</i>	<i>Psy·Soc</i>	<i>All</i>
Age (years)	-0.02* (0.01)	-0.01 (0.01)	0.02 (0.01)	0.02 (0.01)	-0.03*** (0.01)	-0.04*** (0.01)	-0.01 (0.01)	-0.01 (0.01)
Diagnosis								
Diabetes <sup>a</sup>	-1.07 (0.57)		-1.31* (0.63)			-0.32 (0.63)		-1.10 (0.71)
Hypertension <sup>a</sup>	-0.21 (0.54)		-0.14 (0.58)			-0.38 (0.59)		-1.58* (0.72)
Arthritis <sup>a</sup>	0.07 (0.30)		-0.10 (0.32)			0.28 (0.27)		0.24 (0.30)
Depression <sup>a</sup>	1.47 (1.04)		1.16 (0.95)			0.50 (0.44)		1.06* (0.47)
Benign prostate <sup>a</sup>	0.18 (0.34)		-0.01 (0.36)			—		—
Prostate cancer <sup>d</sup>	0.40 (0.58)		0.69 (0.65)			—		—
Gynecological cancer <sup>a</sup>	—		—			0.15 (0.43)		0.22 (0.45)
Treatment								
Diabetes <sup>a</sup>		1.06 (0.64)		1.25 (0.71)		0.50 (0.68)		1.04 (0.76)
Hypertension <sup>a</sup>		0.05 (0.56)		0.06 (0.60)		0.48 (0.60)		1.04 (0.76)
Arthritis <sup>a</sup>		-0.16 (0.40)		-0.00 (0.44)		0.04 (0.36)		-0.47 (0.76)
Depression <sup>a</sup>		-0.96 (1.12)		-1.13 (1.05)		-0.83 (0.59)		-1.57 (0.63)
Benign prostate <sup>a</sup>		0.02 (0.44)		0.35 (0.48)		—		—
Prostate cancer <sup>d</sup>		-1.45 (0.82)		-1.34 (0.89)		—		—
Gynecological cancer <sup>a</sup>		—		—		-0.84 (0.67)		-1.89* (0.76)
Participant sexual restrictions <sup>a</sup>		-0.33 (0.22)		0.18 (0.23)		-0.46 (0.25)		0.24 (0.28)
Sexual attitudes: Self (higher = positive)		-0.03 (0.18)		-0.9 (0.19)		0.33* (0.16)		0.39* (0.16)

Sexual attitudes:					
Relationship (higher = negative)		0.21 (0.14)	-0.18 (0.14)		-0.51*** (0.14)
Sexual desire (1 = <i>not at all</i> , 8 = <i>more than once per day</i> )		0.25*** (0.07)	0.27*** (0.07)		0.20** (0.08)
Long relationship (0 = $\leq$ 20 years, 1 = $\geq$ 20 years)		-0.20 (0.20)	-0.25 (0.21)		0.06 (0.23)
Emotionally satisfied <sup>b</sup>		0.43** (0.15)	0.38** (0.15)		0.58*** (0.14)
Physically satisfied <sup>b</sup>		0.81*** (0.15)	0.84*** (0.15)		0.06 (0.14)
Partner sexual restrictions <sup>a</sup>		-0.22 (0.21)	-0.35 (0.22)		-0.23 (0.21)
Bayesian Information Criterion	1,453	1,479	1,295	1,362	1,407
					1,137
					1,170

Note: Effects are reported in log odds. Parentheses contain standard errors. Bayesian Information Criterion, model with no independent variables, men = 1,453, women = 1,378.

a. Dichotomous variable with 1 = *yes*, 2 = *no*.

b. Variable rated on 5-point scale with 1 = *not at all* and 5 = *extremely*.

\*\* $p < .05$ , \*\*\* $p < .001$ .

**Table 3**  
**Ordinal Logistic Regression Models Predicting Oral Sex**

Regressors	Men			Women				
	Age	Bio	Psy-Soc	All	Age	Bio	Psy-Soc	All
Age (years)	-0.07*** (0.01)	-0.07*** (0.01)	-0.04*** (0.01)	-0.04 (0.01)	-0.10*** (0.01)	-0.10*** (0.01)	-0.06*** (0.01)	-0.05*** (0.02)
Diagnosis								
Diabetes <sup>a</sup>		0.30 (0.68)		0.17 (0.71)		0.28 (1.15)		0.12 (1.20)
Hypertension <sup>a</sup>		-0.31 (0.56)		-0.57 (0.59)		-1.54 (1.18)		-1.56 (1.22)
Arthritis <sup>a</sup>		-0.02 (0.35)		0.07 (0.37)		0.11 (0.32)		-0.11 (0.36)
Depression <sup>a</sup>		1.71 (1.14)		1.52 (1.14)		-0.39 (0.60)		-0.11 (0.71)
Benign prostate <sup>a</sup>		0.69 (0.38)		0.52 (0.40)		—		—
Prostate cancer <sup>a</sup>		0.19 (0.67)		0.31 (0.70)		—		—
Gynecological cancer <sup>a</sup>		—		—		-0.36 (0.70)		-0.67 (0.74)
Treatment								
Diabetes <sup>a</sup>		-0.83 (0.77)		-0.75 (0.80)		0.30 (1.19)		0.21 (1.23)
Hypertension <sup>a</sup>		0.23 (0.58)		0.50 (0.61)		1.40 (1.19)		1.57 (1.24)
Arthritis <sup>a</sup>		-0.22 (0.48)		-0.16 (0.52)		0.02 (0.42)		-0.25 (0.48)
Depression <sup>a</sup>		-1.80 (1.22)		-1.91 (1.24)		0.89 (0.74)		0.79 (0.85)
Benign prostate <sup>a</sup>		-1.15* (0.57)		-0.95 (0.60)		—		—
Prostate cancer <sup>a</sup>		-1.47 (1.26)		-1.12 (1.28)		—		—
Gynecological cancer <sup>a</sup>		—		—		1.06 (0.91)		0.62 (1.00)
Participant sexual restrictions <sup>a</sup>		-0.33 (0.22)		0.18 (0.23)		-0.46 (0.25)		0.24 (0.28)
Sexual attitudes: Self (higher = positive)		-0.03 (0.18)		-0.9 (0.19)		0.33* (0.16)		0.39* (0.16)
Sexual attitudes: Relationship (higher = negative)			0.28 (0.22)	0.27 (0.23)			0.51* (0.21)	0.46* (0.21)

Sexual desire (1 = <i>not at all</i> , 8 = <i>more than once</i> <i>per day</i> )	-0.29 (0.15)	-0.34* (0.16)	-0.21 (0.17)	-0.24 (0.17)
Long relationship (0 = ≤ 20 years, 1 = ≥ 20 years)	0.20** (0.08)	0.18* (0.08)	0.37*** (0.09)	0.41*** (0.10)
Emotionally satisfied <sup>b</sup>	0.18 (0.18)	0.20 (0.18)	-0.25 (0.17)	-0.26 (0.17)
Physically satisfied <sup>b</sup>	0.28 (0.17)	0.33 (0.18)	0.46* (0.19)	0.48* (0.19)
Partner sexual restrictions <sup>a</sup>	-0.25 (0.25)	-0.18 (0.26)	0.12 (0.26)	-0.23 (0.27)
Bayesian Information Criterion	1,091	1,128	1,039	1,078
			939	990
				845
				898

Note: Effects are reported in log odds. Parentheses contain standard errors. Bayesian Information Criterion, model with no independent variables, men = 1,144, women = 1,015.

a. Dichotomous variable with 1 = *yes*, 2 = *no*.

b. Variable rated on 5-point scale with 1 = *not at all* and 5 = *extremely*.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 4**  
**Ordinal Logistic Regression Models Predicting Oral Sex**

Regressors	Men				Women			
	Age	Bio	Psy-Soc	All	Age	Bio	Psy-Soc	All
Age (years)	-0.06*** (0.01)	-0.05*** (0.01)	-0.03*** (0.01)	-0.03* (0.01)	-0.06*** (0.01)	-0.08*** (0.01)	-0.02* (0.01)	-0.03* (0.01)
Diagnosis								
Diabetes <sup>a</sup>		0.30 (0.61)		0.18 (0.62)		0.69 (0.65)		-0.34 (0.78)
Hypertension <sup>a</sup>		0.00 (0.52)		-0.10 (0.55)		0.05 (0.64)		-0.74 (0.80)
Arthritis <sup>a</sup>		0.17 (0.30)		0.18 (0.32)		0.32 (0.27)		0.25 (0.31)
Depression <sup>a</sup>		0.86 (0.98)		1.11 (1.26)		0.92* (0.47)		0.89 (0.55)
Benign prostate <sup>a</sup>		0.02 (0.34)		-0.19 (0.36)		—		—
Prostate cancer <sup>a</sup>		-0.62 (0.61)		-0.76 (0.63)		—		—
Gynecological cancer <sup>a</sup>		—		—		0.29 (0.47)		0.20 (0.52)
Treatment								
Diabetes <sup>a</sup>		-0.33 (0.67)		-0.59 (0.69)		-0.38 (0.71)		0.63 (0.83)
Hypertension <sup>a</sup>		-0.05 (0.53)		0.05 (0.56)		-0.04 (0.65)		0.51 (0.81)
Arthritis <sup>a</sup>		-0.51 (0.39)		-0.60 (0.43)		0.34 (0.36)		0.03 (0.40)
Depression <sup>a</sup>		0.03 (1.07)		-0.51 (1.32)		-0.87 (0.62)		-0.52 (0.70)
Benign prostate <sup>a</sup>		0.29 (0.44)		0.68 (0.48)		—		—
Prostate cancer <sup>a</sup>		-0.88 (0.88)		-0.47 (0.91)		—		—
Gynecological cancer <sup>a</sup>		—		—		-0.81 (0.72)		-1.60* (0.84)
Participant sexual restrictions <sup>a</sup>		-1.22*** (0.22)		-0.85*** (0.23)		-0.46 (0.25)		0.24 (0.28)
Sexual attitudes: Self (higher = positive)			0.17 (0.18)	0.14 (0.19)			0.12 (0.16)	0.16 (0.16)
Sexual attitudes: Relationship (higher = negative)			-0.31* (0.14)	-0.36* (0.14)			-0.83*** (0.15)	-0.88*** (0.15)

Sexual desire (1 = <i>not at all</i> , 8 = <i>more than once</i> <i>per day</i> )	0.21*** (0.06)	0.20** (0.07)	0.52*** (0.08)	0.50*** (0.09)
Long relationship (0 = ≤ 20 years, 1 = ≥ 20 years)	-0.15 (0.20)	-0.11 (0.21)	0.20 (0.23)	0.18 (0.25)
Emotionally satisfied <sup>b</sup>	0.12 (0.15)	0.16 (0.16)	0.08 (0.14)	0.09 (0.14)
Physically satisfied <sup>b</sup>	1.03*** (0.15)	0.97*** (0.16)	0.55*** (0.15)	0.59*** (0.16)
Partner sexual restrictions <sup>a</sup>	-0.12 (0.21)	-0.06 (0.22)	-0.81*** (0.22)	-0.73*** (0.24)
Bayesian Information Criterion	1,404	1,394	1,216	1,232
			1,297	1,322
				987
				1,033

Note: Effects are reported in log odds. Parentheses contain standard errors. Bayesian Information Criterion, model with no independent variables, men = 1,454, women = 1,350.

a. Dichotomous variable with 1 = *yes*, 2 = *no*.

b. Variable rated on 5-point scale with 1 = *not at all* and 5 = *extremely*.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 5**  
**Ordinal Logistic Regression Models Predicting Masturbation**

Regressors	Men			Women				
	Age	Bio	P <sub>xy-Soc</sub>	All	Age	Bio	P <sub>xy-Soc</sub>	All
Age (years)	-0.06*** (0.01)	-0.06*** (0.01)	-0.04*** (0.01)	-0.04* (0.01)	-0.05*** (0.01)	-0.05*** (0.01)	-0.03* (0.01)	-0.02* (0.01)
Diagnosis								
Diabetes <sup>a</sup>	-0.49 (0.52)			-0.91 (0.59)		0.59 (0.70)		0.84 (0.76)
Hypertension <sup>a</sup>	-0.21 (0.49)			-0.10 (0.53)		-0.25 (0.59)		-0.48 (0.71)
Arthritis <sup>a</sup>	-0.31 (0.30)			-0.44 (0.33)		0.02 (0.27)		-0.01 (0.30)
Depression <sup>a</sup>	1.16 (0.61)			0.88 (0.64)		-0.38 (0.57)		-0.82 (0.77)
Benign prostate <sup>a</sup>	0.50 (0.29)			0.34 (0.33)		—		—
Prostate cancer <sup>a</sup>	-0.59 (0.54)			-0.28 (0.60)		—		—
Gynecological cancer <sup>a</sup>	—			—		-0.93 (0.62)		-0.79 (0.64)
Treatment								
Diabetes <sup>a</sup>	0.11 (0.59)			0.31 (0.65)		-0.63 (0.75)		-1.05 (0.82)
Hypertension <sup>a</sup>	0.13 (0.51)			0.33 (0.55)		0.10 (0.60)		0.43 (0.72)
Arthritis <sup>a</sup>	-0.18 (0.40)			-0.08 (0.43)		0.31 (0.33)		0.25 (0.36)
Depression <sup>a</sup>	-1.72* (.73)			-1.43 (0.78)		1.05 (0.64)		1.43 (0.83)
Benign prostate <sup>a</sup>	-0.72 (0.40)			-0.57 (0.45)		—		—
Prostate cancer <sup>a</sup>	0.29 (0.72)			0.18 (0.82)		—		—
Gynecological cancer <sup>a</sup>	—			—		0.24 (0.97)		-0.42* (1.04)
Participant sexual restrictions <sup>a</sup>	0.43* (0.21)			0.25 (0.23)		-0.47 (0.29)		-0.55 (0.33)
Sexual attitudes: Self (higher = positive)			0.07 (0.16)	0.01 (0.17)			0.03 (0.14)	0.03 (0.14)
Sexual attitudes: Relationship (higher = negative)			0.31* (0.13)	0.29* (0.13)			0.06 (0.13)	0.06 (0.14)

Sexual desire (1 = <i>not at all</i> , 8 = <i>more than once per day</i> )	0.65*** (0.07)	0.67*** (0.08)	0.54*** (0.08)	0.55*** (0.09)
Long relationship (0 = $\leq 20$ years, 1 = $\geq 20$ years)	-0.33 (0.22)	-0.32 (0.23)	-0.02 (0.28)	-0.02 (0.29)
Emotionally satisfied <sup>b</sup>	0.14 (0.16)	0.14 (0.16)	-0.23 (0.17)	-0.30 (0.18)
Physically satisfied <sup>b</sup>	-0.67*** (0.15)	-0.65*** (0.16)	-0.09 (0.18)	-0.05 (0.19)
Partner sexual restrictions <sup>a</sup>	0.26 (0.23)	0.25 (0.24)	0.80** (0.28)	0.80** (0.29)
Bayesian Information Criterion	1,551	1,406	1,129	1,181
Criterion	1,588	1,451	1,016	1,067

Note: Effects are reported in log odds. Parentheses contain standard errors. Bayesian Information Criterion, model with no independent variables, men = 1,614, women = 1,179.

a. Dichotomous variable with 1 = *yes*, 2 = *no*.

b. Variable rated on 5-point scale with 1 = *not at all* and 5 = *extremely*.

high blood pressure was associated with higher frequency of hugging and kissing for women,  $B = 1.32, p < .05$ , a diagnosis of depression was associated with higher frequency of intercourse for women, and male participants who reported a sexual limitation masturbated more frequently than did male participants who were not limited.

Other effects supported our hypothesis. Among women, a diagnosis of high blood pressure was associated with lower frequency of hugging and kissing,  $B = -1.19, p < .05$ , and a report of sexual limitation was associated with lower frequency of both oral sex and intercourse. Among men, treatment for a benign prostate condition was associated with lower frequency of oral sex, a report of sexual limitation was associated with lower frequency of intercourse, and treatment for depression was associated with lower frequency of masturbation.

*Hypothesis 3:* The interactive effects of participant and partner sexual health limitations.

For women, the interaction term of participant's sexual health limitations and partner's sexual health limitations was not significant for any outcome (Model 5). For men, the interaction term was significant for intercourse,  $B = 1.31, SE = 0.45, p < .01$ . This effect is opposite to the direction hypothesized: Couples with two limited partners have more frequent intercourse than do couples with one or no limited partners. The small number of individuals reporting that both they and their partners suffer limitations (37 women and 50 men) introduces statistical power problems into our analyses; thus our findings should not be regarded as definitive.

*Hypothesis 4:* Negative attitudes toward sexual activity in later life and low sexual desire negatively associated with frequency of sexual activity. Having a healthy sexual partner and being satisfied with that relationship positively associated, long relationships negatively associated with frequency of sexual activity.

In the psychosocial domain (Model 3), positive attitudes toward sexuality for the self and for the relationship and high sexual desire were, in general, associated with more frequent sexual activity, although all three variables were not significant for every outcome. Effect sizes for these three variables tended to be large. None of the three was associated with men's kissing and hugging. For men, negative attitudes toward sex in relationships were associated with higher frequency of masturbation.

Satisfaction with a partner was associated with higher frequency of kissing and hugging (men, emotional:  $B = 0.67, p < .001$ ; men, physical:

$B = 0.37, p < .05$ ; women, emotional:  $B = 0.53, p < .001$ ) and sexual touch in men and in women. Greater physical satisfaction with the relationship was associated with more frequent oral sex for women. Physical satisfaction with the partner was associated with higher frequencies of intercourse for men and for women, and women with healthy partners had more frequent intercourse than did women with sexually limited partners. Both men and women without partners engaged in more frequent masturbation than did men and women with partners. Men who were less physically satisfied with their partners masturbated more often than did men who were more physically satisfied with their partners. Women with sexually limited partners masturbated more frequently than did women with healthy partners. (Note that because of the dummy variable adjustment for the partner variable, the significant physical satisfaction and limited partner coefficients should be interpreted as a significant difference from the means observed for partnered individuals in the data and not as a significant difference from zero.) Men and women in shorter relationships engaged in more frequent oral sex than did men and women in long relationships.

## Discussion

In this study, we found that although age was negatively associated with frequency of partnered and nonpartnered sexual behavior, accounting for biological and psychosocial variables attenuated this effect, as predicted by the biopsychosocial model. Diagnosed illnesses and their associated treatments exerted surprisingly little influence on frequency of sexual behavior. For all five behaviors for men and women, the Bayesian Information Criterion (BIC) goodness of fit statistic indicated that the psychosocial model fit the data far better than did the biological model. Positive attitudes about and desire for sex and having a physically satisfying relationship were strongly associated with greater frequency of sexual behaviors in both men and women.

## Cohort

Our findings support the conclusion of Edwards and Booth (1994) that members of younger cohorts engage in more varied forms of sex than do members of older cohorts. Out of all five behaviors, increasing age was most strongly associated with infrequent oral sex. Whereas only 44% of women and 38% of men ages 45 to 49 reported never having oral sex, more than 75% of men and women in all age groups over 65 reported never

engaging in this behavior. But those over 65 did engage in intercourse, even though intercourse is more physically demanding than oral sex. Furthermore, independent of age, long relationships were significantly negatively associated only with oral sex, such that individuals in relationships shorter than 20 years engaged in more frequent oral sex than did individuals in relationships longer than 20 years. We speculate that younger cohorts view oral sex as a more acceptable and desirable part of the sexual repertoire than older cohorts do.

### **Age, Gender, and Partnership**

In the majority of our analyses, adding biological, psychological, and social variables to the model did not eliminate the significant effect of age. For women, age likely represents biological variables not available for inclusion in the model. For instance, the hormonal changes associated with women's menopause often result in inadequate lubrication and vaginal atrophy, which may cause pain during intercourse (Dennerstein, Dudley, & Burger, 2001). What the remaining age effect represents is less obvious for men, but these may involve an interaction between biological and psychosocial variables. Burgess (2004) notes that in a cultural context that equates men's sexual performance with penile performance, an aging man may believe himself to be an inadequate sexual partner when his penis no longer responds as it did when he was younger.

Few gender differences emerged. Intercourse was strongly and negatively associated with having or being a male partner who had restrictions, and men's restrictions were associated with more frequent masturbation among their partners. Indeed, the presence or absence of a partner was far more influential than gender, supporting the assertion that social network characteristics are relevant to understanding sexual expression. Men and women without partners masturbated more frequently than did persons with partners. The frequency of all partnered behaviors was positively associated with physical satisfaction in the relationship.

### **Representativeness**

Because participants knew the topic of the study before they agreed to respond, the representativeness of our data is an obvious concern. We can compare some of our behavioral data with the results of the National Health and Social Life Survey (NHSLS; Laumann et al., 1994). The NHSLS sample included persons aged 18 to 59 in 1992. We can compare the reported

frequency of masturbation by persons 45 to 59 in the AARP data with those in the NHSLs data. We compared reports by persons 45 to 49, 50 to 54, and 55 to 59 separately for men and women. Both data sets include reports of (at least) weekly masturbation. The reports of men in the two samples are similar, with reports in all three age groups ranging from 31% to 38% (Laumann et al., 1994, Table 3.1). The reports of women are also very similar, ranging from 1% to 9%. Turning to reports of intercourse, men in the three age groups in the AARP sample are more likely to report at least weekly intercourse (56%, 52%, and 57%) than men in the NHSLs (37%, 27%, and 18%; Laumann et al., 1994, Table 3.4). Women in the AARP sample are also more likely to report at least weekly intercourse (55%, 50%, and 40%) than were women in the NHSLs (27%, 20%, and 7%). Thus the results are similar for masturbation, whereas AARP participants report more frequent partnered activity. Differences may be due to mode of data collection (the AARP data were collected via mailed survey; the NHSLs, via face-to-face interviews) and/or to cohort differences. For example, those 50 years of age in the AARP study were born 7 years later than those 50 years of age in the NHSLs. The 50-year-olds born later would be expected to engage in more frequent sex than the 50-year-olds born later (Edwards & Booth, 1994).

A similar comparison can be made with the results the National Council on Aging (NCOA) survey (1998). The survey was conducted by Roper Starch. Questionnaires were mailed to a representative sample on June 19, 1998 and 1,292 completed surveys were returned by August 11, 1998. The margin of error at 95% is +3.5%. We can compare reports of sexual activity at least once a month in the past year for men and women ages 60 to 69 and 70 to 79. For men in the AARP sample, 71% and 64%, respectively, report sexual activity in the past year, compared with 71% and 57% (NCOA, 1998, Table 1a); for women in the AARP sample, the result is 47% and 26%, compared with 51% and 30%. These percentages are quite similar, the largest difference being 7%. These comparisons give us some confidence that the AARP data are representative of older Americans in the 1990s.

## Limitations

Our study has several limitations of note. First, like all sex research, we must rely on self-reports of sexual behavior, although our results are consistent with those reported by others. Second, we rely on secondary data. Variables such as race/ethnicity, religious affiliation, and living arrangements may affect sexual expression, but this information is not available to

us in these data. We have only a measure of depression diagnosis. Study participants without an official diagnosis could have been experiencing depressive symptoms that interfered with sexual functioning. We have many measures of illness but no measures of healthy biological functioning, and the biopsychosocial model posits that health is as influential as illness. Third, more than 99% of the members of the sample were in heterosexual relationships; too few persons reported same-gender partners to allow for analyses. Finally, this study is cross-sectional, and so we cannot determine causal direction. For instance, we may conclude that individuals in satisfying relationships have more sex, or we may conclude that individuals who have more sex are more satisfied with their relationships.

## Conclusions

Our purpose was to test a biopsychosocial model of the influences on sexual expression of men and women over the age of 45. Individuals who are healthy and satisfied with their relationship remain sexually active into their 70s and 80s. The nature of sexual expression in later life reflects the interplay of body, mind, and social context.

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