Please cite the Published Version

Original Article

Sexual Health and Positive Subjective Well-Being in Partnered Older Men and Women

David M. Lee,[1] Bram Vanhoutte,[1] James Nazroo,[1] and Neil Pendleton[2]

[1]Cathie Marsh Institute for Social Research, University of Manchester, Manchester, United Kingdom. [2]Institute of Brain, Behaviour and Mental Health, University of Manchester, Salford, United Kingdom.

Correspondence should be addressed to David M. Lee, PhD, Cathie Marsh Institute for Social Research, Humanities Bridgeford Street, Oxford Road, University of Manchester, Manchester M13 9PL, United Kingdom. E-mail: david.m.lee@manchester.ac.uk.

Abstract

Objectives: We examine the associations between different patterns of sexual behavior and function and three indicators of subjective well-being (SWB) covering eudemonic, evaluative, and affective well-being in a representative sample of partnered older people.

Method: Using data from a Sexual Relationships and Activities Questionnaire (SRA-Q) in Wave 6 of the English Longitudinal Study of Ageing, latent class analysis identified groups characterized by distinctive patterns of sexual behavior and function and then examined their link to SWB. Eudemonic SWB was measured using a revised 15-item version of the CASP-19, evaluative SWB using the Satisfaction With Life Scale, and affective SWB using the 8-item version of the Centre for Epidemiologic Studies-Depression scale.

Results: Sexual behavior and function was best described by six classes among men and five classes among women. These ranged from high sexual desire, frequent partnered sexual activities, and few sexual problems (Class 1) to low sexual desire, infrequent/no sexual activity, and problems with sexual function (Class 5[women]/6[men]). Men and women who reported either infrequent/no sexual activity, or were sexually active but reported sexual problems, generally had lower SWB than those individuals identified in Class 1. Poorer SWB in men was more strongly associated with sexual function difficulties, whereas in women desire and frequency of partnered activities appeared more important in relation to SWB.

Discussion: Within the context of a partnered relationship continuing sexual desire, activity and functioning are associated with higher SWB, with distinctive patterns for women and men.

Keywords: ELSA—Later life—Sexual activity—Sexual function—Well-being

Human sexuality is a universal part of living, and positive sexual relationships and sexual function are increasingly recognized as important indicators of positive health and quality-of-life. Poor self-rated health and chronic health conditions, on the other hand, are associated with decreased sexual activity and functioning among older men and women (Corona et al., 2010; Field et al., 2013; Lee, Nazroo, O'Connor, Blake, & Pendleton, 2016; Lindau et al., 2007). However, little is known about how sexuality is associated with the aging process more

generally and the specific situations people find themselves in when aging.

Positive Health

In recent years, public health policy has increasingly emphasized positive aspects of health, such as subjective well-being (SWB), as a key indicator of successful aging over and above the absence of physical and mental health conditions. From the perspective of a positive health paradigm

(Rosen & Bachmann, 2008), an important question is to what extent do sexual activities and problems, within the context of an intimate partnership, independently associate with an individual's well-being and happiness? In this context, "positive health" focuses less on disorders or dysfunctions, but emphasizes what is required for individuals to achieve wellness and to flourish both physically and mentally (Ryff & Singer, 1998). Conceptually, the relationship between SWB and later-life sexuality cannot be studied without acknowledging the specific circumstances of different later-life stages. Although a period of high functioning in relative good health and wealth, often labeled the Third Age (Laslett, 1987), is becoming commonplace, the next life phase often does include loss of physical health and quality of relationship, resulting in lower SWB (Vanhoutte & Nazroo, 2014). Therefore, we conceptually expect physical health and relationship quality to be a structuring mechanism of sexual experiences in later life, functioning as conditions to enable sexual behavior in later life to lead to higher SWB. If either good physical health or relationship quality is lacking, we would not expect sexuality in later life to have a positive influence on SWB. As there are strong gender disparities in sexual health and satisfaction (Field et al., 2013; Lee et al., 2016), and the relationship between sexual function, health, and partnership is very different for aging men and woman (Lindau et al., 2007), we would perhaps expect to observe differing associations between sexuality and SWB for both genders.

Subjective Well-Being

SWB consists of several distinct but related aspects: eudemonic well-being, related to self-assessed worth, autonomy, control, and purpose in life (Ryff & Singer, 1998); evaluative well-being, based on a global appraisal of satisfaction with life (E. D. Diener, 1994); and affective well-being, characterized by feelings of happiness, sadness, anxiety, or excitement (Tinkler & Hicks, 2011). It has been shown that these different dimensions of well-being emerge as empirically distinct concepts (Vanhoutte, 2014), have different age trajectories, as well as have different determinants (Jivraj, Nazroo, Vanhoutte, & Chandola, 2014). Affective well-being is strongly related with social support (Jivraj et al., 2014), whereas eudemonic well-being is associated closely with physical health (Blane, Netuveli, & Montgomery, 2008), which determines autonomy and control to a large extent. Evaluative well-being is strongly adaptive to more negative changes in circumstances, and as such illustrates the relative nature of SWB (Jivraj et al., 2014). Whether these dimensions of SWB have differential associations with aspects of sexuality among older men and women is currently unknown and is one of the important research questions of this article. Given the importance of health and social support both as contextual constraints on later-life sexuality, the differential determinants of specific types of SWB, and our specific attention to gender, we expect

a detailed pattern of relations to surface in our analysis. For example, as we know problematic male sexuality in later life is more closely associated with health issues, we would perhaps expect a stronger association between male sexual behavior and eudemonic SWB than with evaluative or affective SWB.

Well-Being and Sexuality Among Older Adults

A large-scale survey carried out by the American Association of Retired Persons found that between 55% and 60% of Americans aged 45 years and older believed that sexual activity was an essential element of a satisfactory relationship and quality-of-life for older adults (AARP, 2005). Similar results were found in Wave 1 of the U.S. National Social Life, Health, and Aging Study (NSHAP; Lindau et al., 2007), where more than half of men and women aged 57–74 years reported being sexually active and rated sexual activity as important in their lives. Laumann and colleagues (2006) examined the predictors of sexual well-being (physical/emotional pleasure, sexual satisfaction, importance of sex) and its association with general happiness among 27,500 men and women aged 40–80 years in the Global Study of Sexual Attitudes and Behaviors (GSSAB). They found that all four aspects of sexual well-being were significantly related to general happiness among sexually active people after adjustment for demographic and health factors. Blanchflower and Oswald (2004) also found that frequency of sexual activity was positively associated with happiness among 16,000 randomly sampled men and women older than 40 years taking part in the U.S. General Social Survey. However, the happiness question used here was, again, a single, and questions on sexuality were limited to number of sexual partners in the previous year, frequency of intercourse, and gender of sexual partner(s). Conversely, Prairie and colleagues (Prairie, Scheier, Matthews, Chang, & Hess, 2011) found that higher levels of enjoyment of sexually intimate activities, but not participation in partnered sexual activity per se, was associated with a higher sense of purpose in life in a longitudinal cohort of U.S. women aged 40–65 years.

In this study, we use three measures covering eudemonic, evaluative, and affective well-being to examine the relationship with distinct aspects of sexuality in Wave 6 of the English Longitudinal Study of Ageing (ELSA). We consider that different aspects of sexual behavior and function are likely to be strongly interrelated and have chosen to distinguish meaningful subgroups rather than examining separate items describing sexual activity and function. To achieve this, we used latent class analysis (LCA), a mixture modeling technique that can uncover forms of unobserved heterogeneity in a population (McCutcheon, 1987). We used the ELSA data set to determine whether key patterns of sexual behavior and function were cross-sectionally associated with SWB. Our first hypothesis is that individuals in LCA groups with more frequent sexual

activities and fewer functional problems will have measurably higher eudemonic, evaluative, and affective well-being. We also hypothesize that if such associations are indeed observed they will be attenuated, or perhaps fully explained, by older age, lower educational attainment, poorer general health, and/or inferior relationship quality. Our second hypothesis is that functional sexual problems would be more strongly associated with SWB among men as compared with those among women. This relates to previous studies demonstrating that sexually active men are more concerned about their sexual activities and function than women (Field et al., 2013; Laumann et al., 2005) and, with increasing age, these specific concerns become more prevalent among men and less prevalent among women (Lee et al., 2016).

Method

Participants and Study Design

The data are from Wave 6 (2012/2013) of ELSA, a nationally representative panel survey of community-dwelling men and women aged 50 years and older in England (Steptoe, Breeze, Banks, & Nazroo, 2013). Data collection consisted of a face-to-face interview and self-completion questionnaires. A total of 10,601 individuals participated in Wave 6, with 7,079 (67%) completing and returning the paper-based Sexual Relationships and Activities Questionnaire (SRA-Q). As we were principally interested in the association between sexuality and SWB within the setting of a present partnership, we restricted this analysis to ELSA members who reported they were currently married, in a civil partnership, or cohabiting, leaving 4,296 individuals in the final sample. Item nonresponse was less than 1% for the sexual health and function variables included in this analysis. ELSA Wave 6 received ethical approval from the National Research Ethics Service Committee South Central—Berkshire, United Kingdom, and all participants provided written informed consent.

Outcome Measures

Eudemonic SWB was assessed using an improved 15-item version of the CASP-19 quality-of-life instrument (Hyde, Wiggins, Higgs, & Blane, 2003). The CASP-19 was originally developed to measure positive functioning and subjective quality-of-life in older people covering four domains of individual needs: control, autonomy, self-realization, and pleasure. A eudemonic SWB index is constructed by summing the scores to 4-point Likert scale responses (often, sometimes, not often, and never) for each item. The shortened version used here consists of 15 items from the original CASP-19, resulting in a balanced three-dimensional structure consisting of control and autonomy, self-realization, and pleasure domains previously shown to be the best fitting solution to measure positive functioning and subjective quality-of-life in later life (Vanhoutte, 2014). The summed

scores for the CASP-15 scale range from 0 to 45 where a higher score indicates better subjective quality-of-life.

Evaluative SWB was measured using the Satisfaction With Life Scale (SWLS; E. Diener, Emmons, Larsen, & Griffin, 1985). The SWLS is widely used as a one-dimensional scale for global life satisfaction and, in common with the CASP-15, has Likert scale responses which are summed to provide an overall score. The responses range from *strongly agree* to *strongly disagree* on a 7-point scale resulting in a score ranging from 5 to 35 with higher scores indicating greater life satisfaction.

Although ELSA does not include a specific instrument to measure affective SWB, we used a shortened 8-item version of the Center for Epidemiologic Studies-Depression (CES-D) scale to capture a broader concept of negative affect (Radloff, 1977). CES-D assesses negative affect during the last week through questions which ask about depressive symptoms experienced and has previously shown to perform acceptably as a one-dimensional construct (Vanhoutte, 2014). The questions have binary yes/no responses, which can be summed to give summary scores ranging from 0 to 8. Those with higher scores are considered to show more depressive symptoms.

These three measures reflect empirically distinct aspects of well-being in measurement (Vanhoutte, 2014), determinants (Jivraj et al., 2014), and are reliable across age and gender groups (Vanhoutte & Nazroo, 2014).

Sexual Behavior and Function

The ELSA SRA-Q includes questions on attitudes to sex, frequency of sexual activities, problems with sexual activities and function, concerns and worries about sexual activities, function and relationships, and details about current sexual partnerships. Table 1 summarizes the items from the SRA-Q on sexual activities and function used in this analysis. Participants completed the SRA-Q in private and sealed the questionnaire in an envelope upon completion. The full range of sexuality measures assessed in the SRA-Q and cross-sectional associations with demographic, lifestyle, and health factors have been described previously (Lee et al., 2016). The SRA-Q instrument is available online (www.elsa-project.ac.uk).

Other Control Variables

We included a number of additional variables that have previously been shown to be associated with SWB. Educational attainment was grouped into three categories based on the age an individual first left full-time education; those who left at or before the compulsory school-leaving age that applied in England to their cohort ("low" education,), those who left after compulsory school-leaving age but before age 19 ("mid" education), and those who left at or after age 19 ("high" education). Respondents were also asked to rate how close they perceived their relationship

Table 1. Core Sexuality Indicators

Topic	Response set
Sexual behaviors/activities (…during the past month)	
How often did you think about sex?	7-point scale: "*not at all*" to "*more than once a day.*" Answering several times a week or more was classified as *high*, several times a month to once a week as *medium*, and those stating once a month or less as *low*.
How many times have you had or attempted sexual intercourse (vaginal, anal or oral)?	
How frequently did you engage in other sexual activities (kissing, petting or fondling)?	
How often did you masturbate?	
Sexual functioning (…during the past month)	
How often did you feel sexually aroused during sexual activity?	6-point scale: "*no sexual activity*" and "never" to "always." Women reporting no sexual activity were classified as *none*, those reporting never or a few times as having *difficulties*, and half of the time to always as having *no difficulties*.
Are you able to get or keep an erection which would be good enough for sexual activity?	4-point scale: "always able" to "never able". Men reporting always or usually were classified as having *no difficulties*. The categories *sometimes* and *never* were retained as asked.
When you had sexual stimulation how difficult was it for you to reach orgasm?	5-point scale: "*impossible*" to "*not at all.*" Those reporting very difficult to impossible were classified as having *severe difficulties*, those reporting moderate or slight difficulty were classified as having *some difficulties*, and reporting *no difficulties* was retained as asked.

with their spouse or partner, that is, "very close," "quite close," "not very close," or "not at all close." Self-rated health was ranked on a 5-point scale and coded as "excellent or very good," "good," and "fair or poor." Although questions concerning chronic comorbidities were included in the ELSA main questionnaire, we excluded them from the main models presented here due to the relative lack of contribution as explanatory variables.

Statistical Analysis

All analyses were conducted using STATA SE v13.1 (StataCorp, College Station, TX) and Mplus v7.2 (Muthén & Muthén, 2010). We used LCA to distinguish meaningful subgroups of sexual behavior/function rather than examining separate items. LCA is a mixture modeling technique that can be used to uncover unobserved heterogeneity in a population (McCutcheon, 1987). Our LCA analysis was done using full information maximum likelihood estimation with robust standard errors (multiple linear regression [MLR]). In this estimation method, missingness is handled by assuming that observations are missing at random (MAR). MAR means that missingness can be a function of observed covariates and observed outcomes. An important issue is determining the optimal number of classes in a given population, which depends on both theoretical and empirical grounds. The theoretical emphasis on physical health and the quality of the partner relation as determinants for sexual behavior make us expect at least four classes, with a class scoring low on sexual drive, partnered sex, and masturbation; a class scoring high on all; a class that has a mix of high drive with low partnered sexual behavior, with higher scores on masturbation; and

a class with low drive but high partnered sexual behavior. This was our theoretical expectation, as the last two classes conform more to a sexuality driven by the partner relation, whereas the first two classes are more in line with individual physical health and drive. A more empirical way to decide on the number of classes makes use of a number of statistical indicators. The Bayesian information criterion (BIC), Lo-Mendell-Rubin (LMR) test, and bootstrap likelihood ratio (BLR) test have been highlighted as the most consistent tests (Nylund, Asparouhov, & Muthén, 2007). Though less of a criterion of model selection, but informative on how strict the separation between the classes is, we equally report a measure of classification certainty, entropy. Solutions were estimated using these statistics for models with a different number of classes, and the optimal number of classes should have the lowest BIC value, significant LMR and BLR test statistics ($p < .05$), and ideally a high entropy value.

A stepwise MLR approach was used to examine the association between the different classes of sexual behavior and multiple indicators of SWB by gender. In a first step (Model 1), we explore the association between sexual behavior and function patterns and SWB. In Model 2, we add sociodemographic and health information to the equation, to examine how strongly this background information determines any associations. Model 3 adds self-reported information on how close each respondent perceives their relationship with their partner to be, as we consider that sexual behavior should also be understood in the context of the quality of the partnership. The number of observations in each MLR reflected those men or women with complete data for Models 1 to 3 for each SWB outcome. All regression models were also repeated additionally adjusting for

the five most common comorbidities reported in ELSA, and these results are shown in Supplementary Tables 1–4.

Results

Sample Characteristics

Demographic and health characteristics of the LCA analysis sample are shown in Table 2. The mean CASP-15 and SWLS scores were not significantly different between women and men, but women had significantly higher CES-D scores than men. Although the distribution of self-rated health did not differ significantly by gender, men reported higher educational attainment than women, whereas women were more likely to report that they were less close to their partner than men.

Extraction of Latent Classes

LCAs were conducted that specified four to seven classes. The best fitting model, as indicated by the lowest BIC but having significant LMR and BLR test values, was the six-class model for men and the five-class model for women. In broad strokes our solution of six classes for men and five classes for women confirms our theoretical ideal types. The additional classes are to be found in intermediate positions of "medium" sexual drive or sexual behavior. The entropy

Table 2. Characteristics of Latent Class Analysis Sample

Variable	Men (*n* = 2,134)	Women (*n* = 2,162)
Age, *M* (*SD*) years	66.6 (8.6)	65.0 (7.9)
CASP-15, *M* (*SD*)	34.4 (6.9)	34.7 (7.1)
SWLS, *M* (*SD*)	26.2 (5.8)	26.2 (6.1)
CES-D, *M* (*SD*)	0.9 (1.5)	1.2 (1.7)
	Percentages (95% CI)	
Age (years)		
50–59	22.8 (21.1, 33.1)	26.4 (24.6, 28.3)
60–69	42.0 (40.0, 44.1)	46.4 (44.3, 48.5)
70–79	27.5 (25.6, 29.4)	23.2 (21.5, 25.0)
80 to >90	7.7 (6.6, 8.9)	3.9 (3.2, 4.8)
Educational attainment		
Low education	31.1 (29.2, 7.6)	40.2 (29.2, 33.1)
Mid education	25.4 (23.6, 27.3)	32.2 (30.3, 34.2)
High education	43.5 (41.4, 45.6)	27.6 (25.7, 29.5)
Self-rated general health		
Excellent/very good	44.5 (42.4, 46.6)	45.7 (43.6, 47.8)
Good	32.4 (30.5, 34.4)	33.1 (31.1, 35.1)
Fair/poor	23.1 (21.4, 25.0)	21.2 (19.5, 23.0)
Closeness to partner		
Very close	80.6 (78.8, 82.2)	71.8 (69.9, 73.7)
Quite close	16.1 (14.6, 17.8)	22.4 (20.7, 24.3)
Not very close	3.0 (2.3, 3.8)	5.0 (4.1, 6.0)
Not at all close	0.3 (0.1, 0.6)	0.8 (0.5, 1.2)

Note: CES-D = Center for Epidemiologic Studies-Depression; CI = confidence interval; *M* = mean; *SD* = standard deviation; SWLS = Satisfaction With Life Scale.

value was relatively high for all class solutions reflecting a high certainty of classifying a respondent in a specific cluster. Table 3 summarizes the indicators for class enumeration for our sample.

Table 4 summarizes what type of sexual behavior each class represents, separately by gender. Although this provides an overview of the most probable answers for each item per class, more detailed data with probabilities for each category are in Supplementary Table 5. For men (Table 4), the largest group, Class 1 (29%), consists of those with frequent levels of sexual desire, intercourse, and other partnered sexual activity, a low frequency of masturbation, and no problems with erectile function or reaching orgasm. Class 2 (15%) has a similar profile, although the frequency of desire, intercourse, and other sexual activity is lower, with monthly rather than weekly intercourse being common in this group. Class 3 (19%) regularly has sexual desires, but rarely/never has intercourse, rarely experiences other forms of sexual behavior, and masturbates never or only rarely. Although in general this group can attain an erection, they have some difficulty reaching orgasm. Class 4 (10%) often thinks about sex, but does not engage regularly in partnered forms of sex. Masturbation frequency is relatively high, and this class rarely has functional sexual problems. Class 5 (9%) exhibits regular sexual desire, engages in intercourse and other sexual behavior but not masturbation, and sometimes experiences erectile or orgasmic problems. Class 6 (18%) has low sexual desire, does not engage in or has low levels of sexual activities, and reports severe problems with erectile function and reaching orgasm.

Among women (Table 4), Class 1 (15%) exhibits frequent sexual desire, a relatively high frequency of intercourse and other partnered sexual activity, rare masturbation, and no difficulties with arousal during sexual activity. Reaching orgasm nevertheless is sometimes a problem. Class 2 (10%) does think about sex regularly but rarely/never has intercourse and rarely engages in other forms of partnered sex. Masturbation is regular in this group, and although arousal during sex is problematic, reaching orgasm is not difficult. Class 3 (23%) is similar to Class 1, but with lower sexual desire and frequency of intercourse and other partnered sexual activities. Class 4 (15%) has low sexual desire, still engages regularly in intercourse and frequently in other partnered sexual activity, but has difficulties becoming aroused and reaching orgasm. Class 5 (36%) is the largest group in our sample of partnered woman, and this group is sexually inactive or rarely sexually active.

In summary, most classes describe variations in the frequency of partnered sexual activity. The absence of partnered sexual activities appears to result in more frequent masturbation for some groups (Class 4 [men] and Class 2 [woman]), or abstention for others (Class 3 [men]). In women, a higher frequency of sexual activity with low desire, possibly through partner dominance, appears to be linked to less frequent arousal and difficulties reaching orgasms (Class 4).

Table 3. Latent Class Analysis Model Fitting

Men					Women			
Model	BIC	Entropy	LMR test	BLR test	BIC	Entropy	LMR test	BLR test
Class 4	—	—	—	—	17,797.852	0.822	0.0004	0.00
Class 5	21,008.592	0.775	0.0028	0.00	17,725.533	0.797	**0.0090***	**0.00***
Class 6	20,985.617	0.776	**0.0028***	**0.00***	17,765.680	0.792	0.4479	0.00
Class 7	21,008.334	0.775	0.0028	0.00	—	—	—	—

Notes: BIC = Bayesian information criterion; BLR = bootstrap likelihood ratio; LMR = Lo-Mendell-Rubin.
*$p < .05$.

Table 4. Patterns of Sexual Behavior in Latent Classes

Men	Class size	Desire	Intercourse	Fondling/petting	Masturbation	Erectile function	Orgasm
Class 1	0.29	High	High	High	Low	No difficulties	No difficulties
Class 2	0.15	Medium	Medium	Medium	Low	No difficulties	No difficulties
Class 3	0.19	Medium	Low	Low	Low	No difficulties	Some difficulties
Class 4	0.10	High	Low	Low	High	No difficulties	No difficulties
Class 5	0.09	High	Medium	High	Low	Sometimes able	Some difficulties
Class 6	0.18	Low	Low	Low	Low	Never	Severe difficulties

Women	Class size	Desire	Intercourse	Fondling/petting	Masturbation	Arousal	Orgasm
Class 1	0.15	High	High	High	Low	No difficulties	Some difficulties
Class 2	0.10	Medium	Low	Low	Medium	Difficulties	No difficulties
Class 3	0.23	Medium	Medium	Medium	Low	No difficulties	No difficulties
Class 4	0.15	Low	Medium	High	Low	Difficulties	Some difficulties
Class 5	0.36	Low	Low	Low	Low	None	No difficulties

LCA Sexuality Groups and SWB

Tables 5–7 summarize the results of stepwise multiple regression models, presenting unstandardized coefficients of the associations between classes of sexual behavior and each SWB outcome separately by gender. Latent Class 1, which is the class with the most frequent partnered sexual activity, rare masturbation, and few functional difficulties, is taken as the reference group.

Subjective Quality-of-Life (CASP-15)

Compared with frequently sexually active men, those with low sexual activity (Classes 3 and 6) experience a markedly lower subjective quality-of-life, whereas men with regular sexual activity but some functional difficulties (Class 5), and with frequent masturbation without intercourse (Class 4), also had a significantly lower quality-of-life (Table 5; Model 1). Older age and poorer health (Table 5; Model 2) appeared to explain a large share of the negative effect on quality-of-life for those belonging to a class with low sexual activity (Classes 3 and 6). Educational level did not have an independent association with men's quality-of-life. Including closeness to partner (Table 5; Model 3), which had a large independent relationship with quality-of-life, further attenuated the associations such that only men reporting low sexual activities and some functional difficulties (Classes

3 and 6) scored significantly lower on the CASP-15 than men in Class 1.

Subjective quality-of-life in women is also associated with sexual behavior. Compared with women who frequently engaged in partnered sex (Class 1), women with low sexual activity (Class 5) and with infrequent partnered sex (Class 2) had the lowest CASP-15 scores (Table 5; Model 1). Women who regularly engaged in partnered sexual activities, but had low desire and some functional difficulties (Class 4), also had a significantly lower quality-of-life, as did the group that had medium sexual activity and no functional difficulties (Class 3). Adjusting for age, health, and education (Table 5; Model 2) attenuated the associations with the CASP-15 scores. Similar associations were observed between age and health, and quality-of-life for women as seen in men, although in contrast to men, more highly educated women had higher CASP-15 scores. Self-reported closeness to partner was strongly associated with quality-of-life in women and markedly reduced the associations between the different sexual behavior/function groups and the CASP-15 score, resulting in only Classes 2, 4, and 5 remaining independently associated with poorer quality-of-life.

Satisfaction With Life Scale

Men who did not engage, or engaged infrequently, in partnered sexual activities (Classes 3, 4, and 6) scored

Table 5. Association of LCA Sexuality Groups With Quality-of-Life: Linear regressions With Unstandardized Regression Coefficients (*b*) and Standard Errors

	CASP-15 (Men)						CASP-15 (Women)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
LCA group (Ref. Class 1)												
Class 2	−0.71	0.47	−0.78	0.43	−0.57	0.42	−3.10***	0.69	−3.00***	0.63	−1.55**	0.59
Class 3	−3.31***	0.44	−2.74***	0.42	−1.88***	0.41	−1.12*	0.54	−0.96	0.49	−0.70	0.46
Class 4	−1.74**	0.54	−1.66**	0.49	−0.79	0.48	−2.53***	0.58	−2.20***	0.53	−1.37**	0.50
Class 5	−1.64**	0.56	−1.10*	0.53	−0.91	0.51	−3.47***	0.49	−2.53***	0.47	−1.35**	0.45
Class 6	−4.19***	0.45	−2.72***	0.48	−2.31***	0.46	—		—		—	
Age			0.11***	0.02	0.10***	0.02			0.07***	0.02	0.04*	0.02
Age²			−0.01***	0.002	−0.01***	0.001			−0.01***	0.002	−0.01***	0.002
Self-rated health (Ref. Excellent/Very good)												
Good			−2.76***	0.31	−2.71***	0.30			−2.64***	0.33	−2.74***	0.31
Fair/poor			−6.92***	0.37	−6.82***	0.35			−6.84***	0.39	−6.61***	0.36
Educational level (Ref. Low)												
Mid			−0.72*	0.37	−0.69*	0.35			−0.14	0.35	−0.17	0.32
High			0.53	0.36	0.46	0.31			1.14**	0.36	1.18**	0.34
Close to partner (Ref. Very close)												
Quite close					−3.95***	0.36					−3.40***	0.33
Not very close					−5.69***	0.77					−8.57***	0.62
Not at all close					−12.26***	2.36					−11.74***	1.55
_cons	36.29***	0.28	31.27***	1.28	33.01***	1.23	37.05***	0.43	34.86***	1.36	36.95***	1.27
R²	.06		.22		.29		.03		.19		.30	
n	2,004		2,004		2,004		2,000		2,000		2,000	

Notes: LCA = latent class analysis; SE = standard error.
Model 1: unadjusted; Model 2: adjusted for age, health, and educational level; Model 3: additionally adjusted for closeness to partner.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 6. Association of LCA Sexuality Groups With Life Satisfaction: Linear Regressions With Unstandardized Regression Coefficients (*b*) and Standard Errors

	SWLS (Men)						SWLS (Women)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
LCA group (Ref. Class 1)												
Class 2	0.12	0.41	−0.13	0.39	0.08	0.37	−2.77***	0.59	−2.74***	0.56	−1.24*	0.52
Class 3	−1.85***	0.37	−1.92***	0.37	−1.13**	0.36	−1.29*	0.46	−1.19**	0.44	−0.87*	0.40
Class 4	−1.17*	0.47	−1.17**	0.44	−0.34	0.42	−1.73***	0.49	−1.62**	0.47	−0.70	0.43
Class 5	−0.20	0.48	−0.25	0.47	−0.05	0.45	−2.57***	0.42	−2.33***	0.42	−1.14**	0.39
Class 6	−1.50***	0.38	−1.41**	0.42	−1.00*	0.40	—		—		—	
Age			0.15***	0.02	0.13***	0.02			0.08***	0.02	0.06***	0.02
Age²			−0.01***	0.001	−0.01***	0.001			−0.002	0.002	−0.003	0.001
Self-rated health (Ref. Excellent/Very good)												
Good			−1.89***	0.28	−1.85***	0.26			−1.43***	0.29	−1.55***	0.27
Fair/poor			−4.66***	0.32	−4.61***	0.31			−4.56***	0.35	−4.31***	0.32
Educational level (Ref. Low)												
Mid			−0.97**	0.32	−0.97**	0.31			−0.73*	0.31	−0.73**	0.28
High			−0.09	0.29	−0.12	0.27			0.30	0.32	0.39	0.29
Close to partner (Ref. Very close)												
Quite close					−3.56***	0.31					−4.00***	0.28
Not very close					−6.20***	0.69					−8.02***	0.54
Not at all close					−8.41***	2.31					−12.96***	1.36
_cons	27.02***	0.24	19.76***	1.14	21.07***	1.09	28.09***	0.36	24.45***	1.20	26.53***	1.10
R²	.02		.14		.22		.02		.11		.27	
n	2,042		2,042		2,042		2,057		2,057		2,057	

Notes: LCA = latent class analysis; SE = standard error; SWLS = Satisfaction With Life Scale.

Model 1: unadjusted; Model 2: adjusted for age, health, and educational level; Model 3: additionally adjusted for closeness to partner.

*p < .05. **p < .01. ***p < .001.

Table 7. Association of LCA Sexuality Groups With Depressive Symptoms: Linear Regressions With Unstandardized Regression Coefficients (*b*) and Standard Errors

	CES-D (Men)						CES-D (Women)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
LCA group (Ref. Class 1)												
Class 2	−0.06	0.10	−0.05	0.10	−0.05	0.10	0.69***	0.17	0.67***	0.16	0.44**	0.15
Class 3	0.25*	0.10	0.17	0.09	0.09	0.09	0.01	0.13	−0.01	0.12	−0.05	0.12
Class 4	0.09	0.12	0.08	0.11	−0.03	0.11	0.41**	0.14	0.37**	0.13	0.24	0.13
Class 5	0.35**	0.12	0.25*	0.12	0.23	0.12	0.44***	0.12	0.29*	0.12	0.11	0.11
Class 6	0.41***	0.10	0.19	0.11	0.15	0.11	—		—		—	
Age			−0.02***	0.005	−0.02***	0.004			−0.02***	0.01	−0.02*	0.01
Age²			0.001*	0.0003	0.001*	0.00			0.001**	0.0004	0.001**	0.00
Self-rated health (Ref. Excellent/Very good)												
Good			−0.34***	0.07	0.34***	0.07			0.42***	0.08	0.44***	0.08
Fair/Poor			1.41***	0.08	1.40***	0.08			1.61***	0.10	1.58***	0.09
Educational level (Ref. Low)												
Mid			0.07	0.08	0.07	0.08			−0.01	0.09	−0.01	0.08
High			−0.14*	0.07	−0.15*	0.07			−0.14	0.09	−0.15	0.09
Close to partner (Ref. Very close)												
Quite close					0.12	0.08					0.56***	0.08
Not very close					1.40***	0.18					1.22***	0.16
Not at all close					2.18***	0.56					2.13***	0.41
_cons	0.68***	0.06	1.85***	0.29	1.71***	0.29	0.93***	0.10	1.70***	0.33	1.40***	0.33
R²	.01		.16		.19		.02		.15		.19	
n	2,064		2,064		2,064		2,097		2,097		2,097	

Notes: CES-D = Center for Epidemiologic Studies-Depression; LCA = latent class analysis; SE = standard error.
Model 1: unadjusted; Model 2: adjusted for age, health, and educational level; Model 3: additionally adjusted for closeness to partner.
*p < .05. **p < .01. ***p < .001.

significantly lower in terms of life satisfaction than men in Class 1 (Table 6; Model 1). The largest reduction in life satisfaction was for those men who reported medium desire, low sexual activity, and some difficulties with orgasm (Class 3). The associations of both Classes 3 and 6 with life satisfaction remained largely unchanged after controlling for age, health, and education (Table 6; Model 2), but were more markedly attenuated when closeness to partner was taken into account. Although men with low partnered sexual activity but who masturbated frequently (Class 4) had lower life satisfaction than those in Class 1, this difference became nonsignificant when closeness to partner was considered (Table 6; Model 3).

Sexual behavior and function was consistently associated with life satisfaction in women. Compared with women who frequently engaged in partnered sex and had few functional difficulties (Class 1), all other patterns of sexual behavior and function report significantly lower life satisfaction (Table 6; Model 1). Adjusting for age, health, and education did not substantially change the magnitude of these associations (Table 6; Model 2). For women who had low desire but engaged in partnered sex regularly (Class 4), the negative association with life satisfaction was no longer significant after accounting for closeness to partner, whereas for the other groups, this attenuation was considerable (Table 6; Model 3).

Depressive Symptoms (CES-D)

Compared with men in Class 1, significantly higher CES-D scores (Table 7; Model 1) were observed among men reporting some orgasmic difficulties (Class 3) or difficulties with both erectile function and orgasm (Classes 5 and 6), independent of the pattern of sexual activities. For men with medium desire, low sexual activities and orgasmic problems (Class 3), and men with low desire, low sexual activities and erectile/orgasmic problems (Class 6), the association with depressive symptoms became nonsignificant after adjustment for age, health, and education (Table 7; Model 2). Following additional adjustment for closeness to partner (Table 7; Model 3), the association between Class 5 (sexually active men reporting high desire and difficulties with both erectile function and orgasm) and depressive symptoms also became nonsignificant.

For women, having medium desire but low partnered sexual activities (Class 2) had a strong positive association with depressive symptoms (Table 7; Model 1), which was attenuated slightly by taking into account age, health, and education (Model 2), and more substantially by adjusting for closeness to partner (Model 3). The association of low desire and low sexual activity (Class 5) with the CES-D score was partly explained by health status, but mainly by closeness to partner. The positive relation between depressive symptoms and low desire but regular partnered sexual activity (Class 4) was also explained predominately by closeness to partner.

Discussion

This is the first nationally representative survey to examine associations between key patterns of sexuality and positive SWB among older men and women in England. Previous observational studies have tended to focus on narrow measures of happiness and limited items asking about satisfaction with sexual life, perceived importance of sexual activity, and frequency of sexual activities (AARP, 2005; Blanchflower & Oswald, 2004; Laumann et al., 2006). We elected to utilize an LCA approach to define meaningful groups of sexual activity and function, rather than to examine separate associations between individual items from the ELSA SRA-Q and SWB. This approach has the advantage of taking into account inherent interrelationships between various aspects of sexual behaviors and function, thereby reflecting different patterns of sexuality as parsimoniously as possible.

Overall, we found that those reporting higher sexual desire, more frequent partnered sexual activities, and fewer functional problems had more favorable scores on the measures of SWB used here. This supports our first hypothesis that such individuals would have measurably higher eudemonic, evaluative, and affective well-being, although adjustment for demographic, health, and interpersonal factors attenuated, or rendered insignificant, some of these associations. Our findings add to the evidence base that favorable sexual health and positive intimate relationships appear to convey tangible benefits in terms of better quality of life and SWB, over and above satisfaction with one's sexual life. Although previous studies have examined predictors of sexual well-being (Laumann et al., 2006) or associated simple measures of happiness with frequency of sexual activities (Blanchflower & Oswald, 2004), our findings more fully integrate the importance of frequency of activities, functional problems, and relationship quality and highlight the utility of considering sexuality in the broader context of overall health and well-being.

Gendered Findings

The only consistent gender similarities in the patterns of association between sexuality and SWB were observed among men and women who reported the lowest levels of sexual activity and some degree of functional difficulties. These respondents had significantly lower scores on both the eudemonic (CASP-15) and evaluative (SWLS) outcomes in our fully adjusted models. This possibly reflects the observation that the CASP-15 is associated closely with physical health which in turn determines autonomy and control to a large extent (Blane et al., 2008). Evaluative well-being is strongly adaptive to more negative changes in circumstances (Jivraj et al., 2014) and in the context of sexuality may indicate reaction to declining sexual health and functioning.

In contrast, patterns of sexual health that included problems with sexual functioning were only associated with poorer eudemonic and evaluative SWB in men. Among

sexually active women, those reporting difficulties with both arousal and orgasm (Class 4) reported only lower subjective quality-of-life. This is in general agreement with our second hypothesis (functional sexual problems would be more strongly associated with SWB among men) and also with earlier findings in ELSA where poor sexual functioning was more strongly associated with greater concerns about and dissatisfaction with overall sex life in men than women (Lee et al., 2016). Men who reported medium desire but low levels of sexual activity also reported significantly poorer eudemonic and evaluative SWB, whereas among women, lower scores in these SWB dimensions were associated with medium desire, low partnered sexual activities, medium levels of masturbation, and problems with arousal. The association between affective SWB (CES-D) and patterns of sexuality was different again. For men, higher depressive symptoms were most strongly associated with high desire, high or medium partnered sexual activities (Class 5), and the presence of functional problems when age, health, and education were taken into account. However, following additional adjustment for closeness to partner, the association with affective SWB became nonsignificant. Among women, those reporting medium desire and masturbation but low partnered sexual activities had the worst affective SWB scores (Class 2). After controlling for age, health, and closeness to partner, a significantly higher CES-D score was only observed in this group of women. Indeed, significantly poorer scores for the eudemonic and affective measures of SWB were also observed for women in Class 2 (after controlling for age, health, and closeness to partner). This conceivably reflects sexual dissatisfaction in this group of women with regard to the frequency of their partnered activities, but unfulfilled by higher levels of masturbation.

Whether the low frequency of partnered sexual activities was primarily due to individual sexual problems or sexual problems of the male partner, or both, remains unknown. Nonetheless, our data strongly indicate that unfulfilled desire is associated with poorer SWB in both men and women. Interestingly, Lindau and colleagues (2007) observed that the main reason given for the lack of sexual activity by men and women who had a partner was the poor health of the man. Earlier studies have also highlighted that older women are interested in continuing their sexual activity (Woloski-Wruble, Oliel, Leefsma, & Hochner-Celnikier, 2010), and the sexual unresponsiveness of an intimate partner was significantly associated with both women's and men's depressive symptoms (Hirayama & Walker, 2011).

Self-Rated Health and Relationship Closeness

The inclusion of both self-rated health and reported closeness to partner in our multiple regression models appeared to have a major attenuating influence on the associations between patterns of sexuality and SWB. The negative influence of fair or poor self-rated health on SWB appeared

similar in magnitude between genders, although when comorbidities were included in the model these only had an independent association with SWB in women (Supplementary Tables 2–4). The attenuating influence of reported closeness to partner was also similar between genders, but was perhaps more evident when considering life satisfaction in women as compared with men. Woloski-Wruble and colleagues (2010) observed among a convenience sample of postmenopausal women that good and open communication with partners regarding sex was delineated as an important part of their sexual satisfaction. Other studies have reported that women tend to describe intimacy in broader terms than just sexual intercourse as compared with men (Clarke, 2006; Penteado, Fonseca, Bagnoli, Assis, & Pinotti, 2003).

Limitations, Future Directions, and Conclusion

The main strengths of ELSA are its large, nationally representative community-based sample covering midlife to the oldest-old, not recruited explicitly to answer questions on their sexual health. Although limitations of the study have been described previously (Steptoe et al., 2013), certain factors need to be highlighted here. ELSA did not oversample ethnic or sexual minorities, and the results presented here may not be generalizable to these groups. Our data were self-reported and, although the interview methods have accepted validity (Fenton, Johnson, McManus, & Erens, 2001), we cannot exclude reporting bias. We chose to restrict our analysis to include only partnered men and women. Although this clearly delimits the generalizability of our findings, we decided on this approach to maintain a specific focus on the potential contribution of "coupled" sexual activities on SWB. Those partnered ELSA participants who did not complete the SRA-Q may not have done so due to pre-existing sexual problems, the lack of a sexual partner, and/or feeling that they were "retired" from sex. Briefly, those in ELSA Wave 6 who declined to complete the SRA-Q were slightly older (68.1 vs 66.5 years; Lee et al., 2016), and it is possible, therefore, that our results are predicated toward more sexually active individuals. Our analyses were also unable to directly contrast the magnitude of gender differences in the patterns documented here, given the difficulty in comparing coefficients from nonnested models across different samples. However, we are currently undertaking dyadic analyses on a subset of the ELSA sample identifiable as married or cohabiting to substantiate our, as yet, statistically untested conclusions. ELSA only sampled community-dwelling older adults, and extrapolating our findings to the management of older couples' sexual health within institutionalized care settings should be done with caution. Finally, the cross-sectional data preclude any examination of temporality, and we cannot distinguish to what degree age-associated changes in sexuality and well-being reflect aging-related or age cohort (generation) effects.

Overall, our findings broadly agree with earlier studies examining the association between sexuality and well-being, although the ELSA data permit a more detailed analysis of the relationship between distinct patterns of sexuality as identified using LCA and a broad assessment of positive SWB. Characterizing the distinctive correlates of positive SWB in later life remains an important goal, and our findings are pertinent to the increasing evidence base that positive SWB is associated with health-related outcomes independently of depression and psychological distress (Boehm, Peterson, Kivimaki, & Kubzansky, 2011; Chida & Steptoe, 2008; Steptoe, Deaton, & Stone, 2015; Steptoe, Demakakos, de Oliveira, & Wardle, 2012; Steptoe & Wardle, 2011, 2012). That lower levels of sexual activity and sexual problems are negatively associated with SWB independently of other demographic, health, and relational factors suggests that improving sexual health care for older people would not only be worthwhile in its own right but may confer broader health benefits over and above sexual outcomes. Recognizing that sexual health may be an unspoken quality-of-life issue for older individuals could also improve the relationship between physician and patients, with better outcomes for the latter. Future waves of ELSA will also include the SRA-Q instrument, facilitating an examination of the temporal relationships between sexual health and SWB.

Better sexual health and functioning was associated with positive SWB, largely independent of demographic, health, and relational factors. The well-being of older people is important, and evidence suggests that SWB is relevant to health and quality-of-life as people age. Our data suggest that the sexual health of older people should not be overlooked in the broader context of maintaining well-being during aging. The gender differences we observed have important implications for individual care within the context of an intimate partnership, suggesting that the management of older married or cohabiting couples' sexual health to improve quality-of-life and well-being would be best served by involving both partners.

Supplementary Material

Please visit the article online at http://gerontologist.oxford-journals.org/ to view supplementary material.

Funding

Acknowledgments

References

AARP. (2005). Sexuality at midlife and beyond: 2004 Update of attitudes and behaviors. Retrieved from http://assets.aarp.org/rgcenter/general/2004_sexuality.pdf

Blanchflower, D. G., & Oswald, A. J. (2004). Money, sex and happiness: An empirical study. *Scandinavian Journal of Economics*, **106**, 393–415. doi:10.1111/j.1467-9442.2004.00369.x

Blane, D., Netuveli, G., & Montgomery, S. M. (2008). Quality of life, health and physiological status and change at older ages. *Social Science and Medicine*, **66**, 1579–1587. doi:10.1016/j.socscimed.2007.12.021

Boehm, J. K., Peterson, C., Kivimaki, M., & Kubzansky, L. (2011). A prospective study of positive psychological well-being and coronary heart disease. *Health Psychology*, **30**, 259–267. doi:10.1037/a0023124

Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine*, **70**, 741–756. doi:10.1097/PSY.0b013e31818105ba

Clarke, L. H. (2006). Older women and sexuality: Experiences in marital relationships across the life course. *Canadian Journal on Aging-Revue Canadienne Du Vieillissement*, **25**, 129–140. doi:10.1353/cja.2006.0034

Corona, G., Lee, D. M., Forti, G., O'Connor, D. B., Maggi, M., O'Neill, T. W., . . . EMAS Study Group. (2010). Age-related changes in general and sexual health in middle-aged and older men: Results from the European Male Ageing Study (EMAS). *The Journal of Sex Medicine*, **7**, 1362–1380. doi:10.1111/j.1743-6109.2009.01601.x

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personal Assessment*, **49**, 71–75. doi:10.1207/s15327752jpa4901_13

Diener, E. D. (1994). Assessong subjective well-being: Progress and opportunities. *Social Indicators Research*, **31**, 103–157. doi:10.1007/BF01207052

Fenton, K. A., Johnson, A. M., McManus, S., & Erens, B. (2001). Measuring sexual behaviour: Methodological challenges in survey research. *Sexually Transmitted Infections*, **77**, 84–92.

Field, N., Mercer, C. H., Sonnenberg, P., Tanton, C., Clifton, S., Mitchell, K. R., … Johnson, A. M. (2013). Associations between health and sexual lifestyles in Britain: Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *Lancet*, **382**, 1830–1844. doi:10.1016/S0140-6736(13)62222-9

Hirayama, R., & Walker, A. J. (2011). When a partner has a sexual problem: Gendered implications for psychological well-being in later life. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **66**, 804–813. doi:10.1093/geronb/gbr102

Hyde, M., Wiggins, R. D., Higgs, P., & Blane, D. B. (2003). A measure of quality of life in early old age: The

theory, development and properties of a needs satisfaction model (CASP-19). *Aging and Mental Health*, **7**, 186–194. doi:10.1080/1360786031000101157

Jivraj, S., Nazroo, J., Vanhoutte, B., & Chandola, T. (2014). Aging and subjective well-being in later life. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **69**, 930–941. doi:10.1093/geronb/gbu006

Laslett, P. (1987). The emergence of the third age. *Ageing and Society*, **7**, 133–160. doi:10.1017/S0144686X00012538

Laumann, E. O., Nicolosi, A., Glasser, D. B., Paik, A., Gingell, C., Moreira, E., . . . GSSAB Investigators' Group. (2005). Sexual problems among women and men aged 40–80 y: Prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. *International Journal of Impotence Research*, **17**, 39–57. doi:10.1038/sj.ijir.3901250

Laumann, E. O., Paik, A., Glasser, D. B., Kang, J. H., Wang, T., Levinson, B., … Gingell, C. (2006). A cross-national study of subjective sexual well-being among older women and men: Findings from the Global Study of Sexual Attitudes and Behaviors. *Archives of Sexual Behavior*, **35**, 145–161. doi:10.1007/s10508-005-9005-3

Lee, D. M., Nazroo, J., O'Connor, D. B., Blake, M., & Pendleton, N. (2016). Sexual health and well-being among older men and women in England: Findings from the English Longitudinal Study of Ageing. *Archives of Sexual Behavior*, **45**, 133–144. doi:10.1007/s10508-014-0465-1

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. *The New England Journal of Medicine*, **357**, 762–774. doi:10.1056/NEJMoa067423

McCutcheon, A. L. (1987). Sexual morality, pro-life values, and attitudes toward abortion: A simultaneous latent structure analysis for 1978–1983. *Sociol Methods and Research*, **16**, 256–275.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo Simulation Study. *Structural Equation Modeling*, **14**, 535–569.

Penteado, S. R., Fonseca, A. M., Bagnoli, V. R., Assis, J. S., & Pinotti, J. A. (2003). Sexuality in healthy postmenopausal women. *Climacteric*, **6**, 321–329.

Prairie, B. A., Scheier, M. F., Matthews, K. A., Chang, C. C., & Hess, R. (2011). A higher sense of purpose in life is associated with sexual enjoyment in midlife women. *Menopause*, **18**, 839–844. doi:10.1097/gme.0b013e31820befca

Radloff, L. S. (1977). The CES-D Scale. *Applied Psychological Measurement*, **1**, 385–401. doi:10.1177/014662167700100306

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. doi:10.1080/00926230802096234

Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry*, **9**, 1–28. doi:10.1207/s15327965pli0901_1

Steptoe, A., Breeze, E., Banks, J., & Nazroo, J. (2013). Cohort profile: The English Longitudinal Study of Ageing. *International Journal of Epidemiology*, **42**, 1640–1648. doi:10.1093/ije/dys168

Steptoe, A., Deaton, A., & Stone, A. A. (2015). Subjective wellbeing, health, and ageing. *Lancet*, **385**, 640–648. doi:10.1016/S0140-6736(13)61489-0

Steptoe, A., Demakakos, P., de Oliveira, C., & Wardle, J. (2012). Distinctive biological correlates of positive psychological well-being in older men and women. *Psychosomatic Medicine*, **74**, 501–508. doi:10.1097/PSY.0b013e31824f82c8

Steptoe, A., & Wardle, J. (2011). Positive affect measured using ecological momentary assessment and survival in older men and women. *Proceedings of the National Academy of Sciences of the USA*, **108**, 18244–18248. doi:10.1073/pnas.1110892108

Steptoe, A., & Wardle, J. (2012). Enjoying life and living longer. *Archives of Internal Medicine*, **172**, 273–275. doi:10.1001/archinternmed.2011.1028

Tinkler, L., & Hicks, S. (2011). *Measuring subjective well-being.* London, UK: Office for National Statistics.

Vanhoutte, B. (2014). The multidimensional structure of subjective well-being in later life. *The Journal of the Economics of Ageing*, **7**, 1–20. doi:10.1007/s12062-014-9092-9

Vanhoutte, B., & Nazroo, J. (2014). Cognitive, affective and eudemonic well-being in later life: Measurement equivalence over gender and life stage. *Sociological Research Online*, **19**. doi:10.5153/Sro.3241

Woloski-Wruble, A. C., Oliel, Y., Leefsma, M., & Hochner-Celnikier, D. (2010). Sexual activities, sexual and life satisfaction, and successful aging in women. *The Journal of Sex Medicine*, **7**, 2401–2410. doi:10.1111/j.1743-6109.2010.01747.x