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## Online Pornography Use and Sexual Satisfaction in Association With Relationship Satisfaction Among Middle-Aged and Older People

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### Abstract

*After the age of 50, the frequency of partnered sex decreases, and coping strategies for dealing with this change may vary as people reach later adulthood. To date, little is known about how access to partnered sex, satisfaction with sexual frequency, and pornography use are related to relationship satisfaction in middle-aged and older adults. Using a convenient sample of internet users aged 50–96 (N = 693; 55.6% men), we estimated a hierarchical regression model for two groups: middle-aged (age 50–64) and older adults (age 64–96). Satisfaction with sexual frequency was the strongest predictor of relationship satisfaction in both mid and later adulthood. However, using pornography online showed a small negative effect on relationship satisfaction only in middle-aged adults. The findings show that, despite the known tendency of older people to reassess the importance of later-life sex, satisfaction with sexual frequency remains an important factor for relationship satisfaction in both mid and later adulthood.*

**Keywords:** ageing; elderly people; sexuality; relationship; satisfaction; online pornography; the Czech Republic

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## Introduction

There is a consensus that the frequency of engaging in partnered sexual activities generally decreases with age. Deteriorating health, especially chronic diseases, can be a substantial explanation for this decline (DeLamater et al., 2019; Fischer et al., 2018; Tong & Waite, 2020; Træen et al., 2018) because they negatively influence sexual functioning, particularly the physical responses associated with erections in men. Therefore, engagement in penetrative sexual activities and the experience of sexual satisfaction may be affected (Geerkens et al., 2020; Kouidrat et al., 2017; Palacios et al., 2019). People over 50 (i.e., middle-aged and older persons) who encounter these difficulties (Field et al., 2013) may reconstruct the importance of partnered sex (e.g., put a greater focus on intimacy), seek help for sexual problems, change partnered sexual practices, or engage in other sexual activities, such as watching online pornography (Ballester-Arnal et al., 2021; Gore-Gorszewska, 2021; Gott & Hinchliff, 2003; Hinchliff et al., 2018; Ševčíková & Sedláková, 2020). The present study aims to examine how partnered sex, satisfaction with the frequency of sexual activities, and online pornography use, including masturbation, are linked to relationship satisfaction in mid and later life.

Some studies show that a decrease in sexual frequency is linked to a lower level of sexual satisfaction or, on the contrary, to a decrease in the perceived importance of sex. Both lead to less concern about the amount of sexual

interaction (DeLamater, 2012; del Mar Sánchez-Fuentes & Sierra, 2015; Galinsky et al., 2014; Kim & Jeon, 2013). Perceiving sex as less important is likely to be more common among those without a partner, while both older men and women within couple relationships tend to report that their sexual life lacks quality to an equal level (Galinsky et al., 2014). Notably, the subjective perception of a between-partner discrepancy in sexual interest and frequency, followed by masturbation, has been linked to the decrease of sexual satisfaction (Fischer et al., 2020, 2021, Gillespie, 2017). In addition, not being satisfied with the frequency of having partnered sex within the couple relationship decreases the probability for sexual satisfaction (Heywood et al., 2018).

Sexual satisfaction and satisfaction with the frequency of partnered sex have been shown to be closely linked to overall relationship satisfaction. According to several population-based studies, people who are satisfied with their relationship are likely to describe their sex-life as satisfying (DeLamater et al., 2008; Fleishman et al., 2020; Kontula & Haavio-Mannila, 2009; Woloski-Wruble et al., 2010). This has also been observed in couples aged 60+ (Fischer et al., 2018; Fleishman et al., 2020; Rahn et al., 2020). Some studies suggest that having sex with a partner has an integral function for relationships and represents a way to express commitment and love (Hinchliff & Gott, 2004, 2008; Landis et al., 2013). The absence of partnered sex, perhaps associated with sexual and health problems related to aging, could, in turn, be associated with relationship problems such that it potentially leads to a decrease in relationship satisfaction (Rosen et al., 2016; Ševčíková & Sedláková, 2020).

Nonetheless, there are studies that suggest that changes in a couple's sex life may not necessarily negatively affect their sexual satisfaction. There seem to be two possible explanations for this. For example, some tend to reframe the meaning of sex (Connor et al., 2023; Freak-Poli & Malta, 2020) in a way that penetrative sex is given less importance in contrast to alternative sexual activities (Erens et al., 2019). Later-life sexual expressions may take on other forms, like holding hands, hugging, kissing, touching intimate parts, and oral sex. This change can become a fully satisfying source of intimacy, connection, and bonding (Connor et al., 2023; Fileborn et al., 2017; Freak-Poli & Malta, 2020; Tetley et al., 2018; Træen et al., 2019; Waite & Das, 2010). Changing sexual activities may help to maintain sexual satisfaction (Tetley et al., 2018). Another explanation suggests that some couples reassess the importance of partnered sex. Several studies have shown that the incongruence in sexual frequency may be reduced by devaluating the importance of sex within couple relationships (Gott & Hinchliff, 2003; Lodge & Umberson, 2012; Ševčíková & Sedláková, 2020). According to Lodge and Umberson (2012), this is especially true for older couples in longer-term relationships. Reduced sexual activities within the relationship, may lead to an increase in the presence of caring behavior, shared activities, and social interactions, and reciprocal support may become more important for expressing closeness and partner exclusivity (Hinchliff & Gott, 2004; Riekkola et al., 2019). Moreover, a link between sexual satisfaction and relationship satisfaction in mid and later life might be complex because sexual frequency decreases with age and relationship length (Morton & Gorzalka, 2015; Waite & Das, 2010), while relationship satisfaction may increase in older couples along with relationship duration (Fallis et al., 2016; Heiman et al., 2011; Jose & Alfons, 2007).

In addition, the association between sexual satisfaction and relationship satisfaction in mid and later life might be even more complex due to the increasing number of older internet users (Hunsaker & Hargittai, 2018) who use the internet for sexual purposes. Because of the easy access to online pornography, its use is prevalent among older people (Ballester-Arnal et al., 2021; Scandurra et al., 2022; Ševčíková et al., 2021; Træen et al., 2018). Identifying the role of online pornography in the relationships of adults aged 50+ is important for the establishment of clinical practices, where the emphasis on partner privacy in health care programs and access to pornography is not common (McAuliffe et al., 2020; Rahn et al., 2020). As the number of older couples in health care programs increases, it is essential to know their needs for relationship satisfaction and well-being.

Several population-based studies have identified a negative association between pornography use and relationship satisfaction (Daspe et al., 2018; Miller et al., 2019). This may be due to the use of pornography for addressing partners' discordance in sexual frequency or the acceptance of pornography use for self-stimulation. Both are explanations that can be linked to lower relationship satisfaction (Kohut et al., 2021; Rehman et al., 2021; Willoughby et al., 2016), especially when pornography use is frequent (Perry, 2020; Veit et al., 2017). This may be especially true for middle-aged people for whom partnered sex may be important for relationship satisfaction, because consuming pornography by one partner may be viewed as infidelity, unacceptable, or acceptable in very specific circumstances (Ferron et al., 2017; Poulsen et al., 2013). Nonetheless, prior research work on younger generations argues that consuming pornography is not an issue, per se, but it is the frequency of masturbation that may substitute for partnered sex (Perry, 2020; Regnerus et al., 2017).

However, there is a limited number of studies that focus on pornography use in relation to sexual satisfaction and relationship satisfaction in older people. According to recent studies, online pornography consumption was prevalent in older internet users who were satisfied with their level of sexual activity (Træen et al., 2018) and who frequently masturbated (Ševčíková et al., 2021; Træen et al., 2018). However, it is also known that older people share more negative attitudes toward pornography than younger internet users (Rissel et al., 2017; Steklíková, 2014) and these negative attitudes are more profound compared to attitudes towards masturbation, which is viewed by half of the older Czech population as a “natural” part of sexual expression (Steklíková, 2014). As barriers for having partnered sex emerge and the importance of sex within the couple relationship is reassessed, these negative attitudes towards online pornography could be more intricate (Connor et al., 2023; Freak-Poli & Malta, 2020). In this respect, it is necessary to understand how pornography use is part of sexuality for people aged 50+ and to inform health care providers and aged-care policy makers about how to frame this activity in later life while respecting the need for sexual expression (Rahn et al., 2020).

## Research Aim

Previous studies have shown a positive association between sexual satisfaction and relationship satisfaction, and that the strength of the association varies with age (Fischer et al., 2018; Fleishman et al., 2020; Gott & Hinchliff, 2003; Lodge & Umberson, 2012; Rahn et al., 2020; Ševčíková & Sedláková, 2020). Given the changes in sexual functioning after the age of 50 and the opportunity to address sexual needs via online pornography consumption, the aim of this study is to explore how sexual satisfaction and pornography use are linked to relationship satisfaction in mid and later life, while taking into consideration the participant’s gender, education, health status, and relationship length.

## Methods

### Participants

An online questionnaire on sexual life and intimate relationships was published on the Qualtrics platform. It was advertised from December 2018 to February 2019 via social media and two of the major advertising agencies—Seznam.cz and Czech News Center (CNC)—to target Czech internet users aged 50 and older. Seznam.cz represents a web portal with more than 30 associated web services, which are used by half of the Czech internet population. The marketing portfolio of CNC includes about 40 online newspaper and magazine products and reaches about 6 million internet users (the Czech Republic has about 7 million internet users aged 16 and older; CZSO 2018). Participants were compensated with the chance to win a 40 Euro gift certificate; there were five certificates available. The study was Research Ethics Committee of Masaryk University (EKV-2016-035).

The questionnaire was filled out by 1,116 respondents. Of these, 317 cases were excluded from the analyses due to one of the following reasons: (1) missing information; (2) hastily addressed questions (i.e., completion in less than 5 minutes); (3) providing too many repetitive answers; and (4) indicating that their age was under 50 years old. This left a sample of 792 respondents. Furthermore, we excluded 64 respondents who reported that they were not currently in a relationship. The respondents’ age in the sample that passed inclusion criteria ( $n = 728$ ) ranged from 50 to 96 years old ( $M = 61.6$ ,  $SD = 7.98$ ,  $Mdn = 61$ ), including 56% men and 44% women.

### Measures

#### *Socio-Demographics*

**Age.** Biological age in years.

**Education.** The highest achieved level of education, according to the Czech education system. Education was treated as an ordinal variable with higher levels indicating higher education. The levels ranged from *elementary education* (1) to *postgraduate degree* (8).

**Relationship Length.** The length of the current relationship, indicated by a respondent through the available intervals. To better fit a linear trend, we assigned numbers to indicate the probable number of years in a relationship for each interval: *Less than 12 months* (0.5); *13 months–4 years* (2); *5–9 years* (7); *10–14 years* (12); *15–19*

years (17); 20–29 years (25); and 30+ years (35). This transformation was considered useful, because, without it, the original ordinal categories could not be treated at the interval level. The same argument applies to the frequency of sexual activities and online pornography use, see below. This approximation allows us to include relationship length in the linear regression model quite easily and use one year of relationship as a unit of measurement.

### ***Relationship Satisfaction***

We used the four-item version of the Couples Satisfaction Index (Funk & Rogge, 2007). Respondents rated statements like *How rewarding is your relationship with your partner?* on a Likert-type scale with responses that ranged from 1 to 7, with higher values indicating higher satisfaction. The scale had very high internal consistency (Cronbach's  $\alpha = .96$ ) and showed measurement invariance for men and women regarding factor loadings, intercepts, and residuals (TLI = .99, RMSEA = .05, SRMR = .01). We calculated the total score as a mean value of items, as long as the respondent provided a valid answer on at least three out of four items.

### ***Frequency of Partnered Sexual Activities***

The highest indicated frequency selected from the following sexual activities over the preceding 12 months: sexual intercourse, caressing/petting, oral sex, and "other". The item read *In the last 12 months, how often did you practice ... ?* To better fit a linear trend, we assigned numbers to indicate the probable highest frequency of sexual activities per month to each interval: *Not a single time* (0), *Less than once a month* (0.5), *Once a month* (1), *Two or three times a month* (2.5), *Once per week* (4), and *Several times a week* (8).

### ***Frequency of Masturbation***

This sexual activity was assessed with a single question: *With regard to the last 12 months, how often did you masturbate?* To better fit a linear trend, we assigned numbers to indicate the probable highest frequency of masturbation per month to each interval: *Not a single time* (0), *Less than once a month* (0.5), *Once a month* (1), *Two or three times a month* (2.5), *Once per week* (4), and *Several times a week* (8).

### ***Satisfaction With the Frequency of Sex***

One item was designed to measure the respondent's satisfaction with the frequency of sex: *How would you rate your satisfaction with the frequency of sex, i.e., how often did you have it in the last 12 months?* Responses were rated on a Likert-type scale that ranged from *Very dissatisfied* (1) to *Very satisfied* (5). Although this item did not define sex, the question on satisfaction with sex frequency was administered after the above-mentioned list of diverse sexual practices.

### ***Online Pornography Use***

We asked respondents how frequently they had watched online pornography in the preceding 12 months. To better fit a linear trend, we assigned numbers to indicate the probable frequency of watching online pornography per month to each interval: *Not a single time* (0), *Less than once a month* (0.5), *Once a month* (1), and *Several times a month, or more* (2.5).

### ***Health Status, Including Partner's Health***

This variable consists of two key items, one referred to the respondent and the second referred to their partner: *Your/Your partner's health is...* Respondents answered on a 5-point Likert-type scale that ranged from *Very good* (1) to *Very bad* (5). We intended to use this item as an indicator for health quality, so it was reverse-coded such that a higher score means better health. In the analysis, both items were analyzed separately due to their different targets.

## Procedure

Data analyses were conducted in R (R Core Team, 2019b). We used a *foreign* package (R Core Team, 2019a) and a *tidyverse* package (Wickham, 2017) to load and clean the data, and a *psych* package (Revelle, 2019) to inspect the data.

We conducted two separate hierarchical multiple linear regression analyses, one for each age group—those who were younger than 65 and those who were at least 65 years old (i.e., retirement age) and who have already entered into the developmental period of late adulthood. Our aim was to predict relationship satisfaction using other variables as predictors. We constructed four-step regression models for each gender. The first-step model consisted of the control variables: gender, education, respondent's and partner's health, and the length of the relationship. To the second model, we added the highest frequency of sexual activities and satisfaction with the frequency of sex. In the third model, we included the frequency of watching online pornography. In the fourth model, the frequency of masturbation was added to assess whether the effect of pornography use remains even after the inclusion of masturbation. For the ordinal variable, Education, only a linear trend was expected. In order to be able to compare nested models, we performed a listwise deletion of missing data, so all of our regression models were fitted to the same sample. As a result, our final sample size for regression analysis dropped from 728 to 519 (71%), with 360 participants in the younger group and 159 participants in the older group.

Based on sensitivity analysis conducted in G\*Power (Faul et al., 2009), by conducting a regression analysis with nine predictors, a sample size of at least 159 people, the alpha level set to .05, and statistical power of .95, we should be able to detect the medium effects of  $R^2$  increase = .10 ( $f^2 = .17$ ) and higher (G\*Power protocol is available in the Appendix). The highest missing answer rates were located on the relationship satisfaction scale (17%) and the items about the health of the respondent and their partner (both 18%), possibly due to their late presence in the questionnaire. Since we found the missing answer ratio to be too high to impute missing data, we decided to drop these cases from the analysis. After this, the ratio of males to females in the sample changed only slightly (55.9% men before exclusion versus 59.7% men after exclusion). The mean age of the sample dropped by approximately a year ( $M = 60.7$ ,  $SD = 7.55$ ) in comparison to the original sample ( $M = 61.6$ ,  $SD = 7.98$ ), also suggesting no substantial change in the sample characteristics. After checking the correlation matrix (see Table 2) and the scatterplots, we found no correlations stronger than  $r = .70$  and no obvious non-linear trends in the data. The assumptions about the linearity and the absence of multicollinearity were met. All regression models also showed approximately normal distribution for residuals, with no signs of heteroscedasticity, pointing to no substantial biases in the findings.

## Results

We report descriptive statistics for each age group in Table 1. Regarding their level of education, 21 participants (3%) completed primary education, 157 (22%) completed secondary vocational education, 297 (41%) completed secondary education, 28 (4%) completed post-secondary vocational education, 13 (2%) completed a bachelor's degree, 195 (27%) completed a master's degree, and 14 (2%) completed a doctoral degree. Two participants did not provide information about their level of education. Overall, 774 respondents reported their sexual orientation: 98% were heterosexual, 1% was homosexual, and 1% was bisexual.

**Table 1.** Sample Characteristics for Participants Younger Than / Older Than 65, Respectively.

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	Min	Max
Relationship satisfaction	394 / 209	5.29 / 5.11	1.39 / 1.44	5.25	1	7
Age	465 / 263	56.67 / 70.35	4.37 / 4.77	56 / 70	50 / 65	64 / 96
Health	390 / 207	3.72 / 3.56	0.80 / 0.79	4	1	5
Health of partner	390 / 207	3.68 / 3.53	0.84 / 0.88	4	1	5
Relationship length (years)	463 / 259	21.79 / 25.15	13.01 / 13.12	25 / 35	0.5	35
Highest frequency of sexual activity (per month)	456 / 258	4.38 / 3.41	2.96 / 2.73	4.0 / 2.5	0	8
Satisfaction with frequency of sex	430 / 236	3.37 / 3.26	1.36 / 1.28	4	1	5
Watching online pornography (per month)	421 / 229	1.01 / 0.98	1.07	0.5	0	2.5
Frequency of masturbation	432 / 225	2.74 / 2.11	2.86 / 2.51	2.5 / 1	0	8

*Note.* The younger sample that passed the inclusion criteria consisted of 228 (49%) men and 237 (51%) women. The older sample consisted of 179 (68%) men and 84 (32%) women. Only one value was reported if it was identical or nearly identical for both groups.

Table 2 shows bivariate Pearson correlations between the constructs for both younger and older participants. There seemed to be no strong distinctions in the correlation matrices between the groups. Relationship satisfaction was significantly correlated with all of the variables, except for age and relationship length. In the whole sample, the strongest correlation of relationship satisfaction was found for satisfaction with the frequency of sex,  $r = .54$  and  $.56$ , both  $p < .01$ .

**Table 2.** Pairwise Pearson Correlation Matrix.

	1	2	3	4	5	6	7	8	9
1. Age		-.03	-.11	-.07	.11	-.20*	-.14	.20**	-.04
2. Highest frequency of sex	-.07		.54**	.02	.45**	.17*	.22**	-.14	-.13
3. Satisfaction with frequency of sex	.04	.61**		-.20*	.56**	.26**	.35**	-.20*	-.23**
4. Watching online pornography	-.04	.07	-.16**		-.14	-.06	.02	.06	.53**
5. Relationship satisfaction	-.01	.42**	.54**	-.16**		.30**	.34**	-.03	-.35**
6. Health (respondent)	-.06	.22**	.25**	-.02	.16**		.35**	-.21**	-.13
7. Health (partner)	-.00	.30**	.33**	.07	.25**	.38**		-.18*	-.08
8. Relationship length	.09	-.18**	-.11*	-.05	-.00	.03	-.11*		-.03
9. Frequency of masturbation	-.14**	.06	-.15**	.59**	-.14**	.08	.01	-.01	

Note. The data includes 360 people younger than 65 and 159 people older than 65. Correlations for younger participants are located in the lower diagonal and correlations for older participants are located in the upper diagonal. \* $p < .05$ . \*\* $p < .01$ .

Additionally, we calculated partial correlations between the frequency of watching online pornography and satisfaction with the frequency of sex, while controlling for the associations with the relationship satisfaction. We found no significant partial correlations.

## Regression Models

The findings from the regression models are shown in Table 3. The first model with gender, education, health, and relationship length as control variables, predicted only a small portion of variance for the younger group (adj.  $R^2 = .05$ ) and slightly more variance for the older group (adj.  $R^2 = .13$ ). Only the health factors significantly ( $p < .05$ ) predicted relationship satisfaction in these models; for both groups, the partner's health was the strongest predictor for relationship satisfaction ( $\beta_{\text{younger}} = .23, p < .001$ ;  $\beta_{\text{older}} = .21, p < .001$ ). In the older group, the respondent's own health was also a significant predictor ( $\beta_{\text{older}} = .20, p = .016$ ).

The second model, which included the highest frequency of sexual activities and satisfaction with the frequency of sex, predicted a large additional variance for the younger group, adj. total  $R^2 = .30, F_{\text{change}}(2, 346) = 62.4, p < .001$ , and for the older group, adj. total  $R^2 = .38, F_{\text{change}}(2, 146) = 33.8, p < .001$ . Both new predictors positively predicted relationship satisfaction. The highest frequency of sexual activities had an overall weak, but still significant, effect for the younger group ( $\beta_{\text{younger}} = .17, p = .006$ ) and the older group ( $\beta_{\text{older}} = .21, p = .012$ ). Satisfaction with the frequency of sex had a significantly moderate effect for both groups ( $\beta_{\text{younger}} = .42, p < .001$ ;  $\beta_{\text{older}} = .41, p < .001$ ). In these two models, the participant's own health ceased to be a significant predictor for both the younger group ( $\beta_{\text{younger}} = -.01, p = .857$ ), and the older group ( $\beta_{\text{older}} = .13, p = .054$ ). Also, the partner's health ceased to be a significant predictor for both groups ( $\beta_{\text{younger}} = .08, p = .106$ ;  $\beta_{\text{older}} = .15, p = .051$ ).

The third model, where pornography use was included, showed that this online sexual activity negatively predicted relationship satisfaction only in the younger group. However, the effect was weak ( $\beta_{\text{younger}} = -.13, p = .016$ ). By adding pornography into the model, the adj. total  $R^2$  did not increase significantly in the older group, but did in the younger group.  $F_{\text{change}}(1, 345) = 5.86, p = .016$ .

Finally, we added the frequency of masturbation into the model. In younger participants, this predictor was not significant ( $p = .482$ ); however, in the older group, masturbation was significantly negatively associated with relationship satisfaction,  $\beta_{\text{older}} = -.23, p = .002$ .

**Table 3.** Hierarchical Regression Results for Participants Younger Than / Older Than 65, Respectively.

Variable	B	p	SE	$\beta$	95% CI $\beta$		adj. $R^2$	$\Delta R^2$
					Lower	Upper		
Step 1							.05 / .13	
(Intercept)	3.46 / 1.69	< .001 / .036	.51 / .80					
Gender (Woman)	.21 / .05	.154 / .850	.15 / .28	.08 / .02	-.22 / -.53	.37 / .56		
Education	-.13 / 1.28	.778 / .075	.47 / .71	-.03 / .27	-.95 / -1.14	.89 / 1.68		
Health (respondent)	.13 / .39	.221 / .016	.10 / .16	.07 / .20	-.13 / -.11	.27 / .51		
Health (partner)	.39 / .51	< .001 / < .001	.10 / .14	.23 / .21	.04 / .03	.42 / .58		
Relationship length (years)	.00 / .01	.678 / .412	.01 / .01	.02 / .07	.01 / .04	.03 / .08		
Step 2							.30 / .38	.25*** / .25***
(Intercept)	2.85 / 1.26	< .001 / .630	.44 / .67					
Gender (Woman)	.15 / -.04	.268 / .883	.13 / .25	.05 / -.01	-.21 / -.51	.32 / .49		
Education	-.44 / 1.05	.276 / .082	.41 / .60	-.10 / .22	-.90 / -.96	.70 / 1.41		
Health (respondent)	-.02 / .26	.858 / .054	.09 / .13	-.01 / .13	-.18 / -.13	.17 / .40		
Health (partner)	.14 / .24	.106 / .051	.09 / .12	.08 / .15	-.09 / -.10	.25 / .39		
Relationship length (years)	.01 / .01	.086 / .083	.00 / .01	.08 / .12	.07 / .11	.09 / .14		
Highest frequency of sexual activities	.08 / .11	.006 / .012	.03 / .04	.17 / .21	.11 / .12	.22 / .30		
Satisfaction with frequency of sex	.43 / .48	< .001 / < .001	.06 / .10	.42 / .41	.30 / .22	.54 / .60		
Step 3							.31 / .39	.01* / .01
(Intercept)	3.14 / 1.58	< .001 / .028	.45 / .71					
Gender (Woman)	-.06 / -.27	.718 / .375	.16 / .30	-.02 / -.08	-.33 / -.67	.29 / .51		
Education	-.45 / 1.00	.269 / .097	.40 / .60	-.10 / .21	-.90 / -.97	.69 / 1.40		
Health (respondent)	-.03 / .25	.705 / .061	.09 / .13	-.02 / .13	-.19 / -.13	.16 / .40		
Health (partner)	.16 / .24	.064 / .049	.08 / .12	.09 / .15	-.07 / -.10	.26 / .39		
Relationship length (years)	.01 / .01	.105 / .133	.00 / .01	.07 / .11	.06 / .09	.08 / .12		
Highest frequency of sexual activities	.08 / .11	.004 / .016	.03 / .04	.18 / .20	.12 / .11	.23 / .29		
Satisfaction with frequency of sex	.41 / .47	< .001 / < .001	.06 / .10	.40 / .40	.28 / .21	.52 / .59		
Watching pornography online	-.17 / -.16	.016 / .164	.07 / .11	-.13 / -.11	-.27 / -.33	.01 / .11		

Step 4							.31 / .42	.00 / .03
(Intercept)	3.18 / 1.93	< .001 / .006	.46 / .70					
Gender (Woman)	-.06 / -.23	.684 / .434	.15 / .29	-.02 / -.07	-.33 / -.65	.29 / .51		
Education	-.47 / .90	.246 / .126	.41 / .58	-.11 / .19	-.91 / -.96	.69 / 1.35		
Health (respondent)	-.02 / .23	.793 / .086	.09 / .13	-.01 / .12	-.19 / -.14	.16 / .37		
Health (partner)	.15 / .23	.076 / .060	.09 / .12	.09 / .14	-.08 / -.10	.26 / .37		
Relationship length (years)	.00 / .01	.105 / .211	.00 / .01	.07 / .09	.06 / .07	.08 / .10		
Highest frequency of sexual activities	.08 / .10	.003 / .026	.03 / .04	.18 / .18	.12 / .09	.23 / .26		
Satisfaction with frequency of sex	.40 / .45	< .001 / < .001	.06 / .10	.40 / .39	.27 / .20	.52 / .57		
Watching pornography online	-.15 / -.02	.077 / .854	.08 / .12	-.11 / -.02	-.27 / -.23	.05 / .26		
Frequency of masturbation	-.02 / -.14	.483 / .002	.03 / .05	-.04 / -.23	-.09 / -.32	.01 / -.14		

Note. Dependent variable—relationship satisfaction. For younger sample,  $n = 360$ , for older sample,  $n = 159$ .  $SE$  = standard error.  $CI$  = confidence interval. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



## Discussion

This study explored how partnered sex, satisfaction with the frequency of partnered sexual activities and masturbation, and online pornography, use were associated with relationship satisfaction in mid and later life, while controlling for gender, education, health, and relationship length.

This study showed that satisfaction with the frequency of having sex was the strongest predictor of relationship satisfaction for both middle-aged and older-aged groups. In addition, frequent involvement in partnered sex had a positive, albeit weak, effect on relationship satisfaction in middle-aged and older adults. Despite the possible negative changes in the frequency of having sex and sexual functioning that are likely to lead to reassessing the importance of sex among older adults (Gore-Goreszewska, 2021; Lodge & Umberson, 2012), our study shows that satisfaction with the frequency of having sex and having relatively frequent sex remain relevant factors for later-life relationship satisfaction. In addition, although older people tend to perceive later-life partnered sex as the icing on the cake (i.e., not an essential part of functioning in later-life relationship; Towler et al., 2022), this finding suggests that even for older adults partnered sex could still be associated with the meaningful and important relational aspects (e.g., relationship exclusivity and couple intimacy) that strengthen or increase relationship satisfaction at older age (Ševčíková & Sedláková, 2020; Ševčíková et al., 2021; Rosen et al., 2016; Towler et al., 2022). There are two possible explanations for this. First, our sample included respondents aged 65+ who probably successfully maintained partnered sex. They were not forced to reappraise their sexual satisfaction nor the extent to which coupled sex should play a role in their later-life relationship functioning. Second, prior research suggests that the reduced frequency of sex, or even a lack of partnered sex, do not necessarily put a strain on a relationship, unless barriers in sex are constructively handled and communicated to address changes in sexual frequency (Erens et al., 2019; Hinchliff et al., 2018). Therefore, in the context of long-term care for older adults, it is important to provide partners with privacy and respect for their sexual life, and to support them in their communication about their sexual difficulties, regardless of gender, as suggested by Rahn and her colleagues (2020).

In addition, we found a weak negative association between the use of online pornography and relationship satisfaction in middle-aged adults, even after controlling for other aspects of sexual life, such as the frequency of sex, the frequency of masturbation, and their overall satisfaction with those frequencies. However, the result should be interpreted with caution due to the small effect size of the association and the 95% confidence intervals that included 0. Thus, the effect of online pornography use is not strong, if any. Moreover, the convenient sample predominately included people who were satisfied with their relationship. This issue might also have biased the associations between online pornography consumption and relationship satisfaction. In this respect, more research is needed to understand whether the effect that was observed only in the younger group might signify that watching pornography can challenge relationship satisfaction in advanced middle age, when people older than 50 are likely to face a rapid onset of sexual difficulties (e.g., erectile difficulties in men, vaginal dryness in women, Mitchell et al., 2013) and when consuming online pornography might be viewed as a response to their own, or their partner's insufficient sexual response (e.g., Bridges et al., 2003; Ferron et al., 2017).

Our study showed that frequent masturbation was associated with weaker relationship satisfaction only in people aged 65 and more. This finding could be in line with a recent study that was representative for the young adult U.S. population, according to which solo masturbation rather than pornography use, per se, predicts lower levels of relational happiness (Perry, 2020). Since this linkage was observed only in older adults, there might be a cohort effect at play. Older people can have more internalized negative beliefs about later-life sexual expressions, including masturbation, than younger generations (DeLamater, 2012; Sinković & Towler, 2019). In this respect, addressing partners' discordance in sexual frequency by masturbation might lead to the partner's disrespect and challenge relationship functioning.

Lastly, the study showed that the health status of the respondent predicted relationship satisfaction only in the older age group. This finding should be interpreted with caution due to the extremely wide 95% confidence intervals, although the effect of health on later-life relationship satisfaction might be expected. Interestingly, participants' self-reported health, as opposed to their partner's health, might play some role in relationship satisfaction. The effect of partner's health diminished after the inclusion of partnered-sex indicators, suggesting that good partner's health could help in maintaining partnered sex and, subsequently, relationship satisfaction. Additional research is needed to corroborate self-reported health status as a protective factor for later-life relationship satisfaction (probably due to the absence of burdens, such as the lack of demand for care from a partner and the experienced power imbalance in a relationship; Lyons et al., 2002; Monin et al., 2019; Walker &

Luszcz, 2009). Lastly, the study showed no gender differences in relationship satisfaction at age 50+, suggesting that ageing within a heterosexual relationship does not create a gender-specific challenge for relationship happiness.

## Limitations and Conclusion

The present study relied on cross-sectional data, so no causal links can be established. This is especially true for the linkage between sexual satisfaction and relationship satisfaction. Although earlier relationship satisfaction could have an effect on the subsequent quality of sexual life, a longitudinal study by Fallis and her colleagues (2016) has not corroborated this linkage. Adopting a longitudinal perspective might help to envision whether and how the relationship between sexual satisfaction and relationship satisfaction in later life change. In addition, it is important to bear in mind that the frequency of masturbation was a single sample that did not distinguish between solo masturbation and masturbation within a sexual interaction with a partner. In this study, only sexual satisfaction was shown to be a predictor of relationship satisfaction, providing support for the linkages examined in this study. Furthermore, the sample sizes were a limiting factor for detecting effects, particularly the small ones that are typical for media effects (Valkenburg & Peter, 2013). Lastly, this study focused only on satisfaction with the frequencies of sexual activities, while sexual satisfaction can include other components (e.g., the quality of touch or pleasure; Štulhofer et al., 2010).

Despite these limitations, we believe that this study is one of the few to examine sexual frequency, online pornography use, and masturbation in association with relationship satisfaction among middle- and older-aged internet users. Although this study cannot provide a conclusive result for online pornography use being intrusive in middle-aged relationships, the findings suggest that, despite the known tendency of older people to reassess the importance of later-life sex, satisfaction with sexual frequency remains an important factor for relationship satisfaction in both mid and later adulthood.

## Conflict of Interest

The authors have no conflict of interest to declare.

## Authors' Contribution

**Anna Ševčíková:** conceptualization, methodology, funding acquisition, co-writing—original draft, review & editing. **Veronika Gocieková:** co-writing—original draft, review & editing. **Andrea Stašek:** investigation, data analysis, writing—review & editing. **Jaroslav Gottfried:** data curation, data analysis. **Kristian Daneback:** writing—review & editing.

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## Appendix

### G\*Power Protocol for Power Analysis

[1] -- Wednesday, May 10, 2023 -- 12:34:05

**F tests:** Linear multiple regression: Fixed model,  $R^2$  increase

**Analysis:** Post hoc: Compute achieved power

**Input:** Effect size  $f^2 = 0.17$

$\alpha$  err prob = 0.05

Total sample size = 159

Number of tested predictors = 9

Total number of predictors = 9

**Output:** Noncentrality parameter  $\lambda = 27.0300000$

Critical  $F = 1.9432231$

Numerator  $df = 9$

Denominator  $df = 149$

Power ( $1-\beta$  err prob) = 0.9659741



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