

# Sexual Frequency Predicts Greater Well-Being, But More is Not Always Better

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## Abstract

Is it true that engaging in more frequent sex is associated with greater well-being? The media emphasizes—and research supports—the claim that the more sex you have, the happier you will feel. Across three studies ( $N = 30,645$ ), we demonstrate that the association between sexual frequency and well-being is best described by a curvilinear (as opposed to a linear) association where sex is no longer associated with well-being at a frequency of more than once a week. In Study 1, the association between sexual frequency and well-being is only significant for people in relationships. In Studies 2 and 3, which included only people in relationships, sexual frequency had a curvilinear association with relationship satisfaction, and relationship satisfaction mediated the association between sexual frequency and well-being. For people in relationships, sexual frequency is no longer significantly associated with well-being at a frequency greater than once a week.

## Keywords

sexuality, well-being, relationships

Sex is like money; only too much is enough.

John Updike

When it comes to sex, is it true that one can never have enough? Or is there an optimal sexual frequency after which sex is no longer associated with greater well-being? Popular messages in the media often imply that engaging in more frequent sex is better for relationship quality. In one example, a New York Times article reported on two couples who “kick-started their marriage” by having sex every day for a year (Gardner, 2008). Several studies have documented a positive linear association between sexual frequency and romantic relationship satisfaction (Brezsnyak & Whisman, 2004; Byers, 2005; Call, Sprecher, & Schwartz, 1995). Having more frequent sex is also associated with greater overall well-being (Cheng & Smyth, 2015; Laumann, Gagnon, Michael, & Michaels, 1994). For example, data from the U.S. General Social Survey (GSS) have documented a positive linear association between self-reported sexual frequency and happiness—the more sex people reported, the happier they felt (Blanchflower & Oswald, 2004).

One explanation for a linear association between sexual frequency and well-being is that engaging in sex is associated with positive emotions and therefore, the more sex you have, the happier you feel. In a study where people provided reports of their daily activities and associated affect, sex was the activity rated as producing the most positive affect (Kahneman & Krueger, 2006; Kahneman, Krueger, Schkade, Schwartz, & Stone, 2004), and one strategy to maximize

well-being may be for people to reallocate their time to engage in the particular activities that hold the greatest potential to enhance well-being (see review by Lyubomirsky & Layous, 2013). However, for couples with busy lives, work responsibilities, and children to care for, feeling the pressure to engage in sex as frequently as possible may be daunting and even stressful. Perhaps the popular perception and previous research evidence suggesting that sex will continue to enhance well-being at higher frequencies is misguided; people may be able to engage in sex frequently enough to maximize their well-being without aiming to engage in sex as frequently as possible. As such, the link between sexual frequency and well-being might be better characterized by a curvilinear association—where sex is no longer significantly associated with well-being after a certain frequency—than a linear association—where the association between sex and well-being is consistent across frequencies—although this possibility has never been empirically tested.

Our prediction that the association between sexual frequency and well-being is curvilinear draws upon an important model that emerges from clinical perspectives in sex therapy.

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The “good enough sex” model acknowledges that it is important for couples to engage in sexual intimacy to maintain satisfying romantic relationships but also to hold realistic expectations about their sex life (McCarthy & Metz, 2008; Metz & McCarthy, 2007). Applied to the current research, if couples are having sex frequently enough to maintain their intimate connection, then they might be maximizing their well-being. In a recent study in which a group of couples was asked to double their sexual frequency, no increases in well-being were observed for these couples compared to those in a control group who maintained their current frequency (Loewenstein, Krishnamurti, Kopsic, & McDonald, 2015). Since the couples in this study were already engaging in sex regularly (i.e., about 5 times per month on average), it is possible that they had already maximized the benefits for their well-being.

While no existing empirical work has tested a possible curvilinear association between sexual frequency and well-being, recent research in positive psychology and the affective sciences suggests that there are some cases in which seemingly positive experiences and emotions are associated with neutral or even negative consequences (Gruber, 2011; Mauss, Tamir, Andersen, & Savino, 2011; McNulty & Fincham, 2012). For example, although happiness is associated with several benefits, including better health and greater social connection, extremely elevated positive emotions can have negative consequences (Gruber, 2011), and high levels of happiness valuation can actually lead to less happiness (Mauss et al., 2011). Even highly pleasurable activities such as socializing with friends have been judged as having more value at moderate levels than at higher amounts (Diener, Ng, & Tov, 2008), and people at higher levels of income do not report significantly greater happiness than those making moderate incomes (Kahneman, Krueger, Schkade, Schwartz, & Stone, 2006). In terms of sex, evidence suggests that the benefits of engaging in sex are not limited to momentary increases in positive affect, but that positive feelings are carried over, at least to the next day (Burlinson, Trevathan, & Todd, 2007), and sexual experiences are associated with broader feelings of satisfaction with the relationship (Brezsnyak & Whisman, 2004; Byers, 2005; Call et al., 1995; for a review see Impett, Muise, & Peragine, 2014). It is unlikely then that couples would have to engage in sex daily in order to maximize the benefits. Instead, if couples are engaging in sex frequently enough to feel satisfied with their relationship, they are optimizing well-being. What we do not yet know from previous work is at what sexual frequency, on average, there is no longer a significant association with greater well-being.

In the current set of studies, we expect sexual frequency to have a curvilinear association with well-being where greater sexual frequency is associated with greater satisfaction, but that this association is no longer significant at higher frequencies. We also expected a curvilinear association with romantic relationship satisfaction and for this to moderate the association between sexual frequency and well-being as relationship

satisfaction tends to be closely associated with overall well-being (for a review see Heller, Watson, & Iles, 2004). In Study 1, we test whether a curvilinear association better explains the relationship between sexual frequency and well-being than a linear association, and whether the effect is consistent for people who are in romantic relationships and those who are single. In Studies 2 and 3, we test the prediction that there is a curvilinear association between sexual frequency and romantic relationship satisfaction, and that relationship satisfaction mediates the association between sexual frequency and well-being for people in relationships. Across all studies, we also test whether the association between sexual frequency and well-being changes as a function of other important predictors of sexual frequency in romantic relationships, including gender, age, and relationship duration.

## Study 1

### Method

Study 1 includes data from the GSS, a high-powered, nationally representative survey conducted almost annually in the United States for the last 40 years (there have been 29 GSS surveys since 1972). Our analyses included all 14 GSS time points from 1989 to 2012 in which our key variables of interest (sexual frequency and happiness) were measured. The data are a replicating cross-sectional design in which a new sample of participants was selected for each survey year (Smith, Marsden, Hout, & Kim, 2013). Our analyses included 25,510 participants (11,285 men and 14,225 women) who completed all of our key variables of interest across the 14 time points. Participants range in age from 18 to 89 ( $M = 45.13$ ,  $SD = 16.94$ ). The variables included in the analyses were sexual frequency in the last year (“About how often did you have sex during the last 12 months?”) rated on a 7-point scale (0 = *not at all*, 1 = *once or twice*, 2 = *once a month*, 3 = *2–3 times a month*, 4 = *weekly*, 5 = *2–3 times per week*, and 6 = *4 or more times per week*;  $M = 2.85$ ,  $SD = 1.97$ ) and general happiness (“Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?”). We reverse coded this item so that higher values represent more happiness (1 = *not too happy*, 2 = *pretty happy*, and 3 = *very happy*;  $M = 2.19$ ,  $SD = .63$ ). Participants were also asked about their marital status each year, and in 1996 and 1998, unmarried participants were asked whether they had a current romantic involvement. For the purpose of testing a moderation of our effects by relationship status, we selected people who reported either being currently married or having a current romantic involvement (coded as 1;  $N = 16,935$ ) and people who reported that they were unmarried without a current romantic involvement (coded as -1;  $N = 7,856$ ). The GSS includes data on the length of marital relationships (computed by subtracting participants’ current age from the age they reported marrying their spouse), participants’ marital length ranged from 1 year to 73 years ( $M = 23.01$ ,  $SD = 15.08$ ).

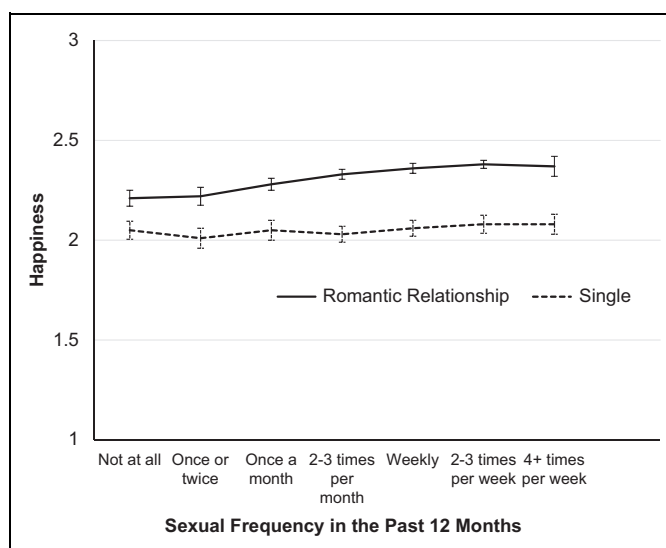
## Data Analytic Strategy

We computed a curvilinear sexual frequency variable by squaring the sexual frequency variable (centered around the mean) and entered both the linear and curvilinear sexual frequency variables as predictors of general happiness in a regression model. A significant curvilinear term in these analyses indicates a nonlinear association between sexual frequency and happiness. Then, to determine whether the effect is consistent across various demographic characteristics of our sample, we tested whether either the linear or curvilinear association between sexual frequency and happiness is moderated by relationship status ( $-1 = \text{single}$  and  $1 = \text{in a relationship}$ ), gender ( $-1 = \text{woman}$  and  $1 = \text{man}$ ), age, or relationship duration.

## Results

The results did, in fact, demonstrate a significant linear association between sexual frequency and happiness,  $\beta = .12$ ,  $t(23,249) = 17.81$ ,  $p < .001$ . When we included the curvilinear (squared) term in the equation, the linear effect remained significant,  $\beta = .14$ ,  $t(23,249) = 19.23$ ,  $p < .001$ , but the curvilinear term was also significant,  $\beta = -.05$ ,  $t(23,249) = -7.12$ ,  $p < .001$ . This pattern of results indicates that a curvilinear association best explains the association between sexual frequency on happiness. Both the linear and quadratic effects of sexual frequency on happiness, however, were moderated by relationship status,  $\beta = .05$ ,  $t(17,352) = 5.42$ ,  $p < .001$  and  $\beta = -.03$ ,  $t(17,352) = -2.28$ ,  $p = .02$ , respectively. As depicted in Figure 1, for single people, neither the linear,  $\beta = .02$ ,  $t(5,658) = 1.27$ ,  $p = .21$ , nor quadratic effects,  $\beta = .02$ ,  $t(5,658) = 1.14$ ,  $p = .25$ , of sexual frequency on happiness were significant, whereas both the linear,  $\beta = .10$ ,  $t(11,693) = 9.18$ ,  $p < .001$ , and quadratic effects,  $\beta = -.03$ ,  $t(11,693) = -2.21$ ,  $p = .03$ , were significant for people in relationships. We also conducted these analyses using only data from 1996 and 1998, two time points of the GSS where relationship status was more accurately assessed (i.e., participants reported their relationship status, not just their marital status, in these years) and the results were consistent. Using a technique described by Nelson and Simonsohn (2014), we confirmed that there is no longer an association between sexual frequency and satisfaction with life at higher frequencies, which, based on graphing the results, was at a frequency of more than once a week (see Figure 1). That is, there was a significant linear relationship between sexual frequency and well-being for people having sex once a week or less,  $\beta = .09$ ,  $t(8,278) = 8.34$ ,  $p < .001$ , and no association for people having sex more than once a week,  $\beta = -.01$ ,  $t(3,414) = -.34$ ,  $p = .74$ .

Finally, we examined the consistency of this effect across demographic characteristics of the sample including gender, age, and relationship duration. Relationship duration was only reported for married participants, so the analyses including relationship duration only include married participants. Although women,  $t(25,508) = 17.26$ ,  $p < .001$ , people who



**Figure 1.** Moderating effect of relationship status on the quadratic association between sexual frequency in the past 12 months and self-reported happiness (Study 1). Note. Bars represent 95% confidence intervals.

are older ( $r = -.46$ ,  $p < .001$ ), and those in longer relationships ( $r = -.60$ ,  $p < .001$ ) reported engaging in less frequent sex, the results held when we controlled for gender, age, and relationship duration, and there were no significant moderations by any of these variables (all  $ps > .13$ ). These results suggest that our findings are consistent across younger and older people, for both men and women and for people in marriages of longer and shorter duration.

## Study 2

### Method

In Study 2, we sought to replicate the effects from Study 1 in an independent sample of people in romantic relationships as well as test our prediction that one reason why people in relationships report greater well-being when having more frequent sex is because sexual frequency is associated with greater relationship satisfaction. In Study 2, we also improved on the measurement of well-being by using the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), a validated multi-item measure of well-being. Also, in order to convey the magnitude of the effects in a more practical way, we compared the association between sexual frequency and well-being to the association between income and well-being.

Participants currently involved in a romantic relationship were recruited through Amazon's Mechanical Turk. We recruited 395 participants, but 16 participants (4%) reported that they were not currently in a romantic relationship, and an additional 44 participants (12%) did not pass an attention check embedded in the survey, therefore their data were not included in the current analyses. The final sample included 335 participants (138 men and 197 women). In Study 2, we

have 80% power to detect a small effect ( $R^2 = .03$ ) in a model with two predictors (i.e., the linear and curvilinear effects) at an  $\alpha$  of .05. Participants ranged in age from 18 to 64 years ( $M = 31.0$ ,  $SD = 9.1$ ) and comprised a diverse range of ethnic backgrounds; 65% were European, 10% were African American, 9% were Asian, 4.5% were Latino or Mexican, 2% were Native American, 1.5% were Indian, and 8% self-identified as “other.” Most participants were married or cohabitating (84%), and the majority of participants (90%) identified as heterosexual. Participants had been in their current relationship for between 4 months and 30 years ( $M = 7.5$  years,  $SD = 8.4$  years). Each participant was paid US\$.60 for completing the 20-minute online survey.

### Measures

**Sexual frequency.** Participants were asked to indicate how frequently, on average, they engaged in sex with their romantic partner (1 = *less than a once a month*, 2 = *about once a month*, 3 = *2–3 times per month*, 4 = *once a week*, 5 = *multiple times per week*, and 6 = *daily*;  $M = 4.03$ ,  $SD = 1.37$ ).

**Income.** Participants indicated their annual household income using the following categories: “under US\$15,000,” “US\$15,001–US\$25,000,” “US\$25,001–US\$35,000,” “US\$35,001–US\$50,000,” “US\$50,001–US\$75,000,” “US\$75,001–US\$100,000” and “over US\$100,000.” The median income level reported was US\$35,001–US\$50,000.

**Satisfaction with life.** Participants responded to the 5-item Satisfaction with Life Scale (Diener et al., 1985), which included items such as: “I am satisfied with my life.” Items were rated on a 7-point scale from 1 = *strongly disagree* to 7 = *strongly agree* ( $\alpha = .90$ ,  $M = 4.49$ ,  $SD = 1.46$ ).

**Relationship satisfaction.** We assessed participants’ relationship satisfaction with the 5-item satisfaction subscale ( $\alpha = .97$ ,  $M = 6.94$ ,  $SD = 2.04$ ) of the Investment Model Scale (Rusbult, Martz, & Agnew, 1998). Items from this measure, such as “I feel satisfied with our relationship,” were rated on a 9-point scale (1 = *do not agree* to 9 = *agree completely*).

### Data Analytic Strategy

We created a curvilinear sex frequency variable by squaring the linear variable (centered around the mean). To test our mediation models, we constructed a 95% confidence interval (CI) for the indirect effect using bootstrapping techniques with 5,000 resamples using the INDIRECT SPSS macro (Preacher & Hayes, 2008; Preacher & Selig, 2010). The indirect effect is present when the CI does not include zero. Finally, we tested whether our effects were moderated by gender, age, or relationship duration. Table 1 displays the bivariate correlations between all study variables.

## Results

As we predicted and consistent with the results from our first study, sexual frequency had a positive linear association with satisfaction with life,  $\beta = .16$ ,  $t(322) = 2.30$ ,  $p = .02$ , as well as a significant curvilinear association,  $\beta = -.15$ ,  $t(322) = -2.17$ ,  $p = .03$ . Sexual frequency also had a positive linear association with relationship satisfaction,  $\beta = .35$ ,  $t(322) = 5.42$ ,  $p < .001$ , and a significant curvilinear association,  $\beta = -.20$ ,  $t(322) = -3.18$ ,  $p = .002$ . As predicted, there was a significant indirect effect of sexual frequency (curvilinear) on well-being through relationship satisfaction (95% CI =  $[-.09, -.02]$ ); when relationship satisfaction was included in the model, it significantly predicted satisfaction with life,  $\beta = .51$ ,  $t(319) = 9.18$ ,  $p < .001$ , and both the linear and curvilinear associations between sexual frequency and well-being dropped to nonsignificance,  $\beta = -.05$ ,  $t(319) = -.79$ ,  $p = .43$  and  $\beta = -.01$ ,  $t(319) = -.20$ ,  $p = .84$ , respectively. As depicted in Figure 2 and consistent with Study 1, additional analyses (Nelson & Simonsohn, 2014) provided evidence that there was no association between sexual frequency and well-being at a frequency greater than once a week. That is, for people having sex once a week or less, there was a significant linear association between sexual frequency and satisfaction with life,  $\beta = .35$ ,  $t(157) = 4.59$ ,  $p < .001$ , and between sexual frequency and relationship satisfaction,  $\beta = .50$ ,  $t(157) = 7.13$ ,  $p < .001$ , but no significant association for people having sex more than once a week,  $\beta = -.05$ ,  $t(164) = -.65$ ,  $p = .52$  and  $\beta = .11$ ,  $t(164) = 1.36$ ,  $p = .17$ , respectively. The effects remained significant when controlling for gender, age, and relationship duration, and were not moderated by any of these variables ( $ps > .21$ ), suggesting that the pattern of results held for men and women, people of different ages, and those in both longer and shorter relationships.

Next, we conducted reverse mediation analyses to test alternative directions of the effects. We did not find support for a model in which sexual frequency mediates the link between relationship satisfaction and satisfaction with life (95% CI =  $[-.01, .02]$ ). We do, however, find support for a model in which satisfaction with life mediates the link between sexual frequency and relationship satisfaction (95% CI =  $[-.10, -.003]$ ) and a top-down model in which relationship satisfaction mediated the link between satisfaction with life and sexual frequency (95% CI =  $[.17, .34]$ ). In these models, the mediator accounts for 100% and 95%, respectively, of the association between the predictor and the outcome variable, and in our predicted model, the mediator accounts for 100% of the effect. It is important to note that the top-down model only includes the linear sexual frequency variable since it is the dependent variable, and this model does not include the curvilinear effect.

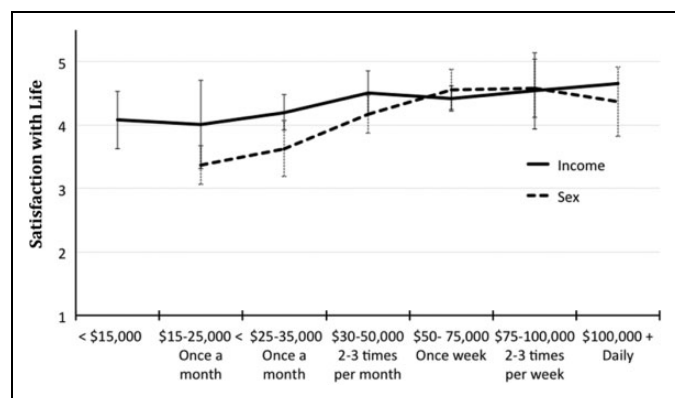
Finally, to convey the magnitude of the effects in more practical terms, in Figure 2 we graphed the association between sexual frequency and satisfaction with life with the association between income and satisfaction with life. We calculated effect sizes for the mean difference between people who reported

**Table 1.** Bivariate Correlation Matrix (Study 2).

	1.	2.	3.	4.	5.	6.	7.
1. Sexual frequency	—	.48***	.26***	-.03	-.34***	-.34***	-.09
2. Relationship satisfaction		—	.53***	-.10	-.22	-.19**	-.03
3. Satisfaction with life			—	-.14*	-.16**	-.11	.15**
4. Gender				—	.05	.08	.01
5. Age					—	.70***	.30***
6. Relationship length						—	.27***
7. Income							—

Note. Gender is coded as 0 = men and 1 = women.

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



**Figure 2.** Curvilinear association between sexual frequency and satisfaction with life compared to the association between income and satisfaction with life (Study 2). Note. Bars represent 95% confidence intervals.

having sex less than once a month compared to once a week ( $d = .91$ , 95% CI = [.46, 1.38]) and between people who reported making US\$15–US\$25,000 per year compared to US\$50–US\$75,000 ( $d = .42$ , 95% CI = [.06, .79]). As depicted in Figure 2, the increase in well-being gained from engaging in sex less than once a month compared to once a week is larger than the increase in well-being gained from making between US\$15–US\$25,000 per year and making US\$50–US\$75,000 per year.

### Study 3

#### Method

In Study 3, we use data from the National Survey of Families and Households (NSFH) to conduct a third test of our prediction that a curvilinear association better describes the relationship between sexual frequency and well-being than a linear association for people in romantic relationships. The NSFH is a three-wave, 14-year national study of married couples in the United States. Our analyses included all married (mixed-sex) couples who completed at least one wave of the NSFH ( $N = 2,400$  couples), and 1,321 couples (55%) completed all three waves. We have 99% power to detect a small

effect with two predictors at an  $\alpha$  of .05. A detailed explanation of the content and design of the NSFH is reported in Sweet, Bumpass, and Call (1988). The variables included in our analyses were both partners’ reports of sexual frequency (“About how often did you and your husband/wife have sex in the past month?”) and participants entered the number of times;  $M_{T1} = 8.06$ ,  $M_{T2} = 6.48$ , and  $M_{T3} = 5.12$ ). They also completed measures of relationship satisfaction (“Taking things all together, how would you describe your marriage?”) from 1 = *very unhappy* to 7 = *very happy*;  $M_{T1} = 6.09$ ,  $M_{T2} = 5.90$ , and  $M_{T3} = 6.14$ ) and happiness (“Taking all things together, how would you say things are these days?”) from 1 = *very unhappy* to 7 = *very happy*;  $M_{T1} = 5.67$ ,  $M_{T2} = 5.51$ , and  $M_{T3} = 5.75$ ).

#### Data Analytic Strategy

We used multi-level modeling to account for the nonindependence in the data. We conducted a three-level model with random intercepts where time point was nested within person and person was nested within couple. In this study, we report the standard errors for each effect (as opposed to the CIs) and the unstandardized  $\beta$ s. Romantic partners’ reports of sexual frequency were highly correlated with each other across all three time point ( $r_s = .59$  to  $.71$ ,  $p_s < .001$ ), so we created a couple-level sexual frequency variable for each time point using the mean of partners’ ratings. This variable centered represented the linear effect of sexual frequency. We then squared the centered variable to represent the curvilinear sexual frequency variable. Both the linear and curvilinear sexual frequency variables were entered as predictors of relationship satisfaction and general happiness. To test our prediction that relationship satisfaction mediates the association between sexual frequency and happiness, we used the Monte Carlo Method for Assessing Mediation (Selig & Preacher, 2008). Table 2 displays the correlations among all variables.

#### Results

Consistent with our predictions and the results of our previous two studies, we found that sexual frequency had a significant linear association with relationship satisfaction,  $b = .04$ ,  $SE = .004$ ,  $t(5,664.20) = 10.77$ ,  $p < .001$ , and a significant

**Table 2.** Bivariate Correlation Matrix (Study 3).

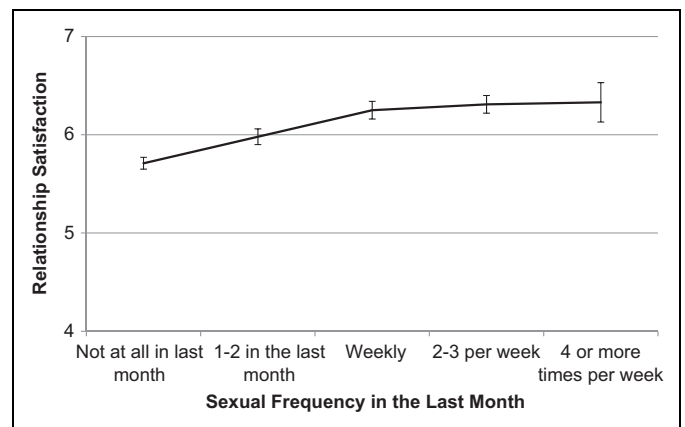
	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Sexual frequency (T1)	—	.56***	.43***	.14***	.07***	.04*	.11***	.03	.05**
2. Sexual frequency (T2)		—	.47***	.11***	.16***	.08***	.07***	.12***	.07***
3. Sexual frequency (T3)			—	.04*	.06***	.11***	.05***	.02	.08***
4. Relationship satisfaction (T1)				—	.34***	.20***	.47***	.25***	.16***
5. Relationship satisfaction (T2)					—	.30***	.26***	.45***	.23***
6. Relationship satisfaction (T3)						—	.15***	.20***	.35***
7. Happiness (T1)							—	.32***	.26***
8. Happiness (T2)								—	.28***
9. Happiness (T3)									—

Note. T1 = Time 1; T2 = Time 2; T3 = Time 3.

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

curvilinear association,  $b = -.01$ ,  $SE = .0003$ ,  $t(5,493.39) = -3.70$ ,  $p < .001$ . Sexual frequency also had a significant linear association with happiness,  $b = .02$ ,  $SE = .004$ ,  $t(5,271.49) = 4.76$ ,  $p < .001$ , but the curvilinear effect of sexual frequency on happiness did not reach significance,  $b = -.0005$ ,  $SE = .0004$ ,  $t(5,410.47) = -1.27$ ,  $p = .21$ . There was, however, a significant indirect effect for both the linear effect (CI = [.01, .02]) and curvilinear effect (CI = [-.005, -.003]) of sexual frequency on happiness through relationship satisfaction. Relationship satisfaction predicted overall happiness,  $b = .36$ ,  $SE = .01$ ,  $t(5,403.84) = 28.74$ ,  $p < .001$ , and when entered into the model with both sexual frequency variables, the associations between linear sexual frequency,  $b = .004$ ,  $SE = .003$ ,  $t(5,112.36) = 1.13$ ,  $p = .26$ , and curvilinear sexual frequency,  $b = -.00001$ ,  $SE = .0003$ ,  $t(5,352.27) = -.15$ ,  $p = .88$ , with happiness were significantly reduced. As shown in Figure 3, we confirmed that sex and relationship satisfaction were not significantly associated at a frequency of more than once a week. For couples having sex approximately weekly (6 times or less per month), there was a significant linear association between sexual frequency and relationship satisfaction,  $b = .04$ ,  $SE = .01$ ,  $t(3,537.98) = 4.24$ ,  $p < .001$ , whereas for those having sex more often, the association was not significant,  $b = .01$ ,  $SE = .01$ ,  $t(1,473.48) = 1.15$ ,  $p = .25$ . None of the effects of sexual frequency on well-being were moderated by gender (all  $ps > .50$ ) or by time point (these analyses would also account for age and relationship duration for couples who participate in all three time points; all  $ps > .10$ ).

Finally, as in Study 2, we conducted reverse mediation analyses. We found some support for a model in which sexual frequency mediates the link between relationship satisfaction and happiness (95% CI = [.007, .003]), however the indirect effect is small, sexual frequency accounts for 7% of the association between relationship satisfaction and happiness. In our predicted model, relationship satisfaction accounts for 95% of the association between sexual frequency and satisfaction with life. There is no significant curvilinear association between sexual frequency and happiness, so we do not find support for a model where happiness mediates that association between sexual frequency and relationship satisfaction. As in Study 2, we find support for a top-down model in which



**Figure 3.** Curvilinear association between sexual frequency in the last month and romantic relationship satisfaction (Study 3). Note. Bars represent 95% confidence intervals. We created sexual frequency categories for graphing purposes only, and the continuous sexual frequency variable was used in the analyses. The y-axis does not include the whole scale.

relationship satisfaction mediated the link between satisfaction with life and sexual frequency (95% CI = [.06, .19]); in this model, the mediator accounts for 14% of the association and only includes the linear (and not the curvilinear) sexual frequency variable.

## Discussion

The current set of studies help dispel the notion that sex has limitless benefits for well-being and, instead, indicate that at least for people in romantic relationships, sexual frequency is no longer significantly associated with well-being at a frequency greater than once a week. Consistent with our theoretical rationale, the current findings suggest that one reason why greater sexual frequency is associated with greater well-being for people in relationships is that having more frequent sex (up to about once a week) is associated with greater relationship satisfaction. In terms of single people, in Study 1 we found no linear or curvilinear association for people not currently in romantic relationships. Likely, there are

important moderators that influence the association between sexual frequency and well-being for single people (for a review of casual sex and well-being see Vrangalova, 2015), an area that is ripe for future research.

Although the results of three studies with over 30,000 participants point resoundingly to the conclusion that the association between sexual frequency and well-being is curvilinear, what is not clear from the current research is why sexual frequency is no longer associated with well-being at frequencies greater than once a week. The average amount of sex reported in established relationships is approximately once a week (Blanchflower & Oswald, 2004; Call et al., 1995; Laumann et al., 1994), so perhaps this tends to be the average because engaging in sex more frequently is no longer associated with well-being. It is also possible that couples feel satisfied as long they think they are engaging in the amount of sex that is considered to be average for couples of their relationship status and duration. Consistent with this possibility, one study found that happiness was positively associated with one's own frequency but was negatively associated with the actual sexual frequency of one's peers (Wadsworth, 2014). It is not clear from this work, however, if people are aware of the average sexual frequency and feel better if they believe they are at or above this frequency. It is also possible that the point at which sex is no longer associated with greater well-being differs based on demographic factors or individual differences, such as a person's ideal sexual frequency. Although the curvilinear effect was not moderated by age, gender, or relationship length in the current studies, it is possible that the point at which there is no longer an association between sexual frequency and well-being could differ based on these factors.

It is important to note that the current set of studies all examined links between naturally occurring sexual frequency and well-being. We cannot make causal claims and, in fact, we find evidence for both top-down and bottom-up effects for the association between sexual frequency and well-being, consistent with research on other indicators of well-being (Brief, Butcher, George, & Link, 1993; Nakasato, Schimmack, & Oishi, 2011). Experimental research could provide evidence for the direction of this effect, however, in a recent study couples did not report greater well-being when they were instructed to double their sexual frequency (Loewenstein et al., 2015). The authors suggested that the directive of being asked to increase sexual frequency removed partners' intrinsic motivation to engage in sex and therefore made sex less enjoyable. The couples in this study, however, were already having sex about once a week (i.e., 5 times a month) at baseline. An interesting avenue for future research would be to test whether increasing sexual frequency benefits couples who are having sex less frequently than once a week, but the research by Loewenstein et al. highlights the challenges of conducting experimental work in the domain of sexuality.

In John Updike's statement at the opening of the article, he suggests that there are limitless benefits to engaging in sex (and making more money) in that a person can never get enough. Our research demonstrates, however, that although greater

sexual frequency is associated with greater well-being, more is not always better. Instead, sex may be like money—only too little is bad.

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