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**Sexual Creativity: A Blessing for Sexual- and
Relationship Satisfaction?
Examining the Effect of Creative Sexual Tasks
on Monogamous Long-term Relationships.**

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Abstract

Sexual satisfaction usually decreases with time in long-term relationships. Several studies found that one way to counteract low sexual satisfaction is to introduce sexual novelty into the bedroom. However, to our knowledge, there is no study showing that sexual creativity in the bedroom leads to higher sexual satisfaction in long-term relationships. Therefore, our study tested the effect of a sexual creativity intervention on sexual satisfaction, relationship satisfaction, sexual desire, sexual communication and sexual boredom. We included participants that were in a heterosexual, monogamous relationship for more than 18 months and between 18 and 60 years (N=230). Participants were randomly assigned to either the control group (n=132) or the intervention group (n= 98). During the course of four weeks, participants in the intervention group were asked to engage in sexually creative tasks with their partner whereas participants in the control group were asked to schedule routine sex. Results show that there are no significant group differences in the outcomes. However, we found support for the idea that length of relationship moderates the effect of sexual creativity on sexual satisfaction, whereas gender does not. In addition, exploratory analyses revealed that, even though not significant, sexual satisfaction increases more in women than in men over the course of the intervention. Thus, future research should further investigate whether sexual creativity does have different effects for men and women.

Keywords: sexual satisfaction, relationship satisfaction, sexual creativity, long-term relationships

Sexual Creativity: A Blessing for Sexual- and Relationship Satisfaction?

Examining the Effect of Creative Sexual Tasks on Monogamous Long-term Relationships

'Everyone has the right to pleasurable sexual experiences' (World Health Organization, 2002, p.5). As the citation makes clear, the WHO recognizes the importance of sexual pleasure to personal development and physical and mental health, but the reality is oftentimes different. Research shows that sexual satisfaction tends to decrease in long-term, monogamous relationships (Morton, 2016; Matthews et al., 2018; Morton & Gorzalka, 2015). Less sexual satisfaction can, in turn, lead to relationship dissatisfaction, which can result in feelings of rejection or even break-up (Morton & Gorzalka, 2015). To counteract the phenomenon of bedroom boredom, researchers found that exposure to stimuli that are explicit and novel increases sexual arousal (Tunariu & Reavey, 2007). Moreover, several studies found support for the positive effect of novelty on sexual satisfaction related to the partner (Matthews et al., 2018). These findings imply that bedroom boredom can be countered with sexual creativity. Hence, there is reason to believe that engaging in creative tasks with a partner will increase sexual satisfaction. Yet, the possibility that sexual creativity increases the sexual satisfaction of people in long-term relationship has never been tested. Therefore, we intend to add to the existing literature by answering the general question of whether creativity in the bedroom can enhance sexual- and relationship satisfaction. In the bigger picture, we thereby want to contribute to evidence-based interventions which can be used in clinical practice to help patients make their sexual experiences in long-term relationships more pleasurable.

Previous research has shown that sexual novelty can increase sexual satisfaction (Rosa et al., 2019). The likelihood of engaging in sexually novel behavior depends, among others, on the level of sexual boredom. Thus, if sexually bored, a person is more likely to engage in sexually novel behavior than someone who is not sexually bored. In addition, the authors found that the likelihood of engaging in sexually novel behavior can be increased by giving persuasive information addressing the importance of sexual novelty (Rosa et al., 2019). In other words, sexual satisfaction can be increased by informing about the importance of sexual novelty and engaging in sexually novel behavior.

Whereas Rosa et al., (2019) raised awareness for the importance of sexual novelty, Morton (2016) tested among others whether ‘...a novelty-based intervention is effective in enhancing sexual functioning...’ (Morton, 2016, p.22) and aimed to draw causal inferences with her experiment. Hence, she asked participants to implement novel sexual activities, which participants were encouraged to discuss with their partner for four weeks and measured sexual satisfaction, sexual wanting, and sexual function before and after the intervention. Even though she found no causal effect of sexual novelty, she confirmed that relationship duration has a negative impact on sexual satisfaction (Klusmann, 2015; Schröder & Schmiedeberg, 2015). Further, she found that novel sexual activity is positively related to greater sexual satisfaction in women and men. Besides, she also found that novel leisure activities have a similar effect. Morton (2016) thereby linked her findings to Mark et al. (2014) who similarly emphasized the importance of engaging in novel leisure activities for sexual satisfaction. However, her study suffered from low adherence and high drop-out rates. Morton’s measurement points have a time period of four weeks in between, which might have been too long and thus one reason for high attrition rates. Hence, participants’ investment in the study might have decreased over the course of the study because of difficulties implementing sexually novel activities without further instructions from the study investigators. We addressed these limitations in our study.

Mating Strategies

Adding to previous research, we will establish why people would invest in a long-term relationship at all, given the presented evidence for decreased sexual satisfaction. From the perspective of sexual strategies theory (Buss & Schmitt, 1993), long-term relationships do have several drawbacks compared to short-term relationships/mating. Buss and Schmitt (1993) argue that having one partner only leads to less offspring and thus less reproduction success from the men’s perspective. Having multiple partners would accordingly increase the chance for reproduction and be most adaptive from the standpoint of sexual strategies theory. Not only for men but also for women, engaging in short-term mating can be similarly beneficial in that they have a better selection of ‘good

genes' (Gangestad & Thornhill, 1997). The more they engage in short-term relations, the more choices they have for finding a mate with good genes which will provide the best care for their offspring. However, given the high costs of reproduction (9- months pregnancy, lactation etc.), short-term mating is limited in its efficiency for women. Consequently, from the perspective of sexual strategies theory, long-term relationships are not the most adaptive form of relationship for both partners (Buss & Schmitt, 1993). Thus, drawing from sexual strategies theory, a lack of sexual satisfaction can stem from the desire to engage in other short-term sexual encounters to increase chances for reproduction.

However, sexual strategies theory is only one out of many theoretical attempts to explain decreases in sexual satisfaction in long-term relationships. Evolutionary theory argues that one to maximally a few mates are efficient for women's reproductive success (Cashdan, 1996) and that other aspects play a central role in long-term mating, too. For example, both, romantic love and attachment, which are part of long-term relationships, were shown to contribute to successful reproduction and child upbringing (Salmon, 2017). Specifically, attachment styles must be considered when examining sexual satisfaction, as they can influence sexual satisfaction apart from the overall relationship satisfaction (Impett & Peplau, 2002). Further, research has shown that individuals who are in happy long-term relationships feel cared for, valued, and supported (Acevedo et al., 2012; Impett et al., 2005; Reis & Shaver, 2020). Consistent with that, another study found that noticing a long-term partner in a crowd can increase activation in brain areas that are associated with reward and motivation (Acevedo et al., 2012). This indicates that even though long-term relationships might not be the most adaptive strategy, individuals in a fulfilling long-term relationship focus their resources on one partner, which can also improve one's reproduction success.

Sexual Satisfaction

Sexual satisfaction can be defined as an '[...] emotional experience of frequent mutual sexual pleasure [...]' (Pascoal et al., 2014, p.27). Whereas some definitions go into more depth, others define sexual satisfaction simply as the absence of dissatisfaction (Young et al., 2000). However, both

parties generally agree that sexual satisfaction can be either an individual process or a dyadic process (Pascoal et al., 2014). This means that individual processes like, for example, arousal or partner-related aspects like, for example, frequency of sex can contribute to sexual satisfaction (Sprecher & Cate, 2004). Since we are interested in dyadic processes, we will base our definition of sexual satisfaction on Pascoal et al., 2014, who emphasize that sexual satisfaction is tied to a partner.

Creativity

Creativity is defined as something that is effective and original (Runco & Jaeger, 2012). Both, effectiveness and originality, aspects have to be fulfilled for something to be creative. However, the definition has been criticized for its simplicity and developed further by Corazza (2016). He argues that creativity needs a dynamic definition, given that creativity itself is a dynamic process. Therefore, he proposes that something is creative if its *potentially* but not necessarily original and effective (Corazza, 2016). In response, Walia (2019) argues that both definitions are too narrow given that creativity is an ongoing process regardless of its outcome. Therefore, to operationalize the concept of creativity, we will use the definition of Runco & Jaeger (2012) and define creativity as something novel and useful.

Bedroom Boredom & Habituation

The contrary of sexual satisfaction can be described as bedroom boredom, which arises out of habituation (Matthews et al., 2018). Habituation describes the weakened response to something if one is exposed to it very often (Klusmann, 2015). Specifically, sexual habituation appears if one is being exposed to a sexually relevant stimulus (i.e., the partner) for a longer period of time, which is the case for long-term relationships. The findings of Klusmann (2015) were strengthened by Koukounas & Over (2000) who argue that sexual arousal decreases with repeated exposure to (sexually relevant) stimuli and, vice versa, sexual arousal increases with increasing exposure to novel (sexually relevant) stimuli. The increase in sexual arousal with novel stimuli is called the novelty effect (Koukounas & Over, 2000). Based on the finding that novelty is linked to sexual arousal, we

investigated whether engaging in sexual creative behavior increases sexual- and relationship satisfaction (RQ1). Additionally, scholars found that the length of relationship influences sexual satisfaction in that it decreases with time (Morton & Gorzalka, 2015). Consequently, we investigated whether the effect of sexual creativity is moderated by the length of relationship (RQ2). Lastly, Morton & Gorzalka (2015) investigated the novelty effect and found different effects for men and women. Specifically, they found that when exposed to an erotic clip, women get more aroused if the situation changes, whilst men get more aroused if actors change. This means that people react differently to various novel stimuli and that novelty can mean different things for men and women (i.e., situation vs. person). Moreover, they found that decreased sexual arousal and desire is more prevalent in men than in women, contradicting the findings of Morton (2016). On the other hand, Klusmann (2015) found that in long-term relationships, sexual desire decreases for both men and women. Contrary to that, Hayes et al. (2008) argue that sexual desire decreases mainly in women. Hence, scholars have not concluded on whether bedroom boredom affects men and women similarly. Given the inconclusive research results, we additionally examined whether the effect of creativity on sexual satisfaction is different for men and women (RQ3).

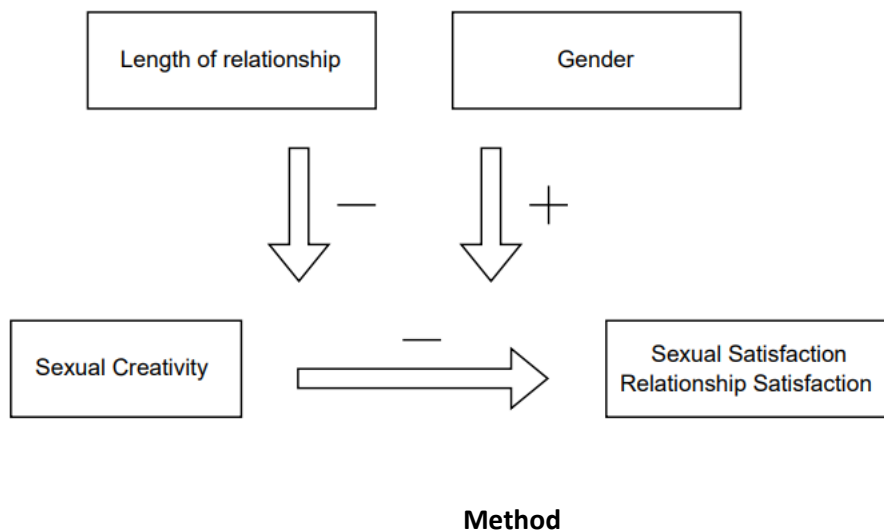
Combining Theory & Previous Findings

Given that long-term mating success presupposes satisfying sex for both parts to counteract feelings of rejection or ultimately break-up/divorce, we aim to implement sexual creativity, which was shown to increase sexual satisfaction for both men and women (Morton, 2016). Addressing the limitations of Morton (2016), we used an experimental study design with individuals who are in a long-term (18 months+), monogamous relationship and implement weekly tasks and measurements to increase adherence and to prevent high attrition rates. Further, implementing the findings of Rosa et al. (2019), we included clear communication about the importance of sexual creativity regarding sexual- and relationship satisfaction to increase the likelihood of participants engaging in such creative behavior. Therefore, we created an informative video about the importance of sexual novelty for participants.

Based on the findings of Morton (2016), we hypothesized that creativity in the bedroom enhances sexual- and relationship satisfaction, sexual desire, sexual communication, and decreases sexual boredom (*Hypothesis 1*). Further, we hypothesized that the length of relationship moderates the effect of sexual creativity on sexual- and relationship satisfaction (*Hypothesis 2*; see Figure 1). Based on the finding of Levine (2002), we expected that gender moderates the effect of creativity in the bedroom on sexual- and relationship satisfaction. Specifically, we anticipated that women benefit more than men from the sexual creativity intervention (*Hypothesis 3*; see Figure 1).

Figure 1

Moderation Model with Length of Relationship and Gender as Moderators



Participants

Participants were recruited by advertising the study on social media, distributing flyers as well as by placing posters around Groningen. Incentives to participate were having access to the study results, getting a rating of own scores, increasing relationship satisfaction, and having the chance to participate in i) a sex toy lottery and ii) a sexual communication workshop after participating in the study. For our study, we sought to recruit participants between 18 and 60 years. Additional inclusion criteria were being in a monogamous, long-term relationship (18 months +) and spending four or more nights of the week together. In total, 1086 people signed up for the study and,

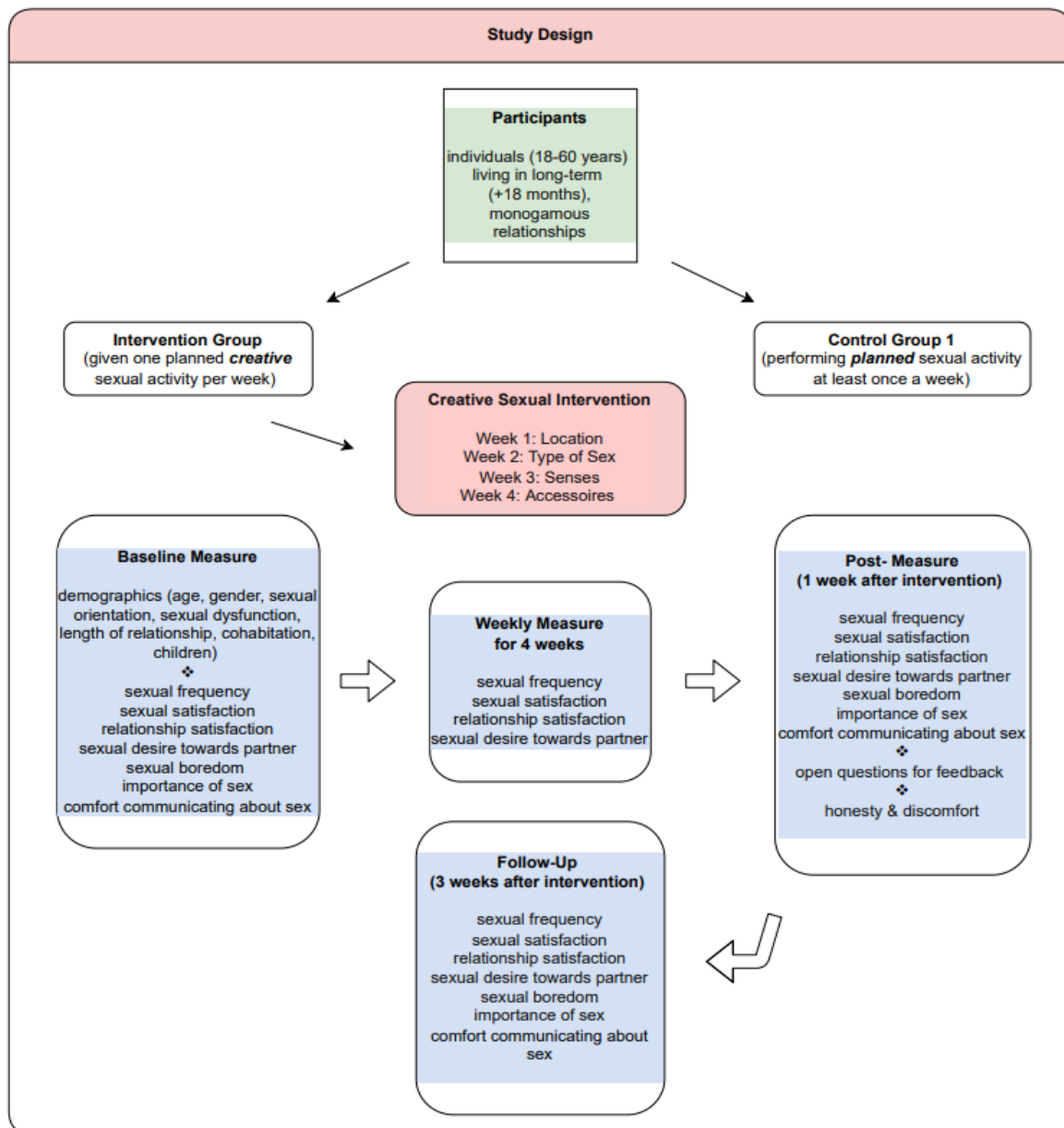
ultimately, 563 people filled in the baseline questionnaire. Out of these 563 participants, 264 were male and 297 were female. Overall, participants were between 19 and 60 years old. The majority of participants that indicated their sexual orientation is heterosexual (n= 481), with 14 participants being homosexual, 47 being bisexual, and 18 participants choosing the option 'Other'.

Design and Procedure

Our experiment consisted of two groups: the treatment group, that received the sexual creativity intervention and the control group, that engaged in sexual activity as usual (Figure 2). When participants clicked on the link to our study, they were directed to a sign-up questionnaire where they could sign up for the study. Afterwards, they were randomly allocated to one of the two groups. Participants provided informed consent and were then presented with an introductory video with information regarding the study. Next, all participants filled out the baseline questionnaire assessing their demographics, followed by items that assessed relationship satisfaction, sexual satisfaction, sexual desire, sexual communication, sexual boredom, sexual novelty, and importance of sex. In the following four weeks, participants in the experimental group were sent weekly themes that entailed suggestions for sexual creative tasks according to the theme. In the email, the couple was asked to agree upon and to plan one specific sexual creative task that they would perform in the upcoming week. Participants in the control group were asked to plan a sexual activity but stay as closely to their routine as possible. After each week, participants received a short questionnaire assessing sexual- and relationship satisfaction, sexual frequency, and sexual desire towards their partner. After four weeks, a final questionnaire was sent to participants which included the same items as the baseline questionnaire. Three weeks after the final questionnaire, we sent the participants a follow-up questionnaire that assessed the same variables as the baseline questionnaire.

Figure 2

Study Design



Materials

Sexual Satisfaction

To assess sexual satisfaction, we used the Global Measure of Sexual Satisfaction (GMSEX; Lawrence et al., 2020). The item that we used to assess sexual satisfaction, namely 'Overall, how would you describe your sexual relationship with your partner?' is rated on five dimensions (i.e., *good, pleasant, positive, satisfying, valuable*) using a 7-point Likert scale. A score of seven means either *very good, very pleasant, very positive, very satisfying* or *very valuable*, depending on the

dimension. The scores on each item are summed up and high scores translate to high sexual satisfaction. The GMSEX showed strong test-retest reliability (.84) and internal consistency ($\alpha=.96$) in comparison to other scales that are measuring sexual satisfaction (Mark et al., 2014). In our sample specifically, the scale had a high reliability ($\alpha=.93$).

Relationship Satisfaction

We used the General Measure of Relationship Satisfaction (GMREL; Mark et al., 2014) to assess relationship satisfaction. Identically to the GMSEX, the measure contains five items and is assessed on a 7-point bipolar scale (*e.g., worthless-very valuable*). An example item is 'Generally, how would you describe your overall relationship with your partner?'. Byers and colleagues (1998) demonstrated high scale's validity. Due to a high correlation with the Dyadic Adjustment Scale, high reliability of the scale ($\alpha=.95$) is given (Alitabar et al., 2018). A high score on the scale means high relationship satisfaction of the person.

Sexual desire towards partner

Sexual desire towards one's partner was assessed with the partner-specific sexual wanting scale (PSSW; Krishnamurti & Loewenstein, 2012). The scale includes five items measured on a 5-, 8- and 9- point Likert scale where one represents low sexual desire and higher numbers indicate high sexual desire. Thus, the higher the number, the more the person was thinking about their partner or experienced physical sexual arousal. For example, one item asked 'When you think about your primary sexual partner, how often does this result in physical sexual arousal?' (*1=rarely, 5=always*). The measure has high test-retest reliability ($\alpha =.87$) (Krishnamurti & Loewenstein, 2012) and showed high internal validity in our sample ($\alpha =.83$). High scores indicate high wanting towards the partner.

Importance of sex

To assess the importance of sex in one's life we used the item 'How important to you is your sex life?' derived from the WHOQOL-100 which assesses quality of life (The WHOQOL Group, 1998). The overall measure of the WHOQOL-100 is divided in several domains like, for instance, physical

health or level of independence. The domain sexual activity, from which we took the aforementioned item, shows moderate reliability ($\alpha = .59$) and high construct validity (De Vries & Van Heck, 1997). The participant could rate the item on a scale with five options ranging from not important to extremely important. High scores on this measure indicate that sex is very important to the person.

Sexual communication

The dyadic sexual communication scale (DSCD) was used to assess sexual communication (Catania, 1998). It consists of 13 items and demonstrates high reliability ($\alpha = .81$) and validity (Catania, 1998). Participants were asked to read 13 statements and rate them on a 5-point Likert scale (*1 = strongly disagree, 5 = strongly agree*). An example item is 'Talking about sex is a satisfying experience for both of us'. Afterwards, a total score was computed by the sum of the item scores. High scores indicate high sexual communication functioning.

Sexual boredom

To measure sexual boredom, we used the sexual boredom scale (SBS; Watt & Ewing, 1996). It consists of 18 items that are divided into two categories. For our questionnaire we included all items of the first category (sexual monotony) which consists of nine items that assess sexual monotony (Watt & Ewing, 1996). Further, after coding one reversed item (*'Maintaining my sexual interest in a relationship is never difficult'*) item scores were summed up with high scores indicating a high level of sexual boredom. The scale has shown high internal consistency (.92 to .95) and high test-retest reliability ($\alpha = .81$; Watt & Ewing, 1996). However, one item in our questionnaire measuring sexual boredom was removed due to a translation error.

Sexual novelty

To assess sexual novelty, one item of the sexual novelty scale (SNS; Matthews et al., 2018) was used. The scale contains five items of which we chose the item with the highest factor loading, namely: 'My partner and I often try new things in bed'. The item has seven answer options (*e.g., strongly disagree/somewhat agree/strongly agree*) and a high score indicates high sexual novelty.

The scale presents high internal consistency and good test-retest reliability ($\alpha = .94$ and $.91$) (Matthews et al., 2018).

Data Reduction and Analysis

As a first step of data cleaning, participants who had missing data, a relationship duration of less than 18 months, were above 60 years, and/or were not in a monogamous relationship were deleted ($n= 98$). It was decided that all participants who spend less than four nights a week together ($n= 79$) are still included, as there is no theoretical base for the cut-off. Afterwards, as a second step of data-cleaning, the datasets of the baseline, the post-measurement and the follow-up were merged. All participants were excluded when they or their partner had at least one missing value in one of the measurement points ($n= 326$). Lastly, all participants in homosexual relationships were excluded ($n= 6$). Therefore, the sample was reduced to a final sample of 230 individuals.

Before analyzing the data, response ranges were transformed in that all items measuring sexual desire were brought to a 9-point scale. One item was reversed before summing the items. The other scales with more than one item were summed as instructed in their manual. To analyze the data, we created a couple score by calculating the mean of the couple's scores. Additionally, a difference score was calculated for the couple by subtracting the male score from the female score to see how much variation there is within a couple (female-male). Lastly, assumption checks for repeated measures ANCOVA revealed no severe violations regarding linearity, normality, homogeneity of variances and homogeneity of regression. However, due to the violation of sphericity, we used the conservative Greenhouse-Geisser correction that adjusted the degrees of freedom.

Results

As a first step, we calculated descriptive statistics and correlations for the dependent variables. Table 1 shows the averages, standard deviations and correlations of all variables of interest. Out of the 230 persons, 130 (56.5%) were in the control group and 100 (43.5%) were in the

experimental group. The ratio of men and women is almost equal with 49.6% being male and 50.2% being female. The majority of participants do not have children (77.1 %) and live with their partner (73.6%).

Table 1

Descriptive Statistics for all Dependent Variables

	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.
1. Age	30.30 (9.02)	1						
2. Relationship length	7.24 (7.12)	.21*	1					
3. Sexual Satisfaction	5.73 (1.00)	-.08	-.17	1				
4. Relationship Satisfaction	6.31 (0.66)	.06	-.08	.62**	1			
5. Sexual Desire	5.07 (0.95)	.01	-.25**	.53**	.43**	1		
6. Sexual Communication	2.65 (0.22)	-.02	-.26**	.07	.17	.13	1	
7. Sexual Boredom	3.11 (0.75)	.00	-.09	-.57**	-.48**	-.41**	.14	1

Note. Couple mean scores were used.

* $p < .05$

** $p < .01$.

Additionally, we calculated summary scores of the dependent variables in the experimental group across the three time points (baseline, post- measurement, follow-up) to see whether means and standard deviations change over time. As expected, the means for sexual- and relationship satisfaction increased across the three time points. The standard deviations decreased (see Table 2). This means that participants rated their sexual- and relationship satisfaction higher each time, and the variation in the scores decreased across time as well. Further, the mean score for sexual boredom decreased across time points, indicating an effect of the condition on sexual boredom.

Table 2

Summary Scores of Dependent Variables across Time Points in Experimental Group

	Pre	Post	Follow-Up
Sexual Satisfaction			
M (SD)	5.73 (1.00)	5.89 (0.96)	5.98 (0.87)
Relationship Satisfaction			
M (SD)	6.31 (0.66)	6.35 (0.61)	6.38 (0.57)
Sexual Desire			
M (SD)	5.07 (0.95)	5.10 (1.00)	5.04 (1.00)
Sexual Communication			
M (SD)	2.65 (0.22)	2.68 (0.18)	2.66 (0.20)
Sexual Boredom			
M (SD)	3.11 (0.75)	3.06 (0.76)	3.04 (0.73)

Main analysis

Hypothesis 1

To test hypothesis one, we used a repeated measure ANCOVA model with three time points. Time served as the within-subjects factor. We used the mean scores of the couple in this analysis. The between-subjects factor was the groups with the control group coded as 0 and the experimental group coded as 1. We used the centered mean of the length of relationship as a covariate. We fitted one model for each outcome (i.e., FILL outcomes).

Sexual Satisfaction.

First, opposing our prediction, we found that the main effect of group on sexual satisfaction was not significant ($F(1, 111) = 0.19, p = .660, \eta^2 = .00$). This means that regardless of which group the participants were assigned to, it did not make a difference in their rating of sexual satisfaction. However, the main effect of time on sexual satisfaction was significant ($F(1.507, 167.32) = 10.73, p = .000, \eta^2 = .08$), meaning that there was a difference in the rating of sexual satisfaction over the course of the three measurement points. Lastly, the interaction effect of time and group was not significant ($F(1.507, 167.32) = 0.82, p = .413, \eta^2 = .01$) which means that the effect of time does not differ between the conditions.

Relationship Satisfaction.

Second, we found no significant main effect of group for relationship satisfaction ($F(1, 111) = .14, p = .713, \eta^2 = .00$). Contrary to our prediction, the main effect of time was also not significant ($F(1.515, 168.167) = 1.65, p = .200, \eta^2 = .02$), indicating no change in relationship satisfaction over time.

Sexual Desire.

Similarly, we did not find a significant main effect of group for sexual wanting ($F(1,111) = .01$, $p = .862$, $\eta^2 = .00$) nor for the main effect of time ($F(1.841,204.301) = .62$, $p = .527$, $\eta^2 = .01$).

Sexual Communication.

Moreover, we hypothesized that sexual communication would increase for the experimental group compared to the control group. However, results were not significant for the main effect of group ($F(1,111) = .20$, $p = .655$, $\eta^2 = .00$), meaning that the ratings of sexual communication do not differ between the two groups. For the main effect of time, we also did not find any significant result ($F(1.872,207.837) = 1.53$, $p = .220$, $\eta^2 = .01$).

Sexual Boredom.

Lastly, sexual boredom was hypothesized to decrease for the participants in the experimental group. However, no differences in ratings regarding their assigned groups were observed ($F(1, 110) = .01$, $p = .929$, $\eta^2 = .00$). Thus, we found no indication for a decrease in sexual boredom in the experimental (vs. control) group.

Hypothesis 2

We hypothesized a moderating role of length of relationship (H2; see Figure 1). Specifically, we predicted that the longer participants have been in a relationship, the weaker the effect of sexual creativity on sexual- and relationship satisfaction would be. To test the hypothesis, we centered the mean of relationship length, given that both partners sometimes indicated different values for the length of their relationship. We then computed a repeated measures ANCOVA with length of relationship as covariate and used the three time points and the condition as independent variables.

Results showed a significant interaction effect between length of relationship and group for sexual satisfaction ($F(1.507, 167.317) = 10.73$, $p = .00$, $\eta^2 = .09$) but not for relationship satisfaction ($F(1.515, 168.167) = 1.9$, $p = .163$, $\eta^2 = .017$). This means that there is evidence that the length of a couple's relationship influences the effect of condition on sexual satisfaction but not on relationship satisfaction. Specifically, the longer a couple has been together, the stronger the effect of condition on sexual satisfaction. The main effect of length of relationship on sexual satisfaction was not

significant ($F(1, 111) = 3.03, p = .08$) meaning that sexual satisfaction scores do not significantly differ between people with different relationship lengths. Similarly, we found no significant main effect of length of relationship for relationship satisfaction ($F(1, 112) = 1.05, p = .31$).

Hypothesis 3

Our third hypothesis states that the effect of sexual creativity on sexual- and relationship satisfaction is moderated by gender. Specifically, we predicted that the effect of creativity on sexual- and relationship satisfaction is stronger for women than for men. We conducted a repeated measure ANCOVA with gender as the covariate and time and condition as independent variables. For this analysis we did not use couple scores but individual scores for sexual- and relationship satisfaction. Sexual- and relationship satisfaction served as the outcome variables. For sexual satisfaction, the main effect of gender was not significant ($F(1,227) = 2.43, p = .121$) which means that sexual satisfaction did not significantly differ between women and men. Further, we did not find a significant effect for the interaction between time and gender ($F(1.575,357.423) = 1.62, p = .204$) meaning that the effect of time on sexual- and relationship satisfaction does not change for men and women. Most importantly, the interaction between group and gender was not significant as well ($F(1,227) = .43, p = .511$) which means that the difference in scores for males and females did not differ between experimental and control groups.

Lastly, we conducted the same analysis with relationship satisfaction as our variable of interest. Results showed a significant main effect of gender ($F(1,227) = 4.31, p = .039$), but no significant interaction between time and gender ($F(1.614,366.369) = .40, p = .629$) and no interaction between group and gender ($F(1,227) = .05, p = .818$).

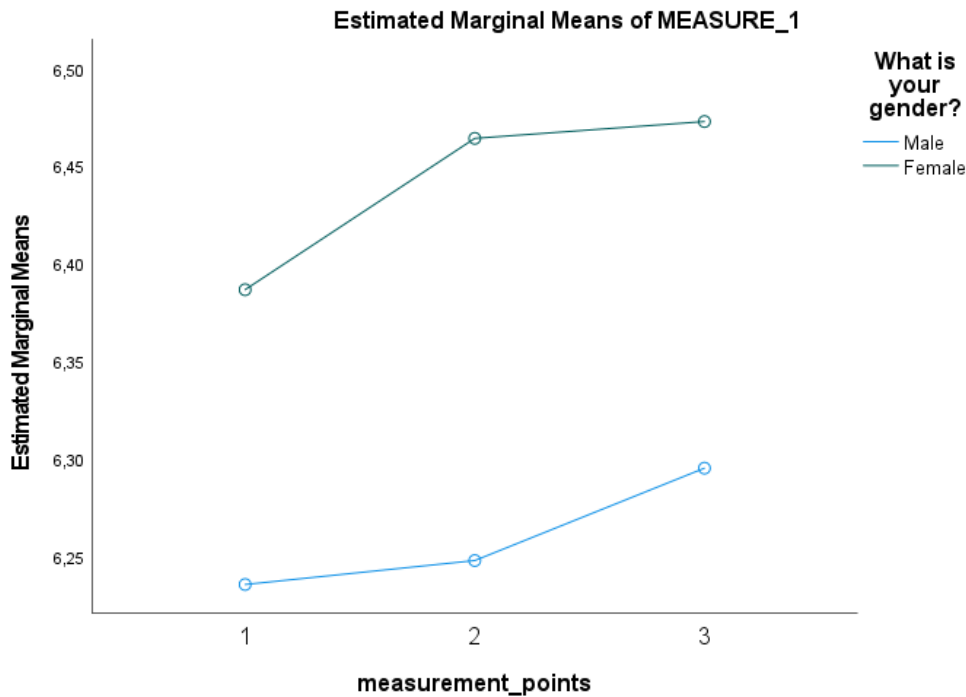
Exploratory Analyses

Following up on hypothesis three, even though not significant, sexual satisfaction ratings slightly increased over the course of time (Table 2). Adding to these findings, an increase in difference scores (Appendix, Table 1) indicates that differences in sexual- and relationship satisfaction ratings among partners cultivate. Thus, even though an increase in sexual satisfaction can be observed, the difference scores indicate that this appears only for one part of the couple.

Therefore, we first visually inspected estimated marginal means, which revealed that females rated their sexual satisfaction generally higher than males at all three measurement points.

Figure 3

Differences in Estimated Marginal Means between Males and Females



Adding to visual inspection, pairwise comparison of sexual satisfaction scores for females across time yields significant results (Table 3) when comparing the follow up score with the post measurement and baseline score. This means that for women, sexual satisfaction appears to increase over time whereas for males, results yield no indication for an increase over time.

Table 3

Pairwise Comparisons of Sexual Satisfaction Scores for Males and Females

		Men			Women		
		<i>Mean difference</i>	<i>SE</i>	<i>p</i>	<i>Mean difference</i>	<i>SE</i>	<i>p</i>
Baseline	Post	-.15	.08	.229	-.17	.08	.079
	Follow-Up	-.17	.08	.084	-.33*	.07	.000
Post	Baseline	.15	.08	.229	.17	.08	.079
	Follow-Up	-.03	.05	1.00	-.16*	.05	.004

Follow-Up	Baseline	.17	.08	.084	.33*	.07	.000
	Post	.03	.08	1.00	.16*	.05	.004

Note. Based on estimated marginal means

*. The mean difference is significant at the .05 level.

Subsequently, the question arises whether the increase of sexual satisfaction ratings for females are linked to the affiliation of the two groups. Therefore, we chose a repeated measure ANCOVA model for the analysis with sexual satisfaction as the outcome variable and gender as covariate. Group was used as between-subjects factor. Results show no significant interaction effect between time, gender and group ($F(3.149, 357.423) = 1.19, p = .316$) which means that the effect of gender on sexual satisfaction over time appears not to differ between the groups that participants were assigned to. Thus, it appears as if women experienced an increase in sexual satisfaction over the course of the experiment due to other factors than group membership, which will be discussed in the following.

Discussion

Our study aimed to test whether sexual creativity can increase sexual- and relationship satisfaction in monogamous long-term relationships. We found no evidence that the sexual-creativity intervention in our study led to an increase in sexual- and relationship satisfaction. We additionally studied whether the length of the relationship and gender have a moderating effect on the impact of being in the intervention group (vs. not) on sexual- and relationship satisfaction. Our results indicate that the effect of receiving the intervention (vs. not) on sexual satisfaction is influenced by the length of a couple's relationship. Specifically, the longer participants are in a relationship, the stronger the effect of the intervention on sexual satisfaction and vice versa. Furthermore, we found that relationship satisfaction did not significantly differ between women and men. Adding to these findings, exploratory analyses revealed that women experienced a small increase in sexual satisfaction whereas men did not.

Effect of Sexual Creativity

Our finding that the sexual-creativity intervention did not have a positive effect on sexual-

and relationship satisfaction in this study aligns with the findings of Morton (2016) who equally did not find an effect of novel sexual activity on sexual satisfaction. However, they do not support recent studies that found a positive effect of novelty on sexual- and relationship satisfaction (Koukounas & Over, 2000; Morton & Gorzalka, 2015; Rosa et al., 2019). Even though not significant, our findings have multiple theoretical implications. First and foremost, we discussed earlier that sexual novelty is related to sexual desire (Morton & Gorzalka, 2015), sexual arousal (Kelley & Musialowski, 1986) and sexual satisfaction in general. However, even though sexual novelty is related to higher sexual arousal, it does not mean that higher sexual arousal generally translates into higher sexual- and relationship satisfaction per se. Moreover, it could be that we did not find an effect because the effect of sexual novelty might only be temporary and short-term. Possibly, participants went back to having routine sex shortly after they engaged in novel sex or habituation occurred quickly after the novel sexual experience as described in the study of Koukounas and Over (2000). Lastly, participants were randomly allocated to one of the two experimental groups regardless of their sexual experience and their levels of sexual satisfaction. Thus, as Table 2 shows, scores in the experimental group on the dependent variables are already rather high at the baseline measurement. This means that participants that signed up for the study were already quite satisfied and open to take part in an experiment whereas people that might score low on sexual- and relationship satisfaction did not sign up for such a study in the first. Therefore, selection bias could have occurred. The high baseline scores may have influenced the results in two ways: First, the control group might have been eager to try new sexual activities as well. Given that the experiment took place online, we had no control over whether the control group stuck with their initial routine sex. Second, when signing up for the study, couples were possibly more eager to talk about their sex life. Such increase in sexual communication may have led to increased sexual satisfaction without actively engaging in new sexual activities (Catania, 1998; Rehman et al., 2011). In summary, high baseline sexual satisfaction scores as well as high motivation in the control group to 'go on a sexual adventure' as advertised may have contributed to the results.

Moderating role of relationship length

Further, findings suggest that the length of a couple's relationship moderates the effect of condition on sexual satisfaction. Thus, our findings add to existing literature showing that the effect of condition on sexual satisfaction is stronger, the longer couples have been together (Rosa et al., 2019; Umberson et al., 2016). These results could have, again, occurred due to high sexual satisfaction scores in the baseline measurement (i.e., ceiling effect) and high motivation to take part in the study. Looking at the societal importance of this finding and specifically high breakup and divorce rates, a lack of sexual satisfaction could be one reason for general relationship dissatisfaction, which, in turn, can lead to breakup or divorce (Tavakol et al., 2017). This concerns married couples and unmarried couples that experience relationship problems arising from sexual boredom. As many negative outcomes are associated with the dissolution of partners, improving sexual satisfaction can, especially for long-term couples, be beneficial for both partners (French et al., 2019; Reed, 2007; Ritter et al., 2021).

Moderating role of gender

Our results indicate that there are no differences between men and women regarding their sexual satisfaction scores. We did not find meaningful differences in sexual satisfaction between men and women. These results align with the findings of Klusmann (2015) who found that sexual satisfaction decreases equally in men and women with increases in relationship length. However, we suspected different findings based on the meta-analysis of Petersen & Hyde (2011) who found that men are slightly more sexually satisfied than women. Yet, several factors may have contributed to the unexpected null finding. One could argue that no gender differences emerged because there simply are none, as proposed by Klusmann (2015). Or, that, even though early studies suggest that there are gender differences regarding the motivation for sex (Murstein & Tuerkheimer, 1998), there are no differences regarding general sexual satisfaction. As described by the authors, the sociobiological perspective suggests that people between 26 and 39 years are invested in passing on their genes and are therefore invested in promoting their relationship including sex. As our sample has a mean age of 30 years (Table 1), one could argue that both, men and women, are equally invested in having a satisfying (sexual) relationship with the aim to pass on their genes. It

follows that sexual satisfaction scores should not differ. Besides this sociobiological explanation, one could argue that even though participants were instructed to answer the questionnaire independently from their partner, they may have filled it out together. Thus, scores may be biased because they wanted to avoid having conflicts with their partner. Another explanation of the results may be that the intervention itself was not effective in increasing sexual- and relationship satisfaction, specifically in men. As discussed earlier, Morton and Gorzalka (2015) found that men get more aroused if actors, instead of situations, change. However, in our study, we defined sexual novelty as performing new sexual activities within the framework of a monogamous long-term couple and thus actors did not change. Therefore, our practical definition of sexual creativity was presumably too narrow.

Sexual creativity and gender differences

Results of exploratory analysis suggest that there are significant differences in women's ratings when comparing scores for the three different measurement points. Specifically, we found that women's sexual satisfaction increases throughout the experiment. However, contrary to the findings of Petersen & Hyde (2011), sexual satisfaction scores were slightly lower for men than for women. This could be because satisfaction scores were already relatively high in the sample but lower for men in the beginning. Thus, for men, lower sexual satisfaction scores at baseline indicate lower sexual satisfaction scores at the follow-up measure compared to women's sexual satisfaction scores which were already higher at baseline. Another reason for lower scores in men might be that expectations about the study were higher in men than in women and the execution of the study with their partners resulted in disappointment or frustration. On the contrary, the increase in women's sexual satisfaction scores might have occurred because the study invited them to communicate their sexual desires with their partners, which can contribute to sexual satisfaction, as shown by Rehman et al. (2011). Thus, enhanced communication about sex with their partners might have led to more sexual satisfaction in women.

Limitations and future research

Our study has many strengths in comparison to other longitudinal studies. First, our

sample is very large given that it required active participation and commitment from both partners. Next, motivating incentives for participation were provided such as a sex workshop at the end of the study and the possibility to win a sex toy after participation. However, there are some methodological limitations that could have led to the absence of an effect of the intervention on sexual- and relationship satisfaction. As mentioned earlier, the control group might not have stuck to their instruction to have routine sex due to high motivation to try something new, as the study was advertised this way. Further, it could also be that the instruction for the control group to plan sex constituted a novel activity which could have impacted sexual- and relationship satisfaction in a similar fashion as the sexual-creativity intervention. Thus, an unintentional increase in novelty in the control group might have made the group less neutral. Another limitation that should be mentioned is the high drop-out rate that we experienced throughout the course of our experiment. We sought to address this known problem (e.g., see Morton, 2016) by sending out weekly reminders and questionnaires which apparently did not prevent high drop-out rates. Initially, we started with 720 sign-ups for the study indicating a strong interest for the intervention and study. However, our final sample consisted of only 230 participants which translates into a 50% drop-out rate until the follow-up. In the future, one might consider implementing an in-person component to increase participants motivation. Further, one might consider increasing the control group's incentives to take part in the study because participants were disappointed when placed in the control group. Another aspect which should be taken into consideration is that the design of the study, specifically the fact that participants are expected to answer the same questions every week, might have led to boredom or habituation. Thus, they might have known what the study aimed for only by answering the questions every week, which might have influenced their responses. Lastly and most importantly, the approach for analyzing the data was not ideal given that we worked with nested data and consequently would have needed a multilevel modeling (MLM) approach. MLM would have allowed us to take the grouping, in our case that individuals belong to couples, into consideration. Because we measured individuals nested in couples, variances in the data could not optimally be accounted for with our analytical approach. Given that the current analysis is only preliminary, we suggest using multilevel

modeling for further analysis.

Conclusion

Our study could not support the notion that sexual creativity leads to an increase in sexual- and relationship satisfaction. However, we did find indications that sexual creativity led to a higher sexual satisfaction in women than in men. Therefore, future interventions should focus more on gender differences, specifically on factors that can enhance sexual satisfaction for women in monogamous long-term relationships.

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Appendix

Table 1

Descriptives of Difference Scores among Couples for Sexual Satisfaction and Relationship Satisfaction

	N	Mean	Std. Deviation
SexSat_Baseline	115	.13	.96
SexSat_Post	115	.16	1.02
SexSat_FollowUp	115	.29	1.01
RelSat_Baseline	115	.14	.95
RelSat_Post	115	.20	.86
RelSat_FollowUp	115	.16	.79