

Effects of Subjective Sexual Arousal on Sexual, Pathogen, and Moral Disgust Sensitivity in Women and Men

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Abstract The present experiment tested a novel method of manipulating subjective sexual arousal to examine the effects of sexual arousal on disgust sensitivity. Participants were instructed to employ their own preferred methods of achieving sexual or physiological arousal in the privacy of their own home to reach a target state of arousal. Participants then completed the Three-Domain Disgust Scale (Tybur, Lieberman, & Griskevicius, 2009), which measures sensitivity to sexual, pathogen, and moral disgust. The sexual arousal manipulation caused large, homogenous increases in sexual arousal in women and men. In women, sexual arousal (but not physiological arousal) significantly reduced sensitivity to sexual disgust and marginally increased sensitivity to pathogen disgust. In men, sexual arousal did not decrease disgust sensitivity in any domain. Findings support the evolutionary hypothesis that sexual arousal inhibits sexual disgust, which facilitates an organism's willingness to engage in high-risk, but evolutionarily necessary, reproductive behaviors, an effect that could be particularly important for women.

Keywords Disgust · Sexual arousal · Disease avoidance · Evolutionary psychology

Introduction

The human body is disgusting. We secrete fluids, harbor germs, and make all manner of bodily noises. We find the idea of coming into contact with items that have been in a stranger's body orifices

very unpleasant (Rozin, Nemeroff, Horowitz, Gordon, & Voet, 1995), with the anus and the vagina being the most intrusion sensitive parts on the body and the mouth being the most contamination sensitive. Yet, we engage in sexual activity despite the inevitable encounters with another's orifices and secretions. The act of physical intimacy presents humans with an evolutionary dilemma: we are simultaneously driven to avoid contamination from potentially dangerous substances and to attain mates for gene propagation. The goal of the current research was to investigate a possible answer to this dilemma: a mechanism that inhibits disgust sensitivity in reproductively-relevant situations. In particular, and consistent with theorizing by Stevenson, Case, and Oaten (2011), we posit that subjective sexual arousal facilitates mating by temporarily reducing disgust sensitivity.

Disgust is a functional emotion that motivates people to avoid activities that would result in acquisition of pathogens (Curtis, de Barra, & Aunger, 2011; Oaten, Stevenson, & Case, 2009), but the overabundance of disgust could contribute to sexual problems (de Jong, Lankveld, Elgersma, & Borg, 2010; de Jong & Peters, 2009). For example, women experiencing vaginismus, painful automatic tightening of the pelvic floor muscles during attempted intercourse, have heightened levels of disgust sensitivity (de Jong, van Overveld, Weijmar-Schultz, Peters, & Buwalda, 2009).

Consistent with these findings, Koukounas and McCabe (1997) found a negative correlation between subjective sexual arousal in response to erotic videos and self-reported disgust. Ariely and Loewenstein (2006) found that sexually aroused men, compared to men in a neutral state, rated a range of sexual activities as potentially more enjoyable and reported greater willingness to engage in unsafe sexual practices. Subsequently, Stevenson et al. (2011) found that men who viewed erotic images, but not pleasant or (non-sexually) arousing positive or negative images, showed significantly less sensitivity to sex-related disgust cues but not to non-sexual related disgust cues. Stevenson et al. interpreted their findings as suggesting that sexual arousal might function as a

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balancing mechanism to disgust, helping to solve the dilemma between disease avoidance and the need to reproduce.

The present study measured disgust using Tybur, Lieberman, and Griskevicius' (2009) Three Domain Disgust Scale (TDDS), which separates sexual, pathogen, and moral disgust. Our primary reason for choosing the TDDS over prior disgust scales (Disgust Scale, Haidt, McCauley, & Rozin, 1994; Disgust-Scale Revised, Olatunji, Haidt, McKay, & David, 2008) was its unique separation of sexual, pathogen, and moral disgust—a distinction central to our hypothesis that subjectively sexually aroused women and men would show a reduction in sensitivity to sexual disgust, but not to pathogen or moral disgust.

Our prediction that subjective sexual arousal would have differential effects on different domains of disgust was based on two premises: First, because of the importance of disgust in protecting people from disease (risk that is, if anything, heightened during sexual interactions), a targeted reduction of disgust would be more beneficial than an across-the-board reduction of disgust. Second, prior research has demonstrated that reductions in disgust are, at times, quite specific. For example, Hoefling et al. (2009) measured involuntary facial muscle responses in hungry and satiated participants to appetizing food images, disgusting food images (e.g., moldy food), pleasant non-food images, or disgusting non-food images. They found that "...Food deprived participants exhibited lower activity of the levator muscle [a muscle linked to facial disgust responses] than satiated subjects when confronted with unpalatable [disgusting] food cues, but not when confronted with disgust related control stimuli" (p. 55). In other words, participants displayed a reduction in domain-specific disgust (in this case, food-related disgust) when hungry but did not display a reduction in disgust to non-food related disgust elicitors.

A major challenge in experiments that attempt to manipulate subjective sexual arousal among men and women is stimulus selection. Ample evidence demonstrates that men and women experience erotic stimuli differently. For example, Koukounas and McCabe (1997) found that men and women rated erotic videos differently, with men reporting greater arousal and anxiety and women reporting greater disgust and curiosity, and Peterson and Janssen (2007) demonstrated that men and women differed in their affective reactions and subjective sexual arousal in response to erotic stimuli.

Given the difficulty of identifying stimuli that would elicit similar reactions in men and women, we created a paradigm that would allow participants to choose their own method(s) to reach sexual arousal, under the assumption that individuals who would consent to participate in a study of sexual arousal would be knowledgeable of the stimuli needed to reach the goal state. We recognize the unconventional nature of an experiment that cedes control of the selection of stimuli to participants, but we believe this unconventional approach is justified in this case. In this, we were inspired by Aronson, Ellsworth, Carlsmith, and Gonzales' (1990) discussion of the standardization of independent variables:

We may take the case of sexual arousal as a polarizing example, one that moves beyond the presentation of instructions and into procedures that might entail the presentation of dramatically different stimuli to different subjects... In other words, often our conceptual independent variable is really some sort of response, like sexual arousal, which we believe will act as an internal stimulus for subsequent behavior. In cases like this it may be more important to strive for standardization of this response, our real independent variable, than for standardization of the external stimulus intended to produce that response. (pp. 229–230)

We also tested whether disgust inhibition was specific to sexual arousal or if it was a response to generic physiological arousal. We predicted that sexual arousal, but not non-sexual physiological arousal, would reduce sexual disgust sensitivity in men and women.

Method

Participants

Participants were recruited from upper-division psychology classes at Northern Illinois University. The experiment was advertised as an online survey investigating the relationship between body states and emotional reactions. During recruitment, it was clearly explained that all participants would be asked to reach states of both sexual arousal and physiological arousal from the privacy of their own home and, while experiencing those states of arousal, they would answer some questionnaires. A website address was distributed, and individuals were instructed to visit the site if they were interested in participating. Extra class credit was offered in return for consideration of participation by simply visiting the website. Participation itself was not necessary for extra credit. During the experiment, participants were reminded three times they could withdraw from the study at any time without penalty.

Of the 145 participants that began the experiment, 37 dropped out prior to completing the post-sexual arousal disgust scale, leaving 108 in the dataset (36 men, 67 women, 5 unidentified; 97 heterosexual, 4 bisexual, 2 gay/lesbian, 5 unidentified; $M_{\text{age}} = 22.44$ years, $SD_{\text{age}} = 4.32$, range, 19–53).

Measures

The TDDS (Tybur et al., 2009) consists of 21 items, seven for each domain (see "Appendix" section). Participants rated how disgusting they found each item on a 7-point scale (0 = *not at all disgusting* to 6 = *extremely disgusting*).¹ The Moral Disgust

¹ Due to an error in formatting the response options, the first 36 participants responded to a 6-point version of the scale. Data for these participants were adjusted to a 7-point scale prior to analysis.

subscale consists of items such as “Shoplifting a candy bar from a convenience store.” The Pathogen Disgust subscale consists of items such as “Stepping on dog poop.” None of the moral or pathogen disgust items ask about disgust within a sexual context.

In line with Tybur et al.’s (2009) conceptualization of sexual disgust as “an evolved solution to the adaptive problem of avoiding biologically costly mates and sexual behaviors” (p. 106), the sexual disgust items ranged from definite and probable unwanted sexual attention (“Finding out that someone you don’t like has sexual fantasies about you” and “A stranger of the opposite sex intentionally rubbing your thigh in an elevator,” respectively) to an ambiguously valenced sexual stimulus (“Hearing two strangers having sex”) to consensual sexual activity (“Performing oral sex,” “Watching a pornographic video,” “Bringing someone you just met back to your room to have sex,” and “Having anal sex with someone of the opposite sex”). Both Tybur et al.’s data and an exploratory factor analysis conducted on our data suggested that the seven items formed one factor.² Thus, although the consensual sexual activity items arguably align more closely with our theorizing than do the other items, our primary analyses included all seven sexual disgust items (alternate analyses that included only the consensual sexual activity items yielded converging results).

Procedure

The experiment was primarily a between-subjects design, with participants randomly assigned to a Sexual Arousal Condition, a Physical Arousal Condition, or a No Arousal Condition. However, to ensure that the same recruitment materials and informed consent form could be used for all participants regardless of experimental condition, all participants were eventually given the sexual arousal and physical arousal instructions (see Table 1). Specifically, in the Sexual Arousal Condition, participants were first given the sexual arousal instructions, then the TDDS, then the physical arousal instructions, then the TDDS again. In the Physical Arousal Condition, participants were first given the physical arousal instructions, then the TDDS, then the sexual arousal instructions, then the TDDS again. In the No Arousal Condition, participants were first given the TDDS, then the sexual arousal instructions, then the TDDS again, then the physical arousal instructions, then the TDDS a third time. Nevertheless, only the first administration of the TDDS was used in the statistical analyses, creating a pure between-subjects design and protecting against likely carryover effects.

After reading the informed consent online and agreeing to participate, participants were asked to rate their current levels of physiological and sexual arousal on 7-point scales (1 = *not very much, resting arousal* to 7 = *extremely aroused*). Participants were then randomly assigned to one of three conditions and encountered their first instructions.

Table 1 Sexual and physical arousal instructions

The sexual arousal instructions read as follows:	Becoming sexually aroused is different for everyone. Some potential methods are: pornography, fantasizing, masturbation. Please use whatever method(s) (even if not suggested above) to achieve a state of sexual arousal. Please be careful not to orgasm because it is important that you answer the upcoming questions in a state of sexual arousal. You are welcome to minimize this survey, move away from the computer or to do whatever best helps you become sexually aroused. When you are sexually aroused please return to the computer and press “Next”
The physical arousal instructions read as follows:	We would like you to engage in activities that get you to a state of physiological arousal. Some common signs of physiological arousal are an accelerated pulse, slight shortness of breath, and increased blood flow to muscles. Some potential methods are: jumping jacks, sit-ups, running in place. Please use whatever method(s) (even if not suggested above) to achieve a state of non-sexual physiological arousal. Please do not exceed the level at which you are comfortable. You are welcome to minimize this survey, move away from the computer or to do whatever best helps you become physiologically aroused. When you are physiologically aroused please return to the computer and press “Next”

After pressing “Next,” participants were again asked to rate their current levels of physiological and sexual arousal. They were then instructed to complete the TDDS, followed by another assessment of their current levels of physiological and sexual arousal. This process continued until participants completed all arousal instructions in their respective conditions.

Participants were then asked to describe the method(s) they used to reach the target states of physiological and sexual arousal in an open-ended format. Demographic questions and debriefing concluded the study.

Results

Attrition

Out of 145 participants that began the experiment, 18 dropped out prior to completing the first TDDS. A Chi square test revealed that attrition differed significantly between conditions, $\chi^2(2, N = 145) = 8.98, p = .01$, with many more people dropping out of the Sexual Arousal Condition (loss of 11 out of

² The results of our factor analysis are available upon request.

Table 2 Men's and women's method(s) used to reach sexual arousal

Type of method(s)	Men (<i>n</i> = 34)	Women (<i>n</i> = 54)
Masturbation	8 (23.5 %)	14 (25.9 %)
Pornography	9 (26.5 %)	17 (31.5 %)
Fantasizing	6 (17.6 %)	10 (18.5 %)
Partner	1 (2.9 %)	6 (11.1 %)
Masturbation and pornography	7 (20.6 %)	3 (5.6 %)
Masturbation and fantasy	1 (2.9 %)	3 (5.6 %)
Fantasizing and pornography	2 (5.9 %)	0 (0 %)
Partner and fantasy	0 (0 %)	1 (1.9 %)

49 participants) compared to the No Arousal Condition (loss of 1 out of 46 participants) or the Physical Arousal Condition (loss of 6 out of 50 participants). Although the recruitment procedure was designed to clearly convey the expectations of the study and encourage participation only if participants were willing to achieve a state of sexual arousal, the differential attrition rates suggest that the sexual arousal instructions set a higher bar to participation than did the physiological arousal instructions or the control condition. However, in both the Physical Arousal Condition and the No Arousal Condition, participants then encountered the sexual arousal instructions, and the attrition rates after these instructions appeared to restore group comparability. A Chi square test performed after removing those participants who did not complete the post-sexual arousal TDDS revealed no significant differences, $\chi^2(2, N = 145) < 1$, with similar rates of attrition across conditions (11 out of 49 in the Sexual Arousal Condition, 13 out of 50 in the Physical Arousal Condition, and 13 out of 46 in the No Arousal condition). Thus, our analyses focused only on the first TDDS, and to maximize the experiment's internal validity they were limited to the participants who persevered through the sexual arousal manipulations and corresponding TDDS.

Sexual Arousal Methods

Table 2 shows the methods that men and women used to achieve sexual arousal. The responses were coded into four main categories: masturbation, pornography, fantasizing, and use of a partner. Four combination categories were also created: masturbation and porn, masturbation and fantasy, fantasy and porn, and partner and fantasy. Percentages were calculated separately for men and women. The percentages between men and women were fairly similar, which provided some evidence to suggest that men and women did not differ in their choice of sexual arousal method.

Arousal Ratings

Two 2 (Gender) \times 3 (Condition) analyses of variance were performed on the ratings of physiological arousal and sexual arousal (see Table 3). For the physiological arousal ratings, there were

significant main effects of Condition, $F(2, 97) = 14.96, p < .001, \eta_p^2 = .24$, and Gender, $F(1, 97) = 7.27, p = .008, \eta_p^2 = .07$, indicating that participants in the Sexual Arousal Condition ($M = 3.06, SD = 1.51$) and in the No Arousal Condition ($M = 2.34, SD = 1.40$) had lower physiological arousal ratings than those in the Physical Arousal Condition ($M = 4.56, SD = 1.70$), but that across condition, men had higher physiological arousal ratings ($M = 4.14, SD = 1.64$) than did women ($M = 2.94, SD = 1.74$). There was no interaction between Condition and Gender on physiological arousal ratings, $F(2, 97) < 1, \eta_p^2 = .004$.

For the sexual arousal ratings, there were significant main effects of Condition, $F(2, 97) = 39.75, p < .001, \eta_p^2 = .45$, and Gender, $F(1, 97) = 8.26, p = .005, \eta_p^2 = .08$. Participants in the Sexual Arousal Condition had higher subjective sexual arousal ratings ($M = 4.83, SD = 1.78$) than either in the Physical Arousal Condition ($M = 2.06, SD = 1.51$) or the No Arousal Condition ($M = 2.06, SD = 1.10$). As with physiological arousal, across Condition, men had higher subjective sexual arousal ratings ($M = 3.36, SD = 2.00$) than women ($M = 2.81, SD = 1.96$). There was no interaction between Condition and Gender on subjective sexual arousal ratings, $F(2, 97) < 1, \eta_p^2 = .01$ (see Table 2 for methods used to achieve sexual arousal and Table 3 for cell means and SDs).

Disgust Ratings

A 2 (Gender) \times 3 (Condition) \times 3 (Disgust Type) mixed model ANOVA revealed a marginally significant three-way interaction, $F(4, 194) = 2.30, p = .06, \eta_p^2 = .05$. We consequently analyzed the effects of Condition and Disgust Type separately for men and women.

For men, the Condition by Disgust Type interaction was non-significant, $F(4, 194) < 1, \eta_p^2 = .02$, as were the omnibus and pairwise effects of condition on moral disgust, sexual disgust, and pathogen disgust (all $ps > .19$) (see Table 3).

Very different results were found for women. For women, the Condition by Disgust Type interaction was significant, $F(4, 194) = 3.59, p = .008, \eta_p^2 = .07$, indicating that the effects of arousal on women's disgust sensitivity differed across the different domains of disgust (see Table 3). Simple effects analyses revealed no significant differences between the Conditions on moral disgust, $F(2, 97) = 1.38, \eta_p^2 = .03$, but marginally significant differences for sexual disgust, $F(2, 97) = 2.68, p = .07, \eta_p^2 = .05$, and significant differences for pathogen disgust, $F(2, 97) = 3.13, p = .048, \eta_p^2 = .06$.

Planned contrasts revealed a significant difference between the Sexual Arousal Condition ($M = 2.95, SD = 1.32$) and the No Arousal Condition ($M = 3.70, SD = 1.19$) on sexual disgust, $F(1, 97) = 5.13, p = .03, \eta_p^2 = .05$, and a marginally significant difference between the Sexual Arousal Condition ($M = 4.91, SD = .76$) and the No Arousal Condition ($M = 4.39, SD = .82$) on pathogen disgust, $F(1, 97) = 3.26, p = .07, \eta_p^2 = .03$. These results indicate that women had significantly decreased sensitivity to

Table 3 Cell means and standard deviations for arousal and disgust measures

Measure	Men			Women		
	No arousal condition <i>M (SD)</i>	Sexual arousal condition <i>M (SD)</i>	Physical arousal condition <i>M (SD)</i>	No arousal condition <i>M (SD)</i>	Sexual arousal condition <i>M (SD)</i>	Physical arousal condition <i>M (SD)</i>
Physical arousal	3.00 (1.66)	3.50 (1.18)	5.12 (1.32)	2.09 (1.24)	2.88 (1.62)	4.05 (1.87)
Sexual arousal	2.78 (1.09)	5.70 (0.95)	2.29 (1.69)	1.78 (1.00)	4.48 (1.92)	1.84 (1.34)
Moral disgust	3.01 (1.60)	3.04 (1.65)	2.67 (1.97)	3.41 (1.44)	3.12 (1.68)	3.94 (1.40)
Sexual disgust	1.52 (0.57)	1.48 (1.28)	2.08 (0.94)	3.70 (1.19)	2.95 (1.32)	3.45 (1.12)
Pathogen disgust	3.83 (1.07)	3.51 (0.79)	3.60 (1.27)	4.39 (0.82)	4.91 (0.76)	4.20 (1.19)

Physical and sexual arousal were measured on 1–7 point scales. Moral, sexual, and pathogen disgust were measured on 0–6 point scales

sexual disgust but marginally increased sensitivity to pathogen disgust while subjectively sexually aroused. Additionally, there was a significant difference for pathogen disgust between the Sexual Arousal Condition and the Physical Arousal Condition ($M = 4.20$, $SD = 1.19$), $F(1, 97) = 5.57$, $p = .02$, $\eta_p^2 = .05$.

Additional Analyses

To investigate the impact of sexual arousal method on ratings of subjective sexual arousal and sexual disgust, we created a new variable that separated participants in the Sexual Arousal Condition who used physical-action methods (the Action group) from participants who used thought-based methods (the Thought group). We defined physical-action methods as those methods that utilized physical interaction (with one's self, or a partner) and thus would likely result in both subjective sexual arousal and physiological sexual arousal. Participants who reported using masturbation or sexual interaction with a partner were coded as using physical-action methods, regardless of whether they also reported thought-based activities (pornography or fantasy). Participants who reported a sexual arousal technique that didn't involve a physical component were coded as using thought-based methods. Such methods are more likely to result solely in subjective sexual arousal but not physiological sexual arousal.

A t test showed no significant difference between the mean subjective sexual arousal rating of the Action group ($N = 18$, $M = 5.22$, $SD = 1.52$) and the Thought group ($N = 12$, $M = 5.17$, $SD = 1.59$), $t(28) < 1$, $\eta_p^2 < .001$. An examination of the means within each gender revealed similar patterns for men and for women. Similarly, a t -test showed no significant difference between the mean sexual disgust rating of the Action group ($M = 2.37$, $SD = 1.43$) and the Thought group ($M = 2.42$, $SD = 1.62$), $t(28) < 1$, $\eta_p^2 < .001$, and, again, the patterns for men and women were similar.

Discussion

The present study made two contributions. First, we developed and tested a new method of inducing subjective sexual

arousal. In contrast to prior operationalizations of sexual arousal that exposed all participants to the same erotic stimuli, we provided participants with the goal state and asked them to use whatever methods they wished to best achieve this state. This method circumvented the problem of stimulus selection impacting each gender to a different degree; our manipulation produced large, homogenous increases in subjective sexual arousal in both men and women.

We found no large frequency differences in the general categories that men and women used to generate sexual arousal although we expect that a deeper examination of the content of these categories would reveal thematic differences between men and women (e.g., the type of pornography sought or watched or the content of the fantasies). Researchers wishing to retain greater control over the stimuli used to manipulate sexual arousal could use the present methodology as a first step by analyzing the content of the self-selected sexual arousal manipulations for gender specific patterns and using the findings of these analyses to produce different, but equally effective, stimuli for men and women.

Second, we used this method to test the hypothesis that subjective sexual arousal would reduce sexual disgust. This hypothesis was supported in women, who showed significant reductions in sexual disgust (and marginally significant increases in pathogen disgust) when sexually aroused. Furthermore, these effects could not be attributed to generic physiological arousal, which produced small, non-significant decreases in both sexual and pathogen disgust in women. These results provide support for Stevenson et al.'s (2011) theorizing that subjective sexual arousal decreases sexual disgust although, notably, we didn't find this effect in men. These results were also somewhat consistent with a recent paper by Borg and de Jong (2012), who used film clips to induce sexual arousal, non-sexual arousal, and non-arousal in a sample of women. Participants were then asked to take part in 16 disgust-related tasks, five sex-related and 11 non-sex-related. Consistent with the present results, sexual arousal significantly reduced disgust ratings for the sex-related disgust tasks, but inconsistent with the present results, sexual arousal also significantly reduced disgust ratings for the non-sex-related disgust tasks.

In addition, the present results extended prior research by examining the effects of sexual arousal on moral disgust. In contrast to the significant decrease in sexual disgust and the marginal increase in pathogen disgust, subjective sexual arousal had little impact on moral disgust—a result that highlights the specificity of the disgust inhibition.

An examination of two individual items provides further insight into the effects of sexual arousal on different types of disgust. First, the item on the sexual disgust subscale that showed the smallest decrease in disgust was the item that explicitly described sexual attention from a disliked source (“Finding out that someone you don’t like has sexual fantasies about you”; $M_{\text{NoArousal}} = 3.85$, $M_{\text{SexualArousal}} = 3.70$). Thus, subjective sexual arousal does not appear to make unwanted sexual attention or partners more palatable. Rather, it reduces the disgust associated with consensual sexual activity and ambiguous sexual stimuli. Second, the item on the pathogen disgust subscale that showed the largest increase in disgust was the item that described cues similar to the visible symptoms of certain sexually transmitted infections (“Sitting next to someone who has red sores on their arm”) ($M_{\text{NoArousal}} = 3.37$, $M_{\text{SexualArousal}} = 4.58$). Thus, subjective sexual arousal appears to most strongly increase sensitivity to the types of pathogen disgust elicitors most likely to occur during a sexual encounter.

This hypothesis was not supported in men, who showed no significant changes in disgust sensitivity in response to either sexual or physiological arousal—a result seemingly in conflict with Stevenson et al.’s (2011) findings. However, in the present study, men showed very low levels of sexual disgust, even when not sexually aroused, indicating a potential floor effect. Consistent with this floor effect explanation in men, Tybur, Bryan, Lieberman, Caldwell Hooper, and Merriman (2011) found consistent gender differences in disgust sensitivity, with women more sensitive than men to disgust, particularly to sexual disgust. Increasing the intensity of the TDDS sexual disgust items might address this floor effect, providing room for men to show reduced disgust sensitivity while sexually aroused.

It is also possible that the proposed mechanism operates more strongly in women than in men. Trivers’ (1972) parental investment theory suggests that women will be more discriminating than men in choosing sexual partners, due to women’s greater obligatory parental investment. Tybur et al. (2009) theorized that sexual disgust relates to the analysis of the riskiness of potential sexual partners and behaviors. The present findings suggest that sexual arousal operates to overcome this sexual disgust when a suitable mate is identified. However, pathogen disgust appears to escalate simultaneously, potentially mitigating the risk of poor partner choice by increasing a woman’s vigilance against evidence that the chosen sexual partner carries contagion risk.

We found no significant differences in reported sexual arousal or sexual disgust responses between participants who used

physical-based methods of inducing sexual arousal and participants who used thought-based methods of inducing sexual arousal. Because physical-based methods are likely to induce both subjective sexual arousal and physiological sexual arousal whereas thought-based methods are more likely to induce solely subjective sexual arousal, one interpretation of these findings is that both methods created equally strong increases in subjective sexual arousal and that it was this subjective sexual arousal that drove the reduced sexual disgust in women.

However, an alternative explanation for these results could be that physical-based methods induce physiological sexual arousal while thought-based methods induce subjective sexual arousal. Since participant sexual disgust scores did not differ by arousal methodology, it is possible that physiological sexual arousal accounted for this reduction in sexual disgust sensitivity in the participants using physical-action methods whereas subjective sexual arousal accounted for this reduction in sexual disgust sensitivity in the participants using the thought-based methods. Future research could resolve this issue by including both self-report measures and genital measures of sexual arousal.

One final issue merits consideration. As noted by a reviewer, participants were not blind to their experimental condition and they could have inferred the “right answer” to the sexual arousal manipulation check, raising the question of whether the results could be attributed to demand effects. We believe, however, that two considerations reduce the likelihood that demand effects account for the full set of results of the study.

First, although the significant effects of condition on arousal ratings could be due to demand effects (participants were told they needed to achieve the target state of arousal and thus they knew they were supposed to be aroused to a greater degree post baseline), the corresponding reductions in sexual disgust and increases in pathogen disgust for women would be more difficult to explain as demand effects. The seven items comprising each of the three disgust subscales were interwoven throughout the disgust scale. Thus, to have generated our findings through demand effects alone, participants would have had to infer that we were expecting a decrease in the sexual disgust items and an increase in the pathogen disgust items and then provide lower scores on every third item starting with the second and higher scores on every third item starting with the third.

Second, we believe the precautions put into place to protect participants’ right to withdraw at any time without penalty reduced the likelihood of our participants giving us false answers. Students were given their extra credit at the start of the study and were told (verbally) during recruitment and again (textually) on the first page of the survey in the informed consent that they could leave at any time without losing the credit they had already received. Additionally, the study was anonymous and conducted online from the privacy of their own homes. Thus, students motivated to get the extra credit but uninterested in participating could have easily just taken their credit and dropped out of the study rather than

continuing to complete the survey. We believe these aspects of the methodology increase the likelihood that participants provided candid responses to their sexual arousal ratings.

Appendix

Three Domain Disgust Scale (Tybur et al., 2009).

1. Shoplifting a candy bar from a convenience store (moral).
2. Hearing two strangers having sex (sexual).
3. Stepping on dog poop (pathogen).
4. Stealing from a neighbor (moral).
5. Performing oral sex (sexual).
6. Sitting next to someone who has red sores on their arm (pathogen).
7. A student cheating to get good grades (moral).
8. Watching a pornographic video (sexual).
9. Shaking hands with a stranger who has sweaty palms (pathogen).
10. Deceiving a friend (moral).
11. Finding out that someone you don't like has sexual fantasies about you (sexual).
12. Seeing some mold on old leftovers in your refrigerator (pathogen).
13. Forging someone's signature on a legal document (moral).
14. Bringing someone you just met back to your room to have sex (sexual).
15. Standing close to a person who has body odor (pathogen).
16. Cutting to the front of a line to purchase the last few tickets to a show (moral).
17. A stranger of the opposite sex intentionally rubbing your thigh in an elevator (sexual).
18. Seeing a cockroach run across the floor (pathogen).
19. Intentionally lying during a business transaction (moral).
20. Having anal sex with someone of the opposite sex (sexual).
21. Accidentally touching a person's bloody cut (pathogen).

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