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# Experimentally Inducing Disgust Reduces Desire for Short-Term Mating

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## Abstract

Short-term mating strategies involve casual sex, multiple partners, and short-time intervals before initiating intercourse. Such strategies should be difficult to implement in the presence of high levels of sexual disgust. Researchers have therefore suggested—and found evidence for—the hypothesis that individuals with a stronger proclivity for short-term mating have lower levels of sexual disgust. Here, we suggest a related hypothesis: inducing sexual disgust should reduce desire for short-term mating. Experiment 1 ( $N = 341$ ) and experiment 2 ( $N = 361$ ) investigated the effects of disgust induction on desire for short-term mating. Both studies found that inducing disgust reduces desire for short-term mating, and that the effect of sexual disgust is particularly strong. These results support the novel hypothesis advanced here and corroborate the broader hypothesis that reduced sexual disgust is a previously undiscovered design feature of short-term mating strategies.

**Keywords** Disgust · Emotions · Evolutionary psychology · Sexual disgust · Mating · Short-term mating

## Introduction

The emotion of disgust and the psychology of human mating have conceptual relevance for one another, but have largely been studied in isolation. Recent research has begun to bridge these two areas of inquiry (Al-Shawaf et al. 2015a, b, c; Borg and de Jong 2012; Curtis, de Barra, & Aunger, 2011; DeBruine et al. 2010; Jones et al. 2013; de Jong et al. 2009; de Jong et al., 2010; de Jong et al., 2013; Lee et al. 2014; Little et al. 2011; Tybur and Gangestad 2011; Tybur et al. 2011). Such work has found, for example, a bidirectional relationship between disgust and sexual arousal. Sexual arousal can inhibit disgust (e.g., Ariely and Loewenstein 2006), but disgust can also inhibit sexual arousal (e.g., Fleischman et al. 2015). The bidirectional nature of the relationship between disgust and

mating is important: mating is a crucial aspect of human life, but disgust must be inhibited in order to facilitate successful sexual congress. On the other hand, disgust must be capable of inhibiting or shutting down sexual arousal in extreme circumstances, such as when cues to pathogens are powerful and numerous, or when new information is discovered that renders a potential mate unsuitable (e.g., he is abusive, she has a sexually transmitted infection, he is a close-genetic relative).

Despite recent advances in disgust research and mating research, much work remains in connecting these conceptually related domains. Recent research bridging the two has found that individuals with a stronger proclivity for short-term mating have lower levels of sexual disgust than their less short-term-oriented counterparts (Al-Shawaf et al. 2015c). Researchers predicted this finding based on a task analysis of short-term mating strategies: because short-term mating involves casual sex, multiple sex partners, and intercourse after brief periods of acquaintance, implementing this strategy would be difficult without a functional reduction in sexual disgust levels. Two independent studies supported this hypothesis (Al-Shawaf et al. 2015c), and these findings have now been replicated by an independent group of researchers using a large online sample (O’Shea et al. *in press*).

If low levels of sexual disgust are a key facilitator of short-term mating strategies, then experimentally inducing sexual disgust should reduce people’s desire for short-term mating. This paper reports two experiments designed to test this hypothesis.

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## Different Forms of Disgust—and Their Relevance to Short-Term Mating

Recent research has identified three types of disgust: *pathogen disgust*, *sexual disgust*, and *moral disgust* (Tybur et al. 2009, 2012). These three types of disgust are distinguished by the social and ecological inputs that activate them, the distinct behavioral outputs that they motivate, and their unique profiles of correlations with other psychological variables.

Our reasoning specifically implicates sexual disgust as relevant to short-term mating. Consistent with this, individuals dispositionally inclined toward short-term mating exhibit low levels of sexual disgust, but not pathogen or moral disgust (Al-Shawaf et al. 2015c). Conceptually, however, pathogen disgust is also relevant to short-term mating: an important cost of short-term mating is increased risk of transmission of sexually transmitted infections and other contagious diseases (National Center for HIV/AIDS, viral hepatitis, STD, and TB Prevention 2011). Some cues—such as a nude human body covered in sores or lesions—should trigger both pathogen disgust and sexual disgust.

Al-Shawaf and colleagues reasoned that the absence of a relationship between pathogen disgust and short-term mating might be an artifact of the nature of pathogen disgust measures. The pathogen disgust subscale of the Three-Domain Disgust Scale—arguably the most conceptually sound and psychometrically valid disgust measure (Al-Shawaf and Lewis 2013; Haidt et al. 1994; Tybur et al. 2009 for more detail)—appears to be constructed so as to index “pure” pathogen disgust: pathogen disgust that does not overlap with measures of other forms of disgust. Developing an instrument with conceptually distinct subscales for pathogen and sexual disgust entails excluding items that simultaneously tap both types of disgust. Although sexual and pathogen disgust have some non-overlapping domains (e.g., rotting meat might induce pathogen disgust but not sexual disgust, incest might induce sexual disgust but not pathogen disgust), sexual contact is a key pathogen-transmission vector. This importance of sexual contact as a pathogen vector renders the two domains inherently linked—a linkage not fully captured by the design of the extant three-factor measure of disgust.

We predicted that a more naturalistic investigation of pathogen disgust—or an investigation that does not limit itself to “pure” pathogen cues—would find a relationship between pathogen disgust and short-term mating. We expect images of diseased human bodies, for example, to trigger pathogen disgust and sexual disgust because of the infection risks inherent in sexual contact.

In the current experiments, we do not limit ourselves to “pure” pathogen cues, and so we expect that inducing pathogen disgust will have an effect on short-term mating desire. However, because only a limited subset of pathogen cues should be relevant to short-term mating (e.g., diseased bodies,

but not rodents or rotting food), we predicted that the effect of pathogen disgust on short-term mating desire would be weaker than the effect of sexual disgust.

## Experiment 1: the Effect of Disgust Induction on Short-Term Mating

Experiment 1 aimed to determine the impact of experimentally induced disgust on desire for short-term mating. We included four experimental conditions: sexual disgust, pathogen disgust, a neutral control condition, and a threatening control. We did not have any hypotheses about the threatening control group; we included it to permit discrimination between the effects of negative emotion induction in general and disgust induction specifically.

### Method

#### Participants

Three hundred fifty two participants (179 men, 162 women;  $M_{\text{age}} = 19.21$ ,  $SD_{\text{age}} = 1.44$ , age range: 18–28 years) were recruited from the psychology subject pool at The University of Texas at Austin to participate in a study about “disgust and human mating”. Sample size was determined before any data analysis. Participant breakdown by experimental condition was as follows: sexual disgust: 86 (40 males), pathogen disgust: 87 (45 males), neutral control: 82 (45 males), and threatening control: 86 (49 males). Participants arrived at the laboratory, provided informed consent to participate in the study, and were escorted by a researcher to a private room where they completed the experiment. Participants received partial course credit for their participation and were debriefed upon completion.

#### Design

Experiment 1 was a  $2 \times 4$  mixed-design ANOVA with one within-subjects factor (interest in short-term mating: pre- and post-manipulation) and one between-subjects factor (experimental condition: sexual disgust, pathogen disgust, neutral control, and threatening control).

The experimental manipulation differed for each group: the sexual disgust group looked at a set of 20 images that included nude elderly individuals, genitalia exhibiting cues to sexually transmitted disease, and similar sexual disgust stimuli; all obtained from the web. Participants in this group were also instructed to “please imagine what it would be like to be in a sexually intimate situation with the person depicted in this picture”. These instructions served to make the sexual aspect of the situation more salient, thereby making it more likely that participants’ primary reaction would be sexual disgust

rather than pathogen or moral disgust. The pathogen disgust group viewed a series of 20 images designed to induce disgust associated with pathogen vectors, including diseased human bodies, rotting food items, rodents, and feces. The threatening control group viewed a series of 20 images of men in menacing poses, pointing guns directly at the screen (adapted from Schaller et al. 2010). Participants viewed the slides for as long as they chose to: they had to click “next” to proceed to the next image. This was to prevent participants from simply closing their eyes and allowing the slideshow to finish without having viewed the stimuli. The neutral control group did not undergo any experimental manipulation.

Participants in each group completed a measure of interest in short-term mating both prior to and after exposure to the respective experimental stimuli. Finally, participants responded to items designed to assess current disgust levels, as well as other instruments as part of a broader study. The order of materials was as follows: pre-measure of short-term mating desire, experimental disgust induction, measure of current disgust, post-measure of short-term mating desire, Three-Domain Disgust Scale, and finally demographic questions. All stimuli are available upon request from the first author.

## Materials

**Current Interest in Short-Term Mating** Because we were interested in *current* short-term mating desire—as opposed to dispositional orientation toward short-term mating—the standard sociosexual orientation inventory (SOI-R, Penke and Asendorpf 2008) would not have been an appropriate measure. Accordingly, we designed a four-item scale to index current interest in short-term mating. This scale consisted of the following items, which were evaluated on a Likert-type scale: “How hard would it be for you to experience a sexual fantasy right now?” (reverse coded), “Right now, how comfortable would you be having sex with somebody that you just met?”, “If you went on a first date with somebody tonight, how willing do you think you would be to have sex with him or her on the first date?”, and “How desirable [as a mate] would someone have to be in order for you to have sex with that person on the first date?” (reverse coded). Participants completed this scale before and after the experimental disgust manipulation.

**Current Disgust** We included an author-generated measure of current, state-level disgust to assess the effectiveness of our manipulation. We reasoned that our brief disgust induction would affect current disgust levels, but not the stable, dispositional disgust sensitivity measured by the Three-Domain Disgust Scale. We therefore generated two items intended to serve as a brief, face-valid method of capturing current disgust. These two items were “How disgusting did you find the

series of images you just saw?” and “How disgusted do you feel right now?”

## Results

### Manipulation Check

We tested the efficacy of our disgust induction procedure by comparing the post-manipulation disgust levels across condition, excluding participants in the neutral control condition, who did not view any images. A one-way ANOVA confirmed that there were significant differences in disgust levels across conditions,  $F(2, 254) = 124.49$ ,  $p < .001$ , partial  $\eta^2 = .50$ . Disgust means and standard deviations for each experimental condition were as follows: sexual 13.27 (SD = 1.76), pathogen 10.58 (SD = 2.93), and threatening control 6.47 (SD = 3.56). Post-hoc tests revealed significant differences in disgust between all three groups. The sexual disgust group exhibited the highest levels of disgust—significantly higher than the pathogen disgust group (difference between means = 2.69, SE = .37,  $p < .001$ ) and the threatening control group (difference between means = 6.80, SE = .43,  $p < .001$ ). Additionally, the pathogen disgust group exhibited significantly higher disgust than the threatening control group (difference between means = 4.11, SE = .50,  $p < .001$ ).

### Descriptive Statistics

Table 1 presents means and standard deviations for the three disgust scales (Cronbach’s  $\alpha$ : moral = .88, sexual = .88, pathogen = .82) and the scale measuring current desire for short-term mating (pre-manipulation  $\alpha = .71$ , post-manipulation  $\alpha = .73$ ).

Sex differences in disgust followed a similar pattern to those reported by Tybur et al. (2009, 2011). Consistent with previous research, women exhibited higher levels of sexual disgust [ $t(333) = -12.87$ ,  $p < .001$ ,  $d = 1.40$ ], pathogen disgust [ $t(332) = -4.40$ ,  $p < .001$ ,  $d = 0.48$ ], and moral disgust [ $t(333) = -2.62$ ,  $p < .01$ ,  $d = 0.29$ ] than did men. These findings replicate the reliable sex difference demonstrated in much of the disgust literature over the last several decades: women exhibit significantly higher levels of disgust than do men (see Al-Shawaf et al. 2018 for a review and novel hypotheses).

Similarly, sex differences in desire for short-term mating [pre-disgust-induction:  $t(301) = 13.07$ ,  $p < .001$ ,  $d = 1.4$ ; post-disgust-induction:  $t(286) = 13.31$ ,  $p < .001$ ,  $d = 1.43$ ] corroborated the robust and well-replicated finding that short-term mating looms larger in men’s psychology than in women’s (Buss 2015; Buss and Schmitt 1993; Lippa 2009).

**Table 1** Means, standard deviations, and effect sizes for the sex differences in experiment 1

Disgust subscale (TDDS)	Men mean (SD)	Women mean (SD)	Cohen's <i>d</i>
Sexual	24.60 (9.51)	37.04 (8.20)	1.40
Moral	31.51 (9.71)	34.18 (8.97)	.29
Pathogen	32.82 (8.19)	36.53 (7.17)	.48
Current desire for short-term mating			
Pre-disgust induction	14.78 (5.33)	8.57 (3.30)	-1.39
Post-disgust induction	13.23 (5.32)	7.02 (3.05)	-1.41

### Interaction: Disgust Manipulation \* Experimental Condition

We conducted a mixed-model ANOVA with one within-subjects factor (interest in short-term mating: pre- and post-manipulation) and one between-subjects factor (experimental condition) in order to assess the effect of the disgust manipulation on desire for short-term mating and to determine whether this effect differed according to experimental condition. There was a statistically significant disgust manipulation  $\times$  experimental condition interaction on short-term mating desire,  $F(3, 332) = 19.47, p < .001$ , partial  $\eta^2 = .15$ , indicating that there were differential effects of the disgust manipulation across conditions.

### Simple Effects of Disgust Manipulation

Before analyzing the simple effects of the disgust manipulation across experimental condition, we checked for sex differences in the extent to which the disgust manipulation affected desire for short-term mating. There were no sex differences in change in desire for short-term mating in any of the experimental conditions (all  $ps > .05$ ), so we collapsed across sex.

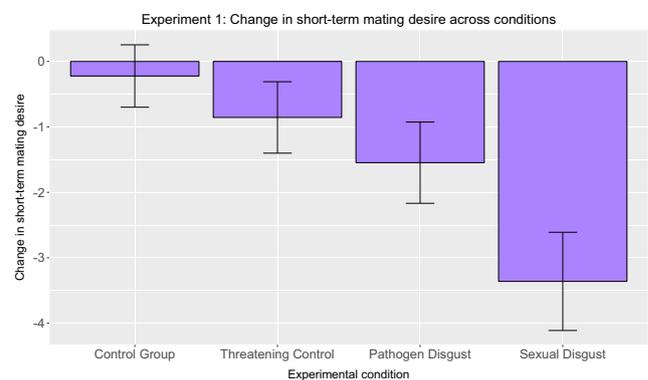
Because our primary hypothesis was that inducing disgust—particularly sexual disgust—leads to a decrease in desire for short-term mating, we began by analyzing the simple effects of the experimental manipulations. As expected, participants exposed to the sexual disgust stimuli exhibited a significant reduction in desire for short-term mating,  $F(1, 85) = 79.24, p < .001$ , partial  $\eta^2 = .48$ . The participants in the pathogen disgust condition also exhibited a reduction in short-term mating desire:  $F(1, 85) = 24.51, p < .001$ , partial  $\eta^2 = .22$ . The threatening control group also experienced a dip in desire for short-term mating,  $F(1, 82) = 9.72, p < .01$ , partial  $\eta^2 = .11$ . As expected, there was no change in desire for short-term mating in the neutral control group,  $F(1, 80) = .86, p = .36$ , partial  $\eta^2 = .01$ .

In order to test the magnitude of the reduction across conditions, we computed a pre-post manipulation difference score for each experimental condition. A one-way ANOVA indicated that, as predicted, there was a significant difference in the magnitude of the reduction in short-term mating desire across conditions,  $F(3, 332) = 19.47, p < .001$ , partial  $\eta^2 = .15$ . Post-hoc tests revealed

that individuals in the sexual disgust condition experienced the greatest reduction in short-term mating desire (all post-hoc tests reported in this manuscript are Tukey HSDs). This decline was greater than that in the pathogen disgust condition (difference between means = 1.81,  $SE = .49, p = .001$ , the threatening control condition (difference between means = 2.51,  $SE = .47, p < .001$ ), and the neutral control condition (difference between means = 3.14,  $SE = .45, p < .001$ ; see Fig. 1).

### Simple Effects of Experimental Condition

Prior to the manipulation, there were no differences between conditions in desire for short-term mating,  $F(3, 341) = .87, ns$ , partial  $\eta^2 = .01$ . After the manipulation, there was a significant difference between groups in desire for short-term mating,  $F(3, 333) = 10.06, p < .001$ , partial  $\eta^2 = .08$ . Post-hoc tests revealed that the sexual disgust group had the lowest desire for short-term mating—lower than the pathogen disgust group (difference between means = 2.04,  $SE = .71, p < .05$ ), the threatening control group (difference between means = 3.61,  $SE = .76, p < .01$ ), and the neutral control group (difference between means = 3.87,  $SE = .79, p < .01$ ). There were no other post-manipulation-between-group differences in short-term mating desire (all  $ps > .05$ ).



**Fig. 1** Change in desire for short-term mating across conditions in experiment 1. The sexual disgust condition experienced the greatest reduction in desire for short-term mating. Bars represent pre-post manipulation difference scores and error bars represent 95% confidence intervals

## Discussion

The results of experiment 1 support the central hypothesis that inducing sexual disgust reduces short-term mating desire. By including both pre- and post-measures of short-term mating desire, we were able to directly measure *change* in desire for short-term mating as a consequence of disgust induction. This analysis revealed several findings that support the primary hypothesis of this study: a) the groups did not differ in their desire for short-term mating before the manipulation, but did differ after the manipulation, b) the sexual disgust group showed the strongest decline in desire for short-term mating, c) the neutral control group showed no change in desire for short-term mating, and d) post-hoc tests revealed that after disgust induction, the sexual disgust group exhibited lower desire for short-term mating than all three other groups, and none of the other groups differed in their desire for short-term mating. It is interesting to note both the power of sexual disgust to reduce short-term mating desire, as well as the finding that pathogen disgust primes and threatening primes also have an impact on short-term mating desire. This suggests that inducing other negative emotions—perhaps those that signal pressing adaptive problems—can also have an effect on short-term mating desire, but that the effect of sexual disgust is especially powerful.

## Experiment 2: the Effect of Different Modes of Disgust Induction on Desire for Short-Term Mating

We sought to replicate this central finding in an independent study with a new sample, different experimental conditions involving additional perceptual modalities, and novel stimuli. We conducted a second study in which we included five experimental conditions: visual sexual disgust, visual pathogen disgust, olfactory pathogen disgust, text-based pathogen disgust, and a threatening control. Our central hypothesis was the same as that of experiment 1: inducing disgust—especially sexual disgust—should cause a decline in desire for short-term mating.

## Method

### Participants

Three hundred fifty participants (153 men, 194 women, 3 unreported;  $M_{\text{age}} = 18.83$ ,  $SD_{\text{age}} = 1.16$ , age range: 17–26 years) were recruited from the psychology subject pool at The University of Texas at Austin. Sample size was determined before any data analysis. No participants from experiment 1 participated in experiment 2. Participants arrived at the laboratory, provided informed consent to participate in the study, and were escorted by a researcher to a private room where they completed the experiment. Participants received

partial course credit for their participation and were debriefed upon completion.

### Design

Similar to experiment 1, experiment 2 was a  $2 \times 5$  mixed-design ANOVA with one within-subjects factor (interest in short-term mating: pre- and post-manipulation) and one between-subjects factor (experimental condition: visual sexual, visual pathogen, olfactory pathogen, text-based pathogen, and threatening control).

Participant breakdown by experimental condition was as follows: sexual 69 (34 males), pathogen 67 (24 males), olfactory 67 (30 males), text-based 65 (36 males), and threatening control 70 (25 males).

The two new conditions in this experiment were the text-based pathogen condition and the olfactory pathogen condition. The text-based group read a popular internet story about parasitic invertebrate infection whose text was modified for this experiment in order to induce pathogen disgust. We induced pathogen disgust in the olfactory group with the use of Liquid ASS® (Liquid ASSets Novelties, LLC, USA), a spray that mimics the odor of putrid feces. As in experiment 1, participants completed the same scale measuring desire for short-term mating, underwent the disgust manipulation, completed the short-term mating scale again, and finally completed the instrument designed to assess current disgust.

We retained the threatening control because the threatening control group in experiment 1 experienced a dip in desire for short-term mating. If we wish to establish that inducing disgust causes a significant decline in desire for short-term mating over and above aversive states in general, then the more appropriate and more conservative control condition is that of the threatening prime.

The disgust induction procedure was somewhat different in the olfactory pathogen condition. In this condition, at the same point in the survey at which the manipulations were introduced into the other conditions, the survey prompted the participant to step outside of the private laboratory room and call the experimenter. The experimenter then entered the participant's room with a rag that had been sprayed twice in the same spot with Liquid ASS®. The experimenter held out the rag and asked participants to take two deep breaths with their nose in the spot where the smell had been sprayed. When this procedure was completed, the experimenter stepped out of the room again, permitting the participant to complete the experiment in privacy.

### Materials

Participants completed the same instruments as in experiment 1, including the short-term mating scale and the measure of current disgust.

## Results

### Manipulation Check

As in experiment 1, we tested the efficacy of our disgust manipulation by comparing the post-manipulation disgust levels of our five groups. Disgust means and standard deviations for each experimental condition were as follows: sexual 11.539 (SD = 3.14), pathogen 11.82 (SD = 2.87), olfactory 10.81 (SD = 3.64), text-based 10.81 (SD = 3.64), and threatening control 10.92 (SD = 3.48). A one-way ANOVA confirmed that disgust levels did not differ significantly between conditions,  $F(4, 333) = 1.22, p = .30, \text{partial } \eta^2 = .014$ .

### Descriptive Statistics

Table 2 presents experiment 2 means and standard deviations for the three disgust scales (Cronbach's  $\alpha$ : moral = .89, sexual = .88, pathogen = .79) and the researcher-generated scale indexing current desire for short-term mating (pre-manipulation  $\alpha = .71$ , post-manipulation  $\alpha = .70$ ).

Sex differences in disgust were consistent with experiment 1 and with previous research. Women in the current study exhibited stronger sexual disgust [ $t(328) = -12.83, p < .001, d = 1.41$ ] and pathogen disgust [ $t(290) = -7.81, p < .001, d = .87$ ]. The sex difference in moral disgust, though in the expected direction, did not reach significance [ $t(301) = -1.53, p = .1, d = .17$ ]. As in experiment 1, sex differences in desire for short-term mating [pre-disgust-induction  $t(266) = 12.30, p < .001, d = 1.36$ ; post-disgust-induction  $t(260) = 10.51, p < .001, d = 1.16$ ] again corroborated the well-established finding that men are more inclined toward short-term mating than are women (Schmitt 2003).

### Interaction: Disgust Manipulation \* Experimental Condition

As in experiment 1, we conducted a mixed analysis of variance (ANOVA) with one within-subjects factor (interest in short-term mating: pre- and post-manipulation) and one between-subjects factor (experimental condition) in order to assess the effect of the disgust manipulation on desire for short-term

mating and to determine whether this effect differed by experimental condition. As in experiment 1, there was a significant interaction between experimental condition and the disgust manipulation,  $F(4, 347) = 6.73, p < .001, \text{partial } \eta^2 = .07$ , indicating that the effect of the manipulation differed across conditions.

### Simple Effect of the Disgust Manipulation

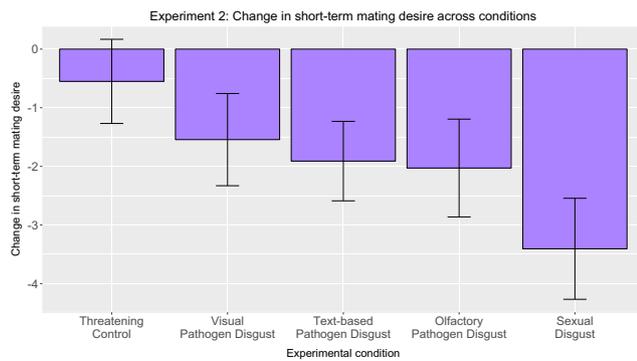
To unpack this significant interaction, we again analyzed the simple effects of disgust manipulation and experimental condition separately. As in experiment 1, these effects did not differ by sex, so we provide the results of these tests for men and women together.

Because our primary hypothesis was that inducing disgust—especially sexual disgust—should lead to a decrease in desire for short-term mating, we began with the simple effects of the disgust manipulations. As in experiment 1, there was a significant decline in desire for short-term mating in the sexual disgust group,  $F(1, 69) = 63.16, p < .001, \text{partial } \eta^2 = .48$ , and in the visual pathogen group,  $F(1, 69) = 16.73, p < .001, \text{partial } \eta^2 = .20$ . The olfactory and text-based disgust groups also exhibited declines in short-term mating desire [olfactory  $F(1, 70) = 23.86, p < .001, \text{partial } \eta^2 = .25$ , text-based  $F(1, 69) = 26.22, p < .001, \text{partial } \eta^2 = .28$ ]. The threatening control group, on the other hand, showed no change in desire for short-term mating,  $F(1, 70) = 2.81, ns, \text{partial } \eta^2 = .04$ .

In order to test the magnitude of the reduction in short-term mating desire across condition, we computed a pre-post manipulation difference score for each experimental condition. A one-way ANOVA indicated that, as predicted—and replicating the findings of experiment 1—there was a significant difference in the magnitude of the reduction in short-term mating desire across conditions,  $F(4, 347) = 6.73, p < .001, \text{partial } \eta^2 = .07$ . Post-hoc tests revealed that individuals in the sexual disgust condition experienced a greater reduction in short-term mating desire than those in the visual pathogen disgust condition (difference between means = 1.81, SE = .55,  $p = .011$ ), the text-based pathogen condition (difference between means = 1.56, SE = .55,  $p < .05$ ), and the threatening control condition (difference between means = 2.79, SE = .55,  $p < .001$ ) (Fig. 2).

**Table 2** Means, standard deviations, and effect sizes for the sex differences in experiment 2

Disgust subscale (TDDS)	Men mean (SD)	Women mean (SD)	Cohen's <i>d</i>
Sexual	22.50 (8.52)	34.94 (9.09)	1.41
Moral	29.52 (10.23)	31.15 (9.01)	.17
Pathogen	30.97 (7.25)	36.94 (6.40)	.87
Current desire for short-term mating			
Pre-disgust induction	15.08 (5.04)	9.09 (3.65)	-1.36
Post-disgust induction	12.76 (5.28)	7.49 (3.73)	-1.16



**Fig. 2** Change in desire for short-term mating across conditions in experiment 2. The sexual disgust condition experienced a greater decline in desire for short-term mating than the visual pathogen disgust condition, text-based pathogen disgust condition, and threatening control condition. Bars represent pre-post manipulation difference scores and error bars represent 95% confidence intervals

### Simple Effects of Experimental Condition

We followed this with an analysis of the simple effect of condition. As in experiment 1, there were no differences between groups in desire for short-term mating before the onset of the manipulation,  $F(4, 351) = 1.91$ , *ns*, partial  $\eta^2 = .02$ . After the manipulation, however—and replicating the findings of experiment 1—the groups differed in desire for short-term mating,  $F(4, 351) = 3.38$ ,  $p = .01$ , partial  $\eta^2 = .04$ . Post-hoc tests revealed that the sexual disgust group had the lowest desire for short-term mating—lower than the threatening control group [difference between means = 2.34,  $SE = .80$ ,  $p = .03$ ] and the olfactory group [difference between means = 2.82,  $SE = .85$ ,  $p = .01$ ]. There were no other between-group differences in desire for short-term mating (all  $ps > .05$ ).

### Discussion

The results of experiment 2 cleanly replicate those of experiment 1, providing empirical support for the hypothesis that inducing disgust—especially sexual disgust—leads to a decline in desire for short-term mating. This is especially interesting given that the manipulation check revealed only non-significant differences in disgust between groups. As in experiment 1, the central findings in experiment 2 provide several pieces of evidence in support of our primary hypothesis: a) the five groups did not differ in their desire for short-term mating before the manipulation, but did differ after the manipulation, b) the sexual disgust group showed the strongest decline in desire for short-term mating (significantly stronger than the visual pathogen group, the text-based group, and the threatening control group), c) the threatening control group showed no change in desire for short-term mating, and d) post-hoc tests revealed that after disgust induction, the sexual disgust group exhibited lower desire for short-term mating than the threatening control group and the

olfactory disgust group. These results support our primary hypothesis and show that the results of experiment 1 replicate robustly across independent samples with modified methods.

### General Discussion

The logic underlying our central hypothesis comes from a task analysis of short-term mating strategies. Since short-term mating involves casual sex, sex with multiple partners, and sex after brief periods of acquaintance, those with a strong proclivity for short-term mating may be less able to implement their preferred mating strategy in the presence of high levels of sexual disgust. This reasoning suggests the hypothesis that short-term mating mechanisms calibrate sexual disgust levels in order to facilitate the implementation of those strategies (Al-Shawaf et al. 2015c). This broad hypothesis gives rise to two specific hypotheses. The first is that individuals oriented toward short-term mating should have lower levels of sexual disgust than their less short-term-oriented counterparts. We have found empirical support for this hypothesis in two independent studies (Al-Shawaf et al. 2015c). The second hypothesis is the one we advance in this paper: because low sexual disgust is an important component of short-term mating strategies, experimentally inducing sexual disgust should cause a decline in desire for short-term mating.

In both studies, inducing disgust caused a decline in desire for short-term mating, and this decrease was most pronounced for those in the sexual disgust group. This suggests that experimentally inducing disgust has the capacity to inhibit short-term mating, and that the inhibitory effect of sexual disgust is particularly strong. In both studies, our groups did not differ in desire for short-term mating before the disgust manipulation, but did differ after it, providing 1) evidence for the efficacy of our disgust induction procedures and 2) evidence that the findings presented here are not artifacts of baseline differences between groups in their desire for short-term mating. Together with the finding that individuals with a stronger proclivity for short-term mating have lower levels of sexual disgust (Al-Shawaf et al. 2015c), the current results bolster the hypothesis that reduced levels of sexual disgust constitute an important but previously undiscovered design feature of short-term mating strategies.

### Limitations and Future Directions

Our use of experimental methodology—and especially of a repeated-measures design—enables us to make causal inferences about the impact of sexual disgust on short-term mating desire. Nonetheless, providing convergent evidence using new stimuli, different methodologies, and novel samples would buttress support for the hypothesis presented here and enhance our confidence in the veridicality of our findings.

Our methodology presents two potential limitations. First, in experiment 1, the neutral control group was not exposed to any slideshow. An alternative would be to present a neutral slideshow, as in Mortensen et al. (2010). In this way, the difference between the neutral condition and other conditions would be isolated to the content of the slideshow. Second, in experiment 2, our induction of olfactory pathogen disgust required an experimenter to enter the room, a feature that was not present in the other experimental conditions. Although we think it implausible that it was the entry of the experimenter rather than the rag with the offensive odor that was responsible for inducing disgust, a future design that enables the presentation of the offensive odor without the presence of the experimenter would be ideal.

The experiments presented are necessarily tied to the way we operationalized our constructs. It remains to be seen, for example, whether future experiments will yield the same pattern of results if we employ different images in the pathogen and sexual conditions, different odors in the olfactory condition, or different stories in the text-based condition. Conducting numerous experiments with varying stimuli is a good way to detect systematic patterns in the results: if different stimulus sets reliably reveal similar patterns as the ones we report here, that points to the robustness and generalizability of the phenomenon and constitutes good evidence for the hypothesis under investigation.

An important next step will be to examine the cross-cultural universality of this phenomenon, as we expect the relationship between short-term mating strategies and disgust to be universal. The behavioral outputs, facial displays, and other outward expressions may vary across individuals and cultures, but we expect uniformity in the underlying psychological mechanisms responsible for short-term mating and its relationship to sexual disgust. Cross-cultural tests also afford the opportunity to examine variables such as prevalence of sexually transmitted infections and local pathogen density, and assess their hypothesized impact on disgust and mating strategy (see Schaller and Murray 2008).

The hypothesis that short-term mating is partly responsible for calibrating sexual disgust also points toward a longitudinal test. Humans have been hypothesized to experience shifts in mating strategy as a function of contextual or organismic conditions such as operational sex ratio, longitudinal changes in mate value, as well as life events such as entering a new romantic relationship, having a child, or emerging from a break-up (e.g., Burnham et al. 2003; Buss and Greiling 1999; Gettler et al. 2011; Mazur and Michalek 1998; McIntyre et al. 2006; Schmitt 2005). A valuable test would be to investigate whether these shifts in mating strategy are accompanied by concomitant shifts in sexual disgust. For instance, having offspring may up-regulate sexual disgust, and emerging from a break-up may downregulate sexual disgust to facilitate a person's re-entry into the mating market.

Another important future direction involves priming participants with mating mindsets. If low levels of sexual disgust are needed to facilitate a short-term mating strategy, then successfully priming a short-term mating mindset may cause a temporary downregulation of sexual disgust (see Ariely and Loewenstein 2006; Borg and de Jong 2012; Stevenson et al. 2011).

A final limitation involves the self-report nature of our measure of short-term mating interest. Although studies show that self-report measures predict behavioral measures fairly well (Glasman and Albarracín 2006), future studies would benefit from including behavioral, endocrinological, and psychophysiological measures. Convergent evidence from multiple data sources is always more compelling, and paints a more comprehensive picture.

## Conclusions

The findings presented here support the hypothesis that experimentally inducing sexual disgust causes a reduction in desire for short-term mating—an effect found for both men and women. These findings provide corroborative experimental support for the broader hypothesis that low levels of sexual disgust facilitate the implementation of short-term mating strategies. Evidence is now accumulating—from experimental and non-experimental studies using a variety of different types of stimuli and disgust induction procedures—that reduced levels of sexual disgust are an important, previously undiscovered design feature of short-term mating strategies (Al-Shawaf et al. 2015c). This growing body of evidence illuminates specialized design features of the psychology of short-term mating and reveals an important link between human mating and the emotion of disgust.

## Compliance with Ethical Standards

**Conflict of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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