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Brief Emotion Regulation Training Facilitates Arousal Control During Sexual Stimuli

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Disgust, a negative emotion which evokes strong behavioral avoidance tendencies, has been associated with sexual dysfunction. Recently, it was postulated that healthy sexual functioning requires a balance between excitatory (increased sexual arousal) and inhibitory processes (lowered disgust levels). This suggests that amplification of excitatory processes (like sexual arousal) could be a valuable addition to treatments for affect-based sexual dysfunctions. The major aim of the present study was to establish whether up-regulation could effectively enhance arousal levels during sexual stimuli, and whether such a training would simultaneously reduce disgust. Students (N = 163, mean age = 20.73 years, SD = 2.35) were trained in up-regulation of affect using either a sexual arousal film (i.e., female-friendly erotic movie) or a threat arousal film clip (i.e., horror movie), while control groups viewed the films without training instructions. Following this, participants viewed and rated state emotions during a series of pictures (sexual, disgusting, or neutral). Up-regulation of mood successfully enhanced general arousal in both groups, yet these arousal levels were not paralleled by reductions in disgust. Overall, the findings indicate that emotion regulation training by maximizing positive affect and general arousal could be an effective instrument to facilitate affect-related disturbances in sexual dysfunctions.

According to research on the human sexual response cycle, healthy sexual functioning depends both on the activation of several crucial components (Masters & Johnson, 1966) and the interaction among them, which may facilitate or hinder proper sexual functioning (Basson, 2001). One key factor in the sexual response cycle for successful sexual behavior is the ability to generate sufficient sexual arousal. Excitatory processes such as sexual arousal may, however, in itself not be sufficient for healthy sexual functioning. For example, many women engage in sexual intercourse even when not yet sexually aroused (Brotto, Bitzer, Laan, Leiblum, & Luria, 2010). Hence, pleasurable sexual behavior could, in addition to bodily stimulation and elicitation of sexual arousal, depend on the effective reduction of inhibitory processes on sexual arousal (Janssen & Bancroft, 2007). Indeed,

research has indicated that compared to men, women focus more on inhibitory processes while men focus on excitatory processes (Bancroft, Graham, Janssen, & Sanders, 2009). The dual control model posits that sexual behavior reflects a balance between sexual excitatory and inhibitory processes (Bancroft et al., 2009).

Emotions are likely candidates that could exert excitatory or inhibitory influences on human sexual arousal, depending on emotional valence. In this regard, positive as well as negative emotions are not merely outcomes of sexual arousal levels. Both positive and negative emotions impact sexual behavior directly by strengthening or reducing levels of key factors within the sexual response cycle (e.g., levels of sexual arousal or sexual desire; Graham, 2010). Indeed, high levels of sexual desire are associated with strong feelings of positive emotions, such as high satisfaction and affection with current sexual relationships (Carvalho & Nobre, 2011). Yet negative emotions like fear related to self-perceived performance and self-esteem may block the initiation of sexual arousal and/or sexual desire (Janssen, 2011). Further underlining the importance of emotions on sexual behavior, individual difficulty with regulating emotions predicted risky

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sexual behavior in women (Messman-Moore, Walsh, & DiLillo, 2010).

Of the potential emotions involved in sexual functioning, disgust may not appear an obvious candidate to be involved in sexual behavior. Yet disgust is one of the basic emotions and functions as a defense mechanism to shield individuals against contamination with hazardous pathogens (Rozin, Nemeroff, Horowitz, Gordon, & Voet, 1995). Thus, disgust is evoked where the human body and external environment intersect. Indeed, individuals generally display heightened sensitivity toward contamination related to body parts and orifices, particularly the mouth and the genitalia (Rozin et al., 1995). In addition, humans are universally disgusted by stimuli that involve the human body and its orifices, such as sweat, saliva, or sexual by-products (Rozin & Fallon, 1987). Increasing research attention has therefore focused on the role of disgust in sexual behaviors (e.g., Borg & de Jong, 2012; de Jong, van Overveld, & Borg, 2013). Disgust is an emotion typified by avoidance and could act as a powerful motivator for sexual withdrawal tendencies. A heightened disgust toward genitalia and sexual by-products would render pleasurable sexual behavior practically impossible. Indeed, previous work has shown that disgust appears associated with the occurrence of sexual complaints (e.g., women with lifelong vaginismus; van Overveld et al., 2012). Further, in the absence of sexual arousal, women generally respond to penetration stimuli with disgust (Borg et al., 2014).

In a recent review (de Jong et al., 2013), a model was proposed whereby sexual arousal and disgust act as opposing forces during sexual functioning. Hence, encountering sexual stimuli could elicit both sexual arousal but also negative emotions such as disgust. Yet de Jong and colleagues (2013) posited that sexual arousal levels may counteract the effects of disgust and vice versa. Thus, in view of this model, the balance between the respective elicited responses determines whether the outcome of the confrontation will result in arousal-induced sexual approach behavior or disgust-induced sexual avoidance behavior. Preliminary evidence for this model presenting sexual arousal and disgust as counteracting mechanisms has been obtained. In lab experiments, Borg and de Jong (2012) confirmed that participants who were erotically stimulated were less disgusted and demonstrated lower disgust-induced avoidance during a series of disgusting (sex- and non-sex-related) behavioral experiments. Further, in men, sexual arousal was associated with a reduction in self-reported levels of disgust toward the prospect of, for instance, having sex with an extremely obese woman (Ariely & Loewenstein, 2006) and a perception of the disgust properties of (previously considered disgusting) sex elicitors as less strong (Stevenson, Case, & Oaten, 2011).

Following on from these findings, treatments of various sexual dysfunctions could be refined by focusing

on amplifying key components of the sexual response cycle (e.g., excitatory processes like sexual arousal) through emotion regulation training. Training participants in regulating emotions has already been examined extensively and is associated with a wide range of benefits, for example, in relationship satisfaction (Murray, 2005), trading performance (Sokol-Hessner et al., 2008), anxiety and arousal (Hofmann, 2009), as well as in stress (Jamieson, Mendes, & Nock, 2013). With respect to enhancing or reducing the strength of experienced emotions, several specific techniques exist that are widely established (for several specific strategies, see also Richards & Gross, 2000; Gross, 2007; Gross & John, 2003; Koole, 2009), such as training participants in down-regulation (i.e., weakening emotional experiences) and up-regulation (i.e., maximizing emotional experiences). Research has confirmed that these strategies have differential effects on well-being (Livingstone & Srivastava, 2012) and are associated with distinct patterns of neural activity (Ochsner et al., 2004).

Further, up-regulation of positive emotions enhanced the experience of positive emotions in patients with mood disorders, while down-regulation was associated with increases in negative emotions and related physiological activity (i.e., heart rate increase; Gilbert, Nolen-Hoeksema, & Gruber, 2013). Consequently, it has been suggested that amplifying positive emotions could present a useful transdiagnostic tool in various disorders in which disturbances in affectual balance are involved (Gilbert et al., 2013). Yet despite indications that emotion regulation techniques may be helpful to emotional control during sexual behavior (e.g., Gillespie, Mitchell, Fisher, & Beech, 2012; Tull, Weiss, Adams, & Gratz, 2012), particularly the use of amplification (or up-regulation; Gross, 2007), such regulation has rarely been applied to sex research to examine whether sexual arousal could be effectively enhanced. Therefore, the major aim of the present study was to investigate whether a brief up-regulation training could effectively enhance arousal levels (and specifically whether up-regulation of arousal during sexual stimuli specifically enhances arousal toward sexual stimuli). We limited our study to excitatory processes (i.e., amplifying threat or sexual arousal) because prior work has already shown that the emotion of disgust is difficult to extinguish (e.g., Smits, Telch, & Randall, 2002), indicating that standard down-regulation exercises may not be sufficient to reduce disgust.

Following the proposed relationship of sexual arousal with disgust (de Jong et al., 2013), procedures to maximize arousal levels could be helpful in treatments of disorders that are characterized by disgust-induced avoidance tendencies. Previous research has shown that disgust levels appear enhanced in women with (primary) lifelong vaginismus (van Overveld et al., 2012), and these women also respond with greater disgust-specific physiological reactivity to erotica instead of with sexual arousal (i.e., activity in facial electromyography

[EMG] of levator labii; Borg & de Jong, 2012). Disgust appraisals for sexual intercourse, and/or for sexual stimuli in general, could hinder the generation of sexual desire and/or sexual arousal in these patients and motivate sexual avoidance behavior. If indeed sexual arousal and disgust levels are opposing forces, then training participants to manipulate individual arousal levels by enhancing excitatory processes (i.e., sexual arousal) may automatically be paralleled by a change in inhibitory factors (i.e., experiencing lower disgust during sexual stimuli).

In addition, different types of arousal exist and may demonstrate separate associations with disgust. For example, while general arousal (i.e., excitement) could be difficult to disentangle from sexual arousal, and both of these types could be associated with enhanced sexual approach behavior, the reverse may be observed for threat arousal. Threat arousal is triggered as part of the fight-or-flight response and will be more strongly associated with survival instincts and avoidance behavior. Interestingly, prior research has observed that threat stimuli in fact enhanced sexual arousal in participants (e.g., Beck, Barlow, Sackheim, & Abrahamson, 1987). Yet this was attributed to the role of automatic and/or controlled cognitive processes. Instead of focusing on inhibiting influences during generation of sexual arousal (e.g., threat), cognitive processes helped participants stay focused on sexual arousal. Further, neuroimaging research showed that areas in the brain associated with arousal (i.e., amygdala; Tettamanti et al., 2012) are involved in all basic emotions. Emotional valence would then provide direction with respect to the interpretation of general arousal levels. Therefore, an alternative explanation could be that when individuals are aroused (i.e., general arousal), cognitive processes facilitate the shift toward arousal states with distinct valence dimensions (i.e., threat or sexual arousal) and related behavioral consequences.

Threat arousal and sexual arousal (and/or general arousal) could exert opposing effects on sexual behavior. Indeed, prior research indicated that sexual arousal could be distinguished from other forms of arousal in neural activity (Walter et al., 2008). In addition, women who viewed threat-related films demonstrated enhanced pelvic floor muscle activity (van der Velde & Everaerd, 2001; van der Velde, Laan, & Everaerd, 2001), which likely reflects a protective mechanism in women rather than sexual excitation. In the same study, a discordance was also observed where physiological reactivity was not paralleled with higher subjective sexual arousal levels, strengthening the claim that a defensive reaction could be involved during threat arousal. Thus, up-regulation of sexual arousal could be associated with decreased state disgust for sexual stimuli, while up-regulation of threat arousal may not decrease disgust for sexual stimuli at all.

Hence, to test the specificity of the proposed sexual arousal and disgust model, the second aim of our study

was to examine whether up-regulation would only decrease disgust levels after enhancing arousal in a sexual context (sexual film clip). Therefore, we selected threat arousal as a control condition because we expected that only enhanced sexual arousal would be associated with a reduction in disgust levels.

Method

Participants

All participants were business administration students at the Rotterdam School of Management at Erasmus University Rotterdam ($N = 163$; 97 men and 66 women). The participants had a mean age of 20.73 years ($SD = 2.35$). Nearly half of the participants were not in a relationship during the testing phase (49.1%; $n = 80$); the rest were in a stable relationship with intimate sexual contact (36.2%; $n = 59$), in an open relationship with intimate sexual contact (11%; $n = 18$), or never had an intimate sexual relationship (3.7%; $n = 6$). Of the men, 96.9% ($n = 94$) indicated they were mainly attracted to women, 2.1% ($n = 2$) to men, and 1% ($n = 1$) to both. Of the women, 92.4% ($n = 61$) were mainly attracted to men, 4.5% ($n = 3$) to women, and 3% ($n = 2$) to both.¹ Participants were randomly assigned to one of four groups: a sexual arousal up-regulation group (SAU; $n = 42$; 19 women), a threat arousal up-regulation group (TAU; $n = 40$; 15 women), a sexual arousal nonregulation group (SANR; $n = 40$; 18 women), and a threat arousal nonregulation group (TANR; $n = 41$; 14 women).

Measures

Disgust Propensity and Sensitivity Scale–Revised (DPSS-R; van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006). The DPSS-R measures dispositional tendency to respond with disgust to any given situation (propensity) as well as the tendency to evaluate the experience of disgust negatively (sensitivity). Participants rate 12 items on a scale from 1 (*Never*) to 5 (*Always*) on how often they experience disgust (propensity) and its emotional impact (sensitivity). The DPSS-R was psychometrically investigated in various studies (Fergus & Valentiner, 2009; van Overveld et al., 2006; van Overveld, de Jong, & Peters, 2010) and is a valid and reliable index for measuring disgust propensity ($\alpha = .76$ in present study) and disgust sensitivity ($\alpha = .73$ in present study).

Sexual Disgust Questionnaire (SDQ; de Jong, van Overveld, Weijmar Schultz, Peters, & Buwalda, 2009). The SDQ indexes a participant's willingness to handle items after contamination with sexual contaminants.

¹Because some of the picture stimuli presented heterosexual activities, we additionally performed all analyses after excluding homosexual individuals from the analyses. The results of the analyses did not differ.

The SDQ measures both the individual willingness to touch contaminated items (SDQ-Willingness) as well as the level of disgust participants would experience if they were to touch these items (SDQ-Disgustingness). Participants rate six items for willingness (and the same six for disgustingness) on a scale from 0 (*Certainly not willing/disgusting*) to 8 (*Certainly willing/disgusting*). The items in both the SDQ-W and SDQ-D are contaminated by two potential sources (familiar persons, unknown persons). Prior research showed that the SDQ is a valid index for measuring disgust toward sexual stimuli (van Overveld et al., 2012; α s in range .63 to .83 in present study).

Need for Arousal (NFA; Figner, Mackinlay, Wilkening, & Weber, 2009). The NFA measures individual tendency to require a certain level of general (nonspecific) arousal in daily functioning. On 8 items, participants rate from 1 (*Does not apply at all*) to 8 (*Strongly applies*) whether a series of descriptions describe their daily routine appropriately and whether they experience or seek general arousal during their daily routine. It is a valid scale for indexing individual desire to experience general arousal ($\alpha = .68$ in present study).

Film stimuli. To induce arousal, four film clips were used. Two films were used for inducing threat arousal and two for sexual arousal. For threat arousal, we selected two film clips from *Halloween* (a woman entering a dark and silent house looking for her friend) and *The Silence of the Lambs* (a detective chasing a murderer through his house). These film clips were edited in accordance with suggestions by Hewig and colleagues (2005) and lasted approximately 3.5 minutes. For sexual arousal, we used 7 minutes from a female-friendly erotic film (*De Gast*; a man and a woman undress and begin having sexual intercourse), which were split into two 3.5-minute films. Previous research found these film clips to be effective in inducing threat arousal or sexual arousal (Hewig et al., 2005; Borg & de Jong, 2012).

Pictures. For the picture-viewing task, we used 18 pictures that we proposed would induce either disgust (six pictures), (sexual) arousal (six pictures), or nothing at all (six pictures). The neutral pictures were all taken from the International Affect Pictorial System (IAPS; Lang, Bradley, & Cuthbert, 2008).² For the sexual stimuli, we used pictures that we used in prior research (penetration pictures from Borg et al., 2014 combined with IAPS pictures). However, to cover a wider variety

of sexual behaviors (e.g., oral sex, tongue kissing) and because some IAPS pictures appear slightly dated, additional pictures were obtained using the Internet. For disgust, all pictures were obtained through the Internet (e.g., garbage, a jar of maggots, moldy bread, a woman licking a toilet bowl, saliva dripping from a tongue, a person sleeping in a puddle of vomit).³

Last, to index state emotions following the films and each picture, visual analog scales (VASs) were used where participants rated how strongly they felt a series of emotions (“To what extent did you experience the following emotions during the film: disgust/fear/pleasure?”). Participants then rated how strongly they felt disgust, fear, and pleasure on a 10 mm line, representing a scale from 0 (*Not at all*) to 100 (*Always*). As participants may not perceive arousal as an emotion per se, a separate question was used for arousal with identical scaling (“How arousing was this film/picture?”).

Procedure

Participants were recruited through the university’s digital board where advertisements can be placed for study recruitment purposes for lab studies. An online advertisement was placed for a study on emotions during sexual stimuli. This was done to prepare participants for the explicit nature of some of our study stimuli. Upon arrival at the lab, students were briefed on the study and provided informed consent. Next, each participant was seated in an isolated cubicle. Depending on group membership, participants received either a nonsexual threat arousal film (i.e., a five-minute film from the movie *The Silence of the Lambs*) or a sexual arousal film (i.e., a five minute excerpt from the female-friendly erotic film *De Gast*). Next, VASs were completed on state emotions during the film. Participants were then instructed to view the next movie (nonregulation groups) or to watch the movie while trying to amplify their emotions (up-regulation groups). The exact instructions are provided in the Appendix. Prior studies using similar instructions have been found effective to amplify emotions (e.g., Giuliani, McRae, & Gross, 2008; Ochsner et al., 2004). Again, participants would view a threat arousal film or a sexual arousal film in a sequential order. This allowed us to investigate whether up-regulation effectively enhanced arousal within individuals. Afterward, participants completed the VASs.

Next, participants rated a series of 18 pictures (six neutral, six core disgust, six sex) that were presented in a fixed (randomized) order. Participants rated how much general arousal, disgust, and pleasure they felt during the 6-second presentation of the pictures. Finally, participants completed a short survey with all the trait

²For neutral stimuli, the corresponding IAPS numbers are: basket (7010), mug (7009), stool (7025), book (7090), lamp (7175), and an abstract art wall decoration (7185). For sexual stimuli, we used the following IAPS pictures: oral sex (4658, 4659) and a man lying on top of a woman (4669).

³All pictures are available from the corresponding author.

Table 1. Means and Standard Deviations for Trait Indices

Trait Measures	Up-Regulation Groups		Nonregulation Groups		Range
	Sexual Arousal (SAU)	Threat Arousal (TAU)	Sexual Arousal (SANR)	Threat Arousal (TANR)	
Disgust propensity (DPSS-RP)	2.89 (.65)	3.08 (.72)	2.92 (.67)	3.04 (.59)	1–5
Disgust sensitivity (DPSS-RS)	2.09 (.64)	2.30 (.77)	2.09 (.69)	2.24 (.64)	1–5
Sexual disgust—familiar persons (SDQ-DF)	5.10 (1.88)	4.95 (2.15)	5.26 (1.83)	4.87 (1.71)	0–8
Sexual disgust—unknown persons (SDQ-DU)	6.56 (1.94)	6.84 (1.71)	6.26 (1.77)	6.59 (1.51)	0–8
Reappraisal (ERQ-RA)	4.99 (.96)	4.87 (1.07)	4.77 (.92)	4.68 (1.72)	1–7
Suppression (ERQ-SP)	3.65 (1.22)	3.54 (1.23)	3.88 (1.37)	4.11 (1.45)	1–7
Arousal propensity (NFA)	5.20 (.74)	5.20 (1.18)	5.07 (.96)	5.25 (.96)	1–8
Valid <i>N</i>	42	40	40	41	

Note. Standard deviations in parentheses. SAU = sexual arousal up-regulation group; TAU = negative arousal up-regulation group; SANR = sexual arousal nonregulation group; TANR = negative arousal nonregulation group; DPSS-RP = Disgust Propensity and Sensitivity Scale–Revised Propensity; -RS = Sensitivity; SDQ = Sexual Disgust Questionnaire; DF = Disgust–Familiar; DU = Disgust–Unknown; ERQ = Emotion Regulation Questionnaire; RA = Reappraisal; SP = Suppression; NFA = Need for Arousal.

measures in our study (DPSS-R, SDQ, ERQ, NFA). The total procedure lasted approximately 45 minutes. Participants received course credit in exchange for their participation. The study was conducted in accordance with standard ethical guidelines for conducting scientific research.

Results

Descriptive Statistics

Tables 1 and 2 present a summary of the means and standard deviations for all trait and state indices. We tested whether the groups differed on trait and state indices. Bonferroni corrections were applied. As a manipulation check for preexisting group differences, we measured trait disgust (DPSS-R), dispositional emotion regulation (ERQ), and need for general arousal (NFA). As expected, the groups showed similar ratings (all $ps > .12$). In line with earlier work (e.g., Olatunji, Arrindell, & Lohr, 2005; van Overveld et al., 2006), women scored higher on disgust propensity ($t(161) = -5.36$; $p < .01$; $d = -.82$) and disgust sensitivity ($t(161) = -3.48$; $p < .01$; $d = -.55$). Further, women demonstrated higher disgust (SDQ) toward stimuli contaminated by sexual by-products (i.e., fluids) by a familiar person ($t(157) = -2.21$; $p < .01$; $d = -.35$) or an unknown person ($t(157) = -5.52$; $p < .01$; $d = -.91$).⁴ No gender differences were observed for reappraisal ($t(161) = 1.10$; $p = .27$; $d = .18$) or suppression ($t(161) = .33$; $p = .74$; $d = .05$), nor for individual need for general arousal ($t(161) = 1.57$; $p = .12$; $d = .25$).

⁴Because women scored consistently higher on disgust (trait disgust and state disgust for the disgust pictures) compared to men, we additionally performed all analyses while correcting for gender. The findings were similar to the current analyses.

Emotional Response to Film Clips

As a manipulation check to examine group differences in general arousal, negative emotions (disgust and fear), and positive emotions (pleasure) during the film clips, a series of MANOVAs were performed. For (general) arousal, a 2 (General arousal: VAS arousal after film 1 and after film 2) \times 4 (Group: TAU, SAU, TANR, SANR) MANOVA revealed a significant interaction term ($F(3, 158) = 6.12$; $p < .01$; $\eta^2 = .02$). Post hoc t tests showed that only the sexual arousal groups increased in general arousal from film 1 to film 2 ($t(82) = -6.84$; $p < .01$; $d = -.50$). The sexual arousal groups (SAU, SANR) consistently scored higher on general arousal compared to threat arousal groups (TAU, TANR; all $ps < .01$). So, although all participants found the films arousing, the erotic films in particular evoked high levels of general arousal.

For disgust, a 2 (Disgust: VAS disgust for film 1 and film 2) \times 4 (Group: TAU, SAU, TANR, SANR) MANOVA indicated a significant interaction term ($F(3, 159) = 6.44$; $p < .01$; $\eta^2 = .04$). Post hoc t tests revealed that only participants in the sexual arousal conditions (SAU, SANR) increased in disgust during film 2 compared to film 1 ($t(81) = -3.62$; $p < .01$; $d = -.40$). Yet the threat arousal groups (TAU, TANR) scored consistently higher on disgust (all $ps < .01$). So while disgust levels gradually built up for the sexual film clips, both threat films were instantly associated with high levels of disgust.

For fear, a 2 (Fear: VAS fear for film 1 and film 2) \times 4 (Group: TAU, SAU, TANR, SANR) MANOVA showed that only the main effect of group was significant ($F(3, 159) = 72.891$; $p < .01$; $\eta^2 = .47$), indicating that, as expected, the threat arousal groups scored higher on fear compared to the sexual arousal groups ($ps < .01$). For pleasure, a 2 (Pleasure: VAS pleasure for film 1 and film 2) \times 4 (Group: TAU, SAU, TANR,

Table 2. Means and Standard Deviations for State Indices

State Emotions (VAS)	Up-Regulation Groups		Nonregulation Groups		Range
	Sexual Arousal (SAU)	Threat Arousal (TAU)	Sexual Arousal (SANR)	Threat Arousal (TANR)	
After film 1					
Arousal	40.50 (25.98)	28.24 (25.57)	38.36 (26.95)	26.07 (27.52)	0–100
Disgust	8.17 (13.31)	37.20 (30.35)	10.58 (18.25)	34.68 (26.98)	0–100
Fear	2.77 (5.45)	45.02 (25.98)	5.40 (11.68)	45.37 (26.36)	0–100
Pleasure	44.65 (26.83)	16.90 (20.55)	43.48 (27.64)	17.00 (20.10)	0–100
After film 2					
Arousal	53.17 (31.12)	27.33 (29.15)	53.33 (28.69)	29.85 (31.62)	0–100
Disgust	17.24 (23.43)	34.03 (32.76)	17.48 (22.61)	23.85 (29.07)	0–100
Fear	3.81 (10.08)	53.33 (32.36)	4.75 (9.56)	48.22 (29.84)	0–100
Pleasure	49.88 (30.91)	12.95 (22.19)	48.30 (31.56)	13.46 (18.62)	0–100
Following disgust pictures					
Arousal	59.86 (26.04)	58.16 (21.81)	56.72 (23.54)	48.48 (18.64)	0–100
Disgust	11.01 (17.83)	16.43 (20.95)	12.20 (16.77)	16.21 (18.87)	0–100
Fear	3.76 (5.26)	3.49 (4.94)	2.68 (4.16)	6.04 (9.19)	0–100
Pleasure	9.98 (14.69)	6.75 (10.11)	7.85 (9.13)	6.12 (9.11)	0–100
Following sex pictures					
Disgust	6.13 (10.79)	6.89 (12.97)	7.25 (10.77)	5.79 (13.67)	0–100
Arousal	42.39 (22.74)	43.47 (24.85)	37.07 (21.91)	37.45 (22.86)	0–100
Pleasure	40.29 (25.76)	42.94 (26.41)	36.01 (23.80)	37.13 (27.27)	0–100
Fear	.77 (1.91)	1.65 (4.48)	1.21 (2.65)	1.82 (6.29)	0–100
Following neutral pictures					
Disgust	8.15 (6.76)	7.91 (5.65)	7.58 (6.88)	7.37 (6.75)	0–100
Arousal	3.40 (5.79)	5.55 (7.88)	4.95 (7.87)	5.81 (10.12)	0–100
Pleasure	4.34 (4.96)	5.10 (8.32)	5.57 (8.30)	5.84 (8.93)	0–100
Fear	3.00 (5.39)	2.72 (5.03)	1.89 (3.75)	3.47 (7.56)	0–100
Valid <i>N</i>	42	40	40	41	

Note. Standard deviations in parentheses. SAU = sexual arousal up-regulation group; TAU = negative arousal up-regulation group; SANR = sexual arousal nonregulation group; TANR = negative arousal nonregulation group; VAS = Visual Analog Scale.

SANR) MANOVA revealed a significant interaction term ($F(3, 159) = 4.04; p = .01; \eta^2 = .01$). Follow-up t tests showed that the sexual arousal groups (SAU, SANR) consistently reported higher levels of pleasure during the films compared to the threat arousal groups (TAU, TANR; all $ps < .01$). No effects of the regulation training were observed (all $ps > .80$).

In sum, as expected, higher levels of negative emotions (disgust and fear) were experienced during the threat arousal films compared to the sexual arousal films, while higher levels of general arousal and positive emotions (pleasure) were experienced during the sexual arousal films compared to the threat arousal films.

Emotional Response to Picture Set

As a manipulation check to test whether the (emotional) picture categories were associated with the appropriate emotions (i.e., neutral, disgust, general arousal), a series of paired t tests were performed. Bonferroni corrections were applied. Disgust pictures induced disgust more strongly compared to fear, pleasure or general arousal (all $ps < .01$). Sexual pictures induced general arousal and pleasure significantly more strongly compared to disgust or fear (all $ps < .001$). No significant differences emerged between levels of

pleasure and general arousal, indicating that general arousal during sexual pictures was perceived with positive connotations ($t(162) = -.78; p = .44; d = .05$). For the neutral pictures, the mean scores on every emotion were low (< 8 on a scale of 0 to 100). Thus, as expected, disgust pictures evoked disgust, erotic pictures evoked (general) arousal and pleasure, and neutral pictures did not evoke any emotions.

Effect of Up-Regulation Training on Emotions During Pictures

Next, we tested whether the up-regulation training would be associated with overall increases in general arousal levels during a series of emotional pictures (disgust and sexual stimuli). Then we tested whether up-regulation of arousal during a sexual film would be specifically associated with enhanced arousal during the sexual pictures).

Hence, first, we explored a 2 (Picture: general arousal during erotic pictures minus general arousal during neutral pictures; general arousal during disgust pictures minus general arousal during neutral pictures) \times 2 (Group: Up-regulators, Nonregulators) MANOVA to determine whether up-regulation strategies would be helpful across arousal conditions (threat as well as sexual

Table 3. Pearson Correlations Between Dispositional Arousal (NFA) and Disgust (DPSS-R) With State Emotions During Sex and Disgust Pictures

Indices	DPSS-RP	DPSS-RS	Disgust Pictures			Sexual Pictures			Neutral Pictures		
			VAS Disgust	VAS Arousal	VAS Pleasure	VAS Disgust	VAS Arousal	VAS Pleasure	VAS Disgust	VAS Arousal	VAS Pleasure
NFA	-.16*	-.18*	-.18*	-.10	.12	-.22**	.07	.15*	-.10	-.06	-.07
DPSS-RP		.54**	.33**	-.01	-.18*	.19*	-.08	-.14	.14	-.07	-.07
DPSS-RS			.29**	.16*	-.04	.24**	.05	-.04	.28**	.23**	.09
Valid <i>N</i>											163

NFA = Need for Arousal scale; DPSS-RP = Disgust Propensity and Sensitivity Scale-Revised Propensity; -RS = Sensitivity; VAS = Visual Analog Scale.

* $p < .05$. ** $p < .01$.

arousal). The interaction term approached significant levels ($F(1, 161) = 2.81$; $p = .09$; $\eta^2 = .01$), indicating that differences were observed between the two groups with respect to general arousal levels during both picture categories. Further, only the main effect of Picture was significant ($F(1, 161) = 198.86$; $p < .01$; $\eta^2 = .41$), indicating that both groups showed stronger general arousal during erotic pictures compared to disgust pictures.

Next, to examine the differences between groups more closely, a series of post hoc *t* tests revealed that the up-regulation group scored higher on (general) arousal only for the erotic pictures compared to the nonregulation group, although results fell marginally outside the range of statistical significance ($t(161) = 1.86$; $p = .07$; $d = .29$). The findings confirm that the up-regulation training enhanced general arousal during sexual pictures.

To examine whether up-regulation of sexual arousal would specifically enhance sexual arousal, a 2 (Picture: Mean general arousal during erotic pictures minus mean general arousal during neutral pictures; mean arousal during disgust pictures minus mean general arousal during neutral pictures) \times 4 (Group: TAU, SAU, TANR, SANR) MANOVA was performed and showed no significant interaction ($p = .27$). Hence, up-regulation of both threat and sexual arousal were associated with an increase in arousal during the sexual pictures. Thus, up-regulation instructions, independent of arousal type, were generally successful in enhancing (general) arousal during erotic stimuli.

Effect of Enhanced Arousal on Disgust During Pictures

To test whether up-regulation training would be associated with a decrease in disgust levels during a series of pictures specifically in the sexual arousal conditions, a 2 (Picture: Mean disgust during erotic pictures minus mean disgust during neutral pictures, mean disgust during disgust pictures minus mean disgust during neutral pictures) \times 4 (Group: TAU, SAU, TANR, SANR) MANOVA was performed. Neither the interaction term ($F(3, 159) = 2.05$; $p = .11$; $\eta^2 < .01$) nor the main effect of group was significant ($F(3, 159) = 1.85$; $p = .15$;

$\eta^2 < .01$), indicating that no group differences were observed. Thus, up-regulation of (general) arousal was not associated with a decrease in disgust levels during erotic or disgust pictures.

Correlations Between Dispositional Disgust and Arousal with State Emotions

Although no group differences could be discerned with respect to experienced disgust, (general) arousal was effectively increased in all groups. The possibility remains that for the inhibition of disgust, the type of arousal (threat/sexual) is irrelevant. If so, a ceiling effect of arousal on the experience of disgust could have been observed. Therefore, we used bivariate Pearson correlations to establish whether dispositional arousal would be negatively associated with overall reductions in experiences of state disgust during disgust and erotic pictures. As Table 3 shows, levels of dispositional general arousal (NFA) were negatively associated with levels of disgust during erotic and disgust pictures in all participants and positively with levels of positive emotions during erotic pictures. Higher levels of trait disgust (DPSS-R) were associated with higher levels of disgust during all pictures.

Discussion

The main findings of the present study were (1) a brief up-regulation training specifically enhanced general arousal for erotic pictures, compared to the control condition in which participants were not instructed to maximize their emotions. This suggests that up-regulation can be effectively applied in affect-based sexual dysfunctions; (2) up-regulation of (threat/sexual) arousal did not reduce disgust levels during a picture-viewing task for disgust pictures, nor for erotic pictures; (3) yet, overall, dispositional (general) arousal levels were negatively associated with trait disgust and state disgust during erotic pictures.

Training participants to amplify positive emotions has been observed as a helpful and potentially transdiagnostic tool for disorders involving affective disturbances (Gilbert et al., 2013). In sexual dysfunctions, such techniques could be valuable to enhance components of the sexual response cycle that are proposed to be involved as prerequisites for successful sexual behavior, such as sexual arousal. To our knowledge, the present study is one of the first to establish that training up-regulation of positive affect and arousal (in a sexual or threat context) can indeed be used to strengthen the experience of such precursors of sexual behavior. In line with the idea that excitatory processes influence sexual behavior (Bancroft et al., 2009), training participants in up-regulation of affect during a sexual stimulus (film clip) enhanced levels of positive emotions and general arousal during erotic pictures compared to participants who did not receive such training. Future research should explore the use of up-regulation in patients with sexual dysfunctions related to arousal management to investigate whether up-regulation exercises could potentially be useful to incorporate in treatments.

It was hypothesized that training participants in sexual arousal (but not in threat arousal) would demonstrate reduced disgust during sexual stimuli and disgusting stimuli. According to recent research (de Jong et al., 2013; Borg & de Jong, 2012), enhanced levels of sexual arousal counteract the emotional experience of disgust during sexual stimuli. The current data revealed that enhanced levels of sexual arousal were not associated with reductions in disgust during erotic or disgusting pictures. However, it needs to be noted that, in general, students indicated low levels of disgust and high levels of positive emotions during the erotic pictures. It is likely that students simply did not experience enough disgust. With respect to disgust, students could represent partially desensitized individuals, given the cleanliness levels of the average student accommodation. Further, because most students in our sample were not in a stable relationship, it is likely that they explored many different contexts of sexual stimuli, which in turn could reduce disgust levels.

Interestingly, negative correlations were observed between dispositional traits on individual proneness to experiencing arousal in general (NFA) and trait disgust (DPSS-R), as well as with the experience of disgust during erotic and disgusting pictures. Thus, individuals who generally experience higher arousal levels were associated with lower levels of state disgust during erotic and disgusting stimuli, suggesting that arousal may have opposing effects on experiencing disgust.

Several limitations apply to the current research. First, only self-report indices were used to index arousal or disgust. This leaves ample room for experimenter bias and social desirability, as well as for differences in interpretation of arousal in participants. Future research should benefit from adding psychophysiological indices

of general arousal (i.e., skin conductance or heart rate), sexual arousal (i.e., plethysmograph), or disgust (i.e., facial EMG of levator muscle activity). It should be noted, however, that several studies in the literature suggest that up-regulation of affect is associated with heart rate changes (e.g., Gilbert et al., 2013), so it is not inconceivable that current self-reported increases in threat and sexual arousal following up-regulation procedures were in fact matched by corresponding psychophysiological arousal changes.

Second, up-regulation training during both threat and sexual films enhanced arousal specifically during sexual pictures. Yet no threat pictures were included, so it could not be robustly tested whether up-regulating threat and sexual arousal could potentially be associated with divergent effects on arousal during the pictures. Future research should establish the specificity of these two arousal types, as this could provide important clues on how to apply up-regulation training most effectively. Third, state disgust during disgusting and erotic pictures was not reduced between sexual arousal and threat arousal groups. Although we expected that, compared to the threat arousal group, the sexual arousal group would demonstrate reduced levels of state disgust during sexual stimuli, this was not the case. In general, a negative relationship was observed between dispositional proneness to general arousal and trait disgust. In this respect, the current experiment may have needed an additional control group that viewed a neutral film, because the relatively low disgust scores during the erotic and disgusting pictures could reflect enhanced levels of general arousal consistently in all groups. In a similar vein, future research should consider using a disgust film to examine whether inflated disgust actively inhibits sexual arousal. An alternative explanation may be that students are not ideal candidates because the participants largely associated sexual stimuli with positive emotions. It is recommended that the current findings be replicated in patients with sexual dysfunctions involving disgust (e.g., primary lifelong vaginismus; de Jong et al., 2009), who may differ considerably in their initial appreciation of sex stimuli and general disgust elicitors.

The current findings indicate that relatively simple exercises on up-regulation of state affect and arousal (sexual or general) are useful instruments to help individuals manage arousal levels. A brief up-regulation training enhanced general arousal levels in both threat arousal and sexual arousal groups. Moreover, enhancements were associated with differential increases in state emotions. Enhanced threat arousal was associated with higher levels of negative emotions (disgust and fear), while enhanced sexual arousal induced positive emotions (pleasure). Although the present findings could not confirm that such increases in general arousal were associated with specific reductions in state emotions, which could explain behavioral avoidance tendencies (i.e., disgust for sexual stimuli), overall, higher

dispositional proneness to experiencing arousal in general was associated with lower levels of state disgust during the experiment. To conclude, although up-regulation of general arousal did not reduce disgust levels, the findings imply that up-regulation of sexual arousal could be a simple yet valuable tool for treatments of sexual dysfunctions with clear problems in effective sexual arousal management.

References

- Ariely, D., & Loewenstein, G. (2006). The heat of the moment: The effect of sexual arousal on sexual decision-making. *Journal of Behavioral Decision-Making, 19*, 87–98.
- Bancroft, J., Graham, C. A., Janssen, E., & Sanders, S. A. (2009). The dual control model: Current status and future directions. *Journal of Sex Research, 46*, 121–142.
- Basson, R. (2001). Using a different model for female sexual response to address women's problematic low sexual desire. *Journal of Sex and Marital Therapy, 27*, 395–403.
- Beck, J. G., Barlow, D. H., Sackheim, D. K., & Abrahamson, D. J. (1987). Shock threat and sexual arousal: The role of selective attention, thought content and affective states. *Psychophysiology, 24*, 165–172.
- Borg, C., & de Jong, P. J. (2012). Feelings of disgust and disgust-induced avoidance weaken following induced sexual arousal in women. *PLoS ONE, 7*, e44111.
- Borg, C., Georgiadis, J. R., Renken, R. J., Spoelstra, S. K., Weijmar Schultz, W., & de Jong, P. J. (2014). Brain processing of visual stimuli representing sexual penetration versus core and animal-reminder disgust in women with lifelong vaginismus. *PLoS ONE, 9*, e84882.
- Brotto, L. A., Bitzer, J., Laan, E., Leiblum, S., & Luria, M. (2010). Women's sexual desire and arousal disorders. *Journal of Sexual Medicine, 7*, 586–614.
- Carvalho, J., & Nobre, P. (2011). Gender differences in sexual desire: How do emotional and relationship factors determine sexual desire according to gender? *Sexologies, 20*, 207–211.
- de Jong, P. J., van Overveld, M., & Borg, C. (2013). Giving in to arousal or staying stuck in disgust? Disgust-based mechanisms in sex and sexual dysfunction. *Journal of Sex Research, 50*, 247–262.
- de Jong, P. J., van Overveld, M., Weijmar Schultz, W., Peters, M. L., & Buwalda, F. (2009). Disgust and contamination sensitivity in vaginismus and dyspareunia. *Archives of Sexual Behavior, 38*, 244–252.
- Fergus, T. A., & Valentiner, D. P. (2009). The Disgust Propensity and Sensitivity Scale-Revised: An examination of a reduced-item version. *Journal of Anxiety Disorders, 23*, 703–710.
- Figner, B., Mackinlay, R. J., Wilkening, F., & Weber, E. U. (2009). Affective and deliberative processes in risky choice: Age differences in risk taking in the Columbia Card Task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*, 709–730.
- Gilbert, K. E., Nolen-Hoeksema, S., & Gruber, J. (2013). Positive emotion dysregulation across mood disorders: How amplifying versus dampening predicts emotional reactivity and illness course. *Behaviour Research and Therapy, 51*, 736–741.
- Gillespie, S. M., Mitchell, I. J., Fisher, D., & Beech, A. R. (2012). Treating disturbed emotional regulation in sexual offenders: The potential applications of mindful self-regulation and controlled breathing techniques. *Aggression and Violent Behavior, 17*, 333–343.
- Giuliani, N. R., McRae, K., & Gross, J. J. (2008). The up- and down-regulation of amusement: Experiential, behavioral, and autonomic consequences. *Emotion, 8*, 714–719.
- Graham, C. A. (2010). The DSM diagnostic criteria for female sexual arousal disorder. *Archives of Sexual Behavior, 39*, 240–255.
- Gross, J. (2007). *Handbook of emotion regulation*. New York, NY: Guilford Press.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348–362.
- Hewig, J., Hagemann, D., Seifert, J., Gollwitzer, M., Naumann, E., & Bartussek, D. (2005). A revised film set for the induction of basic emotions. *Cognition and Emotion, 19*, 1095–1109.
- Hofmann, S. (2009). How to handle anxiety: The effects of reappraisal, acceptance, and suppression strategies on anxious arousal. *Behaviour Research and Therapy, 47*, 389–394.
- Jamieson, J. P., Mendes, W. B., & Nock, M. K. (2013). Improving acute stress responses: The power of re-appraisal. *Current Directions in Psychological Science, 22*, 51–56.
- Janssen, E. (2011). Sexual arousal in men: A review and conceptual analysis. *Hormones and Behavior, 59*, 708–716.
- Janssen, E., & Bancroft, J. (2007). The Dual-Control Model: The role of sexual inhibition & excitation in sexual arousal and behavior. In E. Janssen (Ed.), *The psychophysiology of sex* (pp. 197–222). Bloomington, IN: Indiana University Press.
- Koole, S. L. (2009). The psychology of emotion regulation: An integrative review. *Cognition and Emotion, 23*, 4–41.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2008). *International Affective Picture System (IAPS): Affective ratings of pictures and instruction manual* [Technical report A-8]. University of Florida, Gainesville, FL.
- Livingstone, K. M., & Srivastava, S. (2012). Up-regulating positive emotions in everyday life: strategies, individual differences, and associations with positive emotions and well-being. *Journal of Research in Personality, 46*, 504–516.
- Masters, W. H., & Johnson, V. E. (1966). *Human sexual response*. Boston, MA: Little, Brown.
- Messman-Moore, T. L., Walsh, K. L., & DiLillo, D. (2010). Emotion dysregulation and risky sexual behavior in revictimization. *Child Abuse and Neglect, 34*, 967–976.
- Murray, S. L. (2005). Regulating the risks of closeness: A relationship-specific sense of felt security. *Current Directions in Psychological Science, 14*, 74–78.
- Ochsner, K. N., Ray, R. D., Cooper, J. C., Robertson, E. R., Chopra, S., Gabrieli, J. D. E., & Gross, J. J. (2004). For better or for worse: Neural systems supporting the cognitive down- and up-regulation of negative emotion. *NeuroImage, 23*, 483–499.
- Olatunji, B. O., Arrindell, W. A., & Lohr, J. M. (2005). Can the sex differences in disgust sensitivity account for the sex differences in blood-injection-injury fears? *Personality and Individual Differences, 39*, 61–71.
- Richards, J. M., & Gross, J. J. (2000). Emotion regulation and memory: The cognitive costs of keeping one's cool. *Journal of Personality and Social Psychology, 79*, 410–424.
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review, 94*, 23–41.
- Rozin, P., Nemeroff, C., Horowitz, M., Gordon, B., & Voet, W. (1995). The borders of the self: Contamination sensitivity and potency of the body apertures and other body parts. *Journal of Research in Personality, 29*, 318–340.
- Smits, J. A. J., Telch, M. J., & Randall, P. K. (2002). An examination of the decline in fear and disgust during exposure-based treatment. *Behaviour Research and Therapy, 40*, 1243–1253.
- Sokol-Hessner, P., Hsu, M., Curley, N. G., Delgado, M. R., Camerer, C. F., & Phelps, E. A. (2008). Thinking like a trader selectively reduces individuals' loss aversion. *Proceedings of the National Academy of Sciences of the United States of America, 106*, 5035–5040.
- Stevenson, R. J., Case, T. I., & Oaten, M. J. (2011). Effect of self-reported sexual arousal on responses to sex-related and non-sex-related disgust cues. *Archives of Sexual Behavior, 40*, 79–85.

- Tettamanti, M., Rognoni, E., Cafiero, R., Costa, T., Galati, D., & Perani, D. (2012). Distinct pathways of neural coupling for different basic emotions. *NeuroImage*, *59*, 1804–1817.
- Tull, M. T., Weiss, N. H., Adams, C. E., & Gratz, K. L. (2012). The contribution of emotion regulation difficulties to risky sexual behavior within a sample of patients in residential substance abuse treatment. *Addictive Behaviors*, *37*, 1084–1092.
- van der Velde, J., & Everaerd, W. (2001). The relationship between involuntary pelvic floor muscle activity, muscle awareness, and experienced threat in women with and without vaginismus. *Behaviour Research and Therapy*, *39*, 395–408.
- van der Velde, J., Laan, E., & Everaerd, W. (2001). Vaginismus, a component of a general defensive reaction: An investigation of pelvic floor muscle activity during exposure to emotion-inducing film excerpts in women with and without vaginismus. *International Urogynecology Journal and Pelvic Floor Dysfunction*, *12*, 328–331.
- van Overveld, M., de Jong, P. J., & Peters, M. L. (2010). The Disgust Propensity and Sensitivity Scale–Revised: Its predictive value for avoidance behavior. *Personality and Individual Differences*, *49*, 706–711.
- van Overveld, M., de Jong, P. J., Peters, M. L., Cavanagh, K., & Davey, G. C. L. (2006). Disgust propensity and disgust sensitivity: Separate constructs that are differentially related to specific fears. *Personality and Individual Differences*, *41*, 1241–1252.
- van Overveld, M., de Jong, P. J., Peters, M. L., van Lankveld, J., Melles, R., & ter Kuile, M. M. (2012). The Sexual Disgust Questionnaire: A psychometric study and a first exploration in patients with sexual dysfunctions. *Journal of Sexual Medicine*, *10*, 396–407.
- Walter, M., BERPpohl, F., Schiltz, K., Tempelmann, C., Rotte, M., Heinze, H. J., . . . Northoff, G. (2008). Distinguishing specific sexual and general emotional effects in fMRI-subcortical and cortical arousal during erotic picture viewing. *Neuroimage*, *40*, 1482–1494.

Appendix

First Film Clip

Threat arousal conditions. In this experiment, you will view two emotion-inducing film clips. In this first film, you will see a woman chasing a serial killer through a house. After the movie, we will ask you several questions about the movie. For now, just watch the movie.

Sexual arousal conditions. In this experiment, you will view two emotion-inducing film clips. Both films are parts of a female-friendly erotic film. In this film, you will see a man and a woman kissing, undressing,

and performing sexual acts. After the movie, we will ask you several questions about the movie. For now, just watch the movie.

In this experiment, you will view two emotion-inducing film clips. Both films are parts of a female-friendly erotic film. In this film, you will see a man and a woman kissing, undressing and performing sexual acts. After the movie, we will ask you several questions about the movie. For now, just watch the movie.

Second Film Clip

Threat arousal—up-regulation. In the next movie, you will see a woman turn up at the house to babysit. She does not know that the residents have been murdered. The door of the house is open, and the woman enters. During this movie, we would like you to regulate your emotions in a specific direction. When you watch the movie, show your feelings during the film clip as much as you can. Any emotion you feel during the movie, try to feel it more strongly. *Amplify your feelings.* Try to do this during the entire film clip.

Threat arousal—nonregulation. In the next movie, you will see a woman turn up at the house to babysit. She does not know that the residents have been murdered. The door of the house is open, and the woman enters. Now, watch the second movie. Watch *naturally* during the entire film clip.

Sexual arousal—up-regulation. In the next movie, we will continue where you just stopped watching. However, we would like you to regulate your emotions in a specific direction. When you watch the movie, show your feelings during the film clip as much as you can. Any emotion you feel during the movie, try to feel it more strongly. *Amplify your feelings.* Try to do this during the entire film clip.

Sexual arousal—nonregulation. In the next movie, we will continue where you just stopped watching. Now, watch the second part of the movie. Watch *naturally* during the entire film clip.