



Sexual Disgust: Evolutionary Perspectives and Relationship to Female Sexual Function

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Abstract

Purpose of Review The aim of this review is to examine recent literature on the relationship between sexual disgust and aspects of female sexual functioning, with consideration of how an evolutionary perspective of this important emotion may help inform treatment and intervention programs.

Recent Findings Researchers have begun to link sexual disgust with sexual dysfunction in women. There is evidence to suggest that sexual disgust has an inhibitory effect on sexual arousal, and that it is involved in the development and maintenance of sexual pain disorders. While research has begun to investigate the influence of sexual disgust as it relates to female sexual arousal disorder and orgasm, the overall picture of whether or not sexual disgust facilitates sexual dysfunction in these areas is unclear. Understanding the evolutionary relevance of sexual disgust provides an important perspective for diagnosing and treating sexual dysfunction in women.

Summary Sexual disgust is an emotion that evolved to coordinate a solution to the adaptive problem of avoiding negative outcomes such as disease or selecting a suboptimal mate. Although this emotion within the normal range has an adaptive function, excessively high levels are hypothesized to lead to sexual dysfunction. Understanding individual differences in trait or state-based disgust might elucidate individual differences in susceptibility of sexual dysfunction and expedite the development of interventions targeted to help resolve impediments to healthy sexual functioning.

Keywords Sexual function/dysfunction · Sexual disgust · Sexual concerns · Disgust · Evolutionary psychology

Overview

During human evolutionary history, individuals were faced with the challenge of avoiding costly sexual mates or situations. As a result, it is hypothesized that the emotion of sexual disgust exists to aid in the evaluation of potential partners and sexual behaviors. However, excessively high levels of this emotion may lead to sexual dysfunction. Understanding an evolutionary perspective of this emotion and why it evolved may elucidate the etiology of sexual dysfunction in women

and help clinicians think more critically about why sexual dysfunction exists.

Introduction

Differential sexual reproduction is the driving force of natural selection in sexually reproducing species. Engaging in sex has many immediate benefits such as pleasure, emotional bonding, and obtaining economic goods [1]. Sex also carries a host of non-trivial risks such as damage to social reputation, unpropitious pregnancies, or exposure to sexually transmitted infections (STIs), pathogens, or contaminated bodily fluids [2, 3, 4, 5]. Because avoiding pathogens and successfully mating are both important in sexually reproducing species, the two are hypothesized to be intimately linked, and solving one problem may impede solving the other [6]. Understanding how pathogen avoidance relates to aspects of women's sexuality is therefore an important area of examination.

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The behavioral aspects of pathogen avoidance are largely driven by the psychological experience of disgust. Disgust is recognized as a basic human emotion [7]. It is hypothesized to be an evolved feature of the behavioral immune system, which functions to alleviate the metabolic costs of infection by reducing participation in situations that pose disease risks [8•, 9, 10, 11]. Evolutionary psychologists have begun to develop a functional framework of disgust by considering the relevant demands that our bodies and brains recurrently faced over our evolutionary history [12–19, 20•, 21]. Evolutionary accounts hypothesize that disgust evolved to solve or ameliorate three distinct adaptive problems: avoiding consumption or contact with infectious agents, avoiding risky sexual situations or contact with suboptimal partners, and avoiding the violation of social norms [22–25]. Sexual disgust is specifically hypothesized to activate the avoidance of potential mates or situations: if a potential mate or situation is biologically costly (e.g., the potential mate of interest has a sexually transmitted infection), then sexual disgust should be activated, and avoidance of sex should follow [5].

In addition to the multidimensionality of disgust, there are hypothesized state-or-trait-based variations in individual levels of disgust [14]. These conceptualizations reflect differences in disgust variation within and between individuals, respectively. State-based variation in disgust refers to the ability to modify levels of disgust according to one's current environment. For example, sexual disgust might become activated when there are immediate threats in one's environment such as being approached for mating by someone who is an obvious disease carrier. Conversely, trait-based variation in disgust reflects somewhat stable individual differences in levels of disgust that manifest through heightened or lowered disgust thresholds. For example, sexual disgust thresholds are higher for men, on average, than women; women are more easily disgusted by a range of potential sexual situations. These sex differences are large and robust, ranging in effect size from $d = 0.60$ to 1.54 [4•, 5, 26, 27•]. Having excessively high levels of trait-based sexual disgust might lead to sexual disorders at extreme levels [14] while excessively high levels of state-based sexual disgust might result in the inability to respond to sexual cues in a functional manner. Together, these impairments may result in deficits in sexual functioning if this emotion is activated at an inappropriate time [2, 11].

Deficits in sexual functioning, or female sexual dysfunction (FSD), is described in the *Diagnostic and Statistical Manual of Mental Disorders* as an individual's inability to respond to sexual stimuli or to experience sexual pleasure [28]. Sexual dysfunction is non-homogenous and can include problems with arousal, desire, orgasm, or sexual pain; see Meston and Stanton [29••] for prevalence rates of FSD. According to the DSM-5, this inability must be significantly distressing to the individual and must occur for at least 6 months to meet clinical diagnostic criteria. In addition to this

classification, and classifications of sexual dysfunction by modern diagnostic systems more broadly [30, 31], an evolutionary perspective of the adaptive function of sexual arousal, desire, and orgasm can shed light on how deficits in these areas may emerge [32, 33]. This may be particularly helpful for clinicians to bear in mind when helping patients understand the etiology of sexual concerns.

A group of researchers have begun to link sexual disgust with FSD, describing sexual dysfunction as an insufficient level of positive or adequate stimulation, or an abundance of disgust [6••]; however, this is a relatively new avenue of research. Experiencing disgust or aversive feelings toward sex is hypothesized to be an important factor in the etiology of sexual dysfunction in women [34]. In fact, in previous volumes of the DSM, there was a disorder called sexual aversion disorder. This disorder was defined as “persistent or recurrent extreme aversion to, and avoidance of, all or almost all, genital sexual contact with a sexual partner” [35]. The reasoning behind the removal of this disorder was the lack of empirical support and comorbidity of this disorder with other anxiety disorders [36]. Ironically, the definition of sexual aversion disorder encapsulates the hypothesized function of sexual disgust from an evolutionary perspective and has been linked to disgust in the past [4•, 34, 37]. Despite this disorder's removal, aversion or disgust toward sex still exists. Applying an evolutionary perspective of sexual disgust to women's sexuality might therefore prove fruitful in the development of a cogent theory of women's sexual dysfunction.

Sexual Disgust and Desire

de Jong, van Lankveld, Elgersma, and Borg [38] suggest that disgust impairs sexual responding by interfering with the first stages of the sexual response cycle: desire and arousal. Sexual interest refers to the desire or motivation to engage in sexual activity while sexual arousal refers to the mental and physical preparedness to engage in sexual activity [29]. Hypoactive sexual desire disorder (HSDD) and female sexual arousal disorder (FSAD) were considered separate constructs in the *DSM-IV-TR* [39] and reflected problems with desire and arousal, respectively. More recently, the two disorders were combined into female sexual interest/arousal disorder (FSIAD). FSIAD is defined by the DSM-5 as significantly reduced or absent sexual interest/arousal. In order to be diagnosed with FSIAD, individuals must have three out of six classifying symptoms and experience significant distress [29].

Because FSIAD is such a recent disorder in the DSM, research investigating the link between sexual disgust and FSIAD is lacking; however, preliminary evidence shows that women with FSIAD have higher ratings of disgust in response to erotic stimuli compared to women with no sexual concerns [40]. Further, higher levels of subjective disgust are associated

with greater recent sexual avoidance behaviors, reflecting the reinforcing relationship between sexual avoidance and maladaptive sexual behaviors in response to sexual cues [10, 40]. When separating FSIAD women according to disgust levels, women with a history of sexual victimization show the highest levels of disgust, indicating that perhaps sexual trauma is linked to disgust-induced avoidance behavior in these women [40, 41].

Sexual Disgust and Sexual Arousal

Although the DSM-5 classifies FSIAD as consisting of problems with both desire and arousal, Althof, Meston, Perelman, Handy, Kilimnik, and Stanton [42] argue that sexual desire and subjective sexual arousal are related but separate constructs. This is evident when considering that a person can desire sex but have problems becoming sexually aroused or can become sexually aroused and not desire sex [6•]. Sexual disgust might influence an individual's level of sexual desire and subjective sexual arousal independent of one another and thus researchers or clinicians investigating this association should be aware of this distinction.

Sexual arousal is a complex emotion that involves the coordination of different psychological, biological, emotional, and cognitive mechanisms [6•, 43]. Sexual arousal in women involves the psychological experience of feeling “turned on,” and a physiological response of genital blood engorgement and vaginal lubrication. For many women, arousal precedes desire rather than the reverse. As described by Basson [44], women do not experience spontaneous desire as frequently as do men, and oftentimes for women it is the beginning sensations of arousal that trigger desire and consequently lead women to engage in sex. The experience of sexual arousal—both psychological and physiological—may play a particularly important motivational role in women. Without the psychological and physiological constituents of sexual arousal, women might be deterred from engaging in sex due to the potential costs associated with sex, resulting in ultimately fewer of their genes being passed on to subsequent generations.

de Jong, van Overveld, and Borg [10] propose a model in which exposure to sexual stimuli elicits a response that triggers either sexual arousal or sexual disgust. In this model, the presence and positive valuation of sexual arousal is hypothesized to motivate individuals to approach sexual stimuli while downregulating the experience of negative emotions such as fear, anxiety, or disgust. In contrast, negative valuation of sexual stimuli leads to disgust, which motivates subsequent avoidance behaviors. They argue that sexual engagement is determined by the balance between these two systems: the induction of one seems to have a detrimental effect on the activation of the other. This conceptualization comports with, and complements, an evolutionary perspective of sexual disgust. The two emotions must therefore

compete in order to coordinate an efficient solution to the adaptive problem of successful sexual reproduction.

Early studies of this association provided evidence that feelings of disgust are negatively correlated with increases in arousal in men [45] and that women exposed to sexually arousing stimuli are less avoidant of both sex-related and non-sex-related disgusting stimuli [46]. More recent studies have found that inducing disgust leads to subsequent decreases in sexual arousal in both women and men [47, 48]. Research investigating the opposite relationship has found that increasing sexual arousal leads to decreases in levels of sexual disgust for both sexes [49]. Together, these studies provide evidence for the oppositional nature of this association.

Although this association appears quite robust, several studies provide mixed or null results. Zsok, Fleischman, Borg, and Morrison [50] tested the impact that sexual arousal has on disgust activation when individuals are presented with an attractive or unblemished potential mate. Women were asked to rate their disgust toward anticipated behaviors with photos of men that varied in attractiveness and amount of disease cues (i.e., blemishes). The study found that more disease cues and lower attractiveness significantly increased levels of sexual disgust; however, there was no effect of sexual arousal on decreasing disgust ratings. Zsok, Fleischman, Borg, and Morrison [50] conclude that this provides evidence for the salience of disease cues in selecting potential mates. The authors stated several ideas about why sexual arousal had no effect on disgust ratings in this study. First, because women have higher levels of disgust, on average, they argue that more arousal is necessary to deactivate disgust avoidance in women. This supports an evolutionary account of arousal as an emotion that hypothesizes that women need a higher level of stimulation in order to activate sexual arousal than do men [43]. Second, the authors [50] speculate that levels of arousal in this study were not sufficient enough to override the disgust that was activated by the photos of unattractive or blemished men. The authors [50] take this as supporting evidence of de Jong, van Overveld, and Borg's [10] model, arguing that for women, in order for the inhibitory effects of sexual arousal to work, levels of sexual arousal must outweigh levels of disgust.

To test the hypothesis that levels of arousal must outweigh disgust in order for this mechanism to work properly, van Overveld and Borg [51] conducted a study where participants were exposed to emotion regulation training in order to facilitate increases in arousal. The emotion regulation training successfully led to increases in arousal, but it did not decrease levels of disgust. The authors did, however, find evidence that participants who scored high on a measure assessing need for arousal had lower overall levels of sexual disgust. In a similar vein, Grauvogl, de Jong, Peters, Evers, van Overveld, and van Lankveld [52] found no association between trait-disgust, automatic sexual disgust responses, and arousability in a sample of women with no sexual concerns.

Despite slight disagreement between these studies, the majority of empirical evidence points to sexual disgust as having an inhibitory effect on sexual arousal. Having heightened levels of sexual disgust may lead to disruptions in the ability to become sexually aroused, which may lead to deleterious effects in sexual functioning over time [46, 53]. Further, women with abnormally high levels of sexual disgust might be at an increased risk for experiencing sexual dysfunction. The null findings of the association of sexual arousal and sexual disgust in more recent studies might indicate that this association is only true for women with sexual concerns and highlights the need for more research including women with and without sexual concerns.

Sexual Disgust and Sexual Pain

Most research investigating the relationship between sexual disgust and sexual dysfunction has focused on sexual disgust and pain disorders. Sexual pain is identified in the DSM-5 as genitopelvic pain penetration disorder (GPPPD) [28], although there is debate about how to best classify genital pain disorders because of their multidimensional nature [54–56]. GPPPD can be either lifelong or acquired and consists of significant distress and persistent problems with one or more of the following: (1) penetration during intercourse; (2) pelvic or vulvovaginal pain during intercourse or attempted penetration; (3) tensing or tightening of the pelvic floor muscles during attempted penetration; and (4) anxiety or fear about pelvic or vulvovaginal pain in anticipation of, during, or as a result of penetration. Genital pain is associated with lower sexual functioning and a variety of decreases in psychological well-being including aversion to sex, avoidance of penetration, and relationship deficits [54, 57]. Recently, researchers have begun to investigate the link between disgust and sexual pain, largely focusing on disgust as it relates to vaginismus and dyspareunia, which were separate disorders until being merged into GPPPD in the DSM-5.

Vaginismus refers to the inability to allow penetration into the vagina, despite the desire to do so, due to involuntary vaginal spasms; dyspareunia refers to pain experienced during sex [39]. Researchers have struggled with operationalizing the causes of vaginismus, citing sexual trauma or fear of pain with penetration as potential indicators of this disorder [58]; however, alone neither are necessary nor sufficient for determining who might suffer from this disorder. Researchers turned to disgust as a potential emotion in genital pain disorders because of its high comorbidity with fear. These researchers postulate that disgust might be driving the fear response, or that genital pain might be a result of a disgust-induced defense mechanism [59, 60].

It is hypothesized that women with GPPPD might have higher levels of disgust [47, 52, 59]. Researchers have begun

to investigate this by looking at contamination sensitivity and dispositional disgust's link with vaginismus [37, 61, 62]. de Jong et al. [61] measured disgust propensity and contamination sensitivity in women with vaginismus, dyspareunia, or with no sexual concerns. The study found that women with vaginismus had higher levels of dispositional disgust than women without vaginismus or other types of sexual dysfunction. Women with vaginismus were not, however, significantly more likely to engage in avoidance of sexual stimuli.

Borg et al. [59] examined automatic disgust associations in women with vaginismus, dyspareunia, or no sexual concerns using a single target Implicit Association Task and electromyography (EMG). They found that women with vaginismus and dyspareunia showed higher automatic disgust responses than women without sexual concerns. The study also found that women with vaginismus had higher levels of facial expressiveness and subjective ratings of disgust than women with dyspareunia. The authors argue that the experience of automatic disgust in sexual situations might be a defensive response that interferes with the generation of sexual arousal. Women with vaginismus specifically showed higher ratings of disgust on self-report data and EMG, implying that disgust may play an even bigger role for these women than those with general pain concerns.

Researchers also have postulated that learning mechanisms might be involved in the development of GPPPD [6•, 63, 64]. For example, the presentation of stimuli that has been followed with pain previously (e.g., a naked partner, foreplay, etc.) can become associated with pain over time, thus leading to aversive responses such as fear of sexual activity, negative emotional reactions, and the avoidance of sexual behavior. Borg and de Jong [6•] argue that for individuals who have learned such associations, it might be particularly difficult for them to overcome a negative emotional response, such as disgust, when exposed to sexual stimuli. Both et al. [63] tested this idea and found that pairing a pain stimulus with a sexual stimulus led to decreases in sexual arousal and increased negative feelings toward sexual stimuli in women with dyspareunia and women with no sexual concerns. Taken together, disgust seems to play an important role in the development and maintenance of sexual pain concerns; however, current research has only investigated disgust as it relates to vaginismus and dyspareunia as separate constructs. Future research should investigate how disgust is implemented in pain concerns subsumed by the new definition of GPPPD.

Sexual Disgust and Orgasm

To determine if disgust has a role in women's orgasmic function, researchers must establish if female orgasm serves an adaptive function or if it exists as a result of the selection pressure for male orgasm—which is reliably correlated with

ejaculation and is, on average, necessary for successful sexual reproduction [65–67]. Female orgasmic disorder (FOD) refers to difficulty (i.e., delay, reduced intensity, or infrequency) or an inability to reach orgasm during the majority of sexual encounters [28, 29••]. In order to be diagnosed with this disorder according to the DSM, women must exhibit extreme levels of distress and should have a lower orgasmic capacity than is expected for women of her age and sexual experience. An evolutionary perspective of FOD argues, however, that the DSM makes the regular occurrence of orgasms seem biologically “normal,” inadvertently labeling lack of an inability to experience orgasm during intercourse as “maladaptive” [31]. Regardless of the controversy as to the nature of female orgasm as an adaptation, understanding what makes orgasms difficult for women is important.

Researchers investigating sexual disgust and orgasmic function in women speculate that experiencing disgust may impair sexual arousal, which might then lead to deficits in orgasmic ability. Experiencing high levels of sexual disgust might not only impair women’s psychological capacities necessary for pleasurable sex, but it might be linked to deficits in women’s psychophysiological responses. Indeed, research suggests that high disgust sensitivity and propensity is predictive of orgasm difficulties among women [47]. For example, Grauvogl et al. [52] found that for women, trait disgust was negatively correlated with the orgasm and pain subscales of the Female Sexual Functioning Index (FSFI) [68], as well as the overall total score. McGahan [69] found that disgust sensitivity and propensity scores were negatively correlated with scores on the orgasm subscale of the FSFI, although this association was not significant after statistical corrections. Future research should focus on clarifying the association between sexual disgust and orgasm in women.

Implications for Treatment

The research reviewed above suggests that sexual disgust is related to deficits in sexual functioning, although the direction of causality cannot be determined, and third-variable causation cannot be eliminated. By experiencing disgust within sexual contexts, women may be paying less attention to sexual stimuli and cues present in the situation and focusing their attention elsewhere, resulting in a decrease in sexual responding and an inability to retain the excitatory stimulation necessary to reduce levels of disgust [10, 70]. It is therefore critical to directly target disgust when designing interventions for increasing women’s sexual functioning.

Several strategies for targeting disgust during treatment have been proposed [6••, 51, 54, 71]. First, clinicians should identify the root cause of the sexual dysfunction. Determining if there is a history of sexual trauma, for example, is particularly important in understanding the etiology of the disorder

[72]. If disgust is a driving factor behind the disorder, clinicians should consider (1) including contamination-related preoccupations to target exposure exercises aimed at reducing or neutralizing the disgust associated with sexual stimuli or body parts present in sexual encounters, (2) using emotion regulation training to teach patients how to increase levels of arousal and downregulate disgust experienced during exposure to sexual stimuli, and (3) using an integrated approach of exposure exercises and emotion regulation training to improve female sexual functioning. Research has also shown that prolonged exposure to disgusting stimuli encountered during sex is considered an effective strategy in unlearning disgust [73, 74]. By exposing patients to disgust using cognitive behavioral therapy (CBT) or homework assignments, clinicians might be able to overcome the tendency for dysfunctional individuals to avoid sexual situations and decrease the use of safety behaviors. Together, these proposed solutions may help neutralize disgust associated with sexual stimuli [71].

Conclusion

Theories about sexual dysfunction hypothesize that sexual functioning is partly a cognitive and informational processing mechanism, picking up on sexual cues and determining whether or not to become sexually engaged. This is similar to evolutionary psychology’s approach of the emotion of sexual disgust. Sexual disgust is hypothesized to be influenced by a variety of contextual factors such as mate availability, infectious disease cues, genetic relatedness, and the mate value of the self and potential mate. These factors are hypothesized to function as inputs into an information processing system that determines whether individuals should avoid or approach a potential mate [75]. Because disgust may lead to avoidance if an individual is not sufficiently aroused, understanding how sexual disgust regulates female sexual functioning is critical for the development of treatments and interventions targeted to help resolve sexual concerns [59].

Research has only begun to understand the association between sexual disgust and aspects of women’s sexual functioning. Most of the research that has been conducted has focused on inducing disgust (i.e., state-based disgust) rather than on an individual’s trait-based level of disgust. It is critical to understand the distinction between the two when conducting research or treating a patient with sexual concerns. High levels of trait-based sexual disgust may lead to sexual dysfunctions at the extreme because these individuals are disgusted irrespective of situational cues. Conversely, being unable to reliably respond to cues in one’s environment (i.e., state-based disgust) may result in the inability to become successfully sexually engaged. While both likely matter for sexual engagement, the interaction of the two may be detrimental if it leads to abnormally high levels of disgust. Working to reduce both

types of disgust is therefore critical in decreasing sexual worries in women. By using methods such as CBT or redirecting attentional focus, clinicians can target and increase the sexual arousal response, thereby neutralizing disgust to pave way for healthy sexual functioning.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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