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Review

The revolting body: Self-disgust as a key factor in anorexia nervosa

Klaske A. Glashouwer^{1,2} and Peter J. de Jona¹

Abstract

In this article, we present a theoretical model that points to disgust-induced avoidance as a mechanism that can help explain the persistent and excessive food restriction in individuals with anorexia nervosa (AN). Disgust is characterized by intense negative feelings of revulsion and an overwhelming and irresistible urge to avoid potential disgust elicitors. When eating, or even the prospect of eating, elicits overwhelming feelings of disgust in individuals with AN, this could explain why food restriction persists even when someone is in a state of starvation. Following this model, disgust is elicited by the expected impact of food on the own body ("becoming fat") resulting in body-related self-disgust. We argue that limiting food intake may serve to avoid self-disgust. This implies that when self-disgust remains unchanged after treatment of AN, residual levels of self-disgust after treatment could make individuals vulnerable to relapse.

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Keywords

Anorexia nervosa, Self-disgust, Theoretical model, Prolonged

When I eat ... I feel sick and guilty. . . . I feel that I'm filled up.

My body is filled. I just feel ... disgusting. I feel totally ... I feel that

the food invades everything. . . . It's a disgusting feeling of gluttony.

I feel so much better when I don't eat.

(Statement of individual with anorexia nervosa from Ref. [16])

Anorexia nervosa (AN) is a life-threatening eating disorder affecting around 1-4% of women during their lifetime (e.g., Ref. [27]). It involves a high psychological, social, and economic impact for patients, their family, as well as society in general (e.g. Ref. [48]). Almost half of individuals with AN do not improve after treatment, and even after initial successful treatment, the relapse rate is high [4,6,34,53]. One of the most distinct and disabling features of AN is excessive food restriction, resulting in significant weight loss [2]. A crucial, but so far unsolved, question is how do individuals with AN succeed in persisting with their rigorous restriction of food? How do they succeed in restricting their food intake where common dieters typically fail?

Many existing models stress the role of interpersonal difficulties in the onset and maintenance of AN, expressing itself in an increased sensitivity to interpersonal rejection and related emotions and cognitions, such as shame, guilt, social anxiety, and low self-esteem (e.g., Refs. [17,33,49]). Eating disorder behaviors are thought to function as a way to cope with these negative emotions and prevent the rejection of others. Also, food restriction is thought to be negatively reinforced by avoiding weight gain to prevent social judgments and rejection, the loss of the thin ideal and controlled behavior as important determinants of self-concept, and/or uncontrollable weight gain (cf., [35]). In addition, positive reinforcement such as receiving compliments and feelings of personal accomplishment might also contribute to the continuation of food restriction (e.g., Ref. [54]). Although such positive and negative reinforcers might indeed be involved in the onset of dieting, once individuals are in a state of starvation, the focus on food and the drive to eat become exceptionally strong (e.g., Ref. [28]). It is not directly evident, therefore, how the prospect of social rejection or selfconcept violation in the future could have such an impact that it opposes the strong biological urge to eat in the present, outside of social contexts, meal after meal. In an attempt to solve this critical puzzle, we present a theoretical model that takes a different perspective and focuses on disgust in the prospect of food intake, proposing that the power of disgust has the potential

to overrule the biological urge to eat and drive the restriction of food [46].

Avoiding aversive feelings of disgust

During the last two decades, several researchers have started to link disgust and disgust-related mechanisms to AN [13,18,23,32,50]. Disgust is such an intense aversive feeling that it not only results in a strong urge to escape situations that elicit disgust but also drives the avoidance of potential disgust elicitors to prevent future negative experiences [46]. Both escape and avoidance behaviors are negatively reinforced by the direct decrease or prevention of disgust. Moreover, once something has acquired disgusting properties, it becomes intrinsically revolting and difficult to change with rational arguments ("cognitive impenetrable"). This makes disgust highly robust to corrective information [39]. This critical feature of disgust makes sense considering its evolutionary role in preventing infection from pathogens that are omnipresent but invisible to the naked eye [38,51]. When it comes to life or death, it is "better to be safe than sorry". However, in the context of AN, this inherent power of disgust might have a paradoxical effect: when eating, or even the prospect of eating, elicits overwhelming feelings of disgust in individuals with AN, this could explain why food restriction persists even when someone is in a state of starvation. Although the idea that avoidance is an important factor in het maintenance of AN is not new, we propose that disgust as a driving force behind these behaviors could add to the understanding of the persistence of (food) restriction, and provide fresh starting points for treatment.

Origins of disgust in anorexia nervosa

Disgust not only has an important function in avoiding potential contaminants (pathogen disgust) to safeguard the physical integrity of the individual but also in avoiding socio-moral transgressions (moral disgust) as a means to maintain the integrity of the social group [47]. Moral transgressions elicit disgust [10] and also when individuals are asked to transgress their own internalized sociomoral rules, they were shown to experience feelings of disgust [44]. Such instances of moral disgust are thought to help individuals stay of the wrong track and prevent exclusion from the social group [51].

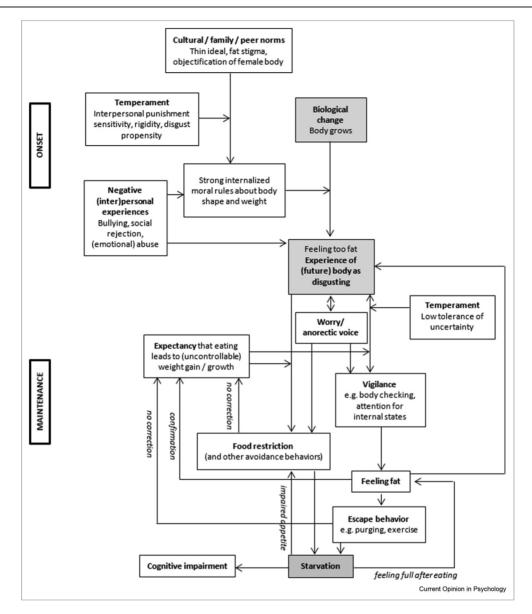
Rules about which physical characteristics are "good" and which are "bad" are omnipresent in our social environment. Under the influence of certain personality characteristics some people may strongly internalize these rules. Punishment sensitivity which has been consistently linked to AN (e.g., Ref. [21]) might contribute to stronger internalization of sociomoral rules which helps to prevent punishment such as interpersonal rejection [49]. Other personality characteristics associated with AN are rigidity and disgust propensity, that is, the tendency to experience disgust quickly [1]. Also, these characteristics might facilitate the detection and internalization of moral rules (e.g., Ref. [24]). The transgression of these rules by others or by oneself ("I am too fat") can result in disgust (cf [5]). So, when one's appearance does not match internalized moral rules regarding shape and weight, confrontation with the own body can elicit selfdisgust (cf [11,42]). Since adolescence is a period of great physical change and bodily growth, this helps explain why the onset of AN typically takes place during this developmental phase [25]. In addition, negative life events can contribute to the internalization of moral rules about weight and shape but also directly to self-disgust. In particular, negative interpersonal experiences such as bullying, social rejection, emotional neglect, or sexual abuse could lead to feelings of body-related self-disgust (cf [30]).

Self-disgust as the motor of food restriction

We recently developed a theoretical model incorporating key mechanisms of existing theories and described how body-related self-disgust can play a central role in the onset and maintenance of AN (see Figure 1; cf [19]). Individuals with AN typically engage in several avoidance behaviors, such as hiding their body in wide clothing, not touching their body, or taking a shower with the lights turned off [37]. Following this model, these avoidance behaviors might function as a way to decrease or prevent intense and overwhelming feelings of revulsion that are automatically elicited by the confrontation with their body. From this perspective, food restriction also serves the avoidance of self-disgust by preventing appalling changes in body size. The stronger the expectancy that eating food leads to an increase in shape/weight, the stronger the avoidance of food [31,52]. Via evaluative learning, food can even acquire disgust-eliciting properties itself and become intrinsically revolting (e.g., Ref. [14]). The core of this model is the assumption that the link between selfdisgust and food restriction over time can lead to starvation. Once in a state of starvation, biological processes arise that further contribute to the development of a vicious circle, such as decreased appetite and feelings of fullness after eating which can be interpreted as being too fat. Finally, starvation can lead to general cognitive impairment, such as slowed thinking, impaired shortterm memory, decreased cognitive flexibility, and concentration problems (e.g., Ref. [22]). As a result, reasoning becomes more difficult and rigid black-andwhite thinking increases.

In addition, vigilance toward potential rule violation is expected to increase, for example, by repeatedly checking the body after eating or by focusing on internal states that could indicate being or becoming fat [37].

Figure 1



Theoretical model with self-disgust as a key factor in anorexia nervosa.

These behaviors likely lower the threshold for someone to "feel fat". Feeling fat could then directly fuel selfdisgust feelings and might work as a confirmation of the expectation that eating leads to weight gain. In addition, feeling fat can lead to escape, for instance by purging or compulsive exercise. Such escape behaviors again prevent the occurrence of expectancy violating experiences and prevent the correction of the expectation if eating, then weight gain ("I did not gain weight, because I compensated after eating"). There is some empirical evidence that checking behaviors indeed are followed by an increase in negative emotions (e.g., Ref. [29]).

Finally, we incorporated two additional phenomena in the model that are often linked to AN. The first phenomenon is low tolerance of uncertainty [7]. Individuals who have difficulty tolerating uncertainty are expected to show a stronger urge to check their body to detect potential signals of rule violation. The second phenomenon is the so-called *anorectic voice* referring to critical self-talk in the form of comments on the own eating, weight, and shape and instructions to restrict or compensate (e.g., Ref. [43]). Self-disgust could strengthen the anorectic voice as well as rumination and both could "fire back" to self-disgust and fuel avoidance/ vigilance behaviors.

Empirical evidence

Despite some theoretical attention to disgust in AN, empirical evidence regarding self-disgust in individuals with AN is scarce. Individuals with AN reported repulsive intrusive imagery of their own body [26] and higher self-disgust on a questionnaire than individuals without an eating disorder [3]. Qualitative findings indicate that self-disgust is linked to avoidance behaviors in AN [8,16]. Individuals with AN reported that they try to avoid feelings of disgust by avoiding food- and bodyrelated situations [16], and that they are afraid of feeling disgusted or being perceived as disgusting by others when eating [8].

Future directions

Investigation of the proposed model starts with systematically testing the core assumption that bodyrelated self-disgust leads to food restriction. Individuals with and without AN could be compared in their body-related self-disgust not only using self-report measures, but also physiological/behavioral indices to gauge difficulties that participants may have in distinguishing between emotions and to avoid demand characteristics [36]. Importantly, it should be taken into account that many individuals with AN might be quite successful in avoiding feelings of self-disgust. In addition, when self-disgust is driven by the anticipated appalling consequences of food ingestion on weight and shape, exposure to the current body might not elicit disgust. Virtual reality provides a unique opportunity to expose patients with AN to healthy or even overweight versions of their body and compare their disgust responses to individuals without AN. In addition, it is important to establish whether self-disgust prospectively predicts food restriction in AN, for instance by testing whether self-disgust levels after treatment predict relapse.

To investigate whether self-disgust is indeed a critical causal factor in the persistence of food restriction in AN (and not for example fear or shame), it would be important to test whether the modification self-disgust leads to a decrease in food restriction. An important strategy to reduce disgust is prolonged exposure. Prolonged exposure is based on the notion that, in contrast to anxiety and fear (e.g., Ref. [12]), expectancies are not considered to play a prominent role in eliciting disgust. Instead, disgusting stimuli are considered to be inherently disgusting. Therefore, habituation instead of expectancy violation is the critical target of prolonged exposure as a procedure to reduce disgust [15,46]. For instance, individuals whose works such as cleaning toilets and cutting dead bodies force them to have close contact with disgust elicitors tend to become neutral toward these stimuli after repeated exposure (cf [45]). Because disgust is thought to be elicited by the expected impact of food on the own body ("becoming fat"), prolonged exposure to the own body seems to be a promising approach to stop food restriction via decreasing body-related self-disgust, in particular to body parts that most strongly elicit disgust. Again, virtual reality could be applied to expose patients with AN for a prolonged period to healthy or even overweight versions of their body (e.g., Refs. [40,41]). Although the actual impact of body exposure on self-disgust is still unknown, several studies have demonstrated positive effects of body exposure on body satisfaction in individuals with eating disorders (e.g., Ref. [20]).

The proposed model was specifically developed to address the critical question of how individuals with AN succeed in persisting with their rigorous restriction of food. Considering the great overlap between different eating disorder classifications [18] and the frequent diagnostic cross-over between disorders [9], this raises the question how disgust is involved in other eating and feeding disorders. The critical distinction between AN and bulimia nervosa (BN) is the weight level related to "success" in food restriction. It could be that in BN, the competition between the drive to eat and the drive to avoid self-disgust (often) results in favor of the drive to eat. One explanation could be that the drive to eat is still intact or simply stronger in individuals with BN than in individuals with AN which makes it difficult to keep dieting and leads to binge eating episodes. Self-disgust nevertheless might still fuel escape behaviors such as purging and exercise. Alternatively, it could be that selfdisgust levels are lower in BN than in AN, or have decreased over time due to exposure to a healthy body (e.g., in treatment). In addition, the relative importance of body shape/weight-related sociomoral rules as basis for self-evaluation might decrease as people age and could lead to a decrease in self-disgust. The latter would be in line with the observation that the onset of AN typically takes place in a younger age group than the onset of BN, and with the phenomenon that more individuals with AN develop BN than the other way around [9].

Conclusion

Current treatments for AN already address many relevant factors incorporated in the current model, which might explain their partial effectiveness. However, when selfdisgust indeed is a key factor in the maintenance of food restriction, residual levels of self-disgust after treatment could make individuals vulnerable to relapse. Because treatments currently do not specifically address self-disgust, this could explain why the effectiveness is often limited on the long term. Therefore, it seems worthwhile to investigate whether body-related selfdisgust indeed is a crucial treatment target for AN and whether reduction of self-disgust can further improve the effectiveness of current treatment approaches.

Conflict of interest statement

Nothing declared.

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