

Obesity Stigma Predicted More by Self-Body Image Than Disgust Sensitivity

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Abstract

Previous research found that increases in pathogen disgust were associated with increased obesity stigma. The nature and magnitude of these effects is however unclear, especially when compared alongside other relevant factors such as Body Mass Index (BMI) and self-body image. The aim of the study was therefore to investigate these issues using female university students (n=50), who completed the Three Domains of Disgust questionnaire, the Anti-fat Attitudes Scale, the self-body image (BSQ) questionnaire and had their Body Mass Index measured. Results revealed that both pathogen and sexual disgust predicted obesity stigma. Additionally, BMI and BSQ explained more of the variance than disgust sensitivity. These findings suggest that stigma toward overweight individuals is connected to both sexual and pathogen disgust, but that these effects are dwarfed by that of self-body image. This has important consequences in many settings, in aiding the reduction of anti-fat attitudes and prejudice towards obese and overweight individuals.

Keywords: Obesity; Disgust; Anti-Fat; Sexual; Pathogen; Body Image; BMI

Introduction

Obese individuals suffer from social disadvantages in many sectors of life, in education, employment, relationships, and healthcare [1]. The stigma towards the obese is unique in that anti-fat biases are held by both thin and overweight individuals [2].

Park and Schaller [3] identified the behavioral immune system as a factor in such issues as the stigmatization of the obese, individuals with non-infectious diseases, and xenophobia. The physical immune system evolved for the purpose of destroying pathogens, microorganisms, and infectious agents that have entered the body. Due to the physical limitations of the immune system and in combination with other selection pressures, the behavioral immune system evolved to prevent initial contact with infectious agents. This system detects cues in the environment which suggest the potential presence of pathogens, triggering behaviors to avoid these threats [4]. Pathogen disgust is elicited in situations which violate our expectations or

when in close proximity to infectious pathogens [5]. Risk of contagion and symptoms of parasitic infection manifest the emotion disgust. Disgust motivates an immediate avoidance response which engages higher cognitive mechanisms in order to compel wariness in future situations [6]. Due to the abundance of infections, pathogens, and parasites, and the plethora of symptoms displayed due to infection, superficial cues are relied upon for detection. However cues are imperfectly correlated with the actual presence of pathogens which can result in signal detection problems [3].

In order to reduce the frequency of rejecting real threats which incur greater costs, disgust is triggered in response to an over generalized set of stimuli [6]. This overgeneralization of stimuli pertaining to infection and therefore false positive identifications of non-infectious individuals has led to prejudice and stigmatization [3]. Individuals who feel more vulnerable from infection appear to have a behavioral immune system that produces more false positive identifications towards non-infectious situations or individuals; resulting in the increase of anti-fat attitudes [7].

The anti-fat attitudes were also increased after exposure to images of obese individuals, showing that observing a morphological deviation triggers the behavioral immune system.

Recent theories of disgust propose that three domains of disgust have developed to address three broad evolutionary imperatives: infections, reproduction, and morality [5]. The concept that disgust contains three separate modalities is supported by the brain imaging studies of Borg, Lieberman & Kiehl [8] who found that pathogen, sociomoral, and sexual related acts activate separate but overlapping neural networks. Previous research [3] has already linked pathogen disgust as a factor in anti-fat attitudes, however little investigation has been conducted on moral or sexual disgust. Sexual disgust evolved to avoid sexual behaviors or suboptimal sexual partners that could reduce fitness or reproductive success [9]. Successful reproduction is based on two main issues: finding an appropriate mate, and investing appropriately in the resulting offspring. Therefore choices regarding sexual and mating behaviors have carried high costs. High quality mating partners increase the chance of having a greater quantity or quality of offspring, therefore psychological mechanisms evolved to evaluate potential partners and motivate accordingly. Disgust is often exhibited in response to unwanted sexual advances or when imagining sexual relations with close relatives [5]. Sexually selected traits, including physical traits, may be an honest indicator of good genes, so are sought in the mate choice market. Chu, Hardaker and Lycett [10] identified traits that women seek in prospective mates: wealth and attractiveness and physical features include beards, height, a muscular build, symmetrical faces, and a healthy Body Mass Index (BMI) [11]. The traits that males seek in prospective mates are youth and attractiveness [12]. Tovee, Maidey, Emery and Cornelissen [13] found that Body Mass Index was the primary determinant of female attractiveness, possibly due to its correlation with both health and fertility. Therefore, the view of an overweight partner as unsuitable may associate sexual disgust with anti-fat attitudes. As a normal BMI is preferred by both males and females, sexual disgust may be cued towards overweight or obese individuals.

Moral Disgust evolved to aid avoidance of individuals who may inflict social costs on the group or upon the individual [5]. In ancestral populations, acts such as stealing, lying, murder, and cuckolding carry great costs so selection pressures would have acted towards developing a mechanism to reduce such activities [12]. Disgust has been argued to be the emotion that underpins judgements concerning morality, an impairment in which may cause psychopathic behaviors [8]. Due to the triggering of moral disgust towards social loafers and the belief of obese individuals as lazy and unsuccessful, [14] moral disgust may be cued towards overweight individuals.

The function of disgust within the evolutionary paradigm is not the only factor influencing anti-fat bias. A desire for thinness in

women has developed within current society [15]. In past decades the 'thin ideal' has taken hold in Industrialized societies, when as recently as the Victorian era, works of art displayed average sized women [16]. The internalization of this ideal has occurred through social reinforcement via peers and the media [17]. The thinness ideal is further reinforced by the notion that being thin leads to social rewards [18]. Research has shown that even short term exposure to media images of thin individuals, leads to increased body dissatisfaction [19]. It is the extent to which these ideals are internalized that mediates the relationship between exposure and decreased esteem [19]. Internalization of the belief in the thin ideal also mediates explicit anti-fat attitudes. Individuals who have low self-esteem may increase their esteem by derogating others, usually those in stigmatized groups [20]. Via upwards comparisons, vulnerable individuals will suffer from decreases in self-esteem [21] and therefore may behave negatively towards stereotyped individuals, such as the obese, to enhance their own esteem [20]. The thin ideal may result in negative attitudes towards overweight individuals. Vartanian, et al. [22] demonstrate that due to the permeation of the thin ideal throughout society, anti-fat attitudes have become widespread. Levels of low body esteem due to internalized social ideals of body size may lead to the use of downward comparisons to bolster esteem [23]. As overweight individuals are both a stigmatized group and hold an unwanted status, anti-fat attitudes may be exhibited by those who have low body esteem. Many measures have been developed to measure body esteem. In this research a shortened form of the Body Shape Questionnaire, 16-a, will be utilized [24]. The BSQ is a measure of body shape preoccupations, therefore of body esteem, typically found in body dysmorphic disorders, such as bulimia nervosa and anorexia nervosa. The BSQ has been widely used in both clinical and non-clinical settings with both males and females. The negative view of fatness in society is a factor predicting anti-fat prejudice [25]. Coupled with internalized views of the ideal body [22] which may result in anti-fat attitudes in both men and women.

Weight is intricately associated with body dissatisfaction. It is suggested that as BMI increases so does the likelihood of experiencing body dissatisfaction [26]. It has been found that exposure to overweight images increases body dissatisfaction in overweight females (Dalley, Buunk & Umit, [27]. Overweight individuals relate more to overweight images and focus on negative aspects of the model, further reducing body esteem [27]. It has been shown that even individuals with high BMIs hold anti-fat attitudes, although they were less potent than those of normal weight individuals [28]. However it was also demonstrated that overweight individuals would choose handicaps or infertility as preferable to being obese, [29], which show extraordinarily negative views of being overweight.

The aims of this study have been developed through investigation into existing factors towards anti-fat attitudes and previously unidentified factors. It is predicted that pathogen

and sexual disgust sensitivity would positively correlate with anti-fat attitudes. Correlations between moral disgust and obesity stigma will be investigated. The thin ideals of women and men respectively, may foster anti-fat attitudes; therefore a significant positive association between body esteem, measured via the BSQ-16a, and anti-fat attitudes is predicted. Due to the correlation between body esteem and BMI, a negative association is predicted between BMI and anti-fat attitudes.

Materials and Methods

Participants

Fifty female university students participated in the study for course credit and were aged between 18 and 22 years ($M = 18.9$ years, $SD = 1.0$ years; Sample characteristics shown in Table 1). An online booking system was used to advertise the study. The study protocol was given ethical approval from the department's ethics committee (British Psychology Society guidelines).

Table 1. Mean (SE) Participant Characteristics

	M	SE
Age	18.90	0.14
Body Mass Index (BMI)	23.13	0.50
Body Shape Questionnaire(BSQ)	50.48.	2.73
Anti-Fat Attitude (Total)	29.80	1.21
TDD*-Pathogen Disgust	26.90	0.94
TDD-Sexual Disgust	22.30	1.13
TDD-Moral Disgust	27.00	1.21

*Three Domains of Disgust questionnaire

Design

A correlational design was utilized for this study with the variables being anti-fat attitudes, sexual disgust sensitivity, pathogen disgust sensitivity, moral disgust sensitivity, age, BMI, and body esteem. Participants completed the questionnaires in a counterbalanced order.

Materials

Anti-fat Attitudes Scale.

Anti-fat attitudes were measured using the modified version of the Anti-fat Attitudes Scale, originally created by Morrison and O'Connor [30]. The modified version was developed with the addition of positively worded statements

regarding overweight individuals to the scale by Wrench and Knapp [31].

The scale consists of 24 items comprised of two factors: antipathy towards overweight people and dislike of overweight people. Antipathy towards fat individuals was measured by the Anti-Fat Attitudes Scale consisting of 10 items (AFAS; Wrench & Knapp [31]; $\alpha = .85$). Aversion towards fat people was measured by the Dislike of Fat People Subscale consisting of 14 items (DFPS; Wrench & Knapp [31]; $\alpha = .86$). The scale consists of statements concerning overweight individuals, and personal agreement with the statement is measured on a 5 point Likert scale with responses ranging from (1) 'Strongly Disagree' to (5) 'Strongly Agree'. The anti-fat attitudes scale encompasses both the AFAS and DFPS.

Three Domains of Disgust Sensitivity

Disgust sensitivity was measured using the Three Domains of Disgust (TDD) sensitivity scale (Tybur, et al [5]; $\alpha = .81$) encompassing moral, sexual, and pathogen disgust sensitivity. The scale consists of 21 items, with 7 items concerning each modality of disgust. Participants made their rating using likert scales ranging from 0- 'not at all disgusting' to 6- 'extremely disgusting'.

Body Esteem

Body esteem was measured using the shortened form of the Body Shape Questionnaire, the Body Shape Questionnaire-16a [24]. Participants rated statements on how frequently they had experienced the noted state in the previous four weeks, from 'Never' to 'Always'. An example question being: 'Has feeling bored made you brood about your shape?' The questionnaire was used with the approved changes to allow the BSQ-16a to be used on men. Higher scores in this questionnaire indicate a greater preoccupation with body shape.

Procedure

Participants were tested individually at the University's department of psychology. Upon arrival, participants provided informed consent and then completed the questionnaire online. They then completed the TDD scale and BSQ-16a with half of the participants completing the TDD followed by the BSQ-16a with the remainder completing the questionnaires in the reverse order. The combined anti-fat attitudes scale was completed as the last questionnaire for each participant so that weight issues were not immediately salient. Once the questionnaires were completed, participants were then led to a separate room where height and weight measurements were taken to calculate their BMI. The participants were then given a full debriefing.

Data Analysis

Data were analyzed using the IBM software: Statistical Package for Social Sciences (SPSS) version 22. The anti-fat data were analysed using hierarchical linear regression with the predictor variables of age, BMI, BSQ and the three domains of disgust (Pathogen, Sexual and Moral). The order that these variables were entered was the same as previous research [32].

**Results
BMI/BSQ**

Analyses revealed that both BMI and BSQ predicted anti-fat attitudes but in different directions (Table 2). Consistent with our predictions, increases in BSQ were associated with increases in anti-fat bias whilst increases in BMI were associated with decreases in anti-fat bias. Since BMI was only significant when BSQ was also included in the model, we also entered the interaction (BMI x BSQ) in the final model which revealed a significant effect (Table 2); and a separate correlation confirmed these two variables were correlated with each other, $r(50) = .54, p < .001$. To examine this interaction further, we completed a median split of the BSQ data and completed separate correlations between BMI and anti-fat attitudes. The correlation was significant for the High-BSQ, $r(23) = -.51, p = .01$, but not the Low-BSQ group, $r(27) = .06, p = .75$. This suggests that BMI predicts anti-fat attitude only at the higher end of the BSQ range.

Table 2. Hierarchical Regression Analysis for Variables Predicting Anti-Fat Attitudes (N=50)

Variable	Standardized (beta) coefficients	S.E.	t-value
<i>Model 1</i>			
Age	.56	2.06	4.79***
Body Mass Index (BMI)	-.24	0.57	-2.06*
<i>Model 2</i>			
Age	.24	2.22	1.90
Body Mass Index (BMI)	-.55	0.61	-4.43***
Body Shape Questionnaire (BSQ)	.63	0.13	4.22***
<i>Model 3</i>			
Age	.20	2.05	1.71
Body Mass Index (BMI)	-.52	0.55	-4.59***
Body Shape Questionnaire (BSQ)	.68	0.12	5.03***
Pathogen Disgust	.21	0.25	2.19*
Sexual Disgust	.25	0.21	2.60**
Moral Disgust	-.13	0.19	-1.40
<i>Model 4</i>			
Age	.14	1.92	1.29
Body Mass Index (BMI)	.22	1.32	0.82
Body Shape Questionnaire (BSQ)	2.18	0.47	4.19***
Pathogen Disgust	.16	0.23	1.79
Sexual Disgust	.25	0.19	2.83**
Moral Disgust	-.11	0.18	-1.25
BMI x BSQ	-1.99	0.02	-2.96**

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$

Disgust Sensitivity

Consistent with prediction, anti-fat attitudes were predicted by sexual, pathogen but not moral disgust, (Table 2), where increases in these variables resulted in greater anti-fat bias.

Magnitude of Effects

The corresponding data on the contribution of each model (Table 3) demonstrates that although each model increases the predictive utility, the inclusion of BMI and BSQ (Model 2, R^2 Change = .18, $p < .001$) has a far greater effect than do the disgust measures (Model 3, R^2 Change = .12, $p < .01$).

Table 3. Summary of Hierarchical Regression Models

Model	Adj R ²	R ² Change	F-Change
Model 1	.33	.35	12.89***
Model 2	.50	.18	17.81***
Model 3	.60	.12	4.78**
Model 4	.66	.06	8.79**

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$

Discussion

The main findings of the study were that pathogen disgust predicted stigma toward overweight individuals, which is consistent with prediction and previous work [7, 31]. The findings of this study indicate that individuals who have high pathogen disgust sensitivity also have chronic anti-fat attitudes independent of pathogen vulnerability or exposure to obese images. The behavioral immune system detects superficial cues that suggest the presence of infectious organisms in the environment, eliciting disgust to trigger pathogen avoidance mechanisms [14]. A detection system that relies on superficial environmental cues is inherently beset with errors. These errors manifest as false positives, where disgust may be elicited towards an over generalized set of stimuli that do not warrant such responses [6]. Obese individuals and out-group members have previously been identified as elicitors of this over generalized disgust response [7,33]. Consequently, individuals with high pathogen disgust sensitivity may have a more error prone behavioral immune system, responding with greater intensity towards environmental cues, resulting in higher anti-fat attitudes,

The present study has further revealed that sexual disgust also predicts anti-fat attitudes. Theoretically, disgust towards sexual abhorrent behaviors (e.g. incest) is said to be an adaptation to reduce costly behaviors and suboptimal sexual unions that may reduce fitness [5]. Due to this selection pressure, a mechanism to reduce suboptimal mating behaviors would be highly adaptive, evolving in the form of sexual disgust. Additionally, the physical features in prospective mates are a highly influential variable for mate choice and hence an individual with an unhealthy BMI may be viewed as a suboptimal partner; a sexual advance from whom would possibly elicit sexual disgust [5]. The correlation and contribution of sexual disgust to anti-fat attitudes may be explained through a disgust response towards obese individuals if perceived as a suboptimal partner or due to associations with morphologically deviant diseases [32]. Chen and Brown [34] found that when ranking potential sexual partners, an obese individual is the least-preferred partner type. Weight biases towards romantic partners, especially women, have been documented, with individuals preferring a previous drug user to an obese individual [35]. Another explanation for the significant contribution of sexual disgust sensitivity to anti-fat attitudes may be the stereotype of obese individuals being lazy [35]. Investment in human offspring, in both time and resources, is required for the infant's survival. Therefore a mate who could provide well for future offspring would be preferred [12]. The stereotype of obese individuals as lazy, unmotivated, and less competent is widespread [14]. This stereotype may impact on the suitability of an obese or overweight individual as a prospective mate. The findings in the present study are in contrast to that of Lieberman, et al. [32] where increases in sexual disgust predicted lower obesity stigma. These divergent findings could be explained by the fact that in our study the TDD was always completed before the Anti-fat attitude questionnaire, but in the previous study were completed in the reverse order, which could suggest an order effect. Interestingly, in their pre-study, those authors did find strong evidence for a link between sexual disgust and obesity when it was phrased in a single question and in fact stronger than either pathogen or moral disgust. Since the findings from our study are consistent with their pre-study and also appear more logical given wider disgust theory, it seems feasible that an order effect may well explain the observed differences.

Moral disgust sensitivity was not correlated with anti-fat attitudes and did not significantly contribute to variance in anti-fat attitudes. This may suggest that obesity is not an issue warranting a significant moral disgust response. Stereotypically, obese and overweight individuals are viewed as lazy, less competent, and less intelligent than normal weight individuals [14]. Although obese individuals are deemed to contribute less to society, widespread obesity is a recent aspect of society [32]. Therefore avoidance due to moral deviancy may not be an issue concerning obese individuals.

The correlation between BSQ score, measuring body esteem,

had the highest significant correlation with anti-fat attitudes and also contributed the highest level of variance. The observed links between body dissatisfaction and low body esteem may explain the body esteem correlation with anti-fat attitudes.

Hence, a relationship between body dissatisfaction and self-esteem has been found in both men and women, with increasing dissatisfaction leading to decreased self-esteem [15]. Further, that negative attitudes towards overweight individuals have been shown to be associated with lower self-esteem in women [36]. It seems plausible then, that the observed correlations in the present study are a result of downward comparisons with perceived inferior (obese) individuals, in order to enhance self-esteem, as shown in other work [23]. However, an alternative theory is that throughout society, thinness is seen as the ideal [37] whilst obesity is viewed highly negatively [23]. Individuals with low body esteem are highly preoccupied with the thin ideal and also with weight loss [15]. The correlation between anti-fat attitudes and body esteem may have resulted from the thin ideal and consequent obese inferior social preoccupation. Further investigation could be made to ascertain if either of the posited theories may explain the observed correlations.

In terms of BMI, we found that increases in BMI were associated with reductions in obesity stigma, which is consistent with previous research [32]. However, we have further learned from the work here that this pattern is mediated by how individuals view their own body image; so, it is only at the higher end of negative self-body image range do we see a pattern of BMI predicting lower obesity stigma. Since both BSQ and BMI correlate strongly, this suggests that there is a threshold of these two measures, below which they do not predict obesity stigma, but above this threshold, significant associations are seen. Interestingly, past research has shown that, unlike many stereotypes, there is no in-group favoritism between overweight and obese individuals [28]. Work has also reported that obese individuals would prefer to be normal weight, even with major handicaps than continue being overweight [29]. However it has been found that, although obese individuals hold anti-fat biases, their explicit and implicit anti-fat bias is less than those of normal weight individuals [28]. The current findings that anti-fat attitudes decrease as weight increases are in agreement with that work.

In light of the results, methodological considerations must be made. The study only investigated the influence of evolutionary disgust domains on one norm target group: overweight and obese individuals. For further confirmation of the influence of sexual and pathogen disgust, other stigmatized groups should be investigated to ascertain the generalizability of the findings.

In summary it was found that both sexual and pathogen disgust sensitivity contributed towards anti-fat attitudes. These ef-

fects, though theoretically important are substantially smaller than those of body image and BMI. This novel finding suggests that an individual's disgust sensitivity impacts upon their attitudes, in this case towards the obese. BMI, body esteem, and age also correlate with levels of anti-fat attitudes and contribute towards its variance.

The stigma of obesity affects individuals in all avenues of their lives, resulting in disadvantages in employment and social contact [1]. The findings of this study could be utilized in an effort to reduce the stigma associated with obese individuals.

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