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Explicit Weight Biases are Curvilinear: Testing Pathogen Avoidance, Intergroup Relations and Socialization Theories

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Honors Thesis
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The present study builds on research (Malloy et al. 2011) that weight bias is best fit by a curvilinear function, that is; trait judgments should vary significantly as a function of weight. More weight bias should be elicited by those body types at extreme weights (i.e., skeletally thin and morbidly obese). Targets at such extreme weights were included to adequately test a new theoretical model of weight bias termed the Pathogen Avoidance Theory. Other theories of weight bias were also considered; Socialization and Intergroup Relations. Participants were presented with six female body types varying in weight and were then asked to rate them on 24 trait judgments. The results were best explained by the Pathogen Avoidance Theory which emphasizes the importance of evolution in regard to weight bias. As the target’s weight increased, judgments were profoundly more negative; correspondingly, as the target’s weight decreased, the perceiver’s judgments were just as negative as well. Skeletally thin and morbidly obese bodies vastly deviate from the average body type, as a result, social rejection and avoidance of these targets is exhibited. Thus, the data confirm the hypothesis that weight bias is indeed curvilinear. This study offers an indication of bias against those at extreme weights (skeletally thin and morbidly obese). Moreover, this study offers important insight on social behavior displayed towards body types that strongly deviate from the average.
Explicit Weight Biases are Curvilinear: Testing Pathogen Avoidance, Intergroup Relations and Socialization Theories

Physical appearance is a basic dimension people use to evaluate one another. Social norms are represented in media portrayals of attractive, physically fit men and women. Weight is a discernible stimulus that affects the way people are perceived. The media depicts thin individuals positively and overweight individuals negatively. This response of intolerance or prejudice against those who are overweight may be the result of what is reinforced in our culture (Weisbuch & Ambady, 2009).

Weisbuch and Ambady (2009) found that the behaviors of television characters reflected the weight of the women with whom they were interacting. Thin female characters received positive responses from other characters. They also concluded that people are frequently exposed to this bias because television is so popular. Hence, thin is widely portrayed as the ideal through different forms of media, with images of women who are often “visibly under-weight” not just thin (Ahern, Bennet, & Hetherington, 2008). This presumed idealization of thin bodies, however, may not actually characterize what is in the minds of people generally.

Evidence of Weight Bias

There is significant bias (i.e., negative stereotypes and discrimination) towards overweight individuals. Different forms of discrimination are evident in school, work and health care (Puhl & Heuer, 2009; Roehling, Roehling, & Pichler, 2007; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). Weight bias occurs when there is a target with the associated devalued features (overweight) and a perceiver exhibiting the bias. Bell & Morgan (2000) found weight bias to have profound negative effects on the overweight individuals. Heavier youths were more likely to experience social exclusion from their peers as well as being targets of
bullying. They were viewed as less likable and desirable by their peers. In addition, they were more likely to be described as dishonest, lazy, stupid and ugly (Pearce, Boergers & Prinstein, 2002). Consequently, they were more likely to have poor self-esteem and report depressive symptoms. Overall, they suffer psychologically, socially and emotionally, (Bell & Morgan, 2000).

Weight bias towards individuals has harmful effects in regards to their self-worth and success. “With 54% of the U.S. population now overweight and 34% obese and the prevalence still increasing in the U.S. and around the world, the health and well-being of many millions of people might be affected ” (Puhl & Brownell, 2001; p. 788). The health risks associated with overweight- obese individuals includes high blood pressure, diabetes, high cholesterol, asthma, arthritis and poor overall health (Bales et al., 2001).

Obese patients were viewed as unintelligent, unsuccessful, inactive, and weak willed by physicians and clerks from a medical clinic (Puhl & Brownell, 2001). Using a self-report study, 16% of obese adults stated that they faced discrimination due to their weight, resulting in difficulties socially and at work. Weight bias can also have an adverse impact on individuals in college and employment. There have been reports of students receiving negative evaluations in education and even dismissal, due to their weight.

Jasper and Klassen (1990) had participants evaluate a hypothetical employee’s resume that included a written manipulation of their weight. Despite the other information on the resume, participants formed a negative impression of the employee on the basis of their weight. Participants admitted that obesity led to their negative judgments. This study reveals the disadvantage and bias that overweight individuals face in different social institutions.

**Theories of Weight Bias**
Socialization Theory. There has been past research conducted on the social and cultural factors that create an idealized and attractive body image in society. From a social perspective, weight bias may be shaped by culture (Weisbuch & Ambady, 2009). Socialization Theory predicts that the larger one’s frame, the more weight bias that will be displayed, and those attitudes toward weight are learned in the social context. Thus, Socialization Theory predicts positive responses to thin bodies and negative responses to larger bodies; that is, weight bias should be linear- as weight increases judgments are more negative, and as weight decreases judgments are more positive. This theory also suggests that there are cultural differences in regard to weight.

Intergroup Relations Theory. Research has revealed that there is both implicit, as well as explicit discrimination and bias against individuals who deviate from the norms represented by our culture (Malloy, Lewis, Kinney, & Murphy, 2011). These individuals may be members of a particular minority group, physically handicapped, or mentally ill. Because weight is a normally distributed variable in the general population, most people are similar in weight to the average weight in the population. Average weight individuals may be considered an “in-group” while thin and heavy people are an “out-group”. Intergroup Relations Theory predicts that judgments of in-group members will be more positive than judgments of out-group members (Tajfel & Turner, 1979).

Relative to average weight people, individuals who are overweight are considered to be members of an out-group and are judged negatively. Similarly, thin individuals are also members of an out-group relative to the average, and should also be considered an out-group and judged negatively. Consequently, Intergroup Relations Theory predicts curvilinear judgments of targets as a function of weight and differs from the socialization theory that predicts a linear
function. Intergroup Relations Theory predicts that as the target’s weight increases, the perceiver’s judgment should become more negative; similarly when a target’s weight decreases, the perceiver’s judgments should be more negative as well.

In one study, it was found that the degree of anti-fat biases was weaker amongst individuals with higher BMIs (Body Mass Index) compared with those with lower BMIs. Thus, the overweight showed less bias towards those who were also overweight. Those who were members of the overweight group judged other overweight people less negatively. This finding was consistent with the prediction of Intergroup Relations Theory (Shwartz, Vartanain, Nosek, & Brownell, 2006).

In contrast to the abundant work on overweight bias, there has been little attention to bias against thin people. However, a study by Brylinsky and Moore (1994) suggested that thin individuals who deviate below the average weight are also considered to be members of an out-group. This study involved students Kindergarten through fourth grade who were presented “thin”, “average” and “chubby” drawings of people. In addition to the expected bias against those who were “chubby” or overweight, a bias against those who were underweight or “thin” became apparent as well. Students attributed negative qualities to those targets that were “thin” as well as positive qualities. Hence, there was a blend of both positive and negative traits attributed to the “thin” targets. Malloy et al. (2011) have reported a similar finding; their judgments of targets of varying weight were best fit by a curvilinear function showing bias against thin and overweight targets.

This is a counter-intuitive and rather complicated finding because society almost forces us to believe that “thin” is the ideal. Advertisements and other forms of media convey that thin is attractive and “good” (Weisbuch & Ambady, 2009). However, the present study attempts to
build on the past research that finds curvilinear judgments of targets as a function of weight (i.e., thin and heavy targets are judged more negatively than average weight targets). Moreover, this study introduces a new intriguing theoretical model of weight bias that was discussed in a recent study (Malloy et al., 2011). In this study, curvilinear weight bias was displayed by both men and women; the gender of the perceiver and the target does not make much of a difference on judgments. However, there was an absence of weight bias when men judged women, and this was interpreted as conscious inhibition of explicit bias of targets whose frames were not too extreme from the average. While the Intergroup Relations Theory predicts the curvilinear pattern of ratings, such a pattern is also predicted by a new theory termed Pathogen Avoidance Theory.

**Pathogen Avoidance Theory.** Kurzban & Leary (2001) emphasized the importance of evolution in regards to stigmatization; humans avoid members of different groups as a means of survival and adaptation. Features of any type that deviate from the average may serve as a signal that activates a brain mechanism that has evolved to avoid infection or harm (Kurzban & Leary 2001). Hence, stigmatization is a process against those members of an out-group that operates for survival purposes. The process of stigmatization involves the avoidance and exclusion of out-group members from social interaction as a survival mechanism.

In a recent literature review, Oaten, Stevenson, and Case (2009) evaluated the relationship between disease avoidance and disgust. They showed that the feeling of disgust serves as a disease-avoidance system in humans and elicits threat. “A defensive system designed to identify and activate avoidant behaviors to such cues would confer a significant fitness advantage” (Oaten, Stevenson & Case, 2009; p. 304). The ability to detect and avoid infection would allow the organism to mate and reproduce a healthy offspring. There is also
evidence of prejudicial reactions towards individuals who do not carry pathogens, such as avoidance and/or social exclusion. Typically these individuals are physically handicapped, disfigured or obese. Thus, disgust can serve as a signal detection error, as well as operating in a situation where there isn’t any real threat or danger (a false positive).

Pathogen Avoidance Theory, like Intergroup Relations Theory, also suggests an alternative theory to The Socialization Theory of weight bias. It predicts that there is a pathogen avoidance mechanism as the origin of weight bias that operates to avoid stimuli that may cause infection. “In response to the threat of communicable pathogens many animal species have evolved immune systems that detect and destroy pathogens when they enter the body” (Park, Schaller, & Crandall, 2007; p. 410). According to this theory, there are evolved brain mechanisms that allow us to detect and avoid infectious stimuli. This mechanism may over generalize, however, to those with body types that differ from the average. An obese and a skeletally thin frame could therefore serve as a sign of infection.

Pathogen Avoidance Theory predicts that those who are heavy, morbidly obese, and skeletally thin have frames that activate an evolved mechanism to avoid those who are different (out-group members) because they may carry pathogens (Hart, 1990; Park, Schaller, & Crandall, 2007). It also predicts that weight bias will be curvilinear. As the target’s weight increases, the perceiver’s judgment should become more negative; similarly, when a target’s weight decreases the perceiver’s judgments should be more negative as well.

Hypotheses

Socialization Theory predicts that weight bias will be negatively linear- as weight increases, judgments will be more negative. Intergroup Relations Theory predicts that weight bias will be curvilinear- as weight increases, judgments will be more negative; when weight
decreases, judgments will be more negative as well. Pathogen Avoidance Theory and Intergroup Relations Theory both predict a curvilinear hypothesis. Weight bias should be curvilinear when viewing targets at extreme ends of the weight distribution (skeletally thin and morbidly obese) in comparison to average weight frames. This is the primary hypothesis of this study, weight bias will be curvilinear. A secondary hypothesis is that the gender of the perceiver should not make a difference in regard to weight bias. Weight bias should be curvilinear regardless of the gender of the perceiver or the target (Malloy et al., 2011).

This hypothesis was revised from both male and female targets to solely female targets. This change occurred due to a number of factors. Obtaining the necessary software to produce such extreme images of both males and females (skeletally thin to morbidly obese) was not possible. Software used in prior research (My Virtual Model) was not able to produce such extreme images (Malloy et al., 2011). In an effort to compensate for ineffectual software, an artist was contacted; however he was unable to produce body images with specific BMIs. Thus, 13 female images were obtained from the internet. These images were then ranked from lightest to heaviest by 28 undergraduate students. Means of rankings were obtained, and 6 images were selected to represent skeletally thin (2), average weight (2) and morbidly obese (2) that would be used for the study (See Table 1). Approximately 99% of the variance in ratings was due to variation in target weight.

Furthermore, targets were solely female for another purpose. Ninety to ninety-five percent of patients with eating disorders are women (Hesse-Biber, Leavy, Quinn, & Zoino, 2006). The high prevalence of eating disorders exists in women significantly more than men. Research also suggests that the majority of men with eating disorders are asexual or homosexual (Carlat, Camargo, & Herzog, 1997). While individual factors are strongly associated with eating
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disorders, the occurrence of eating disorders is still notably higher in women than in men. For males there appears to be a natural confound of sexual orientation and eating disorders and for this reason it cannot be clearly determined if ratings would be due to weight or sexual orientation. For all of these reasons, targets of this study were solely females, whereas male and female judges were included.

A final hypothesis is that weight of the perceiver should make a difference in regard to weight bias. More weight bias should be displayed by those average perceivers in viewing skeletally thin and obese targets. This hypothesis further supports Intergroup Relations Theory.

Method

Participants

Sixty participants were recruited from the Rhode Island College participant pool in the Department of Psychology. There were 30 males and 30 females. Participants were also asked to indicate their weight and height at the end of this experiment so that their Body Mass Index (BMI) could be computed.

Stimulus Targets

The targets of this study were 6 images of women taken from the internet. The 6 targets were dressed in bikinis. Both male and female participants judged the traits of female targets that ranged from skeletally thin to morbidly obese. Six different orders of targets were constructed in a Latin Square to control for order of weight effects. This experiment was performed using the E-Prime Software that is designed for conducting studies on a computer. Participants were seated at the computer, and were presented with targets one at a time. The participants were asked to rate their attitudes and the personality traits of the targets.
Measures

The Big Five Factors (John, 1990) were used in the personality ratings for this study. The five factors were each indicated by two variables using 10 point (1-10) scales that were bounded by opposite adjectives. For Factor 1 (Extroversion) the adjectives were introverted-extroverted, and unsociable- sociable; For factor 2 (Agreeableness) the adjectives were argumentative- good natured and uncooperative- cooperative; for Factor 3 (Conscientiousness) the adjectives were unmotivated-motivated and un-ambitious to ambitious; for Factor 4 (Emotional Stability) the adjectives were insecure-secure and nervous-at ease; and finally for Factor 5 (Intelligence) the adjectives were uncultured-cultured and unintelligent- intelligent.

Participants also rated targets on eight antonym pairs using a 9 point scale (1-9). These antonyms were: sexy/not at all sexy, well groomed/sloppy, attractive/unattractive, powerful/weak, happy/sad, generous/stingy, self-controlled/self-indulgent, energetic/lazy. These were taken from Harris, Waschull, and Waters (1990). Participants also indicated their agreement (1 strongly disagree- 9 strongly agree) with 5 statements for each of the targets that were taken from Morrison and O’Connor (1999); they were: I like this person, I would like to get to know this person, this person is similar to me, this person has a successful romantic relationship, this person has a successful career, and this person has many friends.

In addition, participants responded to 30 attitude measures (Crandall, 1994; Morrison & O’Connor, 1999). Participants also indicated their agreement using a 9 point scale (1 strongly disagree- 9- strongly agree). (See Appendix A).

Lastly, participants responded to 15 disgust items taken from Duncan, Schaller, & Park, (2009) measuring Perceived vulnerability to disease using a 9 point scale (1 strongly disagree- 9- strongly agree). (See Appendix B).
Research Design and Statistical Analysis

Participants were presented with six female targets (one at each of the 6 weight levels). The design was a 2 (gender of judge) x 6 (weight levels); the gender of judge was a between subjects factor and the weight factor was within subjects. Nested within the weights were personality factors and within the personality factors were traits indicating them. Thus there were three levels of the nested factors (targets, personality factors within targets, and indicators of factors).

Mixed Model Anova was used to analyze the data. The six targets at different weights was a repeated factor. In the Anova linear and curvilinear functions were fit to the rating data as a function of weight. The lowest order function (i.e., linear or curvilinear) that fit the data was considered the one that best represented the rating data. The general prediction was that a curvilinear function would fit the rating data better than a linear function.

Results

The primary hypothesis was that trait judgments of targets would vary significantly as a function of weight. It was also predicted that these judgments would be best fit by a quadratic function; that is, weight bias was hypothesized to be curvilinear (Malloy et al., 2011). Other measures in this study are beyond scope of the present research and will be included in other analyses but are not reported here. From the 25 trait ratings of targets, 10 constructs were formed by average relevant indicators. The 10 constructs were: Cultured, indicated by intelligence and cultured; Agreeable, indicated by cooperative, generous, and good-natured; Physical appeal, indicated by; well groomed, attractiveness, appeal, and sexy; Emotional stability, indicated by secure, at ease and happy; Sociability, indicated by many friends, sociable, and extroversion; Motivation, indicated by ambitious, powerful, energetic and motivated;
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Positive affect, indicated by liked, similar to me, and like to know. Additionally, there were 3 factors with a single indicator: Self-controlled; Career success and Romantic success.

With respect to agreeableness, in support of Hypothesis 1, a main effect of target weight was observed ($F(5,54) = 18.93, p =< .001$) with ($\eta^2$ (partial eta squared) = .64). Thus 64% of variance in judgments of agreeableness was due to target weight. Inspections of the means (see Table 1) showed that the lightest and heaviest targets were judged less agreeable whereas targets closer to average weight were judged as more agreeable. Mean agreeableness ratings for the six targets ranging from the lightest to the heaviest were 3.36, 4.41, 6.92, 5.66, 4.45, and 3.69, respectively and these means were fit best by a quadratic function ($F(1,58) = 94.36, p < .001$).

In support of Hypothesis 2, there was not a target by gender of judge interaction ($F(1,58) = 2499.87, p < .001$). However, there was a gender of judge main effect ($F(1,58) = 4.53, p = .038$) and showed that females judged targets higher on agreeableness (mean of 4.84) than did males (mean of 4.44). Partial eta squared ($\eta^2$) was .07 and showed that approximately 7% of the variance in ratings of targets’ agreeableness was due to the gender of the judge.

Concerning culture, a main effect of target weight was observed ($F(5,54)= 24.77, p=<.001$) with($\eta^2 = .70$) in support of Hypothesis 1. Thus, 70 % of variance in judgments of cultured was due to target weight. Assessments of the means showed that the lightest and heaviest targets were judged less cultured whereas targets closer to average weight were judged as more cultured. Mean cultured ratings for the six targets ranging from lightest to heaviest were 3.68, 4.39, 6.71, 5.58, 4.44, and 3.32, respectively and these means were best fit by a quadratic function ($F(1,58) = 108.19, p <.001$). In support of hypothesis 2, there was not a target by gender of judge interaction ($F(1,58)= 1838.57, p<.001$). There was no gender of judge effect.
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(F(1,58)=3.12, p = .083). Partial eta squared (\( \eta^2 \)) was .05 and showed that 5% of variance in target judgments on culture is due to judged gender.

In regards to physical appeal, a main effect of target weight was observed (F(5,54)= 130.89, p=<.001) with partial eta squared(\( \eta^2 \)) =.92. Ninety two percent of variance in ratings of targets’ physical appearance was due to target weight. This is in support of Hypothesis 1. Inspections of means ( see Table 1) showed that the lightest and heaviest targets were judged as less physically appealing ; 2.45, 3.73, 7.01, 6.32, 3.54, 2.19. These means best fit by quadratic function (F(1,58) =677.33, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58) = 2477.09, p<.001). There was no gender of judge main effect (F(1,58)= .56, p=.458). Partial eta squared (\( \eta^2 \)) was .01 and showed that 1% of variance in ratings of targets’ physical appeal was due to gender of judge.

Pertaining to emotional stability, a main effect of target weight was observed (F(5,54)=74.30, p<.001) with partial eta squared (\( \eta^2 \)) =.87). Eighty seven percent of variance in ratings of targets’ emotional stability was due to target weight. Inspections of means showed that the lightest and heaviest targets were judged as less emotionally stable, with the lightest target judged the least emotionally stable; 2.56, 4.11, 7.03, 6.36, 3.96, 3.15. These means were best fit by a quadratic function (F(1,58)=297.27, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58) = 1915.20, p< .001). There was no gender of judge main effect (F(1,58)= .006, p=.94). Partial eta squared (\( \eta^2 \)) was 0 and showed that none of the variance in ratings of targets’ emotional stability was due to gender of judge.

With respect to sociability, a main effect of target weight was observed (F(5,54)=49.93,p<.001 with partial eta squared (\( \eta^2 \)) .82). Eighty two percent of variance in ratings of targets’ sociability was due to target weight. Inspections of means (see Table 1)
showed that the lightest and heaviest targets were judged as the least sociable. The means ranging from lightest to heaviest were; 3.08, 4.55, 6.82, 5.94, 4.06, 3.21 and were best fit by a quadratic function (F(1,58)= 218.22, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58)= 1933.00, p<.001). There was no gender of judge main effect (F(1,58)=. 304, p=.583). Partial eta squared ($\hat{\eta}^2$) was .01 and showed that 1% of variance in ratings of targets’ sociability due to gender of judge.

Relative to motivation, a main effect of target weight was observed (F(5,54)= 42.55,p<.001) in support of Hypothesis 1. Partial eta squared ($\hat{\eta}^2$) was .80). Thus, 80% of variance in ratings of target’s sociability was due to target weight. Inspections of means showed that the lightest and heaviest targets were judged as the least motivated. Mean scores ranging from lightest to heaviest were; 3.33, 4.60, 6.83, 5.97, 4.10, 2.83 and were best fit by a quadratic function (F(1,58)= 603.48, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58)= 2532.62, p<.001). There was also no gender of judge main effect (F(1,58)= .79, p=.378). Partial eta squared ($\hat{\eta}^2$) was .01 and showed that 1% of variance in ratings of targets’ motivation was due to gender of judge.

With regard to positive affect, a main effect of target weight was observed (F(5,54)= 88.13, p<001) with partial eta squared ($\hat{\eta}^2$) = .89). Eighty nine percent of variance in ratings of targets’ motivation was due to target weight. Inspections of means showed that the lightest and heaviest targets were liked the least. Mean scores ranging from lightest to heaviest were; 2.55, 3.78, 7.01, 6.15, 4.01, 3.23 and were best fit by a quadratic function (F(1,58)= 350.49, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58)=1616.94, p<.001). There was no gender of judge main effect (F(1,58)= .628, p=.431).
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Partial eta squared ($\eta^2$) was .01, showing that 1% of variance in ratings of targets’ positive affect was due to gender of judge.

Pertaining to self-controlled, there was a main effect of target weight observed in support of Hypothesis 1 ($F(5,54)=36.02, p<.001$) with partial eta squared ($\eta^2 = .77$). Seventy percent of variance in ratings of targets’ self control was due to target weight. Mean scores ranging from lightest to heaviest were; 4.78, 5.09, 6.71, 5.27, 3.66, 2.64. The heaviest target was judged as having the least self control and these means were best fit by a negative linear function ($F(1,58)= 40.80, p<.001$). Thus, the heaviest target was rated least favorably and as having the least self-control. In support of Hypothesis 2, there was not a target by gender of judge interaction ($F(1,58)= 1453.16, p<.001$). There was also no gender of judge main effect ($F(1,58)= 1.19, p=.278$). Partial eta squared ($\eta^2$) was .02, showing that 2% of variance in ratings of targets’ self-control was due to gender of judge.

With reference to career success, in support of Hypothesis 1 main effect of target weight was observed ($F(5,54)= 17.01, p<.001$) with partial eta squared ($\eta^2 = .61$). Mean scores ranging from lightest to heaviest were; 3.67, 4.38, 6.82, 6.05, 4.60, 3.57 and were best fit by a quadratic function ($F(1,58)= 66.28, p<.001$). The lightest and heaviest targets were judged as having the least career success. In support of Hypothesis 2, there was not a target by gender of judge interaction ($F(1,58)=1232.75, p<.001$). There was no gender of judge main effect ($F(1,58)= .020, p=.888$). Partial eta squared ($\eta^2$) was .00 and showed that none of the variance in ratings of targets’ career success was due to gender of judge.

With regard to romantic success, a main effect of target weight was observed in support of Hypothesis 1 ($F(5,54)= 45.78, p<.001$). Partial eta squared ($\eta^2$) was .81. Thus, 81% of variance in judgments were due to target weight. Inspections of means were; 2.87, 4.10, 7.13,
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6.45, 4.23, 2.73. These means were best fit by a quadratic function (F(1,58)=236.79, p<.001). In support of Hypothesis 2, there was not a target by gender of judge interaction (F(1,58)=1262.50, p<.001). There was no gender of judge main effect (F(1,58)=.163, p=.688. Partial eta (\(\bar{\eta}^2\)) squared was .00 and showed that 0% of variance in ratings of targets’ romantic success was due to gender of judge.

**Judge BMI and Ratings of Targets**

Body Mass Index (BMIs) of participants were computed by BMI= (weight in pounds/height in inches\(^2\)) x 703. The mean BMI was 19.30 with standard deviation of 2.32. On average, the participants fell in the “normal weight range.” Only participants with BMI’s between 16.98 and 21.62 were selected. These participants selected fell between -1 and +1 standard deviations around the mean. Anova with one repeated factor (target weight) and participants’ BMI’s entered as a covariate in the analysis was computed. The covariate was not significantly related to judgments on any of the trait factors showing the BMI of the judge was unrelated to target judgments. The same analysis was also run in which only the two lightest and two heaviest targets were included in the analysis and again judge BMI was unrelated to target judgments on all factors.

**Discussion**

**Hypotheses Tested**

The primary hypothesis of this study was that weight bias should be curvilinear when viewing targets at extreme ends of the weight distribution (skeletally thin and morbidly obese) in comparison to average weight frames. A secondary hypothesis was that the gender of the perceiver should not make a difference in regard to weight bias. Weight bias should be curvilinear regardless of the gender of the perceiver. A final hypothesis was that weight of the
perceiver should make a difference in regard to weight bias. Average weight perceivers should
display more weight bias when viewing skeletally thin and morbidly obese targets. This
hypothesis was derived from Intergroup Relations Theory.

**Socialization and Pathogen Avoidance Theories**

This study further supports prior research on weight bias, notably Malloy et al. (2011),
who were the first to empirically test the curvilinear hypothesis of weight bias. Significant
weight bias was found for both the lightest and heaviest targets. The curvilinear function best fit
all trait judgments. This study is distinctive because it offers an indication of bias against those
at extreme weights (skeletally thin and morbidly obese). Moreover, this study further supports
the findings of Malloy et al. (2011) that people hold significant bias towards thin as well as
heavy people. This study also confirms that more bias is elicited against those weight extremes
(a limitation of Malloy et al, 2011). Thus, extreme target weight was of great importance, and
permitted an adequate test of pathogen avoidance theory which the Malloy et al., (2011) did not.

**Intergroup Relations Theory**

Weight of perceivers was unrelated to the ratings of the 6 targets, nor was it associated
with ratings of targets at the extremes on any of the trait factors. These findings, as well as the
results of Malloy et al. (2011), are inconsistent with Intergroup Relations Theory. Being a
member of an in-group (i.e., normal BMI range) was not significantly related to judgments of
out-group targets (skeletally thin or morbidly obese) or in-group targets (average weight) on any
trait factors. Although membership in an in-group is known to affect response to an out-group
member, often negatively (Tajfel & Turner, 1979), this was not observed in the present study.

**Implications for Socialization Theory**
The data presented in this study, as well as Malloy et al. (2011), are not in support of the Socialization theory. This theory attributes weight bias to socio-cultural factors. Society, through social institutions such as the media (Weisbuch & Ambady, 2009), presumably teaches people that being thin is ideal, attractive and desired. The further a person deviates from being thin, the more bias should be exhibited. Similarly, as weight decreases, judgments concerning that person should become more positive according to this theory. Thus, the Socialization theory predicts that weight bias should be best represented by a negative linear function, whereas in our results (and in Malloy et al., 2011) they are best fit by a quadratic, curvilinear function.

Pathogen Avoidance Theory

Why is there such a negative connotation associated with extremely thin and obese body types? In accordance with Pathogen Avoidance Theory, these body types are so profoundly stigmatized because of an evolved brain mechanism. This mechanism serves a survival function in which individuals avoid stimuli that may cause infection to ensure their survival (Hart, 1990; Park, Schaller, & Crandall, 2007). Disgust elicited by particular stimuli serves as signal detection for survival.

The results are best explained by the Pathogen Avoidance Theory. The skeletally thin and morbidly obese targets strongly deviated from the average weight, and were judged poorly as a result. According to this theory, body types that deviate vastly from the average are perceived as a threat to the species because they do not ensure procreation of one’s genes (Kurzban & Leary, 2001). Moreover, these members do not ensure prolongation of those genes and the species at large. Thus, the Pathogen Avoidance Theory posits an evolved mechanism in order to maintain survival.
Social stigmatization against people at weight extremes is in accordance with this theory. Skeletally thin and morbidly obese bodies deviate from the average body type, as a result, social rejection and avoidance of these targets is exhibited. Moreover, negative connotation is associated with the targets. Extremely thin and obese targets were judged poorly on all trait factors in comparison with the average targets. Bias against skeletally thin and morbidly obese is innate in respect to this theory.

Thus, the data confirm the hypothesis that weight bias is indeed curvilinear which is in support of Malloy et al. (2011). As the target’s weight increased, judgments were profoundly more negative; correspondingly, as the target’s weight decreased, the perceiver’s judgments were just as negative as well. This study offers important insight on social behavior displayed towards body types that strongly deviate from the average.

While body types at such extreme weights do not pose a significant threat, they elicit similar behavioral responses to that of harmful stimuli. Could skeletally thin and morbidly obese targets elicit the same level of disgust and avoidance as those stimuli with actual pathogens? For instance, does a person with an oozing infection evoke the same level of disgust as an extreme body type? Moreover, does a grotesque infection or a pathogen itself evoke the same level of disgust as these extreme body types? In theory, body types of such extremity should elicit the same responses to that of pathogenic stimuli. A study that shows evidence for this hypothesis would further solidify this evolutionary theory in regard to weight bias.

Limitations

Some limitations of this study are that the body images used are all Caucasian. Perhaps using a range of different ethnicities would have broadened and benefitted this study. Another
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limitation is the overall Body Mass Index (BMI) of the subjects used as perceivers. The subjects fell into the “normal” range of weight distribution. Perhaps having subjects that were of greater varying weights would have also strengthened our study. Additionally, including solely females as targets could be another limitation of this study.
References


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Appendix A
1. Extremely overweight/thin people are less sexually active than thin people.
2. Extremely overweight/thin people have only themselves to blame
3. I am disgusted by an extremely overweight/thin person in a bathing suit at the beach
4. I really don’t like extremely overweight/thin people.
5. Extremely overweight/thin people tend to be untrustworthy.
6. Extremely overweight/thin people are not as bright as thin people.
7. It is hard to take extremely overweight/thin people seriously.
8. I don’t have many extremely overweight/thin friends.
9. I feel uncomfortable around extremely overweight/thin people.
10. If I were an employer, I might avoid hiring an extremely overweight/thin person.
11. I worry about becoming extremely overweight/thin.
12. I feel disgusted when I gain/lose weight, One of the worst things would to be gain/lose 25 pounds.
13. Extremely overweight/thin people have not will power.
14. Extremely overweight/thin people could lose some weight by exercising.
15. Being extremely overweight/thin is pretty much one’s own fault.

Appendix B
Running head: THIN AND OVERWEIGHT BIASES

1. It really bothers me when people sneeze without covering their mouths.

2. If an illness is ‘going around, I will get it.

3. I am comfortable sharing a water bottle with a friend.

4. I don’t like to write with a pencil someone else has obviously chewed on.

5. My past experiences make me believe I am not likely to get sick even when my friends are sick.

6. I have a history of susceptibility to infectious diseases.

7. I prefer to wash my hands pretty soon after shaking someone’s hand.

8. In general, I am very susceptible to colds, flu, and other infectious diseases.

9. I dislike wearing used clothes because you don’t know what the last person who wore it was like.

10. I am more likely than the people around me to catch an infectious disease.

11. My hands do not feel dirty after touching money.

12. I am unlikely to catch a cold, flu, or other illness, even if it is going around.

13. It does not make me anxious to be around sick people.

14. My immune system protects me from most illnesses that other people get.

15. I avoid using public telephones because of the risk that I may catch something from the previous user.
Table 1

Mean Rankings of 13 Original Targets (Panel A) and 6 Selected Targets (Panel B)

Panel A

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Panel B

6 Targets Selected from the Set of 13

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Table 2

Mean Ratings of Targets (Image 1 – Image 6) on Factors

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<th>I3</th>
<th>I4</th>
<th>I5</th>
<th>I6</th>
<th>F(5,54)</th>
<th>p</th>
<th>$\hat{\eta}^2$</th>
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Note. F values and associated p values are presented. Partial eta squared is also presented.
Images Selected