

Positive Media Portrayals of Obese Persons: Impact on Attitudes and Image Preferences

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Objective: The purpose of this research was to assess the impact of nonstereotypical, positive media portrayals of obese persons on biased attitudes, as well as propose a change in media practices that could reduce public weight bias and consequent negative health outcomes for those who experience weight stigma. **Method:** Two online experiments were conducted in which participants viewed either a stigmatizing or a positive photograph of an obese model. In Experiment 1 ($N = 146$), participants viewed a photograph of either a Caucasian or African American obese woman; in Experiment 2 ($N = 145$), participants viewed either a Caucasian male or female obese model. Multiple linear regression models were used to analyze outcomes for social distance attitudes toward the obese models depicted in the images, in addition to other negative attitudes and image preferences. **Results:** Participants who viewed the stigmatizing images endorsed stronger social distance attitudes and more negative attitudes toward obese persons than participants who viewed the positive images, and there was a stronger preference for the positive images than the stigmatizing images. These results were consistent regardless of the race or gender of the obese model pictured. **Conclusion:** The findings indicate that more positive media portrayals of obese individuals may help reduce weight stigma and its associated negative health outcomes.

Keywords: obesity, stigma, weight bias, media

Bias against obese individuals is a socially acceptable and pervasive form of prejudice associated with harmful outcomes in a variety of domains, including mental health (Puhl & Heuer, 2009). Obese persons, particularly women, are at higher risk for low self-esteem, body dissatisfaction, anxiety, major depression, and suicidal ideation and attempts (Carpenter, Hasin, Allison, & Faith, 2000; Kivmäki et al., 2009; Reilly et al., 2003). Weight stigma increases vulnerability to these psychological problems (Eisenberg, Neumark-Sztainer, & Story, 2003; Friedman, Ashmore, & Applegate, 2008; Puhl & Heuer, 2009; Puhl & Latner, 2007), in addition to physical complications such as poor cardiovascular health and overall health-related quality of life (Lilis, Levin, & Hayes, 2011; Puhl & Latner, 2007).

Individuals who experience weight stigmatization also have increased risk of binge eating, exercise avoidance, poorer weight-loss treatment outcomes, and underutilization of health care services (Amy, Aalborg, Lyons, & Keranen, 2006; Ashmore, Fried-

man, Reichmann, & Musante, 2008; Carels et al., 2009; Vartanian & Shaprow, 2008), challenging the popular belief that weight bias motivates individuals to lose weight and become healthy (Puhl & Heuer, 2010; Puhl, Moss-Racusin, & Schwartz, 2007). Although the majority of research thus far has documented negative health consequences associated with experiences of stigma, there are still ambiguities about how weight stigma influences health. One study found that stigmatizing experiences worsened psychological functioning but predicted greater weight loss and maintenance in a weight-loss program (Latner, Wilson, Jackson, & Stunkard, 2009). In addition, the relationship between weight stigma and exercise avoidance may not be direct, as internalized antifat attitudes have been found to moderate this effect (Vartanian & Novak, 2011). Such findings emphasize the need for further investigation of the factors that may exacerbate or protect against negative effects of weight stigma.

One source of weight bias that may play a role in perpetuating stigmatizing attitudes is the media. Stigmatizing portrayals of obese persons are common in movies, Internet videos, television shows, and commercials geared toward children and adults (Ata & Thompson, 2010; Herbozo, Thompson, Tantleff-Dunn, & Gokee-Larose, 2004; Himes & Thompson, 2007; Hussin, Frazier, & Thompson, 2011; Puhl & Heuer, 2009); for example, the popular series of *Nutty Professor* movies portrays the obese Klump family as crude, loud, undignified, and unintelligent. In addition, the news media often frame obesity as an issue of personal responsibility (Bonfiglioli, Smith, King, Chapman, & Holding, 2007; Kim & Willis, 2007; Lawrence, 2004; Major, 2009), which places an emphasis on individual blame (Ata & Thompson, 2010; Crandall & Moriarty, 1995; Crandall & Schiffhauer, 1998; Puhl & Heuer,

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2010; Weiner, Perry, & Magnusson, 1988). A content analysis of news images concluded that the majority of images portray obese persons in a negative, stigmatizing manner and rarely present them in positive ways (Heuer, McClure, & Puhl, 2011). This stigmatizing content may be detrimental to public health, as recent research has demonstrated that exposure to weight stigmatizing images and videos leads directly to increased food consumption (Campbell & Mohr, 2011; Schvey, Puhl, & Brownell, 2011). This information is also concerning in light of evidence suggesting that images alone communicate prejudices (Abraham & Appiah, 2006; Messaris & Abraham, 2001) and influence public attitudes regardless of the content of the news stories accompanying the images (Gibson & Zillmann, 2000; Zillmann, Gibson, & Sargent, 1999).

McClure, Puhl, and Heuer (2011) tested the effect of positive versus stigmatizing news images on scores on the Fat Phobia Scale, a measure of stereotypical attitudes toward obese persons, and found that people who viewed the stigmatizing images expressed stronger antifat attitudes than those who viewed the positive images. This research suggests that exposure to negative portrayals of obese persons in the media contributes to biased attitudes. However, no study to date has investigated how positive and negative portrayals may shape the desire for social distance from obese persons. Obese individuals frequently find themselves distanced from or avoided by others in public situations, contributing to experiences of stigmatization (Sobal, 2005); thus, understanding how the media may impact social distance attitudes could reveal a means to reducing them. In addition, research has not yet explored potential differences in the impact of media portrayals of obesity depending on the race and gender of the obese person portrayed. Finally, it is unclear whether the public agrees with and endorses the use of stigmatizing images, or if people desire more positive portrayals of obese persons in the media.

The purpose of the current research was to test whether stigmatizing versus positive portrayals of obese persons influence the desire for social distance from and negative attitudes toward obese persons. This study also explored differences in biased attitudes by manipulating the race and gender of the obese person portrayed in the images. Findings regarding racial differences in stigma experiences are mixed (e.g., Neumark-Sztainer, Story, & Faibisch, 1998; Puhl, Andreyeva, & Brownell, 2008), so this study was exploratory in its investigation of race. Research suggests that women are at greater risk for weight-based stigma and discrimination (Puhl et al., 2008), but men express more antifat attitudes than women overall (Chen & Brown, 2005; Ritchey & Fishbein, 2001), so it was also unclear how model gender would impact men's and women's negative judgments. Finally, this study evaluated preferences for the use of stigmatizing or positive images of obese persons in mainstream media. Considering the current prevalence of stigmatizing portrayals of obese persons in the media (Heuer et al., 2011), evidence that the public prefers positive images to negative images could help shift current media practices and encourage less stigmatizing portrayals of obese persons, ultimately impacting public health.

Experiment 1

The purpose of Experiment 1 was to test the impact of positive versus stigmatizing portrayals of obese models on attitudes toward obese persons. It was hypothesized that viewing positive images

would lead to reduced desire for social distance from the obese model compared with stigmatizing images, and that participants would report fewer negative attitudes about obese persons and greater image preference after viewing positive versus stigmatizing images. The rationale for these predictions was that positive portrayals provide the public with evidence against stereotypes that could neutralize negative attitudes or create more positive attitudes. This experiment also tested whether the effect of images differs according to the race of the featured obese model. There were no a priori predictions about whether the model's race would impact participants' negative attitudes and image preferences.

Method

Participants. Participants were recruited from the Yale School of Management eLab Web site (<http://elab.som.yale.edu>). This Web site draws from a sample of approximately 15,000 adults from across the United States who are recruited through advertisements on social networking Web sites. Registered participants are notified via e-mail when studies are posted, and they are free to choose which studies they would like to complete based on their descriptions. All participation was voluntary, and participants were compensated with entry into a raffle to win a gift card. The study was approved by the university's institutional review board.

It was determined that a sample size of 141 was needed to achieve a power of .90 for the planned regression analyses, with a medium effect size ($f^2 = 0.15$) and an alpha of .05 (Cohen, 1988). Data were collected from 155 participants, but nine participants were excluded as a result of incomplete surveys. In total, data from 146 participants were included (54% female), with an average age of 35 years ($SD = 12.74$) and a mean body mass index (BMI) of 24.35 kg/m^2 ($SD = 7.36$). Participants predominantly identified themselves as White, non-Hispanic, non-Latino (80.1%), followed by 12.3% Asian or Pacific Islander, 2.7% Black or African American, 2.7% American Indian or Alaska Native, and 2.1% Latino or Hispanic.

Measures.

Demographic information. Participants were asked to report their age, gender, ethnicity, and height and weight. Height and weight information was collected to determine the BMI of participants.

Social distance. Participants completed six questions assessing their attitudes about being in social situations with the person featured in the image. These items were adapted from social distance measures commonly used in studies assessing mental health stigma (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999) and tested by Puhl and colleagues for similar research purposes (DePierre & Puhl, 2011; Puhl & Luedicke, 2011). Examples of the items include "I wouldn't mind being friends with the person in this image" and "I wouldn't mind if the person in this image lived next door to me." The questions were rated on a 5-point Likert scale and averaged to create one total score per participant, with higher scores indicating stronger desire for social distance. The six items had high reliability in this sample ($\alpha = .86$).

Public attitudes. Participants rated their agreement with five statements about their attitudes toward obese persons and the images. Two statements addressed how the image influenced participants' negative attitudes toward obese persons (Statement 1:

“This image makes me dislike obese people”; Statement 2: “This image makes me think that obese people are lazy”). The remaining three statements assessed participants’ image preferences, measuring their attitudes toward the image and its appearance in the media (Statement 3: “I don’t mind seeing photos like this one in the media”; Statement 4: “When I see photos like this in the media, it makes me angry because they are insulting to obese people”; Statement 5: “I wish that the media wouldn’t use images like this”). All five statements were rated on a 5-point Likert scale, and Statement 3 was reverse scored. These statements were also developed by Puhl and colleagues for relevant research purposes (DePierre & Puhl, 2011; Puhl & Luedicke, 2011).

Antifat attitudes. The FAT subscale of the Universal Measure of Bias (UMB-FAT) contains 20 items assessing participants’ general attitudes toward overweight persons (Latner, O’Brien, Durso, Brinkman, & MacDonald, 2008). This measure was included to adjust for participants’ pre-existing attitudes toward obese persons. Participants rated their agreement with statements such as “Fat people are sloppy” on a 7-point Likert scale (1 = *strongly agree* to 7 = *strongly disagree*). Several items were reverse scored so that higher scores reflected more negative attitudes toward overweight individuals. The UMB-FAT consists of four subscales: Negative Judgment, Distance, Attraction, and Equal Rights, thus capturing a comprehensive set of biased attitudes. For the purpose of this study, we also used the Distance subscale independently from the UMB-FAT to isolate the most relevant construct for the examination of social distance attitudes, which consisted of five statements such as “I don’t enjoy having a conversation with a fat person.” The UMB-FAT scale and Distance subscale were included as independent variables to adjust for participants’ pre-existing and more general attitudes of social distance and negative stereotypes, and the aforementioned social distance and public attitude items assessed image-specific evaluations above and beyond these general attitudes. The UMB-FAT scale has been shown to correlate with other established measures of bias in samples of undergraduates, $r = .50-.62$ (Latner et al., 2008), and in this sample, both the full UMB-FAT scale and the Distance subscale had good reliability ($\alpha = .87$ and $.73$, respectively).

Experience of weight bias. Participants were asked three forced-choice (yes–no) questions about whether they had ever been teased or treated unfairly because of their weight (Puhl & Heuer, 2011; Puhl, Heuer, & Sarda, 2010). This variable was included because of the possibility that personal experience with weight bias or discrimination may impact attitudes toward obese persons.

Procedure. The survey used a 2×2 design (two positive images: one image of an obese White woman and one of an obese Black woman; two stigmatizing images: one image of an obese White woman and one of an obese Black woman). Both positive images featured the obese model selecting produce at a grocery store, and the stigmatizing images featured each model sitting on a couch consuming unhealthy food such as chips, soda, or ice cream. The images were selected from an image gallery compiled by the Rudd Center (http://www.yaleruddcenter.org/press/image_gallery_intro.aspx). All of the models featured in these images had BMIs of 30 or greater, categorizing them as obese. The models were approximately 40 years old, with the exception of the Black female model who was 24 years old. Nine

images were chosen on the basis of consistency of the featured activity and similar body positioning of the obese models. These images were pretested with a sample of 50 eLab participants in one survey and 47 participants in a second survey. From the nine tested images, four were selected for this experiment. Mean ratings of how the image portrayed the model (such as “degrading” vs. “dignified”) did not differ across images within the positive and stigmatizing conditions. Between conditions, a series of t tests revealed that participants rated the stigmatizing image portrayals as significantly more negative, stereotypical, undignified, and unattractive than the positive portrayals. Some differences were observed between perceived age and weight of the featured models, so these variables were addressed in the primary analyses.

Participants were randomly assigned to one of the four conditions. Conditions were identical except for the image participants viewed, and participants viewed only one of the four possible images. Prior to viewing the image, participants were asked to complete a brief survey of questions assessing demographic information. Participants were then presented with the image and instructed to attend to it before responding to a series of questions about the image they viewed, the model featured in the image, and their attitudes toward obese persons in general. The image was presented before each series of questions concerning the image, and participants could view the images for an indefinite period of time. All participants were debriefed following their completion of the study.

Results

Sample characteristics. A series of t tests revealed no significant differences between image conditions in participant age, gender, BMI, or perceptions of the obese model’s age or weight status. Given the homogeneity of the sample’s racial composition, we created a dummy variable of “non-White” participants (vs. “White”) for our analyses, and there were no differences in race between conditions. In addition, participants did not differ in their scores on the UMB-FAT scale or UMB-FAT Distance subscale. Overall, participants expressed moderate levels of antifat attitudes (UMB-FAT, $M = 3.50$, $SD = 0.85$; UMB-FAT Distance subscale, $M = 2.99$, $SD = 1.06$), which were comparable to those observed in the samples used in the scale’s development (Latner et al., 2008). In addition, 53.4% of participants reported being the target of weight bias in the past. All descriptive means for the dependent measures are displayed in Table 1.

The t tests did reveal that participants who viewed the positive images were more likely than participants who viewed the stigmatizing images to report experiences of weight bias, $t(144) = -2.17$, $p < .032$. As a result, we adjusted for this variable in subsequent analyses. In addition to random assignment to image condition, participants were randomly assigned to see an image of a Black woman or a White woman. There were no significant differences between the two conditions in any participant characteristics or scores, except for perceptions of the obese model’s age. A t test revealed that the Black model was perceived as younger than the White model, $t(144) = 3.44$, $p < .001$, so this variable was adjusted for in all subsequent analyses.

Regression.

Social distance. A four-step hierarchical linear regression was conducted to examine the effect of image condition on social

Table 1
Unadjusted Mean Scores for Social Distance and Public Attitude (PA) Items

Dependent measure	Experiment 1			Experiment 2		
	Condition		Overall mean	Condition		Overall mean
	Positive	Stigmatizing		Positive	Stigmatizing	
Social distance attitudes	2.14 (0.65)	2.31 (0.83)	2.22 (0.75)	2.10 (0.62)	2.41 (0.82)	2.26 (0.74)
PA Item 1: Negative attitudes	2.09 (1.06)	2.74 (1.02)	2.41 (1.09)	1.96 (1.18)	3.03 (1.12)	2.50 (1.26)
PA Item 2: Image preferences	2.53 (0.99)	3.26 (1.12)	2.89 (1.11)	2.51 (1.13)	3.39 (1.02)	2.96 (1.16)

Note. Standard errors are given in parentheses.

distance attitudes. Step 1 included image condition (positive vs. stigmatizing) and model race (Black vs. White); Step 2 included participant gender, race, BMI, perceived age of the model, and participant experience with bias; Step 3 adjusted for the full UMB-FAT scale and the Distance subscale of the UMB-FAT; and Step 4 included the interaction between image condition and model race. This interaction term was not significant, so only the output from Step 3 was interpreted. In addition, the full UMB-FAT scale did not have a significant impact on social distance scores, and because the Distance subscale was most theoretically relevant to the outcome measure, a final regression model was conducted without the full UMB-FAT scale.

The social distance regression results are displayed in Table 2. The residuals were normally distributed, and the final model explained 52% of the variance in social distance scores. Concordant with our predictions, image condition significantly predicted social distance attitudes ($b = -0.31$, $SE = 0.12$, $p < .012$). Positive images predicted less desire for social distance than stigmatizing images, even after adjusting for all of the independent measures. Aside from the UMB-FAT Distance subscale, no other variables in the model significantly predicted social distance attitudes.

Public attitudes. Given the two distinct concepts of negative attitudes and image preferences addressed in the five public attitude statements, we conducted a varimax factor analysis. As expected, two factors emerged: Statements 1 and 2 grouped into a Negative Attitudes item (factor loadings = .90 and .87, eigen-

value = 1.16), and Statements 4 and 5 grouped into an Image Preferences item (factor loadings = .95 and .90, eigenvalue = 2.37). Furthermore, the correlations between the grouped items were high (Statements 1 and 2, $r = .61$; Statements 4 and 5, $r = .78$). Statement 3 did not load into either group, so it was dropped from the analyses.

Consequently, scores for Statements 1 and 2 and Statements 4 and 5 were averaged to create two new items scores. Higher scores on the Negative Attitudes item (Item 1) signify stronger negative attitudes, and lower scores on the Image Preferences item (Item 2) signify more positive attitudes toward viewing the image in a media source. For each item, we performed a four-step hierarchical linear regression, including image condition and model race in the first step, participant race and gender, BMI, perceived age, and experience of bias in the second step, scores from the full UMB-FAT scale in the third step, and the interaction between image condition and model race in the fourth step. For both items, the interaction terms were not significant, so we used output from the third step of the regression models.

The public attitudes regression results are displayed in Table 3. When predicting negative attitudes, the model accounted for 40% of the variance. Consistent with our prediction, the positive image condition predicted significantly less negative attitudes than the stigmatizing condition ($b = -0.63$, $SE = 0.14$, $p < .001$). There was no main effect for model race on participants' negative attitudes, although male participants were more likely to express negative attitudes toward obese persons than female participants.

Table 2
Experiment 1: Unstandardized Coefficients From Linear Regression Analyses of Social Distance Attitudes

Predictor	Step 1	Step 2	Step 3
Positive image (vs. stigmatizing)	-0.22 (0.17)	-0.15 (0.16)	-0.31 (0.12)*
Black model (vs. White)	0.08 (0.17)	0.16 (0.17)	0.02 (0.13)
Male participant (vs. female)		0.47 (0.17)**	-0.01 (0.13)
Non-White participant (vs. White)		0.003 (0.21)	-0.04 (0.15)
BMI		-0.01 (0.01)	0.02 (0.01)
Perceived model age		0.12 (0.10)	0.09 (0.07)
Experience with weight bias		-0.26 (0.17)	-0.19 (0.13)
UMB-FAT Distance subscale			0.69 (0.07)***

Note. $N = 146$. BMI = body mass index; UMB-FAT = Universal Measure of Bias FAT scale. Standard errors are given in parentheses. Scores for social distance attitudes were standardized. Variables for BMI and the UMB-FAT Distance subscale were centered at their means.

+ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Experiment 1: Unstandardized Coefficients From Final Step of Linear Regression Analyses of Public Attitudes (PA)

Predictor	PA Item 1: Negative attitudes	PA Item 2: Image preferences
Positive image (vs. stigmatizing)	-0.63 (0.14)***	-0.68 (0.15)***
Black model (vs. White)	0.05 (0.14)	0.12 (0.16)
Male participant (vs. female)	0.28 (0.14)*	0.36 (0.16)*
Non-White participant (vs. White)	-0.08 (0.17)	0.08 (0.19)
BMI	-0.01 (0.01)	-0.01 (0.01)
Perceived model age	0.17 (0.08)*	0.20 (0.09)*
Experience with weight bias	0.17 (0.14)	0.36 (0.15)*
UMB-FAT	0.48 (0.09)***	-0.29 (0.10)**

Note. $N = 146$. BMI = body mass index; UMB-FAT = Universal Measure of Bias FAT scale. Standard errors are given in parentheses. Scores for public attitude items were standardized. Variables for BMI and the UMB-FAT scale were centered at their means.
⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

For image preference, the regression model accounted for 26% of the variance. As predicted, participants expressed greater preference for the positive images than the stigmatizing images ($b = -0.68$, $SE = 0.15$, $p < .001$). There was no main effect of model race on media image preferences, but male participants reacted more negatively to viewing the images than female participants.

Discussion

Concordant with our predictions, participants who viewed the positive images reported less desire for social distance from the obese model than participants who viewed the stigmatizing images. Participants were also less likely to endorse negative attitudes toward obese persons in direct response to positive images and expressed greater preference for the positive images versus the stigmatizing images. The race of the model featured in the image did not influence the main effects of the image condition, suggesting the generalizability of these effects. Overall, male participants expressed more negative attitudes toward obese persons in reaction to the images, and toward the images themselves, than female participants.

Experiment 2

Experiment 2 tested whether negative attitudes toward obese persons are influenced by positive versus stigmatizing portrayals. However, instead of assessing the effect of the models’ race on attitudes, Experiment 2 investigated whether model gender would moderate the effect. We maintained the same hypotheses as Experiment 1 in regards to the impact of positive versus stigmatizing images on social distance attitudes, negative attitudes, and images preferences. Our examination of model gender as a moderator was exploratory in nature.

Method

Participants. Participants were recruited from eLab, and those from Experiment 1 were not permitted to complete Experiment 2. Information was collected from 147 participants, but two were excluded because of incomplete surveys, resulting in a final

sample of 145 participants. Sixty-four percent of participants were female, the mean age for participants was 33.52 years ($SD = 10.68$), and the mean BMI was 24.45 kg/m² ($SD = 7.33$). The majority of participants identified themselves as White, non-Hispanic, non-Latino (77.2%), followed by 13.1% Asian or Pacific Islander, 3.4% Black or African American, 3.4% other, and 2.8% Latino or Hispanic.

Measures. Experiment 2 included the same measures used in Experiment 1. The reliability for the measures in this sample ranged from moderately low to high (UMB-FAT Distance subscale, $\alpha = .61$; social distance, $\alpha = .82$; UMB-FAT, $\alpha = .84$).

Procedure. This experiment also implemented a 2 × 2 design (two positive images: one image of an obese White woman selecting produce and one of an obese White man; two stigmatizing images: one image of an obese White woman on the couch consuming unhealthy food and one of an obese White man). The two images from Experiment 1 featuring the White female model were used in this experiment, and the images of the White male model were selected from the pretested images. All other aspects of the procedure were identical to Experiment 1.

Results

Sample characteristics. As in Experiment 1, participants were randomly assigned to view either a positive or a stigmatizing image. Results of t tests revealed no significant differences between image conditions in participant age, gender, race, BMI, or perceptions of the obese model’s age or weight status. Participants also did not differ in their scores on the UMB-FAT or Distance subscale scores. Overall, participants reported moderate levels of antifat attitudes (UMB-FAT, $M = 3.40$, $SD = 0.82$; UMB-FAT Distance subscale, $M = 2.88$, $SD = 1.01$), and 52.4% of participants indicated that they had been the targets of weight bias in the past. Table 1 displays the descriptive means for all dependent measures.

There were no significant differences between model gender conditions on participant characteristics or independent measure scores, but there were differences between the perceived ages of the models. The female model was perceived as significantly younger than the male model, $t(143) = 3.37$, $p < .001$, so again, this variable was adjusted for in subsequent analyses. Although past experience with weight bias did not differ significantly between conditions, we adjusted for this variable to maintain consistency in analyses presented in Experiment 1.

Regression.

Social distance. The variables included in the regression model were consistent with those in Experiment 1, with the exception that model gender replaced the variable for model race used in Experiment 1. Again, the UMB-FAT full scale was included in the initial analysis, but because of its nonsignificance and the stronger theoretical relevance of the Distance subscale, the full scale was excluded from the final analysis.

Table 4 presents the social distance regression results. Given the nonsignificance of the interaction term, results were drawn from Step 3 of the regression model. The regression residuals were normally distributed and the model explained 40% of variance in social distance scores. As expected, image condition significantly predicted social distance attitudes, with positive portrayals leading

Table 4
Experiment 2: Unstandardized Coefficients From Linear Regression Analyses of Social Distance Attitudes

Predictor	Step 1	Step 2	Step 3
Positive image (vs. stigmatizing)	-0.42 (0.16)*	-0.44 (0.16)**	-0.42 (0.14)**
Female model (vs. male)	-0.12 (0.16)	-0.27 (0.17)	-0.24 (0.14) ⁺
Male participant (vs. female)		0.39 (0.18)*	0.03 (0.16)
Non-White participant (vs. White)		0.20 (0.19)	0.21 (0.16)
BMI		0.01 (0.01)	0.02 (0.01)*
Perceived model age		-0.32 (0.14)*	-0.19 (0.12)
Experience with weight bias		-0.34 (0.16)*	-0.24 (0.14) ⁺
UMB-FAT Distance subscale			0.55 (0.07)***

Note. $N = 145$. BMI = body mass index; UMB-FAT = Universal Measure of Bias FAT scale. Standard errors are given in parentheses. Scores for social distance attitudes were standardized. Variables for BMI and the UMB-FAT Distance subscale were centered at their means.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

to reduced desire for social distance from the obese models ($b = -0.42$, $SE = 0.14$, $p < .002$).

Public attitudes. As with Experiment 1, a varimax factor analysis was conducted. Once again, Statements 1 and 2 grouped into a Negative Attitudes item (factor loadings = .92 and .89, eigenvalue = 1.07), and Statements 4 and 5 grouped into an Image Preferences item (factor loadings = .92 and .89, eigenvalue = 2.64). The statements in each grouping were highly correlated (Statements 1 and 2, $r = .74$; Statements 4 and 5, $r = .77$), confirming the utility of these groupings. Consistent with Experiment 1, Statement 3 did not load into either group, so it was dropped from the analyses. Scores from Statements 1 and 2 and Statements 4 and 5 were averaged to create a Negative Attitudes item score and an Image Preferences item score.

The variables included in the regression model were consistent with those in Experiment 1, with the exception that model gender replaced the variable for model race used in Experiment 1. Given the significance of one of the interaction terms, output from the fourth step of the regression was analyzed.

The public attitudes regression results are displayed in Table 5.

Table 5
Experiment 2: Unstandardized Coefficients From Final Step of Linear Regression Analyses of Public Attitude (PA) Items

Predictor	PA Item 1: Negative attitudes	PA Item 2: Image preferences
Positive image (vs. stigmatizing)	-1.08 (0.18)***	-1.08 (0.20)***
Female model (vs. male)	-0.38 (0.18)*	-0.10 (0.20)
Male participant (vs. female)	0.53 (0.14)***	0.35 (0.16)*
Non-White participant (vs. White)	-0.29 (0.15) ⁺	-0.12 (0.17)
BMI	-0.02 (0.01)*	-0.02 (0.01) ⁺
Perceived model age	-0.04 (0.12)	-0.07 (0.13)
Experience with weight bias	0.26 (0.13) ⁺	0.53 (0.15)***
UMB-FAT	0.34 (0.08)***	-0.32 (0.09)***
Positive \times Female interaction	0.51 (0.26) ⁺	0.35 (0.29)

Note. $N = 145$. BMI = body mass index; UMB-FAT = Universal Measure of Bias FAT scale. Standard errors are given in parentheses. Scores for public attitude items were standardized. Variables for BMI and the UMB-FAT scale were centered at their means.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

When predicting negative attitudes, the model accounted for 47% of the variance. The positive condition predicted significantly less negative attitudes than the stigmatizing condition ($b = -1.08$, $SE = 0.18$, $p < .001$). The results also showed a significant main effect for model gender, with the female condition predicting less negative attitudes ($b = -0.38$, $SE = 0.18$, $p < .039$). The interaction term between image condition and model gender was marginally significant ($b = 0.51$, $SE = 0.26$, $p < .053$). Further analyses revealed that the effect of image condition was significantly larger when the male model was featured versus the female model (Female: $b = -0.58$, $SE = 0.18$, $p < .002$; Male: $b = -1.08$, $SE = 0.18$, $p < .001$). In addition, a main effect emerged for participant gender, in which male participants were more likely to express negative attitudes than female participants.

For image preferences, the regression model accounted for 34% of the variance and, as anticipated, participants expressed greater preference for positive images than stigmatizing images ($b = -1.08$, $SE = 0.20$, $p < .001$). There was no main effect for model gender, nor was there a significant interaction between image condition and model gender. However, there was a main effect for participant gender: Male participants reacted to viewing the images more negatively than female participants.

Discussion

Experiment 2 provided additional confirmation that positive portrayals of obese persons lead to reduced desire for social distance from the obese model compared with stigmatizing images. As predicted, participants were also less likely to report negative attitudes toward obese people after viewing the positive images and expressed greater preference for the positive images versus the stigmatizing images.

The gender of the model featured in the image moderated the effect of image condition for the negative attitudes item: When the female model was featured, there was a smaller effect of the positive portrayal on participants' negative perceptions of obese persons. This finding could be interpreted as an example of society's greater tolerance and acceptance of obese men compared with obese women, who may be more vulnerable to weight discrimination (Puhl et al., 2008). Nevertheless, despite the differences in the magnitude of these gender effects, positive images

elicited less negative attitudes and stronger preferences than stigmatizing images overall. In addition, male participants once again expressed more negative attitudes toward obese persons and the images than female participants.

General Discussion

The purpose of this study was to expand previous research examining the effects of media images on attitudes toward obese persons. Participants who viewed the positive images of obese persons responded more prosocially toward the obese person featured in the image than those who viewed the stigmatizing images. These findings were not influenced by gender or race of the obese person pictured, nor were they influenced by the gender, race, or weight of respondents.

Participants preferred the positive images and expressed more anger about seeing the stigmatizing images. Furthermore, participants who viewed the positive images were less likely to assert that the image elicited negative perceptions of obese people than those who viewed the stigmatizing images. The effect of the image condition on these negative attitudes was moderated by the gender of the obese model image. Compared with responses to positive and stigmatizing images of the White obese man, attitudes of dislike and perceptions of laziness were more consistent across conditions in response to the obese White woman. It is possible that participants were more disturbed by the stigmatizing image of an obese White woman eating junk food on the couch because women are judged more critically than men for their weight (Puhl et al., 2008) and White women in particular face strict body weight ideals (Hebl & Turchin, 2005). Still, in spite of these differences in the magnitude of effects, the positive images were broadly favored and elicited more positive responses regardless of model race or gender.

This study was unique in its investigation of the impact of stigmatizing and positive portrayals of obese persons on social distance attitudes, negative attitudes, and media image preferences. Findings suggest that presenting obese persons in a positive, non-stereotypical manner could help promote the reduction of weight-biased attitudes held by the public. Stigmatizing images of overweight and obese individuals portrayed as headless figures, not fully clothed, and engaging in stereotypical eating behaviors are common in the media (Heuer et al., 2011). Although it has been proposed that weight stigma may be helpful for motivating people to lose weight (Puhl & Heuer, 2010), this argument is countered by evidence that experiences of weight stigma are associated with increased binge eating, exercise avoidance, and poorer weight-loss treatment outcomes (Ashmore et al., 2008; Carels et al., 2009; Puhl et al., 2007; Vartanian & Shaprow, 2008), along with the other deleterious health consequences (e.g., Eisenberg et al., 2003; Puhl & Heuer, 2009). By substituting the stigmatizing images of obese persons commonly used in news stories and other media outlets with positive portrayals, the public's negative attitudes and stereotypes held about obese persons can be significantly reduced. Thus, the present study offers a simple alternative for media outlets that would benefit people who are overweight and obese, as well as satisfy the general public who may not wish to view stigmatizing images.

To our knowledge, this was also the first study to explore differences in public opinions toward obese persons and media

images based on the gender or race of the obese person pictured. Although research suggests that women may be more vulnerable to experiences of weight bias (Puhl et al., 2008) and culture may moderate perceptions of body and weight-related issues (Hebl & Turchin, 2005; Paxton, Eisenberg, & Neumark-Sztainer, 2006), the present findings reveal that the media's impact on stigmatizing attitudes toward obesity extend across gender and race. Hence, positive images portraying obese persons of different genders and races may be ideal for comprehensively reducing weight bias.

A limitation of this study was the homogeneous racial and ethnic composition of the samples. Research suggests that people may hold harsher weight-related evaluations of people of their own race than those of other races (Hebl & Turchin, 2005), so future studies should include both same- and cross-racial evaluations of images of obese persons. The study design also did not include images of obese Black men, nor did it compare the effects of images of the Black woman and the White man. This study served as a preliminary investigation of the effects of media portrayals on attitudes toward obese persons and images, but future studies could use a more diversified set of images, as well as images portraying persons of other ethnic and racial backgrounds. It may also be beneficial to test whether images of severely obese persons have a stronger impact (the models featured in this study had BMIs over 30 but under 40) given that research indicates that stigma is greater for those who fall into this category (Puhl & Heuer, 2009). In addition, although the image pretests did not reveal differences in ratings of model characteristics such as attractiveness, other image features such as the model's body position or clothing may have influenced participants' reactions to the images. Another limitation was that participants could see only one image for each condition. Replications of this study using different positive and stigmatizing images would enhance the generalizability of our findings. Furthermore, because this study was not longitudinal, we cannot conclude that these images have a lasting impact on attitudes over time. Because this study was conducted online, there is also the risk that participants did not fully attend to the images and questions. Finally, this study was limited in its reliance on self-report data, and we cannot conclude that changes in attitudes will translate into changes in discriminatory behaviors.

The findings from these two experiments have implications for media practices and public health. The common usage of negative images may reinforce internalization of weight bias among overweight and obese persons, but the use of positive images may help buffer this effect, reducing negative emotional and physical outcomes linked to weight bias internalization (Puhl & Heuer, 2009). It is possible that stigmatizing images picturing obese persons eating unhealthy food or being sedentary strengthen notions of blame for obesity that lead to antifat attitudes (Puhl & Heuer, 2010), whereas positive images distract from or contradict these attributions. Although the primary purpose of this research was to identify an effect, future studies are needed to explore this and other potential mechanisms, as well as examine how stereotypical versus positive images impact public perceptions of news story content.

Although media images have previously been found to reinforce and perpetuate stigma (e.g., Abraham & Appiah, 2006; Gibson & Zillmann, 2000; Messaris & Abraham, 2001; Puhl & Heuer, 2009), these findings suggest that the media have the power to correct this problem by changing the type of images used in journalistic

reporting and other forms of media communication. The media have a documented ability to shape public perceptions about health and social issues, as well as impact health behaviors such as food consumption (Campbell & Mohr, 2011; Major, 2009; Nelson, Oxley, & Clawson, 1997; Schvey et al., 2011), so discontinuing the use of negative images may stop the spread of inaccurate perceptions about obese persons, and help increase public support for obesity prevention and treatment efforts. A significant first step would be for news and popular media sources to pledge against perpetuating negative stereotypes of obese persons and use more positive images from the Rudd Center archive or other resources to create a new default set of images. Given the consistent associations between weight stigma and poor health outcomes (Puhl & Heuer, 2010), such a change in media practice could have a substantial impact on public attitudes and public health.

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