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Individual differences and weight bias: Do people with an anti-fat bias have a pro-thin bias?

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Abstract

While levels of weight bias vary among individuals, it is not clear why one person possesses stronger anti-fat attitudes than another person. This investigation examined whether individual differences commonly associated with greater anti-fat bias are also associated with a greater preference for thinness among people of varying levels of weight. Young adults (62% women; 84% Caucasian) recruited from psychology classes ($N = 308$) rated four male and female figures with approximate BMIs of 18.5, 25, 30, and 40, on measures of dislike and personality characteristics and completed measures assessing weight controllability, attitudes toward the obese, and perceptual reliance. Greater negative attitudes, weight controllability beliefs, and perceptual reliance were positively associated with greater dislike and negative personality attributes among obese/severely obese figures, but inversely related among low normal weight figures. Individuals who judge others based on physical features or who view obesity as controllable evidence greater weight bias and a stronger preference for thin body types.

Introduction

Weight bias among children and adults is widespread (Puhl & Heuer, 2009; Puhl & Latner, 2007) and overweight individuals experience weight-based discrimination at rates that rival racial discrimination (Andreyeva, Puhl, & Brownell, 2008). In nearly all areas of life, including interpersonal relationships, education, employment, and health care, obese persons are the targets of weight stigma (Puhl & Heuer, 2009; Puhl & Latner, 2007). Obese individuals who experience weight-based stigmatization or who internalize society's prejudiced attitudes toward weight are more likely to suffer from psychological distress, binge eating, and body image disturbance (e.g., Ashmore, Friedman, Reichmann, & Musante, 2008; Carels et al., 2009; Durso & Latner, 2008; Friedman et al., 2005; Myers & Rosen, 1999). Additionally, individuals, particularly women, experience considerable societal pressures to be thin (Thompson & Stice, 2001).

Levels of weight bias can vary considerably between individuals (Crandall, 1994) and it's not clear why one person possesses stronger anti-fat attitudes than another person. However, Crandall (1994) observed an association between greater weight bias and greater endorsement of ideological beliefs that people get what they deserve in life (i.e., "just world beliefs") and that hard work and determination lead to good things (i.e., Protestant work ethic). Thus, individual difference factors may contribute to variability in weight bias observed among individuals.

To our knowledge, no research has examined whether individual differences commonly associated with greater anti-fat bias also reveal a greater preference for thinness. We wanted to determine whether people who possess a negative bias toward fat people, also evidence a corresponding positive bias toward thin people. To examine this question, two individual difference factors commonly associated with weight bias (global attitudes toward obesity;

controllability of weight) were chosen (Allison, Basile, & Yaker, 1991; Carels et al., 2009; Musher-Eizenman, Holub, Miller, Goldstein, & Edwards-Leeper, 2004). In the present study, we speculated that someone who possesses globally negative attitudes toward obese individuals and someone who views body weight as highly controllable would be more likely to judge obese individuals more negatively and thin individuals more favorably.

This investigation also examined a novel individual difference factor (i.e., Perceptual reliance [PR]) that might contribute to evaluations of obese and thin individuals. Perceptual reliance reflects the propensity to judge individuals based on physical appearance. While research indicates that the physical appearance of a target profoundly influences individual and group perceptions (Zebrowitz, 1996), no research has examined whether individuals prone to judging others using perceptual features (i.e., PR) are more likely to judge overweight/obese persons negatively. Given the well-documented pro-thin bias in the United States, it is plausible that perceptually reliant individuals may attend more closely to body weight and be more likely to judge individuals consistent with prevailing attitudes toward weight.

The goals of the current study were to examine how individual difference variables (i.e., general attitudes toward overweight people, perceived controllability of weight, and PR) were related to individuals' evaluations of specific targets of known weight status (i.e., low normal weight, overweight, obese, extremely obese). Research on weight bias has often relied on self-report measures or line drawings. As such, it has been suggested that weight bias research might benefit from determining the correspondence between a specific BMI and reports of weight bias (Puhl & Brownell, 2003). Recent research using realistic targets of known weight status has yielded important findings (Swami, Chan, Wong, Furnham, & Tovee, 2008; Swami, Furnham, et al., 2008). For example, two experimental studies using photographic stimuli of real people with known BMIs found obese individuals (BMI > 30) were less likely to be hired for a fictional job, less likely to be helped following a fictional minor accident (Swami, Chan, et al., 2008), and more likely to receive attributions of laziness, loneliness, and teasing (Swami, Chan, et al., 2008). In the current investigation, realistic figures were created to depict BMIs ranging from approximately 18.5 through 40 in both men and women.

It was hypothesized that individuals high in PR, with stronger beliefs that weight is controllable, and stronger global negative attitudes toward obese people would rate figures of increasing BMI with greater dislike and negative personality attributes, compared to individuals lower on these traits. In addition, it was hypothesized that low normal weight targets would be evaluated significantly more positively by individuals possessing high levels of these individual difference factors (i.e., pro-thin bias). Comparisons between participants' reported negative attitudes toward the obese and extremely obese targets, relative to the other targets have been discussed previously (Musher-Eizenman & Carels, 2009).

Method

Participants and procedures

Participants were 308 young adults (62% women) recruited from undergraduate psychology classes. Students received research credit for participating in the study. Students who signed up to participate were sent a link to one of four on-line surveys. Surveys were identical except for the order of presentation of the figures and the appearance (e.g., hair color) of the target figures which was varied randomly. Participants completed the survey independently, and data were recorded automatically. Procedures were approved by the Human Subject Review Board of Bowling Green State University.

Regarding missing data, if one scale item was missing, the mean of remaining items was used. If more than one item was missing, no score was calculated for that person's scale. Two-hundred ninety-nine individuals completed all surveys.

Demographic data

Participants' self-reported race was 84% Caucasian, 10% African American, and 6% other races (Asian, Hispanic, and mixed race). The mean age of participants was 20.06 years ($SD = 2.58$; range 18–37 years). Body Mass Index was calculated based on self-reports of height and weight [$M(\text{men}) = 25.17$, $SD = 4.72$; $M(\text{women}) = 23.79$, $SD = 4.26$].

Measures

Weight ratings and bias—Participants saw images of eight individuals (4 men, 4 women) which were created using MyVirtualModel (2008). (See Appendix A for sample male and female figures at BMIs of 18.5, 25, 30, and 40.) The target individuals were created to represent people of average height in the United States (50400 for women and 501000 for men) at BMIs of approximately 18.5, 25, 30, and 40. These BMIs represented the lower bounds of “normal weight,” “overweight,” “obese,” and “extremely obese” (National Heart, Lung, and Blood Institute, 1998). Because of the concern that rating identical targets with only BMI varied would result in cross-contamination of dislike and personality attribute ratings across targets, multiple versions of each target figure were created, and appearance (e.g., hair style) was randomly varied across BMIs for each participant. Figures depicted Caucasian individuals in exercise attire (female: shorts and tank top; male figure: shorts only) with hair style and hair color randomly varied. The three-dimensional body scanners used to create the MyVirtualModel software are highly accurate at capturing surface typology (Horiguchi, 2008; Wells, Treleaven, & Cole, 2007).

Participants completed several sets of ratings about each figure. One set of ratings assessed participants' dislike of the target. *Dislike* included six questions about the extent to which the participant found the target figure to be unlikable (e.g., “people like this make me somewhat uncomfortable”). Two items were adapted from Crandall (1994; i.e., “I really don't like people like this much”; “people like this make me feel uncomfortable”), one item from Quinn and Crocker (1999; i.e., “I have somewhat of a negative reaction when I see this person”), and three items were created for this study (“I'd like to be friends with someone like this”; “I'd like to hang out with someone like this”; “I'd like to socialize with someone like this”). Participants responded on a 9-point scale from “strongly disagree” to “strongly agree.”

A second set of ratings assessed participants' perceptions of the targets' personality attributes using the 14-item Fat Phobia Scale – Short Form (Bacon, Scheltema, & Robinson, 2001). Cronbach's alphas for the 14 items ranged from .79 to .89 across target figures.

Attitudes Toward Obese Persons Scale (ATOP)—The ATOP (Allison et al., 1991) consists of 20 items that assess stereotypical attitudes and beliefs about obese persons (e.g., “obese people are usually untidy”) on a 6-point rating scale from “strongly agree” to “strongly disagree”. Cronbach's alpha for this investigation was .78.

Controllability—Belief in the controllability of weight was assessed with Quinn and Crocker's (1999) modification of Crandall's Anti-fat Attitudes Scale Willpower subscale (Crandall, 1994). The controllability scale consists of eight items assessing the belief that obese persons can control and are responsible for their weight (e.g., “Fat people can lose weight if they really want to”). Items are rated on a 7-point scale from “strongly disagree” to “strongly agree”. Cronbach's alpha for this investigation was .85.

Perceptual Reliance Index (PRI)—The PRI (Livingston, 2001) is a nine-item measure that assesses a tendency to rely on external stimuli qualities in forming social impressions. All items assess the perceivers' confidence in making social inferences based on perceptual cues (e.g., "you can tell a lot about someone's character just by looking at them"), attunement to patterns of covariation in physical appearance (e.g., Japanese and Chinese people are almost identical), and evaluative reactions to physical appearance (e.g., you can usually tell a lot about someone's personality and lifestyle by the type of clothing they wear) on a 5-point rating scale from "totally disagree" to "totally agree". Cronbach's alpha for this investigation was .75.

Results

Preliminary data analyses

Because three of the six items from the dislike scale were created for this study, it was necessary to confirm the factor structure of the dislike scale. A principal components exploratory factor analysis performed using dislike ratings from the male figure with a BMI of 25 yielded one interpretable factor with all six items loading on a single factor (loadings = .74–.88). Bartlett's test of sphericity was significant $\chi^2(15, N = 299) = 2487.23, p < .001$, and the Kaiser–Meyer–Olkin measure of sampling adequacy was 0.82 indicating that the factor model was appropriate. Cronbach's alphas for the 6 items ranged from .88 to .92 across the 8 figures.

Associations among individual differences

Pearson correlations were used to examine the association among the individual differences. There were moderate, positive correlations between ATOP, controllability beliefs, and PR scores. Controllability beliefs were correlated with PR scores ($r = .41$) and ATOP scores ($r = .39$). PR and ATOP were correlated ($r = .49$).

Ratings of dislike and personality attributes

Pearson correlations were used to examine the association between the individual differences and ratings of dislike and personality attributes for low normal, overweight, obese and severely obese male and female figures. Greater PR, stronger beliefs that weight is controllable, and stronger global negative attitudes and beliefs toward obese people were associated with significantly more negative personality attributions for the obese and extreme obese male and female figures (Table 1). In all instances, the correlation between these individual differences and negative personality attributes were higher when rating extreme obese figures compared to obese figures. Furthermore, the associations between individual differences and ratings of personality attributes were reversed for low normal and overweight male and female figures.

Greater PR, stronger beliefs that weight is controllable, and stronger global negative attitudes and beliefs toward obese people were associated with more positive personality attributions for the low normal weight and overweight (with the exception of global negative attitudes and overweight) male and female figures. Greater PR, stronger beliefs that weight is controllable, and stronger global negative attitudes and beliefs toward obese people were also associated with significantly greater dislike of the obese and extreme obese male and female figures (Table 1). In all instances, the correlation between these individual differences and dislike were higher when rating extreme obese figures compared to obese figures. Beliefs that weight is controllable, PR, and global negative attitudes and beliefs toward obese people were not associated with likability ratings of the low normal and overweight male and female figures.

Hierarchical linear modeling: dislike, negative attributes and individual differences

Hierarchical linear modeling (HLM) was used to examine the cross-level interaction between weight (BMI of 18.5, 25, 30, 40) and individual differences predicting dislike and negative personality attribute ratings, respectively, by figure gender. HLM allows for two levels of analysis (within-subject and between-subject) to be conducted simultaneously while adjusting for the autocorrelation of the observations, thus reducing the possibility of inflated results (Hox, 2002). The hierarchical regression equations were specified using HLM 6.02 (Science Software International [SSI]; Lincolnwood, IL), using restricted maximum likelihood computations.

The models with figure BMI and individual differences predicting figure ratings were examined using separate HLM equations containing within subject figure BMI, between subject individual differences, and the cross-level interaction of BMI and individual differences. Of interest in this investigation was the cross-level interaction of figure BMI and individual differences. In all analyses, the cross-level interaction between individual differences and figure BMI was statistically significant (Table 2). Being higher in PR, having stronger beliefs that weight is controllable, and having greater global negative attitudes predicted greater dislike and global negative personality attributes as target BMI increased.

In analyses examining the independent contribution of the interactions between individual differences and BMI on the prediction of dislike and personality attributes, the cross-level interactions of BMI by beliefs that weight is controllable, global negative attitudes, and PR remained independent contributors of negative personality attributes for the male and female figures as well as dislike ratings for the female figure. While the cross-level interactions of BMI by beliefs that weight is controllable and global negative attitudes remained significant for dislike ratings for the male figure, the cross-level interaction between BMI and PR was no longer significant.

Discussion

In this investigation, there was a strong association between individual differences and target ratings of known weight status. For example, in all HLM models, a significant cross-level interaction was observed between the individual difference factor and target weight for ratings of dislike and negative personality attributes. With the exception of the cross-level interaction between BMI and PR on dislike ratings of male figures, all individual difference factors independently predicted dislike and personality adjective ratings for male and female figures.

To our knowledge, this is the first investigation to examine the association between a greater propensity to judge individuals based on physical appearance generally and greater anti-fat attitudes. It appears that the extent to which a person relies on perceptual information, such as appearance, in determining attitudes toward others also impacts the degree to which they make negative evaluations of obese individuals. It is interesting to note that items on the PR scale ask about general social judgment tendencies and do not reference weight or obesity at all.

A finding that has been well documented in the literature and replicated here, is that people who believe that weight is controllable had more negative attitudes toward the obese and extremely obese figures, relative to the people who felt that weight is not controllable. Similarly, respondents' general attitudes about obese persons were highly related to their evaluations of the target figures. While not surprising, it is important to have confirmed that

these general attitudes translate to negative evaluations of specific obese and extremely obese target figures.

In addition, this investigation examined whether individual difference factors that are associated with greater anti-fat attitudes are also associated with more positive ratings of thinner targets. In some cases, the individual difference variables were related not only to more negative ratings of the obese and extremely obese targets, but also to more positive ratings of personality attributes of the low normal weight (BMI $\leq$ 18.5) and in several instances the overweight (BMI $\leq$ 25) targets. We were surprised to see the direction and magnitude of the correlation coefficients reversed when evaluating low normal versus obese individuals on personality attributes. Evidently, the same attitudes that contribute to an anti-fat bias also contribute to a pro-thin bias when contemplating personality attributes. Given the ubiquity of overweight, perhaps past experiences with dieting may have led participants to attribute positive personality attributes to those individuals who are able to stay thin or are only minimally overweight in today's obesogenic culture. In contrast, individual differences associated with greater dislike of the obese and extremely obese figures were not related to level of dislike of low normal and overweight figures. Future research might explore why individuals might assign more positive personality characteristics to thinner figures, but not report greater liking of these figures.

In this investigation, perceived controllability, PR, and general negative attitudes were not related to negative evaluations of the overweight (BMI $\leq$ 25) target figure. This is consistent with other findings which demonstrate that target figures with a BMI of about 25 do not elicit negative judgments (Musher-Eizenman & Carels, 2009). It is possible that because nearly two-thirds of the US population is overweight (BMI $>$ 25), people see being overweight as normal.

Although the findings here contribute to our understanding of weight bias, the current study has several limitations that should be addressed in future research. The current sample's limited age range and racial diversity suggests that replication of these findings with more diverse samples is warranted, as is research using non-Caucasian target figures. Also, while 3-dimensional body scanners used to create the MyVirtualModel software are highly accurate at capturing surface typology (Horiguchi, 2008; Wells et al., 2007), using photographs of real people of various BMIs (Swami, Chan, et al., 2008; Swami, Furnham, et al., 2008) may increase the ecological validity of the research. Similarly, the range of BMIs of the figures in our research was clearly restricted. Research using figures spanning a greater range (e.g., underweight targets; targets with even higher BMIs) as well as making finer distinctions within weight categories (e.g., a BMI of 25 versus 28) would shed further light on this issue. For example, some research suggests that emaciated (BMI $<$ 15) individuals may also be targets target figures differed not only in BMI, but also in hair color, skin tone, hair style, posture, etc. While four versions of each target figure were created and appearance (e.g., hair color and length) was randomly varied across BMIs for each participant, we cannot rule out the possibility that appearance-related factors known to influence evaluations (Bateson, Cornelissen, & Tovee, 2007) influenced participant ratings. Finally, given the importance of implicit attitudes in predicting behavior as well as their resistance to change, future research would benefit from examining whether individual differences are associated with implicit bias.

In this investigation, there was great correspondence between the findings for the male and female figures. Some research has suggested that weight bias may be more prevalent for women (Hebl & Turchin, 2005) whereas other research has failed to find this difference (Puhl & Brownell, 2006). The current findings suggest that some individual difference variables do not differentially relate to weight bias against men or women.

Findings from the current investigation may be used to inform stigma-reduction interventions. For example, recent research suggests that social norms and consensus (Puhl, Schwartz, & Brownell, 2005) may be powerful tools to reduce evaluations of others based on weight. Similarly, interventions that challenge a tendency to rely on perceptual information in social judgments may be effective in reducing weight bias. Given that stigmatizing experiences have negative physical and psychological consequences for people who experience them (Puhl & Heuer, 2009), further understanding of the factors that exacerbate weight bias is critical for improving the well-being of obese individuals.

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Appendix A

Sample male and female figures at BMIs of 18.5, 25, 30, and 40

Pearson correlations between perceptual reliance, beliefs that weight is controllable, global negative attitudes toward obese and ratings of dislike and personality attributes among male and female figures.

Table 1

	Dislike			Personality attributes			
	LN	Ov	Ob	ExOb	LN	Ov	Ob
Females							
Negative Attributes	-.06	.04	-.26**	-.37**	.19**	.10	-.24**
Weight Control	.00	-.03	.28**	.33**	-.20**	-.13*	.24**
Perceptual Reliance	-.06	-.06	.12*	.33**	-.20**	-.15*	.16*
Males							
Negative Attributes	-.02	-.00	-.29**	-.31**	.19**	.11	.22**
Weight Control	.02	-.02	.24**	.27**	-.24**	-.04*	.20**
Perceptual Reliance	.01	.01	.22**	.27**	-.23**	-.16**	.12*

LN = Low Normal weight target, Ov =Overweight target, Ob=Obese target, ExOb = Extremely Obese target.

** p<.01.
* p<.05.

Table 2

Hierarchical (multilevel) regression examining the cross-level interaction between BMI and individual differences on ratings of negative personality attributes and dislike.

	Males				Females			
	β	SE	t	p $\leq$	β	SE	t	p $\leq$
Personality								
BMI ^a	.65	.02	38.16	.001	.59	.03	33.13	.001
Perceptual Reliance ^b	.01	.02	0.28	.780	.03	.02	1.43	.150
Interaction ^c	.15	.03	4.93	.001	.15	.03	5.97	.001
BMI ^a	.65	.02	38.56	.001	.59	.02	34.01	.001
Controllability ^b	.03	.01	2.51	.013	.05	.02	3.10	.003
Interaction ^c	.10	.02	6.57	.001	.12	.01	7.92	.001
BMI ^a	.65	.02	38.29	.001	.59	.02	33.31	.001
Negative Attitudes ^b	-.06	.03	2.07	.039	-.08	.03	2.79	.006
Interaction ^c	-.19	.03	5.89	.001	-.20	.03	6.46	.001
Dislike								
BMI ^a	.49	.03	17.51	.001	.58	.03	17.18	.001
Perceptual Reliance ^b	.30	.11	2.79	.006	.23	.10	2.41	.02
Interaction ^c	.24	.04	5.65	.001	.37	.05	7.23	.001
BMI ^a	.49	.04	13.92	.001	.58	.04	13.16	.001
Controllability ^b	.19	.06	2.88	.005	.23	.06	3.66	.001
Interaction ^c	.15	.04	4.24	.001	.22	.05	4.89	.001
BMI ^a	.49	.03	17.68	.001	.58	.03	17.11	.001
Negative Attitudes ^b	-.49	.13	3.81	.001	-.58	.11	5.20	.001
Interaction ^c	-.35	.05	6.99	.001	-.42	.08	5.21	.001

^a1992 within subject entries.

^b297 between subject entries.

^cCross-level interaction: BMI $\times$ Individual difference.