Original Article
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Obesity

Weight Bias in 2001 versus 2013: Contradictory Attitudes Among Obesity Researchers and Health Professionals

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Objectives: To assess levels of two types of anti-fat bias in obesity specialists, explicit bias, or consciously accessible anti-fat attitudes, and implicit bias, or attitudes that are activated outside of conscious awareness, were examined. This study also assessed changes over time by comparing levels of bias in 2013 to published data from 2001.

Methods: In 232 attendees at the ObesityWeek 2013 conference, we measured explicit anti-fat bias and conducted the Implicit Association Test. These data were compared to those from a study conducted at the 2001 meeting of this group.

Results: Participants exhibited significant implicit and explicit anti-fat/pro-thin bias. Positivity of professional experience with obesity, but not type of professional experience, was correlated with lower explicit anti-fat bias. Compared to 2001, the 2013 sample had lower levels of implicit bias and higher levels of explicit bias.

Conclusions: Although implicit anti-fat attitudes appeared to decrease from 2001 to 2013, explicit anti-fat attitudes increased. Future research should examine whether increasing positive experiences with obese patients reduces anti-fat bias among health professionals. Together, these results suggest that despite the current climate of widespread anti-fat bias, there are pathways toward understanding and ameliorating this bias.

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Introduction

Individuals perceived as overweight or obese face widespread anti-fat bias, defined as social devaluation and denigration of people considered to carry excess weight, which leads to prejudice, negative stereotyping, and discrimination (1). Many factors give rise to these attitudes, including perceptions that obesity is controllable and therefore represents negligent personal responsibility (2). This bias may manifest as either explicit or implicit bias. Explicit bias refers to conscious negative attitudes, often represented by discrimination and prejudice against a social group. Implicit bias, on the other hand, can be defined as negative attitudes that are activated outside of conscious attention (3). An example of a manifested implicit attitude might be a person unintentionally providing better treatment to a thin versus heavy individual despite having no conscious negative attitudes toward heavy individuals. Both types of attitudes predict behavior (e.g., Ref. 4), but their correlation is often moderate (5).

Weight bias is widespread, with some calling it the last "socially acceptable" form of social stigma (1). Evidence of weight bias has been documented in several areas, including employment discrimination (6), media (7), and interpersonal (1) domains. Weight bias has also been observed in healthcare settings (1). Clinician weight bias in the healthcare setting is linked to lower rates of preventive care and increased likelihood of emergency room visits among obese patients (8,9). Experiencing weight stigma can also, ironically, increase unhealthy eating behaviors, thereby potentially exacerbating overweight and obesity (10-13).

Less is known about weight bias, whether explicit or implicit, among scientific researchers—particularly in researchers specializing in obesity. In one study that took place in 2001, Schwartz et al. (14) measured weight bias among researchers and health professionals attending the Annual Meeting of the North American Association

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for the Study of Obesity (NAASO, now named The Obesity Society; TOS). They found that obesity specialists, consisting of researchers, clinicians, and other obesity-related professionals, held anti-fat/pro-thin* implicit and explicit bias, and explicitly endorsed obesity-related stereotyping on traits of "lazy," "stupid," and "worthless."

While the presence of weight bias in these settings has been documented, little is known about whether these explicit and implicit attitudes have changed over time. There is evidence that some forms of social stigma have decreased. For example, the Gallup organization has identified dramatic decreases in prejudice against Black individuals since the 1970s, with similar trends for negative attitudes toward sexual minorities (15). Yet weight stigma may be unlike other social categories. Reports of weight discrimination increased from 1995 to 2006 (16), and weight stigma may now be more common than stigma based on other social identities (17). Furthermore, recent health policy scholars and public health efforts such as the Strong4Life campaign have promoted obesity stigma in order to motivate weight loss (18).

We therefore had two aims in this study. The first was to investigate weight bias among scientific researchers specializing in obesity and other obesity-related professionals. Given the pervasiveness of weight stigma (1), we hypothesized that both explicit and implicit weight bias in this sample would be significantly anti-fat. The second aim of this study was to examine changes in explicit and implicit weight bias since 2001 by replicating the methods used by Schwartz et al. at the 2001 NAASO meeting (14). We conducted our study at ObesityWeek 2013, the NAASO/TOS annual meeting jointly held with the American Society for Metabolic and Bariatric Surgery. Given the upward trend in weight discrimination from the 1990s to the 2000s (16), we hypothesized that explicit weight bias would be higher in 2013 than in 2001. Given prior research demonstrating that implicit attitudes are resistant to change (e.g., Ref. 19), we hypothesized that implicit bias would be no different.

Methods

Participants

Participants ($N = 232$) were attendees at ObesityWeek 2013 in Atlanta, Georgia. Demographic characteristics of this sample and the 2001 Schwartz et al. (14) sample are detailed in Table 1.

Procedure

The University of California, Los Angeles Institutional Review Board approved all procedures. Participants were recruited through approaching conference attendees ($n = 173$) and through group administration of procedures at the business meeting session ($n = 59$). In the group administration setting, a member of our research team invited the session attendees to participate and provided instructions while other research team members distributed materials and monitored adherence. In addition, conference presenters outside our team advertised the study to their audiences.

Participants were given a study packet with the first two pages providing an information sheet that did not request signatures or any identifying information. Completion of the remainder of the packet indicated consent to participate. Next, participants provided demographic information and completed a practice Implicit Association Test (IAT; see measures) before completing the actual tasks. Participants were instructed to work as quickly and accurately as possible and to categorize each item in order without skipping or changing any responses. After completing the IAT, participants completed explicit bias measures.

Measures

Demographics. Demographic questionnaires collected age, sex, race, education, occupation, political beliefs, height, and weight information. We computed BMI using the standard formula (weight in pounds/height in inches^2 × 703).

Self-weight perception. Participants rated "how do you perceive your own weight?" on a 7-point scale (1 = *extremely thin,* 4 = *average*, 7 = v*ery overweight*).

Emotional outlook. Participants rated their general emotional outlook on life on a 5-point scale (1 = *often very depressed*, 3 = *neutra*l, 5 = *usually very happy and optimistic*).

Professional experience. Participants rated the valence of their professional experience with obese people on a 7-point scale (1 = *negative*, 4 = *neutral*, 7 = *positive*). Participants also reported their professional experience with obesity as: (a) conducting obesity-related research, (b) working directly with obese patients, (c) both, or (d) neither.

Personal experience. Participants rated the valence of their personal experience with obese people on 7-point scales (1 = *negative*, 4 = *neutral*, 7 = *positive*). They were also asked to rate how well they understood what it is like to be obese on a 7-point scale (1 = *not at all*, 4 = *somewhat*, 7 = *extremely well*).

IAT. The Implicit Association Test is a timed word categorization task that assesses implicit attitudes with high reliability and validity (20). Studies have shown that IAT scores can predict behavior in settings concerning stigmatized social identities (4,21). Because we needed to test large numbers of participants simultaneously, and to parallel the original study by Schwartz et al. (14), we administered the paper and pencil IAT format. This format involves giving participants a list of words to classify into one of four possible categories, with only one possible correct category for each word. For example, in the present study participants were first given a practice task with a list of words (*bugs, mosquito, roach, daisy, daffodil, tulip, nasty, horrible, terrible, excellent, joyful,* and *wonderful*) to classify into one of four categories (*insects, flowers, bad,* and *good*). These categories were paired on either side of the IAT form (e.g., *flowers* and *bad* on the left side, and *insects* and *good* on the right side). Participants were instructed to categorize each word by making a checkmark on either the left or the right column next to the word. When instructions pair two words together on the same side of the form that are "matched" or highly associated (e.g., *flowers* and *good*) versus "mismatched" or less associated (e.g., *insects* and *good*), participants are able to correctly categorize a greater number of words in the allotted 20 sec for each task. Anti-fat bias was calculated as the difference between the number of correct categorizations when word category pairings were matched versus mismatched. Therefore,

*As the implicit measure is a relative measure of fat/thin bias, we use the terms "anti-fat/pro-thin bias" here, but will hereafter use the term "anti-fat bias."

TABLE 1 Descriptive statistics

	2001 Sample (20)			2013 Sample			
	M (SD)	%	*n*	*M* (SD)	%	*n*	*P*
Age	42.02 (11.66)			42.52 (12.82)			0.188
Male		49	191		41	94	0.085
Female		51	198		59	134	
BMI	24.12 (4.23)		318	24.60 (3.63)		206	0.180
Personal weight perception	Not collected			4.38 (1.02)		231	
Graduate/professional degree		89			82		0.180
Race/ethnicity							0.087
White		82			73		
Asian		10			10		
Hispanic/Latino		3			8		
Black		3			3		
Other		1			3		
Professional experience							<0.001
Obesity-related research		64			21		
Work directly with obese patients		9			26		
Both		24			33		
Profession							0.848
Physicians		31			31		
Research—Humans		21			19		
Research—Animals		14			4		
Dietitians		8			5		
Nurses		1			5		
Students					4		
Psychologists		3			3		
Business		7			3		
Epidemiologists		4			2		
Other obesity clinicians		5			2		
Other research					2		
Pharmacologists		4			1		
Other		3			6		

higher scores indicated greater associations between *fat* or *fat people* and negative traits, and a score of zero indicated no difference in implicit attitudes toward thin versus fat people. Positive numbers indicated anti-fat bias.

After completing the practice task, all participants performed an IAT with the categories *thin*, *fat*, *good*, and *bad*. Each participant completed the task two times: once with *thin* paired with *good* and *fat* paired with *bad*, and once with *fat* paired with *good* and *thin* paired with *bad*. We counterbalanced whether *good* was first paired with *thin* or *fat* between participants. Next, participants were randomized to one of three different IAT versions, each of which assessed the strength of the associations between *thin people* and *fat people* and one of the following three obesity-associated stereotype matched pairs: *lazy*/*motivated*, *stupid*/*smart*, and *worthless*/*valuable*. Schwartz et al. (14) chose these stereotypes because they captured the most common anti-fat beliefs identified by Puhl and Brownell (22) on explicit weight bias and discrimination. We counterbalanced within each stereotype so that each word either appeared with *thin* first or *fat* first. The categories and their respective word list are available in the work by Schwartz et al. (14).

Explicit bias. Each participant completed four questions assessing explicit anti-fat bias. Participants rated their general feelings toward *thin people* and *fat people* on a 7-point scale (1 = *extremely bad* and 7 = *extremely good*). Next, they rated the specific stereotype matched pairs that had just been assessed in their respective IAT (i.e., *lazy*/*motivated*, *stupid*/*smart*, or *worthless*/*valuable*) on a second 7-point scale. Using this scale, participants chose the item that corresponded with the "best description" of *thin people* and *fat people* (i.e., 1 = *extremely lazy* to 7 = *extremely motivated;* 1 = *extremely stupid* to 7 = *extremely smart*; or 1 = *extremely worthless* to 7 = *extremely valuable*). To calculate explicit bias, we subtracted the score on the 7-point scale for *fat people* from the score on the scale for *thin people*. A score of zero indicated no difference in attitudes toward thin versus fat people, and thus no explicit anti-fat bias, and higher scores indicated greater explicit anti-fat bias.

Analytic plan

Our analytic plan mirrored Schwartz et al. (14). Paralleling previous studies using paper-and-pencil IAT methodology (14,23), any participants who categorized fewer than four words or skipped more than

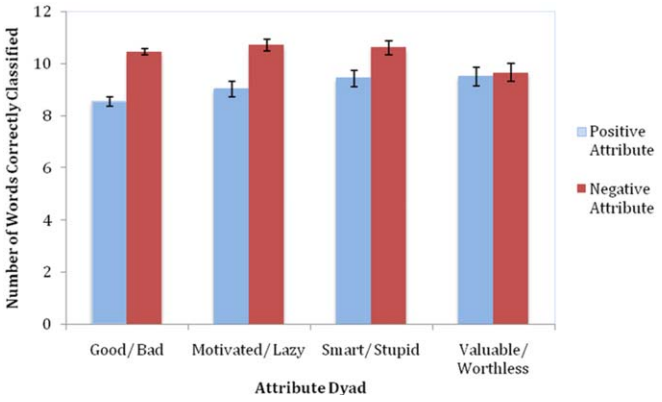

Figure 1 Number of words correctly classified when "fat people" was paired with positive versus negative attributes. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

four words ($n = 24$, 10.3% of sample) were considered non-responders and excluded from the IAT analyses only. Our number of excluded participants is commensurate with previously published exclusion rates (e.g., 14%; 14). Two participants were excluded from IAT analyses for failure to adhere to timing instructions.

We assessed implicit bias using paired *t*-tests. For each of the four trait dyads, we compared the number of words correctly classified when *fat* or *fat people* was paired with the positive versus the negative trait (i.e., number of words correctly classified when *fat people* was paired with *valuable* versus *worthless*). We hereafter refer to implicit and explicit scores for the four trait dyads as the *bad*/*good*, *lazy*/*motivated*, *stupid*/*smart*, and *worthless*/*valuable* scores, with positive numbers indicating stronger anti-fat bias.

To investigate which variables might be associated with anti-fat bias, we conducted correlation analyses or analysis of variance testing between the implicit and explicit scores and other study variables such as demographics. To test whether adjustment for potential covariates was required, we tested whether type of professional experience, weight perception, BMI, age, sex, or race was related to either predictor or outcome. We adjusted for any significant covariates as noted below.

Finally, we compared the current sample's implicit and explicit scores with the original data from Schwartz et al. (14) using analysis of variance (and analysis of covariance where appropriate) to evaluate any differences in both implicit and explicit anti-fat bias in 2001 versus 2013. The explicit bias items were on the same scale and thus directly comparable. To compare implicit bias values in the two studies, we converted bias scores to *d*-scores (20) using each sample's respective SD.

Results

2013 implicit attitudes

Paired *t*-tests indicated that participants correctly categorized significantly more words when *fat* was paired with *bad* versus *good*, $t(207) = 10.17$, $P < 0.001$, 95% CI [1.54, 2.28]; when *fat people* was paired with *lazy* versus *motivated*, $t(78) = 5.75$, $P < 0.001$, 95% CI [1.11, 2.28]; and when *fat people* was paired with *stupid* versus *smart*, $t(63) = 3.72$, $P < 0.001$, 95% CI [0.55, 1.83]. There was no difference in the number of words correctly categorized when *fat people* was paired with *worthless* versus *valuable*. Figure 1 presents the number of words correctly classified when fat was paired with each attribute dyad.

2013 explicit attitudes

Participants reported stronger general bad feelings toward fat people than thin people, $t(230) = 9.44$, $P < 0.001$, 95% CI [0.63, 0.96]. Regarding specific traits, participants described fat people as significantly more lazy, $t(82) = 7.46$, $P < 0.001$, 95% CI [0.87, 1.50], stupid, $t(76) = 2.87$, $P = 0.005$, 95% CI [0.06, 0.31], and worthless, $t(69) = 2.73$, $P = 0.008$, 95% CI [0.06, 0.37], compared to thin people.

Table 2 displays correlations between implicit and explicit anti-fat bias. To determine the appropriate covariates for the 2013 analyses, we tested whether the variables in question related to the predictor or outcome variables. We found that race significantly related to implicit worthless/valuable scores ($P = 0.035$). BMI significantly related to age ($P < 0.001$), and gender significantly related to BMI ($P = 0.002$). Gender was related to age ($P = 0.007$). The following analyses adjust for these covariates as appropriate. As is common in implicit bias research, explicit and implicit biases were uncorrelated in several instances.

2013 weight bias and demographic variables

Table 3 displays correlations between the continuous demographic variables (age, BMI, emotional outlook, personal experience, professional experience, and self-weight perception) and the implicit and explicit measures. In terms of categorical demographic variables, implicit and explicit anti-fat bias did not differ significantly by sex (with or without the significant covariates of BMI and age), but implicit worthless/lazy anti-fat bias differed by race, $F(4,59) = 4.13$, $P = 0.005$, $\eta\rho^2 = 0.219$. Bonferroni *post hoc* tests indicated that mean implicit worthless/lazy anti-fat bias was significantly lower in White ($M = -0.25$, SD = 2.21) compared to Black ($M = 4.0$, SD = 1.73) participants, $P = 0.011$. Explicit lazy/motivated anti-fat bias differed by political beliefs, $F(3,77) = 5.01$, $P = 0.003$, $\eta\rho^2 = 0.163$. Bonferroni *post hoc* tests indicated that mean explicit lazy/motivated anti-fat bias was significantly lower for Liberals/Democrats ($M = 0.53$, SD = 0.84) compared to Independents ($M = 1.78$, SD = 1.87, $P = 0.003$), but not lower compared to Conservatives/Republicans ($M = 1.57$, SD = 1.16, $P = 0.095$). Implicit bias and other explicit bias measures did not differ by political beliefs.

For the continuous variables, emotional outlook was associated with explicit stupid/smart and worthless/valuable scores, such that a more happy and optimistic outlook was associated with greater stupid/smart anti-fat bias ($r = 0.24$, $P = 0.035$), whereas a more depressed outlook was associated with lower worthless/valuable anti-fat bias ($r = -0.27$, $P = 0.027$). Outlook was not associated with any other measures of bias.

More positive self-reported professional contact and experience with obese people was associated with lower explicit anti-fat bias on the

TABLE 2 Correlations among implicit and explicit anti-fat, pro-thin bias scores

	Implicit bias			Explicit bias			
	Lazy/ motivated	Stupid/ smart	Worthless/ valuable	Bad/good	Lazy/ motivated	Stupid/ smart	Worthless/ valuable
Implicit bias							
Bad/good	0.53**	0.47**	0.37**	0.15*	0.24*	0.01	0.20
Lazy/motivated				0.28*	0.25*		
Stupid/smart				0.11		0.15	
Worthless/valuable				0.22			−0.13
Explicit bias							
Bad/good					0.48**	0.54**	0.46**

Participants were randomized to complete implicit and explicit good/bad measures and only one of the three stereotyped trait dyads. Correlations with implicit worthless/valuable bias adjusted for race.
*$P < 0.05$; **$P < 0.01$.

bad/good ($r = -0.16$, $P = 0.017$), and stupid/smart ($r = -0.24$, $P = 0.033$) measures. Valence of professional experience was unrelated to the explicit worthless/valuable or lazy/motivated explicit measures or the implicit bias measures.

More positive self-reported personal contact and experience with obese people was associated with lower explicit bad/good anti-fat bias ($r = -0.13$, $P = 0.043$), and lower explicit stupid/smart bias ($r = -0.23$, $P = 0.048$). This measure was not correlated with other explicit or implicit bias measures.

Higher BMI was associated with lower explicit stupid/smart anti-fat bias after adjusting for gender, age, and perceived weight ($r = -0.32$, $P = 0.006$). After adjusting for BMI, self-weight perception was significantly related to explicit stupid/worthless scores, such that perceiving one's own weight as more overweight was associated with greater explicit stupid/smart anti-fat bias ($r = 0.38$, $P = 0.001$).

Implicit and explicit scores were not associated with self-reported understanding of obesity and did not differ by level of clinical contact with patients.

Comparison of 2001 versus 2013 samples

To first determine the appropriate covariates for each analysis, we again tested whether the variables in question related to the predictor or outcome variables. Professional experience ($P < 0.001$) was clearly significantly different, and race ($P = 0.087$), and sex ($P = 0.085$) were nearly significantly different, and therefore all analyses adjust for these variables. We note that the pattern of findings did not change when not including these covariates. As displayed in Table 4, the 2013 sample was lower in all domains of implicit anti-fat bias (Figure 2) compared to the 2001 sample. The 2013 sample had higher explicit anti-fat bias for general bad feelings and laziness than the 2001 sample, but the two samples did not differ in explicit anti-fat bias for worthlessness or stupidity (Figure 3). Given the different proportions of participants with clinical contact with obese patients between 2001/2013, Table 5 displays bias variables stratified by professional experience and adjusting for race and sex. As the patterns appeared to differ by group, we tested for time × professional experience interactions, again adjusting for race and sex. None of these analyses were significant (all $P > 0.359$), but the pattern of means suggests that the "any clinical contact" group closely mirrors findings found in the overall sample.

TABLE 3 Correlations between study variables and anti-fat, pro-thin bias

			Implicit bias (N = 208)				Explicit bias (N = 228)			
Variable	*M*	SD	Bad	Lazy	Stupid	Worthless	Bad	Lazy	Stupid	Worthless
Age[a]	42.52	12.82	0.02	−0.21	−0.13	0.19	−0.04	−0.20	0.10	0.02
BMI[b]	24.72	3.71	0.07	0.02	−0.11	0.10	−0.11	0.09	−0.32**	0.11
Emotional outlook	4.41	0.8	0.04	0.03	0.04	0.20	0.05	0.05	0.24*	−0.27*
Personal experience	5.40	1.3	0.00	0.00	−0.02	−0.08	−0.13*	−0.14	−0.23*	−0.08
Professional experience	5.67	1.3	−0.03	−0.10	−0.01	0.21	−0.16*	−0.21	−0.24*	−0.06
Self-weight perception[c]	4.38	1.0	0.01	−0.01	0.06	−0.13	0.05	0.37	0.38***	−0.11

BMI = Body mass index. Means (*M*) and standard deviations (SD) presented are for the full sample of N = 232.
[a]Adjusted for gender and BMI.
[b]Adjusted for gender, age, and perceived weight.
[c]Adjusted for BMI.
*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

TABLE 4 Comparison of 2001 versus 2013

	2001 Sample (20) *M* (SD)	2013 Sample *M* (SD)	*F*	df	*P*
Implicit anti-fat, pro-thin bias (*d*-score)					
Bad/good	0.96 (1.00)	0.76 (1.11)	6.17	373	0.013
Lazy/motivated	1.04 (1.00)	0.67 (1.04)	9.55	142	0.002
Worthless/valuable	0.66 (1.00)	0.05 (0.75)	22.15	108	<0.001
Stupid/smart	1.01 (1.00)	0.39 (0.86)	12.47	133	0.001
Explicit anti-fat, pro-thin bias (1-7 scale)					
Bad/good	0.30 (1.11)	0.79 (1.28)	14.65	428	<0.001
Lazy/motivated	0.71 (1.39)	1.17 (1.45)	17.57	158	0.004
Worthless/valuable	0.26 (1.15)	0.19 (0.62)	0.54	122	0.465
Stupid/smart	0.19 (0.60)	0.18 (0.56)	0.35	143	0.554

Higher scores indicate higher levels of anti-fat, pro-thin bias. All comparison tests adjust for professional experience, race, and sex.

Discussion

We found lower levels of implicit anti-fat bias for all attributes in 2013 compared to 2001 among obesity researchers, clinicians, and other specialists—that is, participants more readily associated negative attributes with *fat people* than with *thin people*. Conversely, we found higher levels of some types of explicit anti-fat bias in 2013 compared to 2001, such that participants reported more general bad feelings toward fat than thin people, and reported thinking fat people were lazier than thin people. This divergence between implicit and explicit bias is intriguing. While the decrease in implicit anti-fat bias is encouraging, implicit bias was still significantly anti-fat across most domains in the 2013 sample. Explicit bias was also significantly anti-fat. These results are consistent with the literature finding anti-fat bias among the general community and clinicians (1).

Implicit and explicit anti-fat bias did not vary by demographic variables. Although research shows overweight and obese individuals do not show the in-group favoritism observed in other stigmatized social domains such as race and gender (24,25), here BMI was negatively related to one form of explicit bias (stupid/smart). Conversely, self-perceived weight, which is closer to a measure of body image (especially when controlling for BMI, as we did here), was positively related to stupid/smart explicit bias. As perceived weight is a malleable target, this finding may have implications for bias-reducing interventions.

Several types of explicit anti-fat bias appeared to increase from 2001 to 2013. Explicit attitudes are thought of as a marker of attitudes falling within the constraints of social acceptability and are reflective of social norms (26). These findings indicate that the climate surrounding anti-fat bias has become more permissive over time. Implicit anti-fat bias, however, decreased from 2001 to 2013. Several potential explanations could account for these contradictory findings. Awareness, particularly in this sample, of implicit anti-fat attitudes may have increased given that the original 2003 study was published in this society's flagship journal, *Obesity*. This may have increased motivations to appear non-prejudiced, which can have a small effect on implicit attitudes (27), but if participants had such motives, their explicit attitudes should have also shown decreases.

A second potential explanation concerns the measurement of implicit attitudes and research and policy that promotes a disease

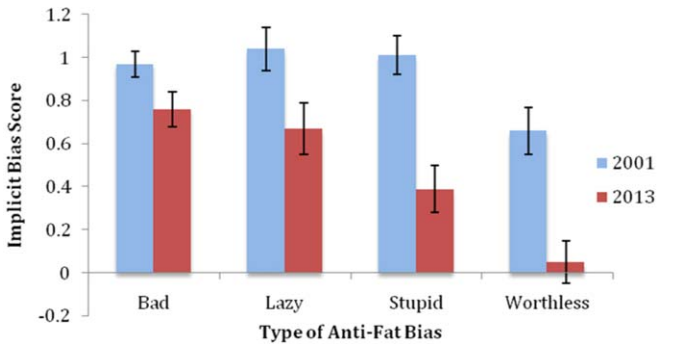

Figure 2 Implicit anti-fat, pro-thin bias in 2001 versus 2013. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

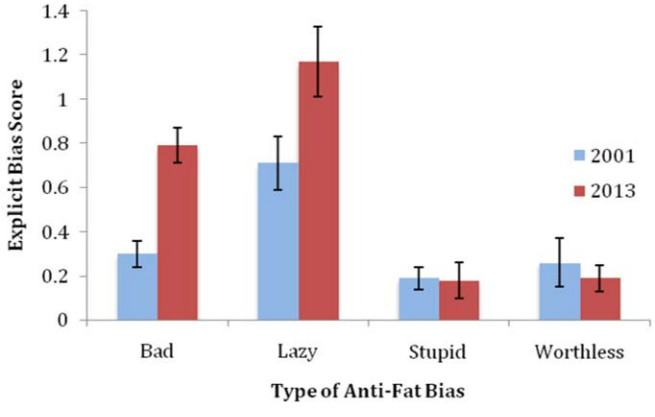

Figure 3 Explicit anti-fat, pro-thin bias in 2001 versus 2013. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

TABLE 5 Comparison of 2001 versus 2013, stratified by professional experience

	Implicit bias: *M*(SD)[*n*]			Explicit bias: *M*(SD)[*n*]		
	2001	2013	*P*	2001	2013	*P*
Any clinical contact						
Bad/good	0.98(0.85)[49]	0.78(1.13)[119]	0.303	0.21(1.36)[68]	0.77(1.30)[132]	0.008
Lazy/motivated	1.45(0.89)[19]	0.79(1.04)[41]	0.036	0.14(1.74)[21]	1.07(1.53)[43]	0.035
Stupid/smart	0.83(0.74)[22]	0.48(0.73)[37]	0.087	0.03(0.49)[30]	0.16(0.52)[45]	0.390
Worthless/valuable	1.05(0.97)[11]	0.05(0.84)[41]	0.002	0.06(1.91)[16]	0.26(0.69)[43]	0.536
Research contact only						
Bad/good	0.99(0.82)[26]	0.74(1.14)[47]	0.161	0.58(1.29)[31]	0.76(1.29)[51]	0.418
Lazy/motivated	1.10(0.98)[13]	0.29(0.96)[19]	0.083	0.73(1.01)[11]	1.00(1.20)[19]	0.448
Stupid/smart	1.02(0.89)[9]	0.23(1.06)[17]	0.017	0.33(0.65)[12]	0.25(0.64)[20]	0.987
Worthless/valuable	0.80(0.96)[10]	0.00(0.76)[11]	0.005	0.00(0.58)[7]	0.25(0.62)[12]	0.141
Neither						
Bad/good	1.09(1.07)[104]	0.72(1.04)[41]	0.060	0.30(1.13)[133]	0.91(1.26)[45]	0.004
Lazy/motivated	1.04(0.87)[40]	0.79(1.07)[18]	0.392	0.72(1.41)[54]	1.55(1.47)[20]	0.070
Stupid/smart	1.08(1.21)[43]	0.36(0.96)[10]	0.213	0.19(0.55)[42]	0.18(0.60)[11]	0.898
Worthless/valuable	0.65(0.97)[25]	0.10(0.46)[13]	0.035	0.54(1.24)[37]	−0.07(0.27)[14]	0.068

Higher scores indicate higher levels of anti-fat, pro-thin bias. All comparisons adjust for race and sex.

model of obesity. The American Medical Association has declared obesity as a disease to garner serious attention and resources to treat the condition. Others have posited that such demarcation may reduce stigma toward the obese by shifting negative attitudes based on beliefs of negligent personal responsibility to a legitimate medical condition requiring treatment (2). Some research suggests that implicit measures of attitudes may reflect mere awareness of current stereotypes more so than affective bias *per se* (28). Therefore, the IAT may be assessing associations of obesity including knowledge pertaining to the disease model of obesity that implicitly does not hold individuals personally accountable for their condition. Thus, reduced implicit bias over time may arise from increased exposure of the disease model of obesity among the research and clinical communities. However, that increased exposure to the disease model was not associated with lower, but increased, explicit negative attitudes, is furthermore intriguing. Perhaps theoretical knowledge about the causes of obesity has not translated into reduced weight stigma. In fact, emerging research suggests that individuals exposed to a disease model of obesity actually show reduced affective neural resonance toward an obese person's pain (29). We found a divergence in our results between researchers and clinicians. Researchers without clinical contact with obese patients showed no increase in explicit bias over time, whereas those with clinical contact showed increases. While speculative, clinicians may be experiencing increased pressure to have patients lose weight based on current obesity guidelines, and the failure of the patient to do so over the long-term, as is commonly the case (30), may result in frustration and blame toward the patient. Future research could examine how the disease model of obesity and increased focus on weight loss to manage health in obesity may contradictorily impact attitudes among different types of obesity professionals.

These findings should be interpreted considering the following limitations. The study samples in 2001 and 2013 may not be directly comparable, despite our efforts to replicate the methods of the original study in the same setting. This study measured attitudes and not actual behavior toward obese individuals. Although research examining other stigmatized social domains such as race and gender have found that implicit attitudes predict biased behavior (e.g., Ref. 4), this may not be the case in obesity (31). Very little research has examined implicit attitudes and behavior in the obesity domain, however, and this area would be ripe for future research. Generalizability of these results is limited due to the fact that weight stigma has been included in professional dialogue of TOS (e.g., the formation of the Weight Bias Working Group and its resources available to members).

Although explicit anti-fat attitudes appeared to increase from 2001 to 2013, explicit attitudes are relatively easier to change than implicit attitudes (32)—and implicit anti-fat attitudes appeared to decrease in that time span. These results together suggest that despite widespread anti-fat bias, there is promise for ameliorating this bias and improving research and treatment. O

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