Internalized Societal Attitudes Moderate the Impact of Weight Stigma on Avoidance of Exercise

Lenny R. Vartanian[1] and Sarah A. Novak[2]

Experiences with weight stigma negatively impact both psychological outcomes (e.g., body dissatisfaction, depression) and behavioral outcomes (e.g., dieting, exercise). However, not everyone is equally affected by experiences with weight stigma. This study examined whether internalized societal attitudes about weight moderated the impact of weight stigma. Adult participants (n = 111) completed measures of experiences with weight stigma, as well as two indexes of internalized societal attitudes (the moderators): Internalized anti-fat attitudes and internalization of societal standards of attractiveness. Psychological outcomes included self-esteem, body dissatisfaction, drive for thinness, and bulimic symptoms; behavioral outcomes included avoidance of exercise and self-reported exercise behavior. Weight stigma was positively correlated with body dissatisfaction, drive for thinness, and bulimic symptoms, and was negatively correlated with state and trait self-esteem. Both indexes of internalized attitudes moderated the association between weight stigma and avoidance of exercise: Individuals high in anti-fat attitudes and high in internalization of societal standards of attractiveness were more motivated to avoid exercise if they also experienced a high degree of weight stigma; individuals low in anti-fat attitudes and low in internalization were relatively unaffected. Avoidance of exercise was negatively correlated with self-reported strenuous exercise. These findings suggest that weight stigma can negatively influence motivation to exercise, particularly among individuals who have internalized societal attitudes about weight. Reducing internalization might be a means of minimizing the negative impact of weight stigma and of facilitating healthy weight management efforts.

Obesity (2011) **19,** 757–762. doi:10.1038/oby.2010.234

INTRODUCTION

Physical activity is important for maintaining health and well-being, and the benefits of regular physical activity are far reaching (e.g., improved cardiovascular health, weight management, and improved mood) (1). Despite these well-documented benefits, many individuals fail to achieve recommended levels of physical activity. Barriers to regular exercise include financial and time limitations, environmental and physical constraints, as well as motivational factors such as lack of interest and enjoyment (2,3). An additional barrier to regular exercise among overweight and obese individuals, for whom exercise can be particularly beneficial, might come from their experiences with weight-based stigma.

Negative attitudes toward obese individuals are widespread in our society, and obese people suffer discrimination in virtually every area of their lives, including education, employment, and romantic relationships (4). Thus, in addition to the numerous health consequences associated with excess weight (e.g., increased risk of type 2 diabetes and heart disease), overweight and obese people also suffer a great deal of prejudice, discrimination, and poor treatment from others. Research indicates that experiences with weight stigma have a significant negative psychological impact, including increased depression and body dissatisfaction, as well as lower self-esteem (5–7).

In addition to the psychological consequences of weight stigma, there is also growing evidence that weight stigma can have negative behavioral consequences, which can ultimately impact individuals' health. For example, in response to weight stigma, obese individuals are more likely to overeat and avoid dieting than they are to go on a diet (6,7). Furthermore, longitudinal studies have shown that weight-based teasing prospectively predicts eating-disordered behavior (e.g., binge eating, unhealthy weight control behaviors) 5 years later (8). Other research has found that weight stigma can negatively affect participation in physical activity. Children report that they are reluctant to become involved in physical activities at school because of teasing that they might experience due to their weight (9,10), and teasing about weight among

[1]School of Psychology, The University of New South Wales, Sydney, New South Wales, Australia; [2]Department of Psychology, Hofstra University, Hampstead, New York, USA. Correspondence: Lenny R. Vartanian (lvartanian@psy.unsw.edu.au)

Received 27 May 2010; accepted 25 August 2010; published online 14 October 2010. doi:10.1038/oby.2010.234

children is related to lower involvement with physical activity and a preference for sedentary activities (11). More recently, researchers have begun to examine weight stigma and physical activity among adults. Schmalz found that stigma consciousness (expecting to be stereotyped because of one's group membership) about weight predicted low perceived competence in physical activity (12), and Vartanian and Shaprow showed that weight stigma was associated with avoidance of exercise (13). Another study found that briefly priming overweight women to think about negative stereotypes associated with weight resulted in significantly lowered perceptions of their own exercise efficacy and exercise intentions (14). Thus, there is mounting evidence that weight-based stigma and stereotypes can interfere with physical activity. Insofar as weight stigma results in decreased motivation for exercise, targets of weight stigma might be less likely to experience the benefits of regular exercise and weight loss.

Although negative psychological and behavioral consequences of weight stigma have been identified, these negative responses are not necessarily universal reactions (15). In some cases, weight stigma can even be associated with positive outcomes. For example, a recent study of individuals attending a weight-loss program found that, despite the negative psychological correlates, experiences with weight stigma were associated with better treatment outcomes (16). Specifically, more frequent experiences with weight stigma predicted a greater amount of weight loss at the end of the treatment program and at 6-month follow-up. An important question, then, is which factors are likely to determine who will respond negatively and who will be more resilient in the face of weight-based stigmatization?

Unlike most social groups, in which a degree of in-group favoritism is observed, research suggests that overweight and obese individuals themselves endorse anti-fat attitudes and stereotypes (17). Thus, overweight and obese individuals appear to have internalized anti-fat attitudes. Individuals who have internalized these negative attitudes tend to exhibit poorer psychological adjustment (e.g., worse body image and lower self-esteem; 18,19). There is also some evidence that individuals who endorse anti-fat attitudes respond more negatively following experiences with weight stigma. Friedman *et al.* found that stigma experiences were related to increased body dissatisfaction among individuals who held strong anti-fat attitudes, but not among individuals who did not endorse anti-fat attitudes (5). Furthermore, Puhl *et al.* found that obese individuals who endorsed obesity stereotypes were more likely to cope with weight stigma by refusing to diet (20). Endorsement of obesity stereotypes did not, however, moderate the effect of weight stigma on self-esteem or depression.

The studies just described conceptualize internalized attitudes as an endorsement of anti-fat bias. Another way of conceptualizing internalized attitudes is as reflecting the extent to which individuals endorse societal standards of attractiveness as personally relevant beliefs (21). Research indicates that internalization of societal standards of attractiveness is associated with increased body dissatisfaction (22). Importantly, there is evidence that only those individuals who have internalized these societal standards respond negatively when exposed to idealized media images (23). Thus, these are two separate (but related) forms of internalization (*cf.* ref. 24): The former (i.e., anti-fat attitudes) can be seen as reflecting the belief that "fat is bad," whereas the latter (i.e., internalization of social standards of attractiveness) can be seen as reflecting the belief that one should strive to achieve the societal standard of attractiveness. Both forms of internalization might be related to individuals' responses to experiences with weight stigma.

The primary purpose of this study was to examine internalized societal attitudes as a moderator of the association between weight stigma and avoidance of exercise. Internalization was conceptualized both in terms of endorsing anti-fat attitudes (hereafter referred to as anti-fat attitudes), and in terms of internalizing societal standards of attractiveness (hereafter referred to as internalization). We hypothesized that individuals who have internalized societal attitudes (in terms of either anti-fat attitudes or internalization) will be more negatively impacted by experiences with weight stigma, specifically in terms of increased avoidance of exercise. A secondary purpose was to examine internalized societal attitudes as a moderator of the impact of weight stigma on other psychological outcomes (e.g., self-esteem, body dissatisfaction). Based on past research (20), we hypothesized that weight stigma would be associated with negative psychological outcomes irrespective of individuals' level of internalized attitudes.

METHODS AND PROCEDURES

Participants

Participants were 111 adults (84 women and 27 men) from two locations in the northeastern United States who responded to advertisements for a study on the "life experience of overweight individuals." Individuals were invited to participate in the study if they considered themselves to be overweight or obese, regardless of their actual weight status. This approach was taken because there is considerable evidence that perception of one's weight status is a better predictor of psychological outcomes than is one's actual weight status (25), and research has found that weight stigma can be experienced by, and can negatively impact, individuals who are not objectively overweight or obese (13). The mean age for women was 36.57 years (s.d. = 15.86; range = 18–65), and the mean age for men was 28.52 years (s.d. = 13.81; range = 17–60), $t = 2.54$, $P = 0.014$. The mean BMI (kg/m^2) for women was 32.44 (s.d. = 7.85; range = 18.44–58.35), and the mean BMI for men was 31.13 (s.d. = 6.69; range = 20.83–47.84), $t = 0.78$, $P = 0.44$. Across both sexes, 26% of participants had a BMI of 25–29.9, and an additional 56% of participants had a BMI ≥30. The majority of the sample was white (71%) and single (57%). Reported household income was as follows: <$20,000 (24%), $20,000–40,000 (21%), $40,000–60,000 (17%), $60,000–80,000 (17%), $80,000–100,000 (10%), and >$100,000 (11%). This study was approved by the university institutional review boards.

Materials and procedure

Participants met individually with a researcher. After signing a consent form, participants completed a questionnaire packet including the following measures:

Experiences with weight stigma. The Stigmatizing Situations Inventory (6) was used to assess individuals' experiences with weight stigma throughout their lives. This measure contains 50 items that are organized into 11 subscales (e.g., Comments from doctors, Comments

from family members, Bias in employment settings). Each item was rated on a 10-point scale ranging from 0 (never) to 9 (daily). Higher scores indicated more frequent experiences with weight stigma. Cronbach's α for the full scale was 0.94.

Anti-fat attitudes. Anti-fat attitudes were assessed using a single item: I strongly prefer thin people to fat people (1 = Strongly agree; 7 = Strongly disagree). This single-item measure has been used in previous research on anti-fat attitudes (17), and has been found to correlate with other indexes of anti-fat attitudes (26).

Internalization. The Sociocultural Attitudes Toward Appearance Questionnaire (27) assesses the degree to which people are aware of societal standards of attractiveness, as well as the extent to which individuals internalize those standards as self-relevant beliefs. Only the eight items of the internalization subscale were included in this study. Each item was rated on a seven-point scale (1 = Completely disagree, 7 = Completely agree), and higher scores indicated a greater degree of internalization (Cronbach's $\alpha = 0.89$).

Avoidance of exercise. Participants completed a three-item measure of motivation to avoid exercising, based on Vartanian and Shaprow (13). Participants were asked to consider their reactions to experiencing "negative situations related to their weight," and responded to the following items: I feel uncomfortable going to a gym where there are a lot of mirrors; I avoid going to the gym when I know there will be a lot of thin people there; and I am too embarrassed to participate in physical activity in public places (e.g., gym or fitness club; walking outside in public; swimming in public, etc.). For each item, participants responded on a seven-point scale (1 = Not at all true; 7 = Completely true). Higher scores indicated greater avoidance of exercise. Cronbach's α was 0.79.

Exercise behavior. A modified version of the Godin Leisure-Time Exercise Questionnaire (28) asked participants to report the frequency and duration of mild (low effort, such as easy walking, yoga, etc.), moderate (not exhausting, such as easy bicycling, baseball, etc.), and strenuous (heart beats rapidly, such as basketball, running, etc.) exercise that they had engaged in over the past week. For each level of exercise (i.e., mild, moderate, and strenuous), participants indicated the frequency of exercise on an eight-point scale (*1 = None; 8 = Seven times or more*), and reported in open-ended format the average duration of exercise (in minutes). The total amount of exercise at each level was computed by multiplying the reported frequency by the reported duration.

Eating disorder pathology. Three subscales of the Eating Disorder Inventory (29) were used as measures of eating-related pathology: Body Dissatisfaction, Drive for Thinness, and Bulimia. For each subscale, items were rated on a six-point scale (1 = Never, 6 = Always), with higher scores indicating more pathological responses. Cronbach's α was 0.87 for body dissatisfaction, 0.83 for drive for thinness, and 0.76 for bulimia.

State and trait self-esteem. The Rosenberg Self-Esteem Scale (30) was used as a measure of global self-esteem. This measure has 10 items rated on a four-point scale ranging from 1 (Strongly agree) to 4 (Strongly disagree). Higher scores indicated higher self-esteem (Cronbach's α = 0.85). Participants also completed the Current Thoughts Scale (31), a 20-item measure that assesses state self-esteem across three domains (social, performance, and appearance). Each item was rated on a five-point scale (1 = Not at all; 5 = Extremely), with higher scores indicating higher state self-esteem. Cronbach's α for the total scale was 0.89.

After completing the questionnaires, participants had their height and weight measured. Participants received $10 for taking part in this study.

Statistical analyses

Data were analyzed using SPSS (version 17.0; SPSS, Chicago, IL). Bivariate correlations and partial correlations (controlling for BMI) were used to examine the association between weight stigma and each of the psychological and behavioral outcome variables. Separate regression analyses were used to examine the effects of weight stigma, internalized societal attitudes, and their interaction, on avoidance of exercise and the psychological outcome variables. All variables included in the interaction term were first centered on their mean to control for multicollinearity among the predictors, and all analyses controlled for BMI, sex, and age. Interactions were decomposed into their simple effects following the recommendations of Aiken and West (32) by examining the impact of weight stigma at 1 s.d. above and below the mean of internalized societal attitudes.

This study included both female participants and male participants. There is recent evidence in the literature that women and men are equally affected by weight stigma (7,33). Indeed, this study found no difference between women ($M = 1.02$, s.d. = 0.81) and men ($M = 1.24$, s.d. = 0.98) in terms of their experiences with weight stigma, $t = 1.61$, $P = 0.25$. Furthermore, in the regression analyses, there were no main effects or interactions involving participant sex. Thus, the analyses reported below collapse across female and males participants.

RESULTS

Ninety-seven percent of participants reported experiencing some form of weight stigma at least once in their lives, and 48% reported experiencing some form of weight stigma at least once per week. Across all items of the Stigmatizing Situations Inventory, the mean rating for experiences with weight stigma was 1.07 (s.d. = 0.86), and mean scores ranged from 0 ("Never") to 4.74 (roughly "About once a month"). Frequency of experiencing weight stigma was positively correlated with participants' BMI ($r = 0.54$, $P < 0.001$).

Table 1 shows the correlations between weight stigma and the psychological outcomes. Weight stigma was positively correlated with indexes of eating pathology (body dissatisfaction, drive for thinness, and bulimic symptoms), and was negatively correlated with state and trait self-esteem. The pattern of correlations remained the same when controlling for BMI (Table 1).

Weight stigma was positively correlated with avoidance of exercise ($r = 0.47$, $p < 0.001$). The association between weight stigma and avoidance of exercise remained significant when controlling for age, BMI, body dissatisfaction, drive for thinness, bulimic symptoms, state self-esteem, and trait self-esteem ($\beta = 0.28$, $P = 0.02$). Weight stigma was not significantly correlated with mild, moderate, or strenuous exercise ($r = -0.06$, -0.06, and -0.16, respectively, $P > 0.10$). Avoidance of exercise was, however, negatively correlated with strenuous exercise

Table 1 Correlations between experiences with weight stigma and psychological outcomes.

	Bivariate correlation	Partial correlation (controlling for BMI)
Body dissatisfaction	0.42***	0.20*
Drive for thinness	0.28**	0.34***
Bulimic symptoms	0.49***	0.39***
Trait self-esteem	−0.27**	−0.35***
State self-esteem	−0.37***	−0.40***

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

($r = -0.20$, $P = 0.03$), but was not correlated with moderate ($r = -0.01$, $P = 0.95$) or mild exercise ($r = -0.05$, $P = 0.60$).

Internalized societal attitudes as a moderator of the impact of weight stigma

Controlling for BMI, internalization was positively correlated with weight stigma ($r_{partial} = 0.39$, $P < 0.001$), but anti-fat attitudes was not ($r_{partial} = 0.09$, $P = 0.35$). Internalization and anti-fat attitudes were positively correlated with one another ($r_{partial} = 0.47$, $P < 0.001$).

We next conducted separate multiple regression analyses to examine the moderating effects of anti-fat attitudes and internalization, respectively, on avoidance of exercise (see **Figure 1**). First, avoidance of exercise was regressed on BMI, sex, age, weight stigma, anti-fat attitudes, and the interaction between weight stigma and anti-fat attitudes. The overall model was significant, F (6, 103) = 6.95, $P < 0.001$, and explained 29% of the variance in avoidance of exercise. Weight stigma was a significant positive predictor of avoidance of exercise ($\beta = 0.46$, $P < 0.001$), but anti-fat attitudes was not a significant predictor ($\beta = 0.14$, $P = 0.14$). Importantly, the interaction between weight stigma and anti-fat attitudes was significant ($\beta = 0.22$, $P = 0.01$). Simple-slopes analyses revealed that, for individuals high in anti-fat attitudes, experiences with weight stigma were positively related to avoidance of exercise ($t = 6.01$, $P < 0.001$). For individuals low in anti-fat attitudes, there was also a positive association between weight stigma and avoidance of exercise ($t = 2.80$, $P = 0.006$), but the magnitude of this association was smaller. A similar pattern of results emerged with internalization as a moderator. The overall model was significant, F (6, 102) = 7.12, $P < 0.001$, and explained 30% of the variance in avoidance of exercise. Both weight stigma ($\beta = .23$, $P = 0.04$) and internalization ($\beta = 0.29$, $P = 0.003$) were significant predictors of avoidance of exercise. The interaction between weight stigma and internalization was only marginally significant ($\beta = .15$, $P = 0.09$); however, the simple slopes analyses were consistent with the results for anti-fat attitudes. For individuals high in internalization, experiences with weight stigma were positively related to avoidance of exercise ($t = 6.24$, $P < 0.001$). For individuals low in internalization, in contrast, experiences with weight stigma were not related to avoidance of exercise ($t = 0.87$, $P = 0.38$).

Secondary analyses examined the moderating effects of internalized societal attitudes on body dissatisfaction, drive for thinness, bulimic symptoms, and state and trait self-esteem. There were no significant interactions for any of these psychological outcomes.

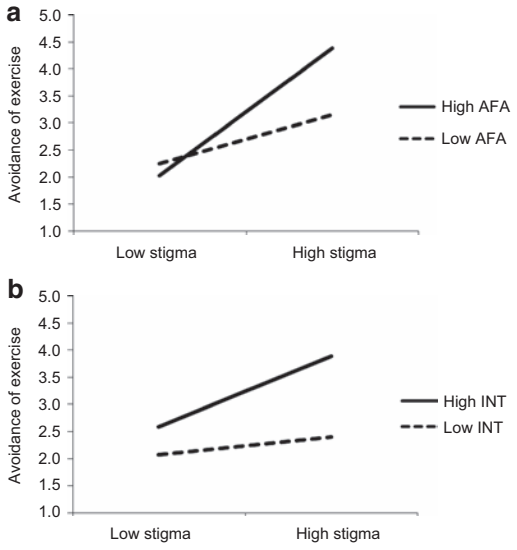

Figure 1 Impact of weight stigma on avoidance of exercise as a function of (**a**) anti-fat attitudes (AFA) and (**b**) internalization (INT), controlling for BMI, sex, and age.

DISCUSSION

This study examined the impact of experiences with weight stigma on motivation to avoid exercise and other psychological outcomes among a community sample of adults, the majority of whom were overweight or obese. As in previous studies (5,6,13,20), experiences with weight stigma were related to a variety of negative psychological outcomes, including higher body dissatisfaction and lower self-esteem. Importantly, these effects held even after controlling for BMI, suggesting that weight stigma can also impact individuals who are not objectively overweight or obese (*cf.* ref. 13). Of particular interest was the impact of weight stigma on health behaviors. Individuals who reported more frequent experiences with weight stigma also reported greater avoidance of exercise and exercise-related situations. Specifically, individuals who experienced more frequent weight stigma reported being embarrassed or uncomfortable going to gyms, a place where they might be judged by other people. Avoidance of exercise was also negatively correlated with the amount of strenuous exercise that participants reported. These findings add to a growing body of literature indicating that experiencing weight stigma can have negative consequences for health-related behaviors, including motivation to exercise (13), motivation to diet (6,7), and disordered eating behavior (34).

One of the primary aims of this study was to examine internalized societal attitudes about weight as a potential moderator of the impact of weight stigma. Previous research suggests that not everyone responds to experiences with weight stigma in the same way; in particular, individuals who have internalized anti-fat bias appear to respond more negatively to experiencing weight stigma (5,20). The present findings add to that research by demonstrating that both internalization of societal standards of attractiveness and internalized anti-fat attitudes moderated the impact of weight stigma on avoidance of exercise. For individuals high in internalization and individuals high in anti-fat attitudes, experiences with weight stigma were related to greater avoidance of exercise. Individuals low in internalization and individuals low in anti-fat attitudes, however, were relatively unaffected by experiences with weight stigma in terms of their avoidance of exercise. Thus, internalized societal attitudes appear to exacerbate the effects of weight stigma, perhaps because individuals are more likely to blame themselves for their experiences with weight stigma,

rather than attributing stigma to unfair treatment from others (*cf.* ref. 35).

It is important to note that the psychological outcomes (e.g., body dissatisfaction, self-esteem) were not moderated by either internalization or anti-fat attitudes. Thus, in many ways, people are negatively affected by experiences with weight stigma regardless of their level of internalization or anti-fat attitudes. This finding is consistent with Puhl *et al.* (20), who found that internalized weight bias moderated avoidance of dieting, but not psychological outcomes.

This body of research emphasizes the need for efforts to reduce weight bias and weight-based stigmatization. The present findings also suggest that it might be particularly useful to work toward reducing internalization of anti-fat attitudes and societal standards of attractiveness among overweight and obese individuals. Stice *et al.* have demonstrated that a dissonance-based program that encouraged women to openly critique the thin-body ideal effectively reduced thin-ideal internalization, which in turn reduced other eating disorder symptoms (36). Although the current findings suggest that weight stigma is still likely to be detrimental to psychological well-being, interventions such as these could help individuals avoid the negative behavioral consequences, and thus help them experience the benefits of exercise and weight loss. Latner *et al.* found that members of their weight-loss program who had experienced more frequent weight stigma lost more weight over the course of the program, despite also experiencing negative psychological consequences (16). It is possible that their participants had not internalized the societal attitudes and were thus able to channel their experiences with weight stigma into a positive behavioral outcome.

There are a number of reasons why experiences with weight stigma might be associated with avoidance of exercise. One possibility is that experiences with weight stigma lead individuals to want to avoid exercise situations out of embarrassment or out of fear of being further stigmatized. Indeed, Ball *et al.* reported that embarrassment is often a barrier to exercise among obese individuals, who consider themselves "too fat to exercise" (37). Furthermore, strong anti-fat bias is found among fitness professionals and regular exercisers (38), which may translate into an unwelcoming environment at fitness centers and health clubs. Thus, the avoidance of exercise among stigmatized individuals might reflect a desire to avoid being further stigmatized. Alternatively, it could be that weight stigma impacts motivation in a more general sense. For example, there is evidence among other stigmatized groups (African Americans and women) that experiencing stigma decreases self-regulatory capacity, resulting in weakened self-control (39). Maintaining an exercise plan or a diet requires self-control. If repeated experiences with weight stigma result in a decreased capacity for self-control, then stigmatized individuals might have less self-regulatory capacity available for persevering with their diet and exercise routines.

Although this study found that avoidance of exercise was negatively correlated with the amount of strenuous exercise that participants report, self-reported exercise behavior was not directly related to stigma experiences. It is possible that experiences with weight stigma affect exercise behavior on a day-to-day basis and, as such, obtaining individuals' retrospective reports of their average exercise is not an ideal measure. Instead, longitudinal assessments using experience sampling techniques would be better suited to assess the relation between weight stigma and actual exercise behavior. It should also be noted that the measure of exercise avoidance used in this study generally focused on exercising in public (e.g., "I am too embarrassed to participate in physical activity in public places"). It is possible that individuals who experience weight stigma are exercising just as much as their non-stigmatized counterparts but do so in more private locations (such as at home). Future research should investigate the different settings in which stigmatized obese individuals might engage in physical activity. Another possible limitation of this study is the recruitment strategy used. Participants responded to advertisements for a study on the life experiences of overweight and obese people, and our sample might therefore consist of individuals who were particularly motivated to discuss their (presumably negative) experiences. This self-selection might limit the generalizability of our findings. Despite these limitations, this study provides additional evidence that weight stigma can negatively impact motivation to exercise, particularly among individuals who have internalized societal attitudes about weight. Thus, interventions aimed at reducing the extent to which individuals internalize societal attitudes about weight could be an effective means of minimizing the negative impact of weight stigma.

ACKNOWLEDGMENTS

We thank the undergraduate research assistants for assistance in conducting this research, and Rebecca T. Pinkus for her helpful comments on this article. This project was supported by a grant from the American Psychological Foundation.

DISCLOSURE

The authors declared no conflict of interest.

© 2010 The Obesity Society

REFERENCES

1. Haskell WL, Lee IM, Pate RR *et al.*; American College of Sports Medicine; American Heart Association. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation* 2007;116:1081–1093.
2. Myers RS, Roth DL. Perceived benefits of and barriers to exercise and stage of exercise adoption in young adults. *Health Psychol* 1997;16:277–283.
3. Tappe MK, Duda JL, Ehrnwald PM. Perceived barriers to exercise among adolescents. *J Sch Health* 1989;59:153–155.
4. Puhl R, Brownell KD. Bias, discrimination, and obesity. *Obes Res* 2001;9:788–805.
5. Friedman KE, Reichmann SK, Costanzo PR *et al*. Weight stigmatization and ideological beliefs: relation to psychological functioning in obese adults. *Obes Res* 2005;13:907–916.
6. Myers A, Rosen JC. Obesity stigmatization and coping: relation to mental health symptoms, body image, and self-esteem. *Int J Obes Relat Metab Disord* 1999;23:221–230.
7. Puhl RM, Brownell KD. Confronting and coping with weight stigma: an investigation of overweight and obese adults. *Obesity (Silver Spring)* 2006;14:1802–1815.
8. Haines J, Neumark-Sztainer D, Eisenberg ME, Hannan PJ. Weight teasing and disordered eating behaviors in adolescents: longitudinal findings from Project EAT (Eating Among Teens). *Pediatrics* 2006;117:e209–e215.

9. Bauer KW, Yang YW, Austin SB. "How can we stay healthy when you're throwing all of this in front of us?" Findings from focus groups and interviews in middle schools on environmental influences on nutrition and physical activity. *Health Educ Behav* 2004;31:34–46.
10. Zabinski MF, Saelens BE, Stein RI, Hayden-Wade HA, Wilfley DE. Overweight children's barriers to and support for physical activity. *Obes Res* 2003;11:238–246.
11. Hayden-Wade HA, Stein RI, Ghaderi A *et al*. Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. non-overweight peers. *Obes Res* 2005;13:1381–1392.
12. Schmalz DL. 'I feel fat': weight-related stigma, body esteem, and BMI as predictors of perceived competence in physical activity. *Obes Facts* 2010;3:15–21.
13. Vartanian LR, Shaprow JG. Effects of weight stigma on exercise motivation and behavior: a preliminary investigation among college-aged females. *J Health Psychol* 2008;13:131–138.
14. Seacat JD, Mickelson KD. Stereotype threat and the exercise/dietary health intentions of overweight women. *J Health Psychol* 2009;14:556–567.
15. Crocker J, Garcia JA. *Self-esteem and the stigma of obesity.* In: Brownell KD, Schwartz MB, Puhl RM, Rudd L (eds). *Weight Bias: Nature, Consequences, and Remedies*. Guilford Press: New York, 2005, pp 165–174.
16. Latner JD, Wilson GT, Jackson ML, Stunkard AJ. Greater history of weight-related stigmatizing experience is associated with greater weight loss in obesity treatment. *J Health Psychol* 2009;14:190–199.
17. Schwartz MB, Vartanian LR, Nosek BA, Brownell KD. The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity (Silver Spring)* 2006;14:440–447.
18. Davison KK, Schmalz DL, Young LM, Birch LL. Overweight girls who internalize fat stereotypes report low psychosocial well-being. *Obesity (Silver Spring)* 2008;16 Suppl 2:S30–S38.
19. Durso LE, Latner JD. Understanding self-directed stigma: development of the weight bias internalization scale. *Obesity (Silver Spring)* 2008;16 Suppl 2:S80–S86.
20. Puhl RM, Moss-Racusin CA, Schwartz MB. Internalization of weight bias: Implications for binge eating and emotional well-being. *Obesity (Silver Spring)* 2007;15:19–23.
21. Thompson JK, Stice E. Thin-ideal internalization: mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Curr Dir Psychol Sci* 2001;10:181–183.
22. Cafri G, Yamamiya Y, Brannick M, Thompson JK. The influence of sociocultural factors on body image: a meta-analytic review. *Clin Psychol: Sci Pract* 2005;12:421–433.
23. Dittmar H, Howard S. Thin-ideal internalization and social comparison tendency as moderators of media models' impact on women's body-focused anxiety. *J Soc Clin Psychol* 2004;23:768–791.
24. Vartanian LR, Peter Herman C, Polivy J. Implicit and explicit attitudes toward fatness and thinness: the role of the internalization of societal standards. *Body Image* 2005;2:373–381.
25. Wilson JM, Tripp DA, Boland FJ. The relative contributions of subjective and objective measures of body shape and size to body image and disordered eating in women. *Body Image* 2005;2:233–247.
26. Vartanian LR. Disgust and perceived control in attitudes toward obese people. *Int J Obes (Lond)* 2010;34:1302–1307.
27. Heinberg LJ, Thompson JK, Stormer S. Development and validation of the Sociocultural Attitudes Towards Appearance Questionnaire. *Int J Eat Disord* 1995;17:81–89.
28. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci* 1985;10:141–146.
29. Garner DM, Olmstead MP, Polivy J. Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *Int J Eat Disord* 1983;2:15–34.
30. Rosenberg M. *Society and the Adolescent Self-Image.* Princeton University Press: Princeton, NJ, 1965.
31. Heatherton TF, Polivy J. Development and validation of a scale for measuring state self-esteem. *J Pers Soc Psychol* 1991;60:895–910.
32. Aiken LS, West SG. *Multiple Regression: Testing and Interpreting Interactions*. Sage: New York, 1991.
33. Carr D, Jaffe KJ, Friedman MA. Perceived interpersonal mistreatment among obese Americans: do race, class, and gender matter? *Obesity (Silver Spring)* 2008;16 Suppl 2:S60–S68.
34. Neumark-Sztainer D, Falkner N, Story M *et al*. Weight-teasing among adolescents: correlations with weight status and disordered eating behaviors. *Int J Obes Relat Metab Disord* 2002;26:123–131.
35. Crocker J, Cornwell B, Major B. The stigma of overweight: affective consequences of attributional ambiguity. *J Pers Soc Psychol* 1993;64:60–70.
36. Stice E, Presnell K, Gau J, Shaw H. Testing mediators of intervention effects in randomized controlled trials: an evaluation of two eating disorder prevention programs. *J Consult Clin Psychol* 2007;75:20–32.
37. Ball K, Crawford D, Owen N. Too fat to exercise? Obesity as a barrier to physical activity. *Aust N Z J Public Health* 2000;24:331–333.
38. Robertson N, Vohora R. Fitness vs. fatness: implicit bias towards obesity among fitness professionals and regular exercisers. *Psychol Sport Exerc* 2007;9:547–557.
39. Inzlicht M, McKay L, Aronson J. Stigma as ego depletion: how being the target of prejudice affects self-control. *Psychol Sci* 2006;17:262–269.