

# Health Consequences of Weight Stigma: Implications for Obesity Prevention and Treatment

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**Abstract** Despite decades of research documenting consistent stigma and discrimination against individuals with obesity, weight stigma is rarely considered in obesity prevention and treatment efforts. In recent years, evidence has examined weight stigmatization as a unique contributor to negative health outcomes and behaviors that can promote and exacerbate obesity. This review summarizes findings from published studies within the past 4 years examining the relationship between weight stigma and maladaptive eating behaviors (binge eating and increased food consumption), physical activity, weight status (weight gain and loss and development of obesity), and physiological stress responses. Research evaluating the effects of weight stigma present in obesity-related public health campaigns is also highlighted. Evidence collectively demonstrates negative implications of stigmatization for weight-related health correlates and behaviors and suggests that addressing weight stigma in obesity prevention and treatment is warranted. Key questions for future research to further delineate the health effects of weight stigmatization are summarized.

**Keywords** Obesity · Stigma · Discrimination · Health · Health behaviors

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## Introduction

Stigma and discrimination are common experiences reported by individuals with overweight and obesity. National estimates indicate that weight discrimination is among the most frequent forms of discrimination reported by adults and is comparable to rates of racial discrimination among women [1]. Among youths, weight stigma is experienced as pervasive bullying and victimization and is reported by youths, teachers, and parents to be one of the most prevalent forms of bullying that youths face at school [2–5]. In addition to numerous social consequences, economic inequalities, and psychological consequences imposed by weight stigma [6], those who experience weight bias or discrimination may be additionally vulnerable to health risk behaviors and outcomes that can exacerbate poor health and obesity. Increasing evidence has documented links between perceived weight stigmatization and adverse health consequences such as binge eating, increased food consumption, avoidance of physical activity, physiological stress, weight gain, and impaired weight loss outcomes. Taken together, this evidence suggests that weight stigma may interfere with efforts to improve health and well-being and potentially increase risk of behaviors that reinforce obesity. The aims of this review are to summarize recent evidence documenting health consequences associated with weight stigma and discuss implications for future research and stigma reduction efforts in obesity prevention and treatment.

## Methods

A systematic literature search of studies published between 2010 through September 2014 was conducted using online libraries of psychological, medical, social science, and education research including PsycINFO, PubMed, SCOPUS, and ERIC. The following search terms were used to identify studies addressing weight stigma: *bias*, *discrimination*,

*discriminatory, discriminate, stigma, prejudice, prejudicial, stereotype, stereotypical, stereotyping, victimization, victimize, blame, blaming, shame, shaming, teasing, tease, unfair, bully, bullying, harassment, weight, obese, obesity, overweight, BMI, fat, and fatness.* As the aim of this paper is to review the literature on weight stigma specifically in the context of its associated health consequences and implications for obesity prevention and intervention, the following search terms were additionally used in different combinations with the aforementioned list of terms above: *eat, overeat, diet, consumption, intake, caloric, calorie, physical activity, exercise, weight gain, weight change, weight trajectory, physiological, cortisol, stress, biochemical, hormone, blood pressure, campaign, and health promotion.* Finally, manual searches were conducted with reference lists of retrieved articles and in databases for authors with published work in this field. Unpublished manuscripts, dissertations, commentaries, and non-English publications were excluded. The initial search step identified 2366 articles. Upon removal of duplicates ( $N=712$ ), titles and abstracts were further screened to exclude articles based on study design (e.g., qualitative, case studies), involving animal samples, examining implications of weight stigma outside the scope of this review (e.g., employment discrimination), or studies that used non-weight-specific measures of stigma ( $N=1581$ ). Of the 73 remaining articles, full-text versions of 20 articles were further reviewed for clarification, and 13 articles were excluded due to use of composite health measures lacking differentiation between physical and emotional health, evaluations of outcomes uninformative for this review's aims (e.g., emotional eating), and sampling of clinical population affected with diseases unrelated to weight (e.g., schizophrenia). In total, 60 published articles were eligible for inclusion in this review.

## Weight Stigma and Associated Health Consequences

### Binge Eating

Individuals who report experiences of weight stigmatization have an increased likelihood of engaging in binge eating. In light of research documenting a high lifetime prevalence of obesity among individuals with binge eating disorder (BED) [7] and that many individuals with BED have a history of childhood obesity [8], it is important to examine the relationship of binge eating behaviors and experiences of weight stigmatization. Evidence indicates that weight stigmatization is a meaningful and unique predictor of binge eating beyond other established risk factors [9]. In clinical samples of adults, evidence has documented higher exposure to weight stigma among individuals with BED compared to controls ( $N=78$ )

[10] and significant associations between overt weight stigma and greater binge eating among overweight and obese adults ( $N=55$ ) [11]. Research with community samples ( $N=415$ ) has similarly found that perceived weight discrimination contributes significantly and independently to the variance in emotional eating and binge eating [12].

For youths, similar findings have emerged. Among boys and girls enrolled in weight loss camps ( $N=361$ ), those who reported experiencing weight-based teasing had an increased likelihood of engaging in unhealthy eating behaviors [13] and binge eating compared to peers who were not teased [14]. A study of 1491 adolescents found that reports of weight-based teasing were consistently associated with disordered eating for both boys and girls across weight strata [15]. These patterns also appear to be present in minority samples of youths. In a study of 57,997 Spanish adolescents, weight-related teasing was significantly related to abnormal eating in girls and with body dissatisfaction in both boys and girls [16]. Among Hispanic and African American girls ( $N=141$ ), weight-related teasing from peers and parents correlated with emotional eating, and parent-specific teasing was associated with binge eating [17]. In a study of African American girls seeking treatment for obesity ( $N=92$ ), weight-based teasing was significantly correlated with eating pathology [18]. Retrospective research with young adult women ( $N=1533$ ) also found that those who experienced childhood weight teasing were significantly more likely to engage in maladaptive eating behaviors than non-weight-teased peers, and as the variety of weight teasing insults increased, so did disordered eating patterns and current body weight status [19].

Internalization of weight bias (the extent to which a person engages in self-stigma, attributing negative weight-based stereotypes toward oneself) may have particularly important implications for binge eating behaviors. Weight bias internalization is positively associated with binge eating in obese adults seeking weight loss treatment [20, 21] and is endorsed at higher levels in weight-loss treatment samples compared to controls [22]. In a sample of treatment-seeking obese patients with BED ( $N=100$ ), internalization of weight bias made significant independent contributions to the variance of eating disorder pathology even after controlling for depression, self-esteem, and personal anti-fat attitudes [22] and also correlates with poorer self-reported health among overweight patients seeking treatment for BED ( $N=255$ ) [23]. Recent evidence additionally found that implicit self-stigma predicted individuals' ( $N=78$ ) eating disorder psychopathology over and above their reported experiences of weight stigmatization and regardless of whether they had obesity or BED [24]. In community samples, weight bias internalization has also been found to partially mediate the relationship between perceived weight discrimination and eating pathology [12].

## Increased Food Consumption

The influence of weight stigmatization on food consumption patterns is an area of emerging research. Although previous work has documented that as much as 79 % of overweight and obese women ( $N=2449$ ) reported eating more food in response to experiences of weight stigmatization, only recently has this topic been experimentally investigated [25]. Recently, four experimental studies have tested the impact of exposure to weight stigmatization on immediate food consumption. In a first study, researchers randomly assigned overweight ( $N=34$ ) and non-overweight ( $N=39$ ) women to view one of two brief videos, depicting either weight stigmatizing media content or neutral content, after which participants were invited to consume (pre-weighed) snacks *ad libitum* [26]. Overweight women who watched the stigmatizing video ate more than three times as many kilocalories as overweight women who watched the neutral video (302.82 vs. 89.00 kcal) and consumed significantly more calories than the normal-weight individuals who watched either the stigmatizing or the neutral video.

In a second study, women ( $N=93$ ) were randomly assigned to read a news article about weight stigma experienced by overweight persons in the employment setting or a control article [27]. They were then asked to talk about the content and implications of the article in front of a video camera, followed by a “break” period during which they watched a neutral video and were invited to eat (pre-weighed) snack foods provided for them. Women in the weight stigma threat condition who perceived themselves to be overweight (but not women who did not perceive themselves as overweight) ate more calories and felt less able to control their eating compared to women in the control condition.

Third, two experiments by Brochu and Dovidio (2014) tested the effect of weight-based stereotype threat on food choice, as a function of body mass index (BMI) [28]. In the first study, participants ( $N=176$ ) were randomly assigned to a weight stereotype threat or control condition and asked to make dinner selections from a restaurant menu. Participants in the stereotype threat condition ordered food containing more calories from a conventional menu (that did not present calorie information) as their BMI increased, but no association between participants' BMI and calories was found in the control condition. In the second experiment ( $N=367$ ), participants in the stereotype threat condition again ordered more calories from a conventional menu as their BMI increased, but no association between BMI and calories was observed for participants who ordered from a menu where calorie information was present, indicating that calorie labeling removed the effect of stereotype threat.

Finally, a fourth study by Chao and colleagues (2012) conducted two experiments to assess whether weight-related shame induces a desire for food [29]. In a first experiment

( $N=56$ ), participants were randomly assigned to a shame or no-shame (control) condition. It was found that compared to a control group experiencing no shame, participants experiencing shame rated a buffet meal more desirable and had an increased likelihood of binge eating. In a second experiment ( $N=102$ ), participants experiencing shame ate more food than controls in a comparative taste test. Findings remained consistent after controlling for levels of hunger, time since last meal, and negative emotions reported by participants.

Taken together, although this topic of study has received limited research attention, the recent available evidence suggests that exposure to weight-related stigma and shame leads to overeating and increased desire for food. More work is needed to clarify mechanisms that may be at play and to better identify how energy intake is affected by personal experiences of weight stigma compared to internalization of stigma or exposure to weight stigmatizing content in other forms (e.g., media).

## Physical Activity

Increasing research has begun to examine implications of weight stigma for engagement in physical activity, especially for youths. Weight-based teasing during physical activities in the school setting is reported to be both commonly observed and experienced by students. In a survey study of 1555 adolescents, 85 % reported that they had witnessed overweight peers being teased about their weight during physical activities at school [2]. Another study of 361 adolescents enrolled in weight loss camps found that 73 % reported that they had been teased or bullied about their weight in a physical activity setting, such as their school gym class or sports practice. Of concern, 42 % also reported being teased or bullied about their weight by physical education teachers and/or sports coaches [30]. This finding may be partially explained by recent evidence demonstrating that teacher attitudes about students may be negatively influenced by students' body weight. For example, an experimental study of 162 physical educators found that participants expressed lower ability expectations for overweight students than non-overweight students, especially for girls [31], and variable responses to intervene in situations where they became aware of students being teased about their weight [32]. Trainees in sport exercise and PE-related programs ( $N=167$ ) have similarly expressed negative perceptions of overweight children [33].

Not surprisingly, weight-based teasing at school and/or during physical activity has negative implications for exercise motivation and behavior in youths. In a study of 1419 middle school students, after controlling for demographic characteristics, students who reported being teased about their weight ( $N=245$ ) had lower physical self-concept, lower physical activity self-efficacy, and lower levels of physical fitness compared to peers who were not teased [34]. An experimental

study of 140 overweight youths found that those who were randomly assigned to a stereotype-threat condition performed worse on an exercise-based game than those who were not exposed to stereotype threat [35].

Several studies have further demonstrated strong associations between student reports of more frequent weight-based teasing and decreased physical activity [34, 36, 37]. Some evidence suggests that girls experience higher levels of teasing experiences during physical activities and decreased physical activity compared to boys [37], where as one study has demonstrated this association in boys only [36]. Other research found that among 394 adolescents who had reported being teased about their weight during the past year, both boys and girls who reported more negative affect in response to teasing experiences were more likely to cope with teasing through avoidance of school activities, including avoiding participating in physical activities and going to gym class [14]. Although little longitudinal work has been done in this area, a recent study of preadolescents ( $N=108$ ) found that children with overweight and obesity who experienced teasing during physical activity were more likely to report poorer subsequent health-related quality of life 1 year later. Teasing during physical activity also negatively influenced physical activity levels in youths who were not overweight [38].

Taken together, this evidence suggests that youths are highly vulnerable to weight-based victimization in physical activity settings and that this may in turn negatively impact their attitudes toward and engagement in physical activity. These findings have led to calls for re-examination of curricula and physical activity education to ensure that students are not marginalized because of their weight [39].

Less research has addressed weight stigma and physical activity in adults, but recent findings suggest that internalized weight stigma may play a particularly important role in physical activity among adults. In a study of 76 adults enrolled in a weight management program, awareness and internalization of weight stigma, regardless of objective weight status, were found to negatively affect individuals' willingness to participate in physical activity and perceived competence in physical activity [40]. Vartanian and Novak (2011) illustrated that weight stigma negatively influenced motivation to exercise among overweight and obese adults ( $N=111$ ), particularly for those who internalized societal attitudes about weight [41]. Similarly, a study of 177 overweight and obese women demonstrated that internalized weight stigma negatively influenced exercise motivation, self-efficacy, and reported levels of exercise and was a partial mediator between experiences of weight stigma and exercise behavior [42]. However, this study also found a positive association between stigma experiences and exercise behavior, indicating that more work in this area is needed to clarify how internalized versus experiences of stigma influence exercise motivation and behaviors among adults.

## Weight Gain, Obesity, and Weight Loss

Given the harmful implications of weight stigma for weight-related health behaviors, research has begun to examine obesity as a potential outcome of stigma. Among adults, longitudinal evidence demonstrates a clear link between weight discrimination and obesity [43, 44•] and weight gain [43, 45]. One nationally representative study of 6157 adults from the Health and Retirement Study evaluated the association between experiences of everyday discrimination and obesity over 4 years [44•]. Regardless of baseline BMI, compared to adults without experiences of weight discrimination, those who reported experiences of weight discrimination (but not other forms of discrimination such as race, appearance, or sexual orientation) were 2.5–3 times more likely to become obese or remain obese, respectively. In a second longitudinal study of 2944 adults from the English Longitudinal Study of Ageing, independent of baseline BMI, people reporting perceived weight discrimination similarly experienced greater odds of becoming obese (odds ratio (OR)=6.67) and experienced significant increases in weight and waist circumference [43]. However, this study did not observe significance for the relationship between weight discrimination and likelihood of *remaining* obese. Given measurement differences between the two longitudinal studies, more methodologically comparable research with overweight and obese samples is needed. Notably, one nationally representative study in Sweden asked participants ( $N=2628$ ) about their experiences in health care; relative to individuals of comparable BMI who did not report any weight discrimination, those who perceived discrimination experienced an increased change in BMI [45].

Among youths, compared to girls without experiences of weight stigmatization, those reporting previous experiences of weight stigma face a 64–66 % increased risk of becoming overweight and obese [46–48]. During adolescence, teasing and hurtful labels from family members may be especially harmful. One study ( $N=2379$ ) of a diverse sample of girls reports greater odds of obesity as a result of stigmatization from family members, rather than friends and teachers (OR=1.62 vs. 1.40) [48]. For boys, evidence is less clear. Two studies suggest that weight-related teasing is not a significant predictor of overweight and obesity for boys [46, 47]. However, one study ( $N=1643$ ) evaluated *changes* in teasing over 10 years and observed that increases in weight-related teasing from adolescence to adulthood were associated with higher probability of being overweight for adult females (OR=2.43) and males (OR=1.67) [47]. As excess weight in childhood and adolescence increases the risk of obesity [49] and morbidity and premature mortality in adulthood [50], it is important to continue examining the long-term effects of weight stigma on obesity across the lifespan.

Weight stigma may also pose challenges for achieving weight loss. Among treatment-seeking patients, preliminary

evidence suggests that experiences of weight stigma may interfere with weight loss outcomes [11, 51•]. In a study of adults in primary care ( $N=600$ ), compared to patients who perceived respectful treatment from their primary care providers, those who felt judged by providers because of their weight were less likely to achieve a  $\geq 10\%$  weight loss ( $OR=0.87$ ) [51•]. Several studies have also begun to examine associations between implicit weight bias among patients and percentage of weight loss, with one study demonstrating that patients with greater weight bias have poorer weight loss outcomes [52] and others showing either an opposite direction of association [53] or no significant association [21]. Furthermore, among adult patients with obesity in weight management clinics ( $N=115$ ), those who experienced weight discrimination selected potentially riskier weight loss interventions and expressed higher ideal weight loss compared to patients of similar BMI without experiences of weight discrimination [54].

More work in this area is clearly needed to identify the extent to which experiences of weight stigma influence weight loss efforts and weight outcomes over time. Preliminary evidence suggests that including components of treatment to address weight stigma with patients may facilitate positive treatment outcomes [55] including weight loss [56]. In light of documented associations between weight stigmatization and binge eating, increased food consumption, and reduced physical activity, all of which can reinforce weight gain and interfere with weight loss, identifying that effects of stigma on body weight seem particularly warranted.

### Physiological Stress Responses

Other forms of societal discrimination (e.g., inequities resulting from race/ethnicity) have been shown to induce negative physiological reactivity in stigmatized individuals [57–59]. Similarly, increasing research has begun to examine the ways in which weight discrimination may trigger physiological stress responses that impair neuroendocrine control of health behaviors and contribute to increased adiposity and elevated risk for cardiovascular and metabolic co-morbidities of obesity. In evaluating blood pressure, one experiment exposed women ( $N=99$ ) to weight stigmatization in which women were told that their body weight was either visible or not visible to others. Findings showed that higher BMI was associated with greater increases in blood pressure only for participants who believed that their body weight was visible to others, but not when they believed that their weight was not visible [60]. Among youths, one cross-sectional study ( $N=644$ ) provided preliminary evidence demonstrating a direct association of weight-related teasing and bullying with elevated systolic and diastolic blood pressure [61]. As a well-documented marker of hypertension and other cardiovascular diseases prevalent among individuals with obesity and overweight, additional experiments with standardized test

procedures and larger sample sizes that include both men and women are warranted. To date, only one experiment has examined cortisol reactivity (another index of physiological stress) in response to weight stigmatization within a laboratory setting [62]. In this study, exposure to weight-stigmatizing stimuli elicited greater cortisol reactivity among both overweight and non-overweight women ( $N=123$ ). Given that experiences of weight stigma are reported by adults at different body weight categories [63], the link between weight stigma and cortisol could be important to examine in samples across the weight spectrum. Another study closely examined this link among women with overweight and obesity ( $N=45$ ) and similarly demonstrated that more frequent experiences of weight discrimination were associated with greater blood pressure and oxidative stress, independent of adiposity [64]. Recent work has also begun to examine links between weight stigma and C-reactive protein (CRP), a biomarker of systemic inflammation that may be independently predictive of type 2 diabetes and cardiovascular disease [65, 66]. In one nationally representative study of adults with overweight and obesity ( $N=7394$ ), greater experiences of weight discrimination were associated with higher levels of circulating CRP, except for those with class III obesity [67]. Interestingly, these findings extended to experiences of discrimination related to physical disability, but not race or age. Additionally, within a subsample of the national *Midlife in the United States* survey of non-diabetic adults ( $N=938$ ), weight discrimination was identified as a stressor that exacerbated the harmful effects of waist to hip ratio on glycemic control (indexed by glycated hemoglobin ( $HbA_{1c}$ )) [68]. The observed interaction between waist to hip ratio and weight stigmatization suggests that the psychosocial consequences of weight stigma and discrimination experienced by individuals with overweight and obesity may be sources of increased vulnerability that partly explains the manifestation of clinical diabetes. As research examining physiological responses to weight stigmatization remains in its infancy, more studies are needed to clarify the effects of exposure to weight stigma on blood pressure, cortisol reactivity, CRPs, and  $HbA_{1c}$  levels. Given the co-morbidities associated with obesity, it will be especially important to determine whether physiological responses to weight stigmatization exacerbate or contribute to obesity and its related adverse health outcomes.

### Media Campaigns Addressing Obesity

The above evidence documents a range of negative health consequences that weight stigma can create for eating behaviors, physical activity, and even weight status. In light of this research, careful consideration should be given to messages communicated in public health media campaigns targeting obesity prevention, to ensure that messages intended to promote optimal weight-related health behaviors do not simultaneously stigmatize or shame individuals with obesity.

Despite hundreds of public health media campaigns targeting obesity that have been disseminated across the USA, very little assessment or evaluation of media campaigns has occurred. However, several recent studies have begun to examine stigmatizing content in obesity-related media campaigns and its impact on the public. In a national study of 1014 adults, participants viewed a random selection of 10 (from a total of 30) messages from major obesity public health campaigns, evaluating each according to positive and negative descriptors [69]. Campaign messages that were publicly criticized for their stigmatizing content received the most negative ratings and the lowest intentions to comply with message

content. Furthermore, messages that were perceived to be most positive and motivating made no mention of the word “obesity” at all and, instead, focused on making healthy behavioral changes without reference to body weight. In a follow-up experimental study, the same researchers randomly assigned a national sample of 1085 adults to view either ten obesity-related campaigns that were stigmatizing or ten campaigns that contained more neutral content [70]. Again, stigmatizing campaigns were no more likely to instill motivation for improving lifestyle behaviors than campaigns that were more neutral, and stigmatizing campaigns were also rated as inducing less self-efficacy for health behavior change and

**Table 1** Key research questions for future study on the health consequences of weight stigma

Topic	Research questions
Eating behaviors	<ul style="list-style-type: none"> <li>• How does exposure to weight-based bullying and teasing affect binge eating and food consumption in youths?</li> <li>• How does weight stigmatization affect food consumption across individual characteristics such as race/ethnicity, gender, age, and weight status?</li> <li>• How does internalization of weight stigma affect binge eating and/or increased food intake?</li> <li>• Can efforts to help patients cope with weight stigma lead to reductions in binge eating, food consumption, or improve treatment outcomes for binge eating disorder?</li> </ul>
Physical activity	<ul style="list-style-type: none"> <li>• To what extent does weight stigmatization affect exercise behaviors? Are there differences across sociodemographic factors or weight status?</li> <li>• Among adults, how prevalent and consequential are experiences of weight stigma and discrimination in physical activity settings (e.g., fitness centers and group sports)?</li> <li>• How does internalization of weight stigma affect levels of physical activity in youths and adults?</li> <li>• Can efforts to help individuals cope with weight stigma lead to improvements in physical activity?</li> </ul>
Weight gain, obesity, and weight loss	<ul style="list-style-type: none"> <li>• How do experiences of weight-related teasing and bullying in youths affect the development and continuation of obesity in adulthood?</li> <li>• Are there differential effects of experiences of weight discrimination versus internalization of weight bias on weight status?</li> <li>• Does weight stigma influence weight gain or weight loss differently across gender, race/ethnicity, age, or body weight status?</li> <li>• To what extent does weight stigma influence weight loss maintenance?</li> <li>• Can helping patients address weight stigma improve weight loss treatment outcomes?</li> </ul>
Physiological responses	<ul style="list-style-type: none"> <li>• How do negative physiological responses associated with weight stigmatization contribute to eating behaviors, health outcomes, and obesity?</li> <li>• Are there differential effects of experiences of weight discrimination versus internalization of weight bias on physiological responses?</li> <li>• Does weight stigmatization affect physiological responses similarly or differently across individual characteristics such as race/ethnicity, gender, age, and weight status?</li> <li>• What other neuroendocrine markers (e.g., ghrelin and leptin) and physiological responses (e.g., heart rate) associated with obesity and related diseases respond to weight stigma and discrimination?</li> <li>• Do perceptions of psychological stress influence the association between weight stigma and negative physiological reactivity?</li> <li>• Can interventions addressing internalization of weight stigma reduce physiological stress responses among individuals experiencing or anticipating weight stigma?</li> </ul>
Media campaigns	<ul style="list-style-type: none"> <li>• Do stigmatizing obesity-related media campaigns influence health behavior outcomes for adults and youths with obesity? How do these outcomes compare with exposure to non-stigmatizing campaigns?</li> <li>• How do different segments of the population (e.g., ethnic minorities, parents, youths) respond to obesity-related media campaigns that are stigmatizing versus non-stigmatizing?</li> <li>• What types of non-stigmatizing health campaign messages can effectively increase awareness of obesity and improve health behaviors?</li> </ul>

having less-appropriate visual content compared to more neutral campaigns. These findings remained consistent regardless of participants' body weight and across most sociodemographic predictors. A more recent experimental study examined the effect of a controversial media campaign on perceptions of childhood obesity. A national sample of adults ( $N=1699$ ) was randomly assigned to view one of three publicized media messages featured in a controversial childhood obesity awareness campaign intended to increase awareness of the seriousness of childhood obesity or a control (no exposure) group [71]. Messages tested specifically highlighted health consequences of obesity (e.g., hypertension), psychosocial consequences (e.g., bullying), or parental contributions to childhood obesity. The media messages had no effect on participants' attributions of responsibility to parents, support for obesity prevention policies, or perceived importance and seriousness of childhood obesity, nor did they increase weight-based stigma. Although much work remains to be done in this area, this preliminary evidence indicates that some highly disseminated media campaigns targeting obesity may not have their intended effects and, in some cases, may backfire by instead leading to perceptions of stigma and lower motivation and intentions to engage in healthy behaviors. This underscores the importance of ensuring that obesity-related media campaigns are adequately tested and grounded in evidence and that steps are taken to avoid content that may further stigmatize individuals with obesity [72].

## Conclusions and Implications for Obesity Prevention

Collectively, recent research examining weight stigma illustrates a range of potential adverse health consequences that can reduce quality of life for individuals with obesity and may ultimately interfere with efforts to improve their health, lose weight, or prevent weight gain. Despite national attention to obesity as a public health priority and strategies to identify its effective prevention and treatment, weight stigma and its associated health consequences are often absent in national discourse, decision-making, and policy efforts. Although more research is needed to obtain a comprehensive picture of the ways in which weight stigma may influence different health indices (see Table 1 for a summary of key research questions that need to be addressed to advance this field of study), implications from existing work nevertheless suggest that weight stigma can interfere with weight-related health behaviors. Increasing efforts should consider strategies to reduce weight stigma as part of broader initiatives to prevent and treat obesity.

As a first step, increased awareness of weight stigma and its consequences is needed in the fields of medicine, public health, obesity, nutrition, and physical activity. This can be achieved through provision of education and sensitivity training on weight stigma to scientists, health care professionals,

and advocates working on obesity prevention and treatment. Some medical schools and many bariatric centers across the country have already begun to implement sensitivity training to reduce weight stigma. With recognition that stigma is a legitimate and prevalent problem experienced by children and adults with obesity, these fields will be better prepared to respond through increased diligence to ensure that existing and future obesity prevention, intervention, and treatment approaches provide support and empowerment to persons with obesity rather than reinforce stigma, shame, or blame. There have been increasing calls for obesity prevention efforts to include strategies to prevent weight stigma [73, 74] and to ensure that health messages targeting individuals with obesity first and foremost do no harm [72]. This may involve shifting the emphasis of prevention efforts to encourage and support health behavior change in individuals across diverse body weight categories rather than disseminating messages that focus specifically on obesity or weight loss [69].

Finally, professionals in health-related fields can advocate for and support broader systemic and policy efforts that aim to reduce weight stigmatization in our society. With weight bias and discrimination present in many domains of living including employment settings, educational institutions, and the mass media [6], societal-level remedies may be needed to change this otherwise widespread form of bias. Thus, as policy remedies are increasingly discussed and considered as strategies to offer protection against discrimination for people with obesity [75], professionals in health-related fields can inform these initiatives and advocate for improving quality of life for individuals affected by weight stigma and discrimination.

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### Compliance with Ethics Guidelines

**Conflict of Interest** Rebecca Puhl and Young Suh declare that they have no conflict of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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