

The Countervailing Effects of Weight Stigma on Weight-Loss Motivation and Perceived Capacity for Weight Control

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Abstract

We hypothesized that exposure to weight stigma simultaneously *increases* motivation to lose or avoid gaining weight to avoid future stigma and *decreases* perceived capacity to do so, by heightening concerns about experiencing stigma and negative affect. Study 1 showed that more frequently experiencing weight-based discrimination was associated with greater concerns about being a victim of weight stigma, which predicted increased motivation to lose weight but decreased perceived capacity for weight control. Study 2 showed that participants randomly assigned to view a weight-stigmatizing (vs. control) message showed increased concerns about being a target of weight stigma, which indirectly increased motivation to lose weight and decreased state self-control. These, in turn, predicted increased willingness to engage in unhealthy weight-loss behaviors and decreased perceived capacity for weight control, respectively. Study 3 showed that increased motivation to avoid stigma and increased negative affect mediate these effects of exposure to weight stigma.

Keywords

stigma, stigma avoidance, weight stigma, weight discrimination, weight bias, weight-loss motivation

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The weight of the U.S. population has increased dramatically over the last several decades, where more than two thirds of adults and almost one in three young people are now considered to be “overweight” or “obese” according to their body mass index (BMI; Ogden et al., 2014). Concerns about rising weight have prompted a variety of approaches to combat it. The majority target individual behavior as the driver of weight gain, and many employ messages that implicitly stigmatize higher weight individuals by blaming them for their size (Puhl & Heuer, 2010). Anti-obesity ad campaigns often contain stigmatizing images and content designed to persuade people to reduce unhealthy habits and to lose weight (Brochu et al., 2014; Heuer et al., 2011). Some public health officials and health policy scholars have explicitly endorsed weight stigma as a health promotion tool to reduce obesity and have called for the use of “tough love” or “stigmatization lite” to shame heavier people into changing their behavior (e.g., Callahan, 2013; Crister, 2004). Such sentiments were echoed in 2019 on national television, when a prominent talk show host asserted “Fat shaming doesn’t need to end it needs to make a comeback. Some amount of shame is good” (Maher, 2019). Implicit or explicit in such campaigns are the fundamental assumptions that (a) exposure to weight stigma will result in successful weight loss because (b) obesity is

largely a matter of self-control and (c) stigmatizing higher weight individuals will motivate them to enact positive health behaviors (Puhl & Heuer, 2010; Vartanian & Smyth, 2013).

A growing amount of research, however, undermines the validity of the first assumption—that stigmatizing heavier individuals will result in weight loss (see Hunger et al., 2015; Major et al., 2018; Puhl & Heuer, 2009; Puhl & Suh, 2015, for reviews). Exposure to weight-stigmatizing experiences, such as weight-related teasing, harassment, and discrimination, is associated with weight *gain* among both children and adults (e.g., Haines et al., 2006; Hunger & Tomiyama, 2014; Quick et al., 2013; Sutin & Terracciano, 2013). Exposure to weight stigma is also associated with binge eating (Durso et al., 2012) and exercise avoidance (Vartanian & Novak, 2011; Vartanian & Shaprow, 2008)—behaviors that are

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associated with weight gain. In addition, exposing higher body weight children and adults to weight-stigmatizing experiences, such as social exclusion (Salvy et al., 2011), stereotypical representations of heavier people in the media (Schvey et al., 2011), or news articles discussing weight-based discrimination (Major et al., 2014) causes them to eat *more* in a subsequent task or order higher caloric meals (Brochu & Dovidio, 2014) than those not exposed to such experiences.

A substantial amount of research also contradicts the second assumption—that a person's weight is largely under his or her control (Mann et al., 2007; Puhl & Heuer, 2010; Tomiyama et al., 2013). It is now well established that neural, physiological, and genetic processes contribute to weight gain as well as to the difficulty of sustained weight loss (e.g., Appelhans et al., 2011). A wide variety of situational factors also influence weight gain and loss (Mann et al., 2007). Consequently, diets seldom result in significant weight loss, even under optimal conditions. Moreover, the vast majority of people who do lose weight will regain it within a few years (Franz et al., 2007).

The third assumption—that exposure to weight-stigmatizing experiences *motivates* people to lose weight—has received surprisingly little attention. The prevailing view among weight-stigma scholars is that weight stigma *de-motivates* people to lose weight (Puhl & Heuer, 2010; Vartanian & Smyth, 2013). This perspective is supported by surveys in which higher body weight individuals reported being more likely to overeat and avoid dieting than to go on a diet in response to experiences of weight stigma (Myers & Rosen, 1999; Puhl & Brownell, 2006). The correlational design of these studies, however, limits inferences about the causal effects of weight stigma on motivation. Another study using ecological momentary assessment to track daily experiences with weight stigma found that people reported decreased motivation to diet, exercise, and lose weight on days they experienced weight stigma (Vartanian et al., 2018). This study, however, did not include assessments of motivation to lose weight outside of weight-stigmatizing experiences (e.g., during random signals); thus, participants who reported less motivation to lose weight on days they experienced weight stigma might also report less motivation to lose weight in their daily life, independent of their stigma experiences.

Some scholars also interpret the finding that people consume more calories and report decreased intention to exercise in public after experiencing weight stigma as evidence that exposure to weight stigma *de-motivates* people to lose weight (Puhl & Heuer, 2010; Vartanian & Smyth, 2013). We believe, however, that it is crucial to differentiate the effect of weight stigma on people's *motivation to lose weight* from its effect on their *perceived capacity for self-control over their weight*. Experiencing weight-based stigma and discrimination is physiologically stressful, increasing blood pressure (Major et al., 2012) and production of cortisol (Schvey et al., 2014; Tomiyama et al., 2014). It also evokes negative

emotions, including shame and guilt (Blodorn et al., 2016; Hatzenbuehler et al., 2009; Himmelstein et al., 2015), and leads to concern about future stigmatization (Blodorn et al., 2016; Hunger et al., 2018; Hunger & Major, 2015). The stress and negative emotions induced by weight stigma can stimulate a drive for high-sugar and high-fat foods, a behavior colloquially known as “comfort eating” (Tomiyama, 2014). Furthermore, weight-stigma exposure can cause higher body weight individuals to perform more poorly on tests of executive functioning necessary for self-control (Major et al., 2012). An increased drive for “comfort foods” and reduced capacity to exercise self-control over eating such foods, however, are distinct from a lack of *motivation* to lose weight.

Stigma Avoidance

We theorize that exposure to weight-stigmatizing events and messages not only increases stress and negative affect but also *motivation to escape or avoid future stigmatization* (Goffman, 1963; Hunger et al., 2015). Some devalued identities, such as race or gender, are group identities with which people are often strongly and positively identified. Heavier individuals, however, typically do not embrace their weight as central part of their self-image (Crandall, 1994; Shapiro, 2011). One way people cope with stress and negative emotions elicited by stigmatization, particularly on the basis of an undesired identity which they perceive has permeable boundaries, is to try to escape or exit that group (Goffman, 1963; Tajfel & Turner, 1985). For example, people with a stutter, who smoke, who are poor, or who have a disfiguring scar may seek to avoid or escape stigma by undergoing speech therapy, quitting smoking, pursuing higher education, or undergoing plastic surgery. Likewise, if having a higher body weight is perceived to be a cause of stigma, exposure to weight stigma may motivate people to lose weight—or stay thin—to escape or avoid stigmatization.

Several lines of evidence are consistent with the argument that exposure to stigma increases rather than decreases motivation to lose weight or stay thin in an effort to escape or avoid stigma. Among adolescents, weight-related teasing is associated with unhealthy weight control behaviors such as dieting, skipping meals, and taking diet pills (Haines et al., 2006; Hunger & Tomiyama, 2018; Neumark-Sztainer et al., 2002). In a large nationally representative survey, the more people reported experiencing weight stigma, the more they reported using diet pills, starving themselves, or vomiting to try to lose weight (Himmelstein et al., 2018). As noted above, weight-based stigma and discrimination are also associated with reports of greater motivation to avoid exercising in public (e.g., Vartanian & Shaprow, 2008). We believe that, rather than reflecting a lack of motivation to lose weight, this finding may instead reflect a desire to avoid further stigmatization. Items on the scale used to measure exercise avoidance in response to weight stigma included “I avoid going out in

public places because I am afraid that people will make comments about my size,” and “I avoid going to the gym when I know there will be a lot of thin people there” (Vartanian & Shaprow, 2008). Higher weight individuals often encounter or anticipate weight stigma in highly evaluative contexts such as exercising in public. A qualitative study of the experiences of heavier adults found that nearly half were unwilling to participate in exercise because they expected that people would “laugh at,” “ridicule,” “stare at,” or “abuse” them (Lewis et al., 2011).

In sum, we propose that exposure to weight stigma increases, rather than decreases, motivation to lose weight. This, in turn, increases people’s willingness to engage in weight-loss behaviors such as restrictive dieting. Contrary to popular belief, however, restrictive dieting seldom results in weight loss, and often results in long-term weight gain (Mann et al., 2007; Tomiyama et al., 2013). More importantly, efforts to control weight through restrictive eating behaviors such as taking diet pills or vomiting are also unhealthy coping responses that can have serious negative consequences for health and well-being (Herpertz-Dahlmann et al., 2008; Kärkkäinen et al., 2018; Nagata et al., 2018; Wade et al., 2012).

We propose that exposure to weight stigma simultaneously decreases self-control, which impairs people’s capacity to control their weight. This is consistent with experimental evidence that exposure to weight stigma led heavier women to perform more poorly on a test of executive functioning (Major et al., 2012), feel less self-efficacy for controlling their eating (Major et al., 2014), and consume more calories in the presence of snack foods (Major et al., 2014). We suggest that the finding that heavier adults and children eat more snack food or consume more calories after exposure to weight stigma reflects decreased self-control (e.g., Major et al., 2014; Salvy et al., 2011; Schvey et al., 2011) rather than decreased weight-loss motivation. Concerns about experiencing weight stigma engender stress and negative emotions, which hinder people’s ability to effectively self-regulate their food intake and enact positive health behaviors.

Current Research

Three studies tested elements of our hypothesized model. Study 1 used a correlational design to test the prediction that the more frequently people report having experienced weight-based discrimination in the past, the more concerned they are about encountering weight stigma in the future, which, in turn, is associated with increased motivation to lose weight yet decreased perceived capacity for weight control. Study 2 used an experimental design to manipulate weight-stigma exposure and added measures of weight-related behavioral intentions and feelings of self-control. We predicted that exposure to messages that stigmatize higher weight would increase concerns about being a target of weight-based stigmatization, which in turn would increase

motivation to lose weight and, as a consequence, willingness to engage in unhealthy weight control behaviors. However, we hypothesized that increased concerns about being a target of weight stigma would simultaneously undermine feelings of self-control, which in turn would reduce perceived capacity to control one’s weight. Study 3 provided a full test of our model, replicating and extending Study 2 by directly measuring motivation to avoid stigma and negative affect as mediators of increased weight-loss motivation and reduced self-control, respectively.

Study 1

Method

Participants. A total of 527 individuals participated in Study 1 through Amazon’s Mechanical Turk in exchange for 50 cents. After completing measures of interest (see below), participants completed demographic measures, reported their height and weight (used to calculate self-reported BMI), and rated their self-perceived weight on a 7-point scale (1 = *very underweight*, 4 = *average weight*, 7 = *very overweight*). Prior to data analyses, we omitted 39 participants who failed to pass attention checks as well as three who did not provide their height and/or weight. This resulted in a final sample size of 485 (18–77 years old, $M = 35.10$, $SD = 11.57$; 53.0% male; 77.7% White/European American, 6.8% Asian/Asian American, 5.6% Latino/a or Hispanic, 4.5% Black/African American, 5.3% Other). Post hoc power analysis using Monte Carlo simulations (Schoemann et al., 2017) indicated that this sample size had excellent power ($>.99$) to detect the hypothesized indirect effects tested below. Participants’ BMI ranged from 15.87 to 65.22 ($M = 26.76$, $SD = 6.86$). According to World Health Organization classifications, 3.3% of the sample was “underweight” ($BMI < 18.5$), 45.8% was “normal weight” ($18.5 \leq BMI < 25$), 28.9% was “overweight” ($25 \leq BMI < 30$), and 22.1% was “obese” ($BMI \geq 30$).¹ Self-perceived weight ranged from 1 (*very underweight*) to 7 (*very overweight*), $M = 4.75$, $SD = 1.14$, and was positively correlated with BMI ($r = .75$, $p < .001$).

Procedure. Upon providing consent, participants completed the key measures of interest, followed by the demographic and height/weight measures. Participants were then told the study purpose and compensated. The study was approved by the Institutional Review Board of the University of California, Santa Barbara.

Measures

Experienced weight discrimination. Eight items, adapted from the Everyday Discrimination Scale (Williams et al., 1997), assessed the frequency with which participants had experienced weight-based discrimination ($\alpha = .95$). Participants indicated how often they had experienced eight different types of interpersonal discrimination (e.g., “You are

Table 1. Study 1 Hierarchical Regression Analyses With Perceived Weight Discrimination, BMI, and Their Interaction as Predictors.

Outcome	Step 1	Predictor	β	Step 2	Predictor	β
Weight-stigma concerns	$F(2, 482) = 177.93$, $p < .001$, $R^2 = .425$	PWD	.499***	$\Delta F(1, 481) = 4.420$, $p = .036$, $\Delta R^2 = .005$	PWD $\times$ BMI	-.086*
		BMI	.323***			
Weight-loss motivation	$F(2, 482) = 32.372$, $p < .001$, $R^2 = .118$	PWD	.153***	$\Delta F(1, 481) = 19.059$, $p < .001$, $\Delta R^2 = .034$	PWD $\times$ BMI	-.218***
		BMI	.379***			
Perceived capacity for weight control	$F(2, 482) = 100.414$, $p < .001$, $R^2 = .294$	PWD	-.484***	$\Delta F(1, 478) = 3.349$, $p < .068$, $\Delta R^2 = .005$	PWD $\times$ BMI	.068
		BMI	-.167***			

Note. BMI = body mass index; PWD = perceived weight discrimination.

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

treated with less respect than other people”; “People act as though you are unattractive or romantically unappealing”) in their day-to-day life “because of your weight.” Each event was rated on a 7-point scale (0 = *never*, 1 = *less than once a year*, 2 = *a few times a year*, 3 = *a few times a month*, 4 = *at least once a week*, 5 = *almost every day*, 6 = *daily*).

Weight-stigma concerns. Five items developed by Hunger and Major (2015) assessed concerns about future weight-based mistreatment and devaluation ($\alpha = .97$). Participants rated their agreement with items such as “I am afraid that others will reject me because of my weight” and “I am concerned that I will not be treated fairly by others because of my weight” on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*).

Motivation to lose weight. We assessed motivation to lose weight with three items created for this study ($\alpha = .92$). Participants rated their agreement with the items “I am motivated to lose weight”; “I am motivated to be thinner”; and “I am motivated to eat less” on 7-point scales (1 = *strongly disagree* to 7 = *strongly agree*).

Perceived capacity for weight control. Perceived capacity for weight control was measured with eight items (adapted from Armitage & Conner, 1999; Povey et al., 2000) assessing participants’ *perceived behavioral control and self-efficacy for weight control* ($\alpha = .90$). Participants responded to items such as “I believe I have the ability to reach my desired weight” and “How much personal control do you feel you have over your weight?” on 7-point scales (1 = *strongly disagree* to 7 = *strongly agree* and 1 = *no control* to 7 = *complete control*, respectively).

Correlations among measures are presented in Table S1 in the supplementary materials.

Results

Regression analyses. We first conducted hierarchical regression analyses in which we entered centered weight discrimination and BMI on Step 1 and the BMI $\times$ Weight

Discrimination interaction on Step 2 to predict our proposed mediator (weight-stigma concerns) and outcomes (motivation to lose weight and perceived capacity for weight control). Table 1 reports results of these analyses. Women, higher BMI individuals, and people who reported experiencing more weight-based discrimination reported more weight-stigma concerns, greater motivation to lose weight, and lower perceived capacity for weight control. BMI interacted with weight discrimination to predict weight-stigma concerns ($p = .036$) such that the association between weight discrimination and weight-stigma concerns, although significant for both, was stronger among lower (-1 SD, BMI = 19.91) versus higher ($+1$ SD, BMI = 33.62) BMI individuals ($\beta = .559$, $p < .001$ vs. $\beta = .439$, $p < .001$). BMI also interacted with weight discrimination to predict weight-loss motivation such that the association was only significant among lower (-1 SD) but not higher ($+1$ SD) BMI individuals ($\beta = .301$, $p < .001$ vs. $\beta = .001$, $p > .98$).²

Tests of hypothesized model. Study 1 tested the hypothesis that experiencing stigmatization leads to greater concerns about being a target of weight stigma in the future, which in turn *increases* motivation to lose weight but *decreases* perceived capacity for weight control (see Figure 1). We separately tested the indirect effect of perceived weight discrimination (predictor) on weight-loss motivation and perceived capacity for weight control (outcomes) via weight-stigma concerns (mediator) using Hayes’s PROCESS model 4 (Hayes, 2013), controlling for participant BMI and gender.³

Results confirmed our hypothesized model. More frequent experiences of weight-based discrimination significantly predicted increased weight-stigma concerns ($\beta = .473$, $b = .767$, $p < .001$), which in turn predicted both *increased* motivation to lose weight ($\beta = .542$, $b = .423$, $p < .001$; standardized indirect effect = .189, $SE = .026$, 95% confidence interval [CI] = [.138, .242]) and *decreased* perceived capacity for weight control ($\beta = -.203$, $b = -.137$, $p < .001$; standardized indirect effect = $-.097$, $SE = .025$, 95% CI = [0–.149, $-.052$]).

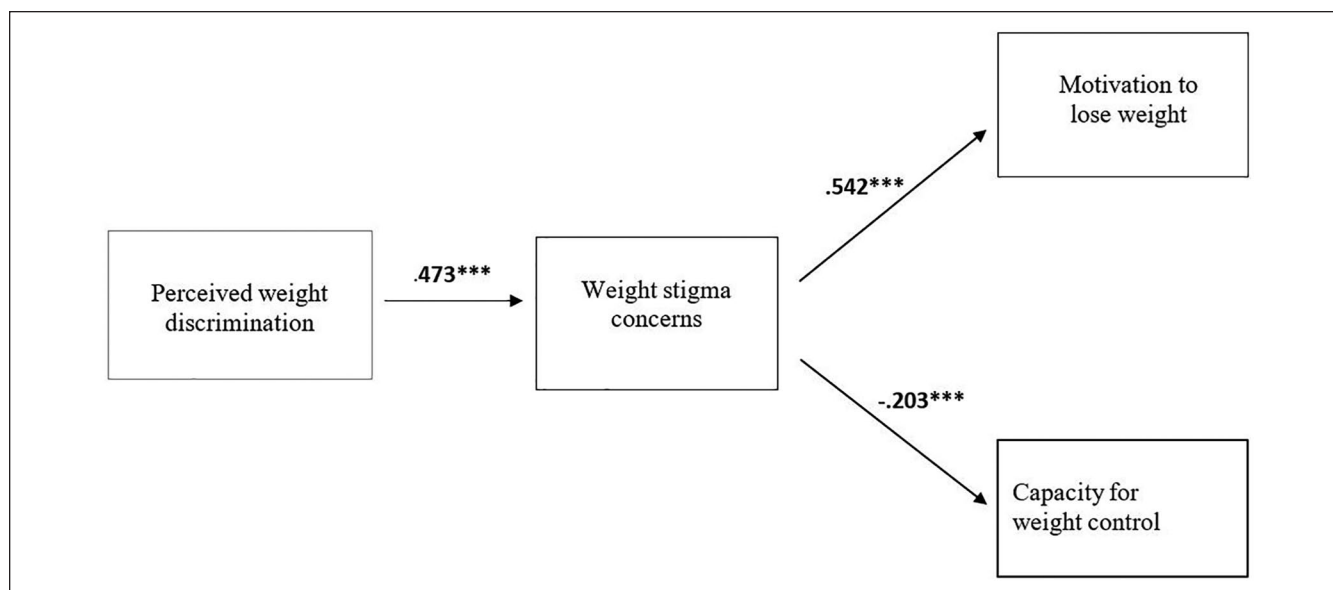


Figure 1. PROCESS results from Study 1 illustrating the relationships among weight discrimination, weight-stigma concerns, motivation to lose weight, and perceived capacity for weight control, controlling for participant BMI and gender.

*** $p < .001$.

Note. BMI = body mass index.

Discussion

As predicted, the more often people reported experiencing weight-based discrimination in their day-to-day life, the more concerned and anxious they were about experiencing weight stigma in the future. Greater stigma concerns, in turn, were associated not only with increased motivation to lose weight but also with lower perceived capacity for weight control. Notably, these effects held whether or not we controlled for BMI or gender, factors that are themselves reliably associated with weight-stigma concerns, motivation to lose weight, and reduced perceived capacity for weight control. This illustrates that perceived discrimination and weight-stigma concerns are associated with weight-loss motivation and perceived capacity for weight control independent of gender or body weight per se.

Although Study 1 provides initial support for parts of our theorized model, its methodology does not provide causal support. To address this limitation, Study 2 used an experimental design to manipulate people's exposure to weight-stigmatizing messages. We theorized that exposure to such messages increases weight-stigma concerns, which indirectly increases motivation to lose weight and decreases perceived capacity to do so. In addition, to investigate whether motivation to lose weight influences behavior, participants were asked how willing they would be to engage in weight-loss behaviors that are risky to health to lose weight/avoid gaining weight, such as purposely vomiting after eating. Finally, we assessed state self-control as a mechanism by which heightened weight-stigma concerns may lead to reduced perceived capacity for weight control (Sasaki & Vorauer, 2010).

Study 2

Method

Participants. A total of 403 individuals participated in Study 2 through Amazon's Mechanical Turk in exchange for \$1. Prior to data analyses, we omitted 89 participants who were smokers (indicated they smoked at least once a month or more often) and 12 who failed to pass basic attention checks, resulting in a final sample of 302 participants (18–83 years old, $M = 34.99$, $SD = 11.36$; 54.6% female; 83.1% White/European American, 5.0% Asian/Asian American, 5.3% Black/African American, 4.0% Latino/a or Hispanic, 0.7% Other). Self-reported BMI ranged from 17.43 to 53.37 ($M = 27.15$, $SD = 6.20$), with 1.7% classified as “underweight,” 42.1% as “normal weight,” 29.8% as “overweight,” and 26.5% as “obese.” Self-perceived weight ($M = 4.86$, $SD = 1.12$) was positively correlated with BMI ($r = .76$, $p < .001$). Of the 302 participants, four had missing data on key variables, and one in the weight-stigma condition and two in the control condition incorrectly identified the sentence included with the image. These were excluded from the primary analysis of our hypothesized model.

Post hoc power analysis using Monte Carlo simulations (Schoemann et al., 2017) indicated that this sample size had adequate power (.73–.93) to detect the hypothesized indirect effects tested below.

Procedure. Upon providing consent, participants were informed the study concerned how people “remember and respond to images found in health campaigns and advertisements.” They were told they would have up to 30 s to view one of several images and would then be asked to describe it.

Table 2. Study 2 Hierarchical Regression Analyses With Condition, BMI, and Their Interactions as Predictors.

Outcome	Step 1	Predictor	β	Step 2	Predictor	β
Weight-stigma concerns	$F(2, 296) = 54.927$, $p < .001$, $R^2 = .271$	Cond	.201***	$\Delta F(1, 295) = .133$, $p = .716$, $\Delta R^2 = .000$	Condition $\times$ BMI	.027
		BMI	.479***			
Weight-loss motivation	$F(2, 296) = 23.039$, $p < .001$, $R^2 = .135$	Cond	.025	$\Delta F(1, 295) = .074$, $p = .786$, $\Delta R^2 = .000$	Condition $\times$ BMI	-.022
		BMI	.366***			
Unhealthy weight control behaviors	$F(2, 296) = .399$, $p = .672$, $R^2 = .003$	Cond	.047	$\Delta F(1, 295) = .067$, $p = .796$, $\Delta R^2 = .000$	Condition $\times$ BMI	.023
		BMI	.022			
Perceived capacity for weight control	$F(2, 296) = 23.282$, $p < .001$, $R^2 = .136$	Cond	-.117*	$\Delta F(1, 295) = .011$, $p = .916$, $\Delta R^2 = .000$	Condition $\times$ BMI	.009
		BMI	-.349***			
State self-control	$F(2, 296) = 4.298$, $p = .014$, $R^2 = .028$	Cond	-.069	$\Delta F(1, 295) = 3.330$, $p = .069$, $\Delta R^2 = .011$	Condition $\times$ BMI	-.156
		BMI	-.153**			

Note. BMI = body mass index; Cond = weight stigma (1) versus control (0).

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

Participants were randomly assigned to condition. Participants viewed a stigmatizing image and a message indicating that, “nearly two in three people say they look down on people who are overweight” [vs. look down on people who smoke]. Sex of the person depicted in image was counterbalanced (see Supplementary Materials).

After viewing the message/image, participants were asked to describe it as accurately as possible and to rate its comprehensibility for ninth-grade students as a means of disguising the true purpose of the study. Participants then completed our key dependent measures (see below), demographic measures, and reported their height and weight, self-perceived weight, and how frequently they smoke cigarettes. Finally, participants completed a manipulation check, were provided with a debriefing form, asked for permission to use their data, and compensated. The Institutional Review Board of the University of California, Santa Barbara approved the study.

Measures. Measures assessing weight-stigma concerns ($\alpha = .97$), motivation to lose weight ($\alpha = .94$), and perceived capacity for weight control ($\alpha = .90$) were identical to Study 1. Participants were instructed to answer all items based on their feelings *at this moment*.

Unhealthy weight control behaviors. Eight items created for the purpose of the study assessed participants’ willingness to engage in unhealthy weight control behaviors to lose weight or avoid gaining weight ($\alpha = .80$). These included fast (go without eating) for a day or longer, purge (purposely throw-up) after eating, smoke cigarettes, and exercise beyond exhaustion, each rated on a 7-point scale (1 = *not at all willing* to 7 = *extremely willing*).

State self-control. Nine items assessed feeling a loss of self-control ($\alpha = .93$; Sasaki & Vorauer, 2010). These

included items such as “I feel mentally exhausted,” “My mental energy is running low,” “I feel like my willpower is gone,” and “If I were tempted by something right now, it would be very difficult to resist,” each rated on a 7-point scale (1 = *not true* to 7 = *very true*).

Manipulation check. Participants were asked to identify which of four sentences was included with the image that they saw initially: “Do you look down on people who . . .”: “are single?” “who are overweight?” “who smoke?” or “who break traffic laws?”

Results

Regression analyses. Correlations among measures are shown in Table S2 in the supplementary materials, and results of hierarchical regression analyses are shown in Table 2. As predicted, participants in the weight-stigma condition reported significantly greater weight-stigma concerns ($\beta = .201$, $p < .001$) than participants in the control condition. In addition, participants in the weight-stigma condition reported significantly lower perceived capacity for weight control ($\beta = -.117$, $p = .031$), relative to participants in the control condition. No other condition effects were significant ($ps > .228$). BMI significantly predicted all outcomes in the expected direction ($ps < .009$) with the exception of a non-significant effect for willingness to engage in unhealthy weight control behaviors ($\beta = .022$, $p = .709$). However, BMI did not moderate the effect of condition on any outcome variable ($ps > .068$).⁴

Test of hypothesized model. We conducted path analysis using the lavaan R package (Rosseel, 2012) and 5,000 bootstrapping samples to test our hypothesized model. Using manifest variables, we created a structural model, with condition

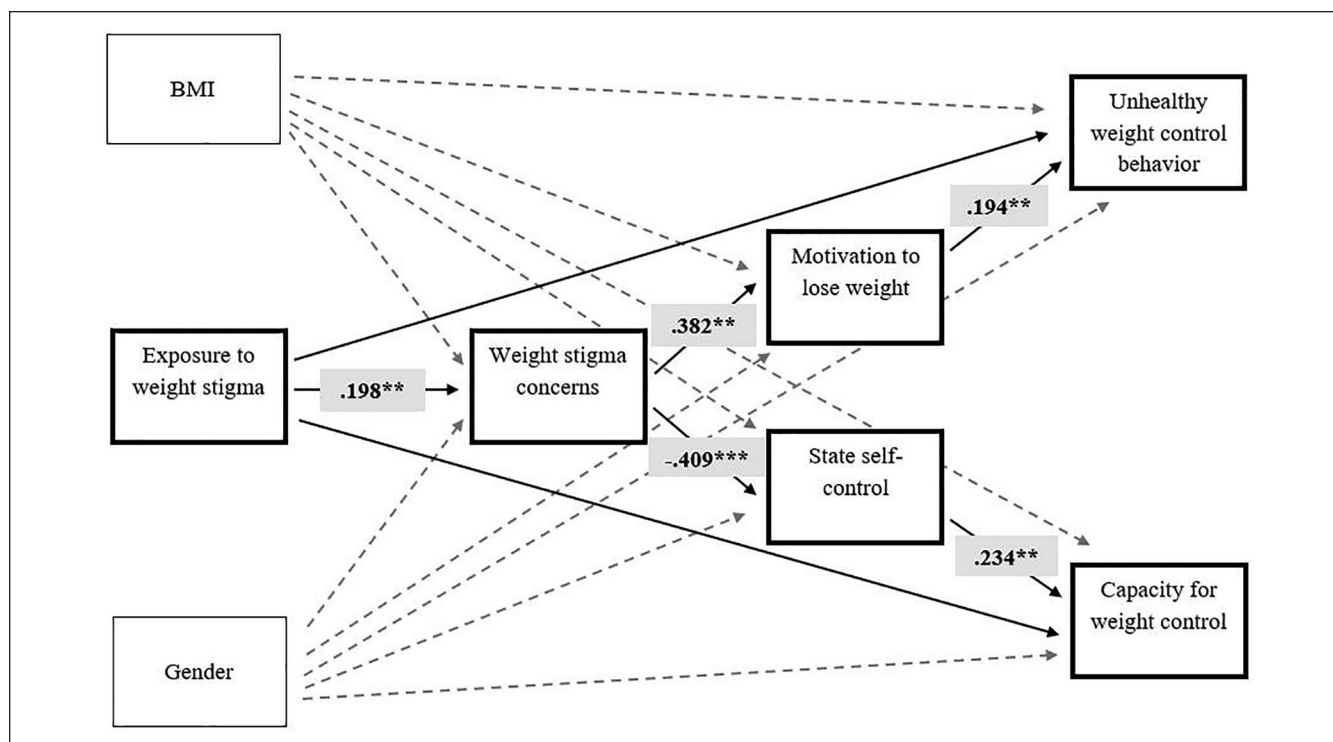


Figure 2. Path model tested in Study 2, illustrating the impact of weight stigma on willingness to engage in unhealthy weight control behavior and perceived capacity for weight control, via weight-stigma concerns, motivation to lose weight, and state self-control, controlling for participant BMI and gender.

** $p < .01$. *** $p < .001$.

Note. BMI = body mass index.

specified as an exogenous variable; weight-stigma concerns, motivation to lose weight, and state self-control specified as serial mediators; willingness to engage in unhealthy weight control behavior and perceived capacity for weight control were specified as endogenous variables. As in Study 1, participant gender and BMI were controlled for.⁵ Model fit indices indicated that our model provided excellent fit to the observed data: $\chi^2(9) = 13.480$, $p = .142$; comparative fit index (CFI) = .988; standardized root mean square residual (SRMR) = .038; root mean square error of approximation (RMSEA) = .041. The full model and path coefficients are shown in Figure 2.

Path analyses revealed that participants who were exposed to weight stigma reported significantly greater weight-stigma concerns ($\beta = .198$, $p < .001$), relative to participants in the control condition. Greater weight-stigma concerns were associated with a significant increase in motivation to lose weight ($\beta = .382$, $p < .001$), which was in turn correlated with a significant increase in willingness to engage in unhealthy weight control behaviors ($\beta = .194$, $p = .006$). The indirect effect of exposure to weight stigma (vs. control) on willingness to engage in unhealthy weight control behaviors, via weight-stigma concerns and motivation to lose weight, was significant ($\beta = .015$, $p = .030$, $SE = .016$, 95% CI = [.009, .071]). Simultaneously, greater weight-stigma concerns were also significantly correlated

with lower state self-control ($\beta = -.409$, $p < .001$), which was in turn associated with reduced perceived capacity for weight control ($\beta = .234$, $p < .001$). The indirect effect of exposure to weight stigma (vs. control) on perceived capacity for weight control, via weight-stigma concerns and state self-control, was significant ($\beta = -.019$, $p = .009$, $SE = .018$, 95% CI = [-.086, -.018]).

Discussion

Results of Study 2 replicate and extend Study 1 by showing that experimental exposure to messages that stigmatize higher weight significantly increases concerns about being a target of weight-based stigmatization, which in turn increases motivation to lose weight and, as a consequence, willingness to engage in unhealthy weight control behaviors. Simultaneously, however, concerns about being a target of weight stigma undermine feelings of self-control, which in turn reduce perceived capacity to control one's weight. Thus, Study 2 offers evidence that encountering weight-stigmatizing messages directly heightens anticipated stigma, and that anticipated stigma has downstream implications for both heightened motivation to engage in extreme behaviors to achieve weight loss and decreased perceived capacity for weight control.

According to our theorizing, weight-stigma concerns increased motivation to lose weight because weight loss is

one way of avoiding future stigma, and weight-stigma concerns reduced self-regulation because they increase negative affect and stress (Major et al., 2012, 2018). Study 3 aimed to provide a full test of our model by directly measuring motivation to avoid stigma and negative affect as additional mediators, thus replicating and extending Study 2.

Study 3

Study 3 was pre-registered on the Open Science Framework (OSF).

Method

Participants. A priori power analyses using Monte Carlo simulations (Schoemann et al., 2017) revealed that, to detect our hypothesized indirect effects, a sample size greater than 593 was required. To maximize power, and in the anticipation of participant loss due to incomplete data or failed attention checks, 1,039 participants were recruited in Study 3 through Amazon's Mechanical Turk in exchange for \$0.75. Of those, 338 participants were excluded from analyses for one or more of the following reasons: they were smokers, they failed basic attention or manipulation checks, or they did not give permission for their data to be used in analyses. In addition, three participants reported a height and weight that indicated a BMI below 11 or above 80. Such BMI values are implausible (Nakamura et al., 2013), and likely due to self-report error or indicative of a population that is beyond the scope of this study. Therefore, these participants were also excluded from analyses. This resulted in a final sample of $N = 698$ (18–78 years, $M = 36.93$, $SD = 12.25$; 48.4% female; 70.8% White/European American, 7.0% Asian/Asian American, 10.5% Black/African American, 7.2% Latino/Latina/Hispanic, 0.1% Native Hawaiian/Pacific Islander, 0.4% Other). BMI calculated from self-reported height and weight ranged from 13.68 to 65.18 ($M = 27.29$, $SD = 7.03$), with 3.7% classified as “underweight,” 40.1% as “normal weight,” 28.9% as “overweight,” and 27.2% as “obese.” Self-perceived weight ($M = 4.86$, $SD = 1.15$) was positively correlated with BMI ($r = .76$, $p < .001$).

Procedure. Study 3 used the same procedure as Study 2. This study was approved by the Institutional Review Board of the University of California, Santa Barbara.

Measures. The manipulation check and measures assessing weight-stigma concerns ($\alpha = .97$), motivation to lose weight ($\alpha = .93$), unhealthy weight control behavior ($\alpha = .81$), state self-control ($\alpha = .95$), and perceived capacity for weight control ($\alpha = .90$) were identical to Study 2. Participants were instructed to answer all items based on their feelings *at this moment*.

Motivation to avoid stigma. Five items developed for this study assessed motivation to avoid stigma ($\alpha = .96$), including “I am motivated to lose weight or avoid gaining weight to avoid being devalued by others because of my

weight” and “I am motivated to lose weight or avoid gaining weight to avoid being teased or harassed by others because of my weight.” Participants responded to each item on a 7-point scale (1 = *not at all* to 7 = *extremely*).

Negative affect. A nine-item scale (adapted from Blodorn et al., 2016), assessed current experience of nine negative emotions: stressed, anxious, embarrassed, ashamed, confident, proud, disgusted, uncomfortable, and pleased ($\alpha = .89$). Participants responded to each emotion on a 7-point scale (1 = *not at all* to 7 = *extremely*).

Results

Test of hypothesized model. Correlations among all measures are reported in Table S3 in the supplementary materials. As in Study 2, we conducted path analyses using the lavaan R package and 5,000 bootstrapping samples to test our hypothesized model. We created the same structural model as in Study 2, with two additional mediators: motivation to avoid stigma and negative affect. Participant gender and BMI were controlled for.⁶ Model fit indices indicated that our hypothesized model provided good fit to the observed data: $\chi^2(18) = 63.439$, $p < .001$; CFI = .980; SRMR = .034; RMSEA = .060. The full hypothesized model and path coefficients are shown in Figure 3.

Path analyses supported our hypothesized model and replicated findings from Study 2. Specifically, exposure to weight stigma (vs. control) was associated with a significant increase in weight-stigma concerns ($\beta = .089$, $p = .010$). Greater weight-stigma concerns were significantly correlated with greater motivation to avoid stigma ($\beta = .667$, $p < .001$), which was in turn associated with increased motivation to lose weight ($\beta = .655$, $p < .001$) and subsequent willingness to engage in unhealthy weight control behaviors ($\beta = .322$, $p < .001$). The indirect effect of exposure to weight stigma (vs. control) on willingness to engage in unhealthy weight control behaviors, via weight-stigma concerns, motivation to avoid stigma, and motivation to lose weight, was significant ($\beta = .012$, $p = .019$, $SE = .013$, 95% CI = [.007, .058]). Simultaneously, greater weight-stigma concerns were significantly associated with heightened negative affect ($\beta = .610$, $p < .001$), which was in turn correlated with reduced state self-control ($\beta = -.684$, $p < .001$) and subsequent lower perceived capacity for weight control ($\beta = .168$, $p < .001$). The indirect effect of exposure to weight stigma (vs. control) on perceived capacity for weight control, via negative affect and state self-control, was significant ($\beta = -.006$, $p = .044$, $SE = .007$, 95% CI = [-.032, -.015]).

Discussion

As theorized, Study 3 showed that exposure to weight-stigmatizing (vs. control) messages indirectly led to increased willingness to engage in unhealthy weight control behaviors, via the mediators of increased weight-stigma concerns, increased motivation to avoid stigma, and increased motivation

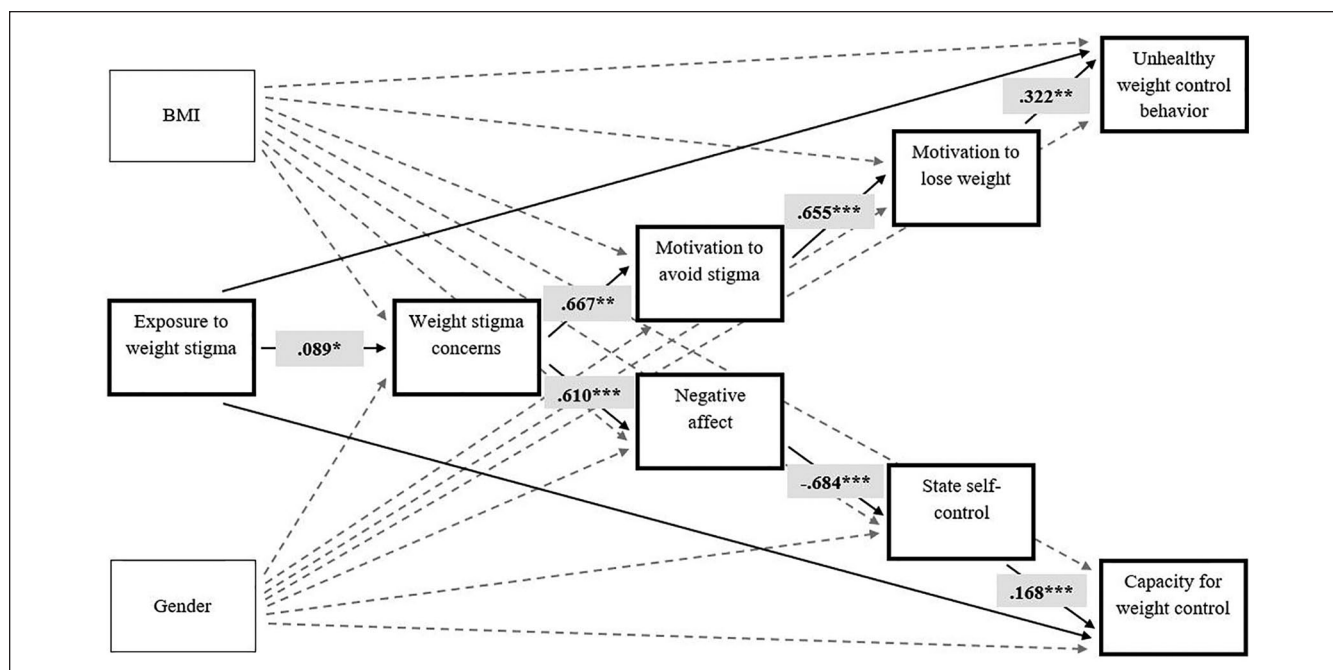


Figure 3. Path model tested in Study 3, illustrating the impact of weight stigma on willingness to engage in unhealthy weight control behavior and perceived capacity for weight control, via weight-stigma concerns, motivation to avoid stigma, motivation to lose weight, negative affect, and state self-control, controlling for participant BMI and gender.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Note. BMI = body mass index.

to lose weight. Simultaneously, however, exposure to weight-stigmatizing (vs. control) messages also indirectly led to reduced perceived capacity for weight control, via the mediators of increased weight-stigma concerns, increased negative affect, and reduced feelings of state self-control.

General Discussion

Fueled by concerns about the growing prevalence of obesity in the Western world, public health campaigns that implicitly or explicitly stigmatize higher body weight individuals are proliferating. Such campaigns assume that stigmatizing messages and images will motivate heavier individuals to change their eating behavior and thus will result in successful weight loss. Growing evidence indicates, however, that exposure to weight stigma results in weight *gain* rather than weight loss. Some scholars argue that one reason for this is that experiencing weight stigma de-motivates rather than motivates weight-loss efforts among heavier individuals. In contrast, we propose that exposure to weight stigma motivates people to lose weight or avoid gaining weight because it heightens their concern about experiencing weight stigma in the future and their desire to avoid such stigma. At the same time, we propose that the stress and negative emotions stemming from experiencing or anticipating weight stigma undermine people's perceived (and actual) capacity to control their food intake, thereby contributing to weight gain.

Three studies provided strong support for our hypotheses. Study 1 showed that the more people had experienced weight-based discrimination in the past, the more concerned they were about being a victim of weight stigma in the future. These concerns, in turn, predicted increased motivation to lose weight as well as decreased perceived capacity for weight control. Study 2 replicated and extended these findings using an experimental design. Exposing people to messages that emphasized the social devaluation associated with obesity caused them to become more concerned about being a target of weight stigma in the future. This, in turn, increased their motivation to lose weight and, as a consequence, willingness to engage in unhealthy weight control behaviors. Simultaneously, however, increased concerns about being a target of weight stigma undermined feelings of self-control, which in turn reduced perceived capacity to control one's weight. Study 3 provided support for our full model, illustrating that increased motivation to avoid stigma mediated the effects of exposure to weight-stigmatizing (vs. control) messages on increased motivation to lose weight and consequent willingness to engage in unhealthy weight control behaviors, and that increased negative affect mediated the effects of exposure to weight-stigmatizing (vs. control) messages on reduced feelings of state self-control and consequent reduced perceived capacity for weight control. Thus, Studies 2 and 3 offered evidence that encountering weight-stigmatizing messages directly heightens anticipated stigma,

and that anticipated stigma has downstream implications for both heightened motivation to engage in extreme behaviors to achieve weight loss *and* decreased perceived capacity for weight control.

These studies are the first to our knowledge to show these dual and countervailing effects of weight stigma. Consistent with our claim, exposure to weight stigmatization does not decrease motivation to lose weight, but rather increases it due to a desire to avoid or escape stigma. Nonetheless, this increased motivation to lose weight is unlikely to result in actual weight loss, due to the negative downstream effects of stigma on self-regulation and perceived capacity for weight control. Furthermore, engaging in unhealthy weight-loss behaviors has been shown prospectively to lead to weight gain (Nagata et al., 2018), as well as poorer mental and physical health (Herpertz-Dahlmann et al., 2008; Kärkkäinen et al., 2018; Nagata et al., 2018; Wade et al., 2012). Thus, both motivational and self-regulatory processes resulting from weight stigmatization are likely to undermine rather than promote both weight loss and general health and well-being. Importantly, these countervailing processes of increased weight-loss motivation coupled with decreased perceived capacity for weight control may lead to a downward spiral of yo-yo dieting, self-blame, and internalized weight stigma, all of which also have negative implications for health and well-being (Major et al., 2018). Of particular concern are the implications for eating disorder risk. Maladaptive eating behavior, driven by a desire to lose weight or avoid weight gain, is a key characteristic of bulimia nervosa (BN). In addition, both BN and binge eating disorder (BED) are characterized by feelings of a loss of self-control (American Psychiatric Association, 2013). Therefore, exposure to stigmatizing campaigns may increase people's risk of developing an eating disorder, maintaining an existing disorder, or triggering a relapse.

One limitation of the current research is that we assessed the impact of stigma exposure on *perceived* capacity for weight control (e.g., self-efficacy, feelings of self-control) rather than actual self-regulation of behavior or a direct measure of executive functioning. As noted above, however, prior experiments have established that experiencing or anticipating weight stigma increases stress, anxiety, and negative emotions (e.g., Blodorn et al., 2016; Major et al., 2012); decreases executive resources necessary for self-regulation (Major et al., 2012); decreases perceived self-efficacy for dietary control (Major et al., 2014); and increases food consumption among individuals with heavier body weight (Major et al., 2014). The current research adds to this body of research by demonstrating that increased negative affect and reduced feelings of state self-control mediate the effects of exposure to weight stigma on reduced perceived capacity for weight control.

As would be expected, heavier individuals experienced more weight stigma, anticipated more weight-stigmatizing experiences, were more motivated to lose weight, and felt less capable of controlling their weight. Results were similar, however, whether or not we controlled for body weight

or gender in tests of our model. Furthermore, neither gender nor body weight interacted with stigma exposure to predict our outcomes, with the exception that experiencing weight discrimination predicted weight-stigma concerns and motivation to lose weight more strongly among individuals with lower versus higher body weights in Study 1. While unexpected, it may be that for those with lower BMIs, exposure to weight stigma creates a "fear of fat" that motivates them to control their weight to avoid being part of the stigmatized group. The negative affect and stress that accompanies this fear, however, may undermine their feelings of self-control over their weight. Given that these interactions of stigma with BMI were unpredicted, did not emerge in Studies 2 or 3, and were of small magnitude, however, they may be of limited evidential value. Thus, we urge caution in interpreting this result until it is replicated using a well-powered, pre-registered approach. Overall, our findings suggest that the effects of experiencing weight stigmatization on concerns about being stigmatized in the future, and the downstream effects of these concerns, can be quite similar for those who are, and are not, "objectively" a higher body weight.

In sum, these studies show that experiencing or being exposed to weight stigma (enacted stigma) increases concerns about being a target of future stigma (anticipated stigma), which in turn motivates the desire to escape or avoid stigmatization. This subsequently increases motivation to lose weight, which increases people's willingness to engage in unhealthy weight-loss behaviors. At the same time, anticipated stigma undermines perceived capacity for weight self-control by increasing negative affect and decreasing self-control, consistent with findings of past research (e.g., Major et al., 2012, 2014). Thus, despite the motivational effects of stigma, the current findings add to a growing body of research illustrating the dangers of using stigma as a health promotion tool. Efforts to lose weight through dieting, fasting, taking diet pills, vomiting, or avoiding exercise are not healthy coping responses, seldom result in long-term weight loss (Mann et al., 2007; Tomiyama et al., 2013), prospectively predict weight gain (Nagata et al., 2018), and can negatively affect health and well-being (Herpertz-Dahlmann et al., 2008; Kärkkäinen et al., 2018; Nagata et al., 2018; Wade et al., 2012). Independent of BMI, experiencing weight stigma is associated with weight gain, poorer health (Major et al., 2018; Puhl & Suh, 2015), and increased risk for mortality (Sutin et al., 2015). In addition, weight-stigmatizing images and media promote bias against heavier individuals (Brochu et al., 2014). Thus, use of weight-stigmatizing images and messages as health promotion tools is not only ineffective but also damaging to health.

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Notes

1. Results did not change when body mass index (BMI) outliers were excluded from analyses (i.e., BMI less than 17 or above 60; Brochu & Dovidio, 2014). Therefore, these outliers ($n = 6$) were retained in the final analyses.
2. Additional analyses were conducted to test if participant gender moderated the effect of weight discrimination on weight-stigma concerns and our outcome variables. Gender did not moderate these relationships ($ps > .10$). These analyses are reported in the supplementary materials.
3. We also tested whether BMI or gender moderated the effects of weight-based discrimination on weight-stigma concerns in these process models. We observed a small but significant interaction for BMI and no significant interaction for participant gender. Results from Study 1 did not change when BMI and gender were not controlled for in model testing.
4. Additional analyses were conducted to test whether participant or target gender moderated the effect of condition on the outcome variables. Women were significantly less willing to engage in unhealthy weight control behaviors to lose weight or avoid gaining weight ($p = .022$), and reported significant lower perceived capacity to control their weight ($p = .033$), compared with men. No main effects of target gender were found; nor did participant or target gender moderate the effect of condition on any outcome variables. Results of these analyses are reported in the supplementary materials.
5. Neither BMI nor participant gender moderated the effect of condition on weight-stigma concerns. In addition, the results from Study 2 did not change when BMI and gender were not controlled for.
6. As in Study 2, BMI and participant gender did not moderate the effect of condition on weight-stigma concerns in Study 3; nor did the results change when BMI and gender were not controlled for. In addition, the results did not change when BMI outliers were excluded from analyses (i.e., BMI less than 17 or above 60; Brochu & Dovidio, 2014). Therefore, these outliers ($n = 12$) were retained in the final analyses.

Supplemental Material

Supplemental material for this article is available online.

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