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BRIEF REPORT

Weight Stigma Mediates the Association Between BMI and Self-Reported Health

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Objective: Weight stigma is pervasive in the United States. We tested the hypothesis that stigma may be a mechanism through which obesity negatively affects self-reported health. Two studies examined whether perceived weight-based discrimination and concerns over weight stigma mediated the association between BMI and self-reported psychological health (Study 1) and physical health (Study 2). **Method:** In 2 online studies, adult community members completed measures of stigma-relevant mediators (perceived weight discrimination, weight stigma concerns) and provided their height and weight. In Study 1 ($N = 171$) participants also completed measures of psychological health (depression, self-esteem, quality of life), whereas participants in Study 2 ($N = 194$) also completed a measure of self-reported physical health. Process modeling was used to simultaneously test for mediation through perceived discrimination and stigma concerns independently as well as for serial mediation through both variables. **Results:** Across both studies, we hypothesized and found support for serial mediation such that BMI was indirectly related to poorer self-reported health through its effect on perceived discrimination and concerns about stigma. Additionally, concerns about stigma mediated the association between BMI and health independent of perceived discrimination. **Conclusions:** Weight stigma is an important mediator of the association between BMI and self-reported health. Furthermore, results indicate that concerns about facing stigma in the future mediate the link between perceived past experiences of discrimination and psychological and physical health.

Keywords: weight stigma, discrimination, physical health, psychological health, BMI

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Being overweight is associated with poorer psychological and physical health (Moskovich, Hunger, & Mann, 2011). Much of the evidence linking body mass index (BMI) to health, however, comes from large, population-based studies focused on disease outcomes. Because most of these studies assume a direct effect of BMI on health, less attention has been given to psychosocial mediators through which high BMI may get “under the skin” to influence health. In two studies, we test the effects of two relatively unexplored mediators through which BMI may negatively affect self-reported health: weight-based discrimination and concerns about future weight stigma.

Overweight and obese individuals face pervasive and escalating stigmatization in the United States (Puhl & Heuer, 2009). Provocatively, a number of scholars argue that the profound stigma and

discrimination faced by heavy individuals may contribute to the negative impact of weight on health (e.g., Muennig, 2008). This would be consistent with evidence that experiencing discrimination on the basis of race, ethnicity, gender, and sexual orientation has harmful consequences for mental and physical health-related outcomes including depression, anxiety, high blood pressure, and mortality (see Major, Mendes, & Dovidio, 2013; Pascoe & Smart Richman, 2009).

Experiencing weight-based discrimination may have similar implications for the mental and physical health of overweight individuals (Puhl & Heuer, 2009). For example, individuals who report experiencing weight discrimination are twice as likely to have mood and anxiety disorders compared to those who do not report discrimination (Hatzenbuehler, Keyes, & Hasin, 2009). Perceived weight discrimination is also associated with exercise avoidance motivation (Vartanian & Novak, 2011) and weight gain over a 4-year period (Sutin & Terracciano, 2013). Encounters with discrimination, however, represent just one component of the experience of stigma. Some overweight individuals internalize negative weight-based stereotypes, and these individuals are at a greater risk for binge eating than those who do not internalize their stigmatization (Puhl, Moss-Racusin, & Schwartz, 2007). Furthermore, the mere concern than one may encounter weight-based rejection, avoidance, and devaluation may itself be stressful and undermine

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health (Major & O'Brien, 2005; Major, Eliezer & Rieck, 2012). Although perceptions of past discrimination are likely to be highly related to concerns about future stigmatization, they are nonetheless distinct constructs. Recent evidence suggests that being concerned about weight stigma decreases executive control resources (Major et al., 2012) and undermines the self-regulation of food intake (Major, Hunger, Bunyan, & Miller, 2014), even in the absence of interpersonal discrimination.

The current research tested the hypothesis that the negative relationship between BMI and self-reported psychological health (Study 1) and physical health (Study 2) is mediated by both past discrimination experiences and stigma concerns. We theorize that concerns about stigma may arise from a variety of sources, but are especially likely to emerge in response to discrimination. Just as past rejection heightens rejection sensitivity (Downey & Feldman, 1996), and negative experiences with out-group members shape stigma-related expectations (Kang & Inzlicht, 2012), past experiences with discrimination may heighten concerns about future mistreatment. Thus, our hypothesized model situates BMI as a predictor of health that is serially mediated by perceived past discrimination and concerns about being the target of stigma.

Study 1

Method

One hundred and 71 American individuals from Mechanical Turk (MTurk) completed a brief online survey.¹ Women comprised 59.6% ($n = 102$) of the sample, and the average age was 36.31 years ($SD = 12.41$). Most participants self-identified as White (85.4%, $n = 146$). The mean BMI was 25.44 ($SD = 5.41$, range = 16.13–47.46).

We modeled our measure of perceived weight discrimination on a widely used measure of perceived racial discrimination (Williams, Yu, Jackson, & Anderson, 1997). People responded to five items (e.g., "In the past 12 months, how often other people treated you unfairly because of your weight?") on 0 (*never*) to 4 (*all the time*) scales. This measure was highly reliable ($\alpha = .92$). We modeled our measure of current weight stigma concerns after existing scales used to assess individual differences in other forms of stigma concerns (e.g., Pinel, 1999). People responded to five statements (e.g., "I am concerned that other people's opinion of me will be based on my weight") on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). This measure was highly reliable ($\alpha = .94$) and has shown convergent and discriminant validity with measures of rejection (see supplemental material).

We assessed current psychological health with a 5-item version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965; $\alpha = .92$), the 6-item depression subscale of the Brief Symptom Inventory (Derogatis & Melisaratos, 1983; $\alpha = .90$), which measures depression over the past 7 days, and with the quality of life electronic visual analog scale (de Boer et al., 2004), on which people indicated their current quality of life on a scale ranging from 0 (*worst imaginable quality of life*) to 100 (*perfect quality of life*). Because the pattern of results was the same across measures, we standardized and combined these scales into a composite measure of psychological health.

Results and Discussion

Table S1 (available as online supplemental material) displays descriptive statistics and correlations among all measures. Women ($M = 3.44$, $SD = 1.55$) reported greater weight stigma concerns than men ($M = 2.76$, $SD = 1.49$), $t(169) = -2.84$, $p < .01$, $d = .44$, but there were no gender differences in perceived discrimination, $t(169) = -1.53$, $p > .12$. To test our hypothesis that perceived discrimination and stigma concerns act as serial mediators of the relationship between BMI and psychological health, we used the SPSS PROCESS macro (Hayes, 2013). Five thousand bootstrap samples were used to create 95% bias-corrected and accelerated (BCa) confidence intervals to test the significance of indirect effects, which are significant at $p < .05$ if the 95% confidence interval does not include zero.

The PROCESS model 6 results for Study 1 are displayed in the top panel of Figure 1. Consistent with past research, we found a negative direct effect of BMI on psychological health ($b = -.049$, $p < .001$). As predicted, however, this relationship became nonsignificant when both stigma mediators were included in the model ($b = -.017$, $p > .13$). We also tested three indirect effects. First, as hypothesized, the indirect effect of BMI on psychological health through both perceived discrimination and weight stigma concerns was significant ($b = -.016$, 95% BCa CI: $-.028$, $-.009$). Second, the indirect path from BMI to psychological health through stigma concerns alone was also significant ($b = -.009$, 95% BCa CI: $-.019$, $-.002$). Third, we tested the indirect path from BMI to psychological health through perceived discrimination alone. This path was nonsignificant ($b = -.007$, 95% BCa CI: $-.022$, $.005$).²

Study 1 demonstrated that the relationship of high BMI to poorer psychological health is indirect, mediated by increased experiences of weight-based discrimination and concerns about weight-based stigmatization. These findings both support and extend prior research on weight-based discrimination and psychological health by suggesting that perceived discrimination undermines psychological health in part by increasing concerns about future stigmatization. Study 2 examined whether the same pattern of results emerges with self-reported physical health.

Study 2

Method

One hundred and 94 individuals from MTurk participated.¹ The sample was 62.9% female and had an average age of 33.19 years ($SD = 12.37$). The majority (72.5%, $n = 140$) self-identified as Caucasian/White and the mean BMI was 26.51 ($SD = 6.45$, range = 14.92–48.46). We assessed our focal variables in the same way as in Study 1, with one modification. Given the longer time course typically needed for physical (vs. psychological) decrements in health to manifest, we assessed lifetime discrimination

¹ Twenty participants in Study 1 and 18 participants in Study 2 failed an attention check (e.g., they answered a question for which they were explicitly asked not to provide an answer) and were removed from the data. Additionally, nine participants who participated in Study 1 were removed from the data for Study 2.

² This pattern of results holds when controlling for gender and race/ethnicity. Additionally, BMI did not interact with either perceived discrimination or stigma concerns to predict psychological health.

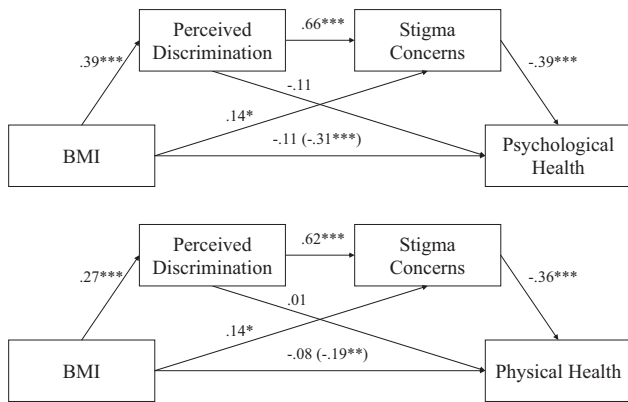


Figure 1. PROCESS results for Study 1 displayed in the top panel and results for Study 2 in the bottom panel. Standardized coefficients (β) are presented. * $p < .05$, ** $p < .01$, *** $p < .001$.

rather than incidence over the past 12 months. Both weight discrimination and stigma concerns scales were internally reliable ($\alpha = .94$ and $.96$, respectively). We assessed current physical health with a widely used and well-validated 5-item general health scale ($\alpha = .85$; Ware & Sherbourne, 1992).

Results and Discussion

Descriptive statistics and correlations among all measures are shown in Table S2 (available online as supplemental material). As in Study 1, women ($M = 3.88$, $SD = 1.80$) reported greater stigma concerns than men ($M = 2.83$, $SD = 1.63$), $t(192) = 4.01$, $p < .001$, $d = .62$. Women also reported experiencing more weight discrimination ($M = 2.25$, $SD = .83$) than men ($M = 1.83$, $SD = .80$), $t(192) = 3.43$, $p < .001$, $d = .51$. We tested the same model in Study 2 as we did for Study 1; PROCESS results for Study 2 are displayed in the bottom panel of Figure 1. Results revealed a direct effect of BMI on physical health ($b = -.023$, $p < .01$) that became nonsignificant when both stigma mediators were included in the model ($b = -.010$, $p > .24$). The indirect effect of BMI on physical health through both perceived discrimination and weight stigma concerns was again significant ($b = -.007$, 95% BCa CI: $-.016$, $-.002$). Furthermore, the indirect path from BMI to physical health through stigma concerns alone again was significant ($b = -.006$, 95% BCa CI: $-.013$, $-.002$). However, the indirect path from BMI to physical health through perceived discrimination alone was again not significant ($b = .000$, 95% BCa CI: $-.007$, $.008$).³

Study 2 replicated results of Study 1 and extended them to self-reported physical health. As expected, higher BMI was related to poorer health, but as predicted, this relationship was mediated by stigma. Like Study 1, perceived past discrimination appeared to adversely affect physical health by increasing concerns about future stigmatization, which in turn predicted poorer health.

General Discussion

Across two studies we found that perceived discrimination and stigma concerns mediated the negative relationship between BMI

and self-reported health, reducing this frequently observed relationship to nonsignificance. These findings add to the growing body of research illustrating the important impact of stigma on health (Major et al., 2013). In addition, we showed that discrimination experiences and stigma concerns have somewhat different relationships with self-reported health. Controlling for stigma concerns, perceived discrimination was itself not a significant mediator of the relationship between BMI and health. However, controlling for perceived weight-based discrimination, stigma concerns remained a significant mediator of the BMI–health relationship. This pattern, observed in both studies, is consistent with other recent evidence showing that even in the absence of perceived discrimination, perceptions of stigma are associated with physiological markers of poorer health (e.g., Ratner, Halim, & Amodio, 2013).

The current research advances the literature on stigma and health in two main ways. First, past research has focused primarily on the health effects of interpersonal discrimination and major discriminatory events. The health implications of anxiety and concerns about the possibility of stigma have been relatively unexamined. We examined both the health implications of weight-based discrimination and concerns about being devalued by others because of one's weight. By highlighting the importance of these concerns, the present work encourages further research examining how aspects of stigma beyond discrimination (e.g., stigma concerns, internalized stigma) may undermine psychological and physical health. Second, we examined the relationships among BMI, weight stigma, and self-reported health among general members of the community rather than self-selected groups such as people seeking to lose weight, adding to the generalizability of the findings.

Given the cross-sectional nature of the data, the standard caveats regarding causality are relevant. It is possible that BMI predicts lower psychological wellbeing, which in turn increases perceptions of weight stigma. It is also possible that having poorer health increases an individual's exposure to weight-stigmatizing environments (e.g., doctors' offices). It may also be the case that an unmeasured variable (e.g., high negative affectivity) is associated with greater reports of weight stigma as well as poorer self-reported health. Ruling out these alternative explanations will require additional designs and methods. For example, a longitudinal design could disentangle whether weight stigma precedes poorer psychological and physical outcomes or if these poorer outcomes beget greater weight stigma. Further, laboratory designs that manipulate rather than measure perceived weight stigma (e.g., Major et al., 2012, 2014) are more suited to address its casual role in the psychological and physical health of overweight individuals.

The present studies also relied exclusively on self-report data. The self-report format poses limits on the conclusions that can be drawn from this research, a limitation shared with much of the work in public health. Although self-reported BMI typically correlates strongly with actual BMI, the misreporting of weight may still bias our results. Additionally, use of more objective and clinically validated measures of psychological and physical health

³ This pattern of results holds when controlling for gender and race/ethnicity. Additionally, BMI did not interact with either perceived discrimination or stigma concerns to predict physical health.

are needed to establish the relationships among BMI, weight stigma, and health. Finally, the scores on perceived weight-based discrimination were, on average, low and restricted in range. This may reflect people's lack of awareness or reluctance to report experiencing discrimination. These limitations notwithstanding, the present research provides initial evidence for the significance of weight stigma concerns and sets the stage for additional experimental and longitudinal studies to test these relationships further.

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