



## Weight discrimination, anticipated weight stigma, and disordered eating

Jeffrey M. Hunger<sup>\*</sup>, Dorian R. Dodd, April R. Smith

Department of Psychology, Miami University, Oxford, OH, United States of America



### ABSTRACT

Weight discrimination is a well-established risk factor for disordered eating cognitions and behaviors. However, little is known about what may account for this association. Recent research suggests that anticipated weight stigma may explain the relationship between weight discrimination and non-eating disorder related health outcomes; the present study seeks to replicate this premise and extend it to the disordered eating realm. In a non-clinical sample of adults in the United States ( $N = 297$ ) we test the hypothesis that weight discrimination has an indirect association with eating disorder symptomatology through anticipated stigma. At a single timepoint, participants recruited from the online data collection platform SocialSci completed self-report, online surveys of weight discrimination in day-to-day life, anticipated weight stigma, eating disorder symptoms, and demographic information. As hypothesized, weight discrimination was indirectly associated with greater disordered eating symptoms via its association with anticipated weight stigma. This pattern of results held when controlling for gender, body mass index, and self-perceived weight status. These findings suggest that anticipated stigma is relevant in the association between weight discrimination and greater disordered eating. This premise deserves additional attention using methodological approaches that can facilitate stronger causal claims. We discuss the potential for this line of research to inform clinical interventions.

### 1. Introduction

Weight discrimination is a potent risk factor for disordered eating (Vartanian & Porter, 2016). Among both adolescents and adults, negative weight-related comments and teasing predict the development of disordered eating behaviors such as fasting, skipping meals, purging, and binge eating (e.g., Eisenberg, Berge, Fulkerson, & Neumark-Sztainer, 2012; Hunger & Tomiyama, 2018; Wang, Peterson, McCormick, & Austin, 2014). Likewise, adults who have experienced more weight-based discrimination report a stronger drive for thinness, poorer body satisfaction, and greater bulimic symptoms than individuals not experiencing such discrimination (e.g., Durso, Latner, & Hayashi, 2012; Vartanian, 2015). The present study aims to better understand why weight discrimination is associated with disruptions in eating behavior and body image. Specifically, we test whether anticipated stigma is a mechanism linking weight discrimination and eating disorder symptomatology.

In the present study we draw on research from the social identity threat perspective. Social identity threat involves high awareness of the threat of being mistreated on the basis of belonging to a marginalized, stigmatized group or having an identity that is viewed unfavorably, with negative attributions (Steele, Spencer, & Aronson, 2002). Awareness of stigmatized identity and the possibility for discrimination can lead to vigilance about and anticipation of future discrimination. The weight-based social identity threat model posits that this *anticipated stigma* leads to emotional dysregulation, over-activation of

physiological stress systems, and greater allostatic load which can undermine mental and physical health (Hunger, Major, Blodorn, & Miller, 2015; Major, Tomiyama, & Hunger, 2018). Anticipated weight stigma can arise both from previous experiences with discrimination, as well as from situational cues that signal the potential for discrimination (e.g., interacting with an anti-fat peer; Hunger, Blodorn, Miller, & Major, 2018). In support of the social identity threat perspective, previous research suggests that anticipated stigma across various marginalized identities is associated with negative outcomes, such as distress among people with concealable stigmatized identities (Quinn & Chaudoir, 2009), stress, hypertension, and cardiac reactivity among racial and ethnic minorities (Hicken, Lee, Morenoff, House, & Williams, 2014; Orom, Sharma, Homish, Underwood, & Homish, 2017; Sawyer, Major, Casad, Townsend, & Mendes, 2012), and depression among sexual minority adults (Lewis, Derlega, Griffin, & Krowinski, 2003).

Although conceptually related, discrimination and anticipated stigma are distinct in important ways. Whereas discrimination refers to interpersonal, external events of mistreatment that have occurred in the past, anticipated stigma refers to the intrapersonal, internal cognitive phenomenon of beliefs and expectations that one will be mistreated in the future. In this way, anticipated stigma provides one possible route by which discrete occurrences of discrimination might “take root” psychologically and lead to negative outcomes. Indeed, anticipated stigma is a mechanism linking discrimination with decreased social support, medication adherence, and physician trust among adults with HIV (Turan et al., 2017), and furthermore, anticipated weight stigma

<sup>\*</sup> Corresponding author.

E-mail address: [hungerjm@miamioh.edu](mailto:hungerjm@miamioh.edu) (J.M. Hunger).

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appears to be a mechanism by which weight discrimination is related to negative outcomes in non-eating disorder domains, such as depression, anxiety, and self-rated health (Hunger & Major, 2015).

However, to date, no research has examined whether anticipated weight stigma may also help explain the documented relations between weight discrimination and disordered eating, which was the aim of the current study. Specifically, consistent with past work, we hypothesize that greater weight-based discrimination will be associated with disordered eating indirectly through its association with anticipated weight stigma.

## 2. Method

### 2.1. Study design and participants

Three hundred and six English-speaking participants from the US (52.8% women) were recruited through the online data collection platform SocialSci to complete a survey in exchange for monetary compensation. SocialSci described its recruitment and data quality protocol in the following way: “We take a three-tiered approach to our participant pool. We first authenticate users to make sure they are human and not creating multiple accounts. We then send them through our vetting process, which ensures that our participants are honest by tracking every demographic question they answer across studies. If a participant claims to be 18-years-old one week and 55-years-old the next, our platform will notify you and deliver another quality participant free-of-charge. Finally, we compensate participants via a secure online transaction where personally identifiable information is never revealed.” The study was titled “Self-Perception and Interpersonal Needs” on SocialSci and was described as investigating the effect of past social experiences on perception, behavior, and experiences. Potential participants on SocialSci self-selected into the study after being presented with the title and brief description.

Six participants were excluded from analyses because they did not report height or weight and therefore body mass index (BMI) could not be calculated. One participant was excluded due to a self-reported BMI below 11 suggesting either a data entry error or severe physical ailment. Two participants identified outside of the male-female gender binary; due to significant differences across self-identified male and female participants on variables of interest (see below), gender was included as a covariate in analyses, and these two individuals were therefore also excluded from analyses given limited statistical power for a third gender group. Power analyses using Monte Carlo simulations (Schoemann, Boulton, & Short, 2017) indicated that our final sample size ( $N = 297$ ) was well powered to detect the hypothesized indirect effects (power > 0.95). Final sample demographics are presented in Table 1.

### 2.2. Weight discrimination and anticipated stigma

Weight discrimination was assessed using a modified 9-item version of the Everyday Discrimination Scale (Hunger & Major, 2015; Williams, Yu, Jackson, & Anderson, 1997), which was adapted to assess experiences specifically on the basis of weight (e.g., *You are treated with less respect than other people are because of your weight*; current sample  $\alpha = 0.97$ ). Total scores were computed as the mean of the nine items and could range from zero to three, with higher scores indicating more experiences of weight stigma. Anticipated weight stigma was assessed using five items from Hunger and Major (2015, e.g., *“I am concerned that I will not be treated fairly by others because of my weight”*, current sample  $\alpha = 0.94$ ). Total scores were computed as the mean of the five items and could range from one to seven, with higher scores indicating more anticipated weight stigma. The measures of weight discrimination and anticipated stigma were significantly positively correlated, but only at a moderate magnitude ( $r = 0.55, p < .01$ ), supporting their conceptualization as related but distinct constructs.

**Table 1**  
Final sample demographics.

Variable	%	n
Race		
White	75.4	224
American Indian/Native American/Alaskan Native	0.3	1
African American/Black	7.1	21
Asian/Pacific Islander	15.5	46
Other/prefer to self-describe	1.7	5
Ethnicity		
Latin or Hispanic	7.1	21
Not Latin or Hispanic	92.6	275
Did not respond	0.3	1
Gender		
Male	47.1	140
Female	52.9	157
Perceived weight		
Very underweight	0.3	1
Underweight	2.7	8
Slightly underweight	10.8	32
Average weight	33.7	100
Slightly overweight	20.5	61
Overweight	21.9	65
Very overweight	10.1	30
Income		
Under \$10,000	27.9	83
\$10,00–\$20,000	17.2	51
\$20,00–\$30,000	12.8	38
\$30,00–\$40,000	11.4	34
\$40,00–\$50,000	6.4	19
\$50,00–\$60,000	7.7	23
\$60,00–\$70,000	4.0	12
\$70,000 and above	11.8	35
Did not respond	0.7	2
Education		
Some high school	1.7	5
High school diploma/GED	5.1	15
Some college	24.2	72
Trade/technical/vocational training	1.7	5
Associate’s degree	5.4	16
Bachelor’s degree	38.0	113
Master’s degree	17.5	52
Professional degree	2.7	8
Doctoral degree	3.4	10
Did not respond	0.3	1
Marital status <sup>a</sup>		
Single	39.1	116
Married	31.3	93
Dating (not living together)	12.8	38
Dating (living together)	10.1	30
Other (includes engaged, separated, widowed, divorced, triad)	7.4	22
Sexual orientation		
Only or mostly attracted to other sex	85.2	253
Both sexes, or somewhat more attracted to other or same sex	8.8	26
Only or mostly attracted to same sex	5.4	16
Neither	0.7	2

Variable	M	SD	Range	
			Min.	Max.
Age	31.93	11.16	17	76
Body mass index	27.32	8.48	17.15	66.56

<sup>a</sup> Exceeds 100%,  $n = 2$  selected both divorced and dating.

### 2.3. Disordered eating behaviors and cognitions

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) was used to assess core cognitive features of disordered eating during the previous four weeks. The EDE-Q is a well-established and widely-used measure of eating pathology with demonstrated reliability and validity (Berg, Peterson, Frazier, & Crow, 2012). The EDE-Q assessed dietary restraint (e.g., *“Have you been deliberately trying to*

**Table 2**  
Summary of results from mediation analyses.

Path and mediator	Point estimate	SE	95% CI
<b>All models</b>			
Path a: weight discrimination → anticipated stigma	1.76***	0.16	1.44, 2.08
<b>Model 1: Restraint</b>			
Path b: anticipated stigma → restraint	0.27***	0.06	0.16, 0.38
Path c: weight discrimination → restraint	0.56***	0.16	0.25, 0.88
Path c': weight discrimination → restraint	0.09	0.18	-0.27, 0.45
Indirect effect (ab)	0.47	0.13	0.24, 0.73
<b>Model 2: Eating concerns</b>			
Path b: anticipated stigma → eating concerns	0.26***	0.04	0.19, 0.34
Path c: weight discrimination → eating concerns	0.85***	0.11	0.64, 1.09
Path c': weight discrimination → eating concerns	0.40**	0.13	0.15, 0.65
Indirect effect (ab)	0.46	0.09	0.30, 0.64
<b>Model 3: Shape concerns</b>			
Path b: anticipated stigma → shape concerns	0.50***	0.05	0.40, 0.59
Path c: weight discrimination → shape concerns	0.99***	0.16	0.68, 1.31
Path c': weight discrimination → shape concerns	0.12	0.16	-0.20, 0.44
Indirect effect (ab)	0.87	0.13	0.63, 1.13
<b>Model 4: Weight concerns</b>			
Path b: anticipated stigma → weight concerns	0.41***	0.05	0.32, 0.50
Path c: weight discrimination → weight concerns	1.06***	0.14	0.78, 1.34
Path c': weight discrimination → weight concerns	0.34*	0.15	0.05, 0.64
Indirect effect (ab)	0.71	0.11	0.50, 0.94
<b>Model 5: EDE-Q Global Score</b>			
Path b: anticipated stigma → EDE-Q global score	0.36***	0.04	0.28, 0.44
Path c: weight discrimination → EDE-Q global score	0.86***	0.12	0.62, 1.11
Path c': weight discrimination → EDE-Q global	0.24	0.13	-0.02, 0.50
Indirect effect (ab)	0.63	0.10	0.44, 0.84
<b>Model 6: Binge eating<sup>^</sup></b>			
Path b: anticipated stigma → binge eating	0.39***	0.09	0.22, 0.56
Path c': weight discrimination → binge eating	-0.16	0.29	-0.72, 0.41
Indirect effect (ab)	0.69	0.18	0.38, 1.10
<b>Model 7: Unhealthy weight control behaviors (UWCB)<sup>^</sup></b>			
Path b: anticipated stigma → UWCB	0.23*	0.09	0.05, 0.41
Path c': weight discrimination → UWCB	0.03	0.28	-0.52, 0.59
Indirect effect (ab)	0.40	0.17	0.11, 0.77

Note: All models include gender, BMI, and perceived weight status as control variables; SE = standard error; CI = confidence interval.

\* = significant at  $p < .05$ .

\*\* = significant at  $p < .01$ .

\*\*\* = significant at  $p < .001$ .

<sup>^</sup> = Direct and indirect effects are on a log-odds metric. Total effects are not reported in PROCESS version 3.4 when the outcome is dichotomous.

limit the amount of food you eat to influence your shape or weight?";  $\alpha = 0.85$ ), eating concern (e.g., "Have you been afraid of losing control over eating?";  $\alpha = 0.83$ ), shape concern (e.g., "Has your shape influenced how you think about (judge) yourself as a person?";  $\alpha = 0.92$ ), and weight concern (e.g., "Have you had a strong desire to lose weight?";  $\alpha = 0.85$ ). These subscales were also combined to form a global EDE-Q score ( $\alpha = 0.91$ ). EDE-Q subscale and global scores were calculated as the mean of the items comprising each scale, with scores ranging from zero to six and higher scores indicating higher endorsement of eating disorder features. In addition, the EDE-Q assessed episodes of binge eating/loss of control eating and unhealthy weight control behaviors (i.e., purging, laxative use, or diuretic use) over the past 28 days. Given the low frequency of these behaviors, they were dichotomized to reflect any binge eating or any unhealthy weight control behaviors (both coded as 0 = absence; 1 = presence).

#### 2.4. Demographic variables

Individuals self-reported their height and weight, which were used to calculate BMI. Participants also rated their perceived weight status on a scale ranging from 1 (*very underweight*) to 7 (*very overweight*). Additionally, participants self-reported their gender, race/ethnicity, education level, and personal gross income bracket.

#### 2.5. Analytic approach

We used Model 4 of the PROCESS Procedure for SPSS (Version 3.4; Hayes, 2018) to test our hypothesis that weight discrimination would be significantly associated with disordered eating outcomes through its association with anticipated stigma. We tested the indirect effects of seven mediation models in total. All models included weight discrimination as the independent variable, anticipated stigma as the mediator, and gender, BMI, and perceived weight status as control variables. Each of the seven models examined one of the following dependent variables: restraint, eating concerns, shape concerns, weight concerns, EDE-Q global score, presence/absence of binge eating in the past four weeks, presence/absence of unhealthy weight control behaviors in the past four weeks.

#### 2.6. Data preparation

Data were examined for missingness. Data were complete with the exception of one participant missing data on one item of the Everyday Discrimination Scale. Following recommendations from Widaman (2006), this participant's total score for this measure was calculated as the average of the eight answered items, resulting in no missing data on the subscale and scale level.

Next, we examined data normality. BMI scores were slightly kurtotic (kurtosis score = 3.6; no transformation computed due to small magnitude of kurtosis). All other variables were normally distributed (as

defined by skewness and kurtosis scores < 2.5). We then utilized the collinearity diagnostics in SPSS Version 21 (IBM Corp., 2012) to test for issues of multicollinearity. All models had acceptable tolerance (i.e., > 0.30) and variance inflation factor statistics (i.e., < 3.0).

Finally, we examined the data for systematic differences based on gender. Men and women did not significantly differ in their mean levels of experienced or anticipated weight stigma, nor levels of dietary restraint, eating concerns, weight concerns, EDE-Q global scores, or frequency of bingeing (all  $p$ s > 0.068). Women were more likely to endorse shape concerns than men ( $M = 2.45$ ,  $SD = 1.77$  vs.  $M = 2.06$ ,  $SD = 1.59$ ,  $p = .045$ ,  $d = 0.23$ ), and men were more likely to have engaged in unhealthy weight control behaviors ( $X^2 = 8.40$ ,  $p < .004$ ); therefore, gender was entered as a covariate in subsequent analyses. Additionally, BMI and perceived weight status were entered as covariates. The significance and magnitude of all results are unaffected with these covariates removed from the models.

### 3. Results

#### 3.1. Analyses

A summary of the results are presented in Table 2. As hypothesized, experienced weight stigma was indirectly associated with greater restraint ( $b = 0.474$ ,  $SE = 0.130$ , 95% CI: 0.237, 0.734), eating concern ( $b = 0.460$ ,  $SE = 0.088$ , 95% CI: 0.296, 0.642), shape concern ( $b = 0.869$ ,  $SE = 0.129$ , 95% CI: 0.628, 1.131), and weight concern ( $b = 0.712$ ,  $SE = 0.113$ , 95% CI: 0.502, 0.943), as well as a higher global EDE-Q score ( $b = 0.629$ ,  $SE = 0.102$ , 95% CI: 0.437, 0.840) via its association with anticipated weight stigma. Likewise, this pattern of results emerged for the odds of a recent binge/loss of control episode ( $b = 0.686$ ,  $SE = 0.180$ , 95% CI: 0.385, 1.098), and recent use of unhealthy weight control behaviors ( $b = 0.402$ ,  $SE = 0.171$ , 95% CI: 0.106, 0.774).

### 4. Discussion

Consistent with our hypothesis, greater experiences with weight discrimination were indirectly associated with disordered eating behaviors and cognitions via anticipated weight stigma. These findings are in line with the literature linking weight discrimination to disordered eating (Durso et al., 2012; Eisenberg et al., 2012; Hunger & Tomiyama, 2018; Vartanian, 2015; Wang et al., 2014). To our knowledge, however, these are the first data to show such a relationship with anticipated stigma. This study adds to a large and growing body of work that highlights the negative mental and physical health correlates of weight discrimination (Major et al., 2018; Papadopoulous & Brennan, 2015; Puhl & Heuer, 2010; Puhl & Suh, 2015; Wu & Berry, 2018) and underscores the usefulness of a social identity threat approach that emphasizes the role of anticipated stigma (Blodorn, Major, Hunger, & Miller, 2016; Hunger et al., 2015, 2018). These findings also complement recent work by Romano, Haynes, and Robinson (2018), who found that perceiving oneself as heavier was associated with uncontrolled eating, likewise via anticipated stigma. Our findings hold when controlling for perceived weight status, however, suggesting that discrimination experiences as well as merely perceiving oneself as heavier can independently contribute to anticipated weight stigma. Future research would benefit from understanding why higher perceived weight status is sufficient to elicit anticipated stigma; this may stem in part from collective representations regarding the mistreatment and social denigration of heavier individuals (Major & O'Brien, 2005).

These findings should be interpreted within the context of the study limitations. First, due to our cross-sectional and correlational design we are unable to rule out reverse causality (i.e., greater disordered eating symptoms leading to more weight stigma). The directionality of these findings needs to be corroborated with daily diary, longitudinal, and experimental designs, approaches that are exceedingly rare in the

weight stigma literature (Vartanian & Porter, 2016). Second, although SocialSci takes steps to vet participants and provide quality data, we had no methods in place within our survey to prevent or screen for random, inconsistent responding. Thus, a limitation of the current study is that we did not include data quality checks. Despite good overall internal reliability scores for our measures in the present sample, it is possible that individual participants' data could be of poor quality. Third, the present study relied on self-report measures, which are limited by what participants are both able and willing to report, and therefore reflect participants' subjective perceptions. Initial evidence of concordance between retrospective recall and ecological momentary assessments of eating disorder behaviors (Wonderlich et al., 2015) provides some support for the use of retrospective recall measures in this domain. While BMI can be biased (due to over-estimations of height and under-estimations of weight) when collected via self-report versus objective measurements (Gorber, Tremblay, Moher, & Gorber, 2007; Wen & Kowaleski-Jones, 2012), self-reported and objective BMI are still highly correlated (Pursey, Burrows, Stanwell, & Collins, 2014). Fourth, we are unable to rule out unmeasured variables that may confound the relationship between weight stigma and disordered eating such as hostility and neuroticism (Huebner, Nemeroff, & Davis, 2005). However, personality accounts for < 3% of the variance in experienced weight stigma (Sutin & Terracciano, 2019), suggesting that it is unlikely to confound the present findings. This should be tested directly in future research. Future work would also benefit from assessing weight bias internalization to understand how internalization and the dimensions of stigma assessed in the present study may be uniquely associated with disordered eating risk (Pearl, 2018). Finally, although the measures of weight discrimination and anticipated stigma exhibited high internal reliability, as has been found elsewhere in the literature (e.g., Hunger & Major, 2015; Romano et al., 2018), they have yet to undergo formal psychometric evaluation, a critical next step in this line of inquiry.

If supported in future research that addresses the above limitations, these findings stand to inform clinical interventions. Specifically, our results suggest that targeting anticipated weight stigma could help attenuate the disrupted eating behavior that can result from weight discrimination. One way to target anticipated stigma could be through cognitive therapies focusing on any faulty information processing associated with anticipated stigma. For example, biases in attention and memory may lead individuals to anticipate stigma at higher levels than would be warranted based on the evidence, or in circumstances in which it is unlikely. These cognitive biases could be addressed with techniques like cognitive restructuring (e.g., Clark, 2014) to help modify the beliefs and expectations that contribute to anticipated stigma. In support of cognitive interventions, one small-scale study found that a model of cognitive behavioral therapy helped increase positive outcomes (e.g., positive coping, self-esteem) and decrease negative outcomes (e.g., depression, internalized stigma, negative coping) among women with HIV (Tshabalala & Visser, 2011).

However, so long as weight discrimination occurs, it is important to acknowledge and validate the experiences of those who are impacted by it; the goal of interventions must be to decrease anticipated stigma in situations where it is unlikely, while also helping protect against its negative effects when it does occur. Interventions designed to cultivate self-compassion may be beneficial in this regard, as initial findings suggest that greater self-compassion is associated with an attenuated link between mental-health discrimination and anticipated mental-health stigma (Heath, Brenner, Lannin, & Vogel, 2018). Lastly, given the association between weight discrimination and anticipated stigma, large scale interventions are needed to decrease weight biases and discrimination at the societal level. Ideally individuals would not have to experience weight stigma; unfortunately, research suggests that negative weight-related attitudes have actually worsened over time (Charlesworth & Banaji, 2019). It will be vital for future research to not only identify ways to decrease weight discrimination at multiple levels (e.g., structural and interpersonal), but also identify ways to buffer

against its negative impact on anticipated weight stigma and poorer health when it does occur (Hunger, Smith, & Tomiyama, 2020).

### CRedit authorship contribution statement

**Jeffrey M. Hunger:** Conceptualization, Formal analysis, Writing - original draft. **Dorian R. Dodd:** Validation, Writing - review & editing. **April R. Smith:** Conceptualization, Formal analysis, Writing - original draft.

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