



Weight stigma and eating behavior: A review of the literature



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ABSTRACT

Weight stigma is a pervasive social problem, and this paper reviews the evidence linking weight stigma to eating behavior. Correlational studies consistently find that experiences with weight stigma are associated with unhealthy eating behaviors and eating pathology (such as binge eating, skipping meals), although results vary somewhat depending on the sample being studied and the specific stigma/eating constructs being assessed. Experimental studies consistently find that manipulations such as priming overweight stereotypes, exposure to stigmatizing content, and social exclusion all lead to increased food intake, but whether or not those manipulations capture the impact of weight stigma experiences per se is less clear. Finally, studies of stigma experiences in daily life show that more frequent stigma experiences are associated with decreased motivation to diet and with less healthy eating behaviors. Overall, this research highlights the potential for weight stigma to negatively impact individuals' eating behavior, which in turn could have consequences for their overall health and well-being.

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1. Introduction

Weight stigma as a social problem has been apparent for many years, with studies dating back to the 1960s describing weight-based stereotypes and prejudice (e.g., Richardson, Goodman, Hastorf, & Dornbusch, 1961; Staffieri, 1967). More recently, researchers have outlined the significant impact that experiences with weight stigma can have on individuals with obesity, which can include psychological impacts (e.g., lowered self-esteem), physiological stress responses (e.g., increased cortisol), and behavioral impacts (e.g., decreased motivation to engage in health behaviors) (Tomyiama, 2014; Vartanian & Smyth, 2013). The potential behavioral consequences of stigma are particularly important because they can reduce the likelihood that individuals with obesity will lose weight, and may even contribute to weight gain over time (e.g., Sutin & Terracciano, 2013; Tomyiama, 2014). By developing a better understanding of the impact that weight stigma has on health behaviors, we can work toward reducing the negative impact of those experiences and thereby improving the wellbeing of the stigmatized individuals.

This paper reviews the evidence related to the association between weight stigma and eating behavior. We searched the following databases for relevant articles: PsycINFO, Scopus, and

Google Scholar. The search included all combinations of key terms related to weight (*weight, overweight, obese*, fat, fatness, heavy, heaviness, BMI, anti-fat*), stigma (*stigma, shame, shaming, discriminat*, bias, biases, biased, stereotyp*, prejudic*, tease, teased, teasing, bully*, ostraci*, victim*, harrass**), and eating (*eat, eating, diet*, health, intake, consume, consumption, food, hunger, snack**). All articles available from the databases through August 2015 were reviewed for inclusion. The reference lists of all relevant articles were also reviewed to find other literature that had been missed in the initial searches. The inclusion criteria were as follows: (a) the article was written in English, (b) the research either measured or manipulated weight stigma experiences, and (c) the research measured outcomes directly related to eating behavior (as opposed to eating attitudes, beliefs, or other related constructs). Our review is organized by research methodology used in the relevant studies (correlational studies, experimental studies, studies of daily life), and concludes with some considerations for future research. The overarching aim was to summarize what is currently known about the association between weight stigma and eating, and also to stimulate and guide future research in the area.

2. Correlational studies

Before we proceed with a review of correlational studies connecting stigma and eating-related variables, it is important to outline the different measures and definitions of the relevant constructs that are used in the literature. After doing so, we will

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review the correlational data in the following sections: overweight samples, unrestricted adolescent samples, unrestricted undergraduate samples, treatment-seeking samples, longitudinal studies, and moderators/mediators (see Table 1 for a summary of the study characteristics).

2.1. Measurement of weight stigma and eating behavior

With respect to measures of weight stigma, most studies use measures of the frequency of stigma or teasing experiences (such as the Stigmatizing Situations Inventory [SSI; Myers & Rosen, 1999] and the Perceptions of Teasing Scale [POTS; Thompson, Cattarin, Fowler, & Fisher, 1995]). Even among measures that assess the frequency of stigma experiences, however, there is variability in the precision or temporal focus of the ratings. For example, the SSI asks people how frequently they have experienced various stigmatizing situations, with response options ranging from “Never” to “Daily,” whereas the POTS is more abstract with responses ranging from “Never” to “Very Often.” The specific form of stigma assessed also varies across studies (e.g., teasing, bullying, victimization, discrimination), and some studies specifically asked participants how upsetting the stigma experiences were. (For a detailed discussion of the characteristics, strengths, and limitations of individual measures of weight stigma experiences, see DePierre & Puhl, 2012.) As a final note about stigma measures, our emphasis in this review is on measures that in some way reflect experiences with stigma. Thus, constructs such as weight bias internalization, which are more reflective of weight-related attitudes or beliefs, are discussed as potential mediators or moderators of the association between stigma experiences and eating behavior.

There is also a range of different measures used to assess eating-related variables in these correlational studies. These include measures of binge eating and symptoms of bulimia (e.g., Binge Eating Scale; Gormally, Black, Daston, & Rardin, 1982), more generalized measures of eating pathology (e.g., Children's Eating Attitudes Test [ChEAT]; Smolak & Levine, 1994), diagnosis of an eating disorder (usually binge eating disorders), or self-reports of healthy (e.g., increasing fruits and vegetables) and unhealthy (e.g., skipping meals, taking diuretics) eating behaviors. Note that, because our review focuses on eating behavior, rather than eating attitudes or other similar constructs, we did not include other measures that are sometimes reported in the literature but that do not actually address eating behavior (e.g., body dissatisfaction). For example, despite the fact that the drive for thinness subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) is sometimes referred to as “dietary restraint,” it does not actually address eating behavior and so that measure is not included in our review.

2.2. Samples of individuals who are overweight

A number of studies have assessed the association between weight stigma experiences and eating outcomes among individuals who are overweight or obese. Among overweight adolescents, those who experienced weight-related teasing (compared to those who did not experience teasing; Neumark-Sztainer et al., 2002) and those who experienced greater frequency of weight-related teasing (Libbey, Story, Neumark-Sztainer, & Boutelle, 2008) showed higher levels of unhealthy weight control behaviors (e.g., fasting, making themselves vomit) and binge eating behaviors. Libbey et al. (2008) further found that frequency of teasing was associated with eating in secret and feeling out of control while eating; that overweight adolescents who were teased by a greater number of sources were at greater risk of engaging in unhealthy weight control behaviors and were more fearful of losing control of their eating; and that the

extent to which participants were bothered by the teasing was associated with disordered eating thoughts and behaviors. In contrast to the findings from studies using primarily Caucasian samples, Olvera, Dempsey, Gonzalez, and Abrahamson (2013) found that, among adolescent Hispanic and African American girls who were overweight, there was no relationship between weight-related teasing and either healthy or unhealthy weight control behaviors. These findings suggest that it may be important to consider possible cultural differences in how stigma is experienced and how it might impact eating behaviors and other health outcomes.

Other studies have focused on adult community members who are overweight and obese, and have found that stigma experiences are associated with eating pathology. For example, Vartanian and Novak (2011) and Vartanian (2015) found that scores on the Stigmatizing Situations Inventory were positively correlated with scores on the bulimia subscale of the EDI. Furthermore, those studies found that the association between stigma experiences and bulimic symptoms was similar for women and for men. Womble et al. (2001) also found that a history of childhood weight-related teasing was associated with binge eating later in life, and Wu and Liu (2015) found that SSI scores predicted binge eating in a community sample of Taiwanese adults who were overweight.

2.3. Unrestricted adolescent samples

Although individuals who are overweight might experience stigma more frequently than those who are not overweight, research using unrestricted samples (i.e., not just those who are overweight) indicates that weight stigma experiences are associated with negative outcomes across the weight spectrum. For example, girls who were teased about their weight by their family (siblings and parents) scored higher on the bulimia subscale of the EDI than did those who were not teased (Keery, Boutelle, van den Berg, & Thompson, 2005). In another study, both boys and girls who experienced more frequent teasing by parents or peers also reported more frequent restrictive eating, emotional eating, and external eating (Goldfield et al., 2010). Similarly, weight-related teasing by others in general was predictive of binge eating behavior in adolescent female twins (Suisman, Slane, Burt, & Klump, 2008), and weight-related teasing by peers was associated with greater eating pathology (Rojo-Moreno et al., 2013).

Other studies have looked at the specific characteristics of the stigma experience that might be associated with eating behavior. For example, Puhl and Luedicke (2012) found that overall weight-related teasing was not associated with the use of binge eating as a coping strategy but, for boys at least, being teased in the locker room and in the bathroom were associated with binge eating. Lieberman, Gauvin, Bukowski, and White (2001) obtained self-reported experiences of weight-related teasing from adolescent girls, as well as peer reports of teasing. They found that it was specifically weight-related teasing that participants rated as “hurtful” that was associated with restrictive dieting (as measured by the ChEAT). Furthermore, reports from peers that a particular student was teased because of her weight were associated with bulimic symptoms for the teased student, but this was not the case for non-weight-based social rejection, suggesting that the association was specific to weight-related teasing.

Finally, Lampard, MacLehose, Eisenberg, Neumark-Sztainer, and Davison (2014) examined weight-related teasing at the school level (i.e., the percentage of participants in a given school who reported experiencing weight-related teasing) to determine whether the broader weight-related teasing climate of a school was associated with weight control behaviors. They reasoned that observing others being teased about their weight could influence beliefs

Table 1
Summary of correlational studies included in the review.

Author/s	Year	N	Age (years)	% Female	BMI	Main ethnicity (%)	Stigma measure used	Eating measure used	Association
Almeida, Savoy, & Boxer	2011	UG: 100 P: 99	<i>M</i> = 20.03 <i>M</i> = 35.44	77 94	<i>M</i> = 24.01 <i>M</i> = 33.51	Asian/other (50%) Black/African American (48%)	SSI SSI	BES	+
								BES	0
Ashmore, Friedman, Reichmann, & Musante	2008	93	<i>M</i> = 53.56	74	<i>M</i> = 42.32	White (95%)	SSI	BES	+
Benas & Gibb	2008	203	<i>M</i> = 19.07	64	N/A	Caucasian (53.7%)	PARTS-W/ST	EDI-BUL	+
								BES	+
								DEBQ-RES	+
								DEBQ-EMO	+
							TQ-R-APP	DEBQ-EXT	+
								EDI-BUL	+
								BES	+
								DEBQ-RES	+
DEBQ-EMO	0								
DEBQ-EXT	0								
Eisenberg, Berge, Fulkerson, & Neumark-Sztainer	2012	1902	<i>M</i> = 25.3 (Time 3)	57	N/A	White (48.4%)	Project EAT: comments by family (Time 3)	Project EAT: dieting	+(f), 0 (m)
								Project EAT: UWCB	+(f), +(m)
								Project EAT: EWCB	+(f), 0 (m)
							Project EAT: comments by significant other (Time 3)	Project EAT: binge eating	+(f), +(m)
								Project EAT: dieting	+(f), +(m)
								Project EAT: UWCB	+(f), +(m)
Project EAT: EWCB	+(f), 0 (m)								
Project EAT: binge eating	+(f), 0 (m)								
Farrow & Tarrant	2009	198	N/A	N/A	<i>M</i> = 22.95	N/A	Weight-related discrimination	DEBQ-EMO	+
Friedman, Ashmore, & Applegate	2008	94	<i>M</i> = 47.8	73	<i>M</i> = 47.8	White (81%)	SSI	BES	+
Gerke et al.	2013	92	<i>M</i> = 13.9	62	<i>M</i> z-score = 2.50	African American (78%)	POTS	ChEDE-Q	+
Goldfield et al.	2010	1491	<i>M</i> = 14.7	57	<i>M</i> = 21.6	N/A	MRFS-III-peer	DEBQ-RES	+
								DEBQ-EMO	+
							MRFS-III-parent	DEBQ-EXT	+
								DEBQ-RES	+
								DEBQ-EMO	+
DEBQ-EXT	+								
Keery, Boutelle, van den Berg, & Thompson	2005	424	<i>M</i> = 12.6	100	N/A	Caucasian (85%)	Modified POTS	EDI-BUL	+
								EDI-BUL	+
King, Puhl, Luedicke, & Lee	2013	361	<i>M</i> = 16.25	48	36% HW/24% OW/40% OB	Caucasian (71%)	Weight-based victimization	Project EAT: HWCB	+
								Project EAT: UWCB	+
								Project EAT: binge eating	+
Lampard, MacLehose, Eisenberg, Neumark-Sztainer, & Davison	2014	2793	<i>M</i> = 14.4	53.2	N/A	African American/Black (29%)	Project EAT: school-level weight-related teasing	Project EAT: dieting	+(f), 0 (m)
								Project EAT: UWCB	0 (f), 0 (m)
								Project EAT: EWCB	0 (f), 0 (m)
Libbey, Story, Neumark-Sztainer, & Boutelle	2008	130	<i>M</i> = 15.2	65.5	38% AROW/62% OW	White (58.4%)	Project EAT: number of sources of teasing	EDE-Q: eating in secret	+
								EDE-Q: binge eating	0
								Project EAT: HWCB	0
								Project EAT: UWCB	+
								Project EAT: ODC	+
							Project EAT: frequency of teasing	EDE-Q: eating in secret	+
								EDE-Q: binge eating	+
								Project EAT: HWCB	0
								Project EAT: UWCB	+
								Project EAT: ODC	+
Lieberman, Gauvin, Bukowski, & White	2001	876	<i>M</i> = 14.08	100	<i>M</i> = 21.14	N/A	Non-weight social rejection	ChEAT: dieting	0
								ChEAT: bulimia	0

(continued on next page)

Table 1 (continued)

Author/s	Year	N	Age (years)	% Female	BMI	Main ethnicity (%)	Stigma measure used	Eating measure used	Association
							Peer overweight tease	ChEAT: dieting	+
								ChEAT: bulimia	+
							Self-report weight tease	ChEAT: dieting	+
								ChEAT: bulimia	+
							Self-report body tease	ChEAT: dieting	+
								ChEAT: bulimia	+
							Self-report appearance tease	ChEAT: dieting	+
								ChEAT: bulimia	+
Madowitz, Knatz, Maginot, Crow, & Boutelle	2012	79	<i>M</i> = 10.0	58.8	<i>M</i> = 27.31	White 76%	Teasing	EDE-Q: UWCB	+
Muscat & Long	2008	220	<i>M</i> = 20.9	100	N/A	Canadian (62%)	SHQ: critical comments	EDE-Q	+
Neumark-Sztainer et al.	2002	4746	<i>M</i> = 14.9	50.2	N/A	Caucasian (48.5%)	Frequency of weight-teasing	Project EAT: UWCB	+
Neumark-Sztainer et al.	2010	356	<i>M</i> = 15.8	100	<i>M</i> = 25.8	Black (28.4%)	Family weight-teasing	Project EAT: UWCB	+
								Project EAT: EWCB	+
								Binge eating	+
Olvera, Dempsey, Gonzalez, & Abrahamson	2013	141	<i>M</i> = 11.1	100	19% OW/81% OB	Hispanic/African American (100%)	MRFS-IV: peer teasing	MRFS-IV: emotional eating	+
								MRFS-IV: weight control behaviors	0
							MRFS-IV: parent teasing	MRFS-IV: binge eating	0
								MRFS-IV: emotional eating	+
								MRFS-IV: weight control behaviors	0
Piran & Thompson	2008	UG: 436	<i>M</i> = 20.8	100	N/A	European (56%)	Weight Harassment	MRFS-IV: binge eating	+
								Dieting	+
								Bingeing	+
								Additional weight control methods	+
		CM: 341	<i>M</i> = 21.6	100	N/A	European (76.2%)	Weight Harassment	Dieting	+
								Bingeing	+
								Additional weight control methods	+
Puhl & Brownell	2006	F: 2449	<i>M</i> = 49.85	100	<i>M</i> = 37.6	White (95%)	Modified SSI	Modified CRI	UTC
								QEWP-R: BED	UTC
							Interpersonal sources of weight stigma	Modified CRI	UTC
Puhl & Luedicke	2012	1361	<i>M</i> = 16.4	52	<i>M</i> = 22.5	Caucasian (82%)	Teasing incidents	Coping strategies: Eating/binging	0 (f), 0 (m)
Puhl, Moss-Racusin, & Schwartz	2007	1013	<i>M</i> = 49.33	100	<i>M</i> = 37.66	White (95%)	Modified SSI	Modified CRI: weight loss strategies	0
Quick, McWilliams, & Byrd-Bredbenner	2013	1533	<i>M</i> = 19.66	100	<i>M</i> = 22.77	White (55%)	POTS	EDE-Q	+
								TFEQ-EMO	+
								TFEQ-DIS	+
								EES	+
								ChEAT	+
Rojo-Moreno et al.	2013	57,997	Range 13-16	49.1	N/A	N/A	POTS	Diagnostic interview	0
Rosenberger, Henderson, Bell, & Grilo	2007	174	<i>M</i> = 42.9	75	<i>M</i> = 50.2	Caucasian (68.4%)	Teasing history	Early onset dieting	+
								Yo-yo dieting	+
Salwen, Hymowitz, Bannon, & O'Leary	2015	383	<i>M</i> = 19.36	56.4	<i>M</i> = 25.86	Caucasian (48.7%)	WRAQ: verbal	NEQ	+
								QEWP-R: binge eating	+
								QEWP-R: UWCB	+
								TFEQ-EMO	+
							POTS	NEQ	0
								QEWP-R: binge eating	0
								QEWP-R: UWCB	0
								TFEQ-EMO	0

association between teasing by family members and unhealthy weight control behaviors.

Other studies have focused on adult patients enrolled in behavioral weight-loss programs. For example, a study with obese treatment-seeking adults found that frequency of weight stigmatizing experiences was associated with binge eating (Ashmore, Friedman, Reichmann, & Musante, 2008). Wott and Carels (2010) found also that stigmatizing experiences were correlated with baseline levels of binge eating, but not with binge eating following the weight-loss intervention. Furthermore, stigmatizing experiences were positively correlated with caloric intake throughout the study, but this association was rendered non-significant after controlling for participants' BMI. Puhl and Brownell (2006) examined the specific strategies that members of a weight-loss support group used to cope with stigmatizing experiences and found that eating more food and refusing to diet, but also dieting, were all common responses to stigma experiences. Puhl, Moss-Racusin, and Schwartz (2007) further showed that it was those who had internalized negative stereotypes about obesity who were most likely to report refusal to diet as a coping response to weight stigmatizing situations. However, neither experiences of weight stigma nor internalized negative stereotypes predicted the extent to which participants engaged in weight-loss strategies.

Finally, research with adult patients seeking medical weight-loss treatments has produced results that are somewhat mixed. For example, although Almeida et al. (2011) found that weight stigma was a unique and significant predictor of binge eating in an undergraduate sample, this pattern was not replicated in their sample of patients receiving medical treatment from a weight control clinic. Rosenberger, Henderson, Bell, and Grilo (2007) found that, among patients seeking gastric bypass surgery, a history of childhood weight-related teasing was associated with an earlier onset of dieting, and with "yo-yo" dieting, but not with eating disorder diagnosis. Furthermore, those with a teasing history did not differ from those without a teasing history in frequency of binge eating or in dietary restraint, but did show marginally higher eating concerns. In another study, patients seeking weight loss surgery who reported more stigmatizing experiences were more likely to have a Binge Eating Disorder (BED) diagnosis (Friedman, Ashmore, & Applegate, 2008). Weight stigma was also associated with binge eating in that study, but this association became non-significant after controlling for age, gender, and BMI.

2.6. Longitudinal studies

One longitudinal study examined hurtful weight-related comments at three time points over an 11-year period (Eisenberg, Berge, Fulkerson, & Neumark-Sztainer, 2012). Although recent hurtful weight-related comments from family members and from relationship partners were associated with unhealthy weight control behaviors, extreme weight control behaviors, and binge eating, early hurtful comments from family and peers were not associated with disordered eating after controlling for recent hurtful comments. The authors concluded that hurtful weight-related comments are most strongly linked to disordered eating in the short-term but may not have lasting effects in the long-term, unless those experiences are repeated.

2.7. Possible mediators and moderators

In addition to assessing the overall association between weight stigma and eating behavior, a few studies have also explored potential mediators or moderators of this association. Negative affect and psychological distress have received the most attention in the literature, with several studies showing that the association

between stigma experiences and eating is mediated by negative affect (Puhl & Luedicke, 2012; Suisman et al., 2008) and by depression and self-esteem (Gerke et al., 2013). Another factor that has been examined as a potential mediator of the stigma-eating link is the extent to which the individual has internalized weight stigma. Durso, Latner, and Hayashi (2012) showed that experiences with interpersonal discrimination (albeit not necessarily weight-based discrimination) were associated with greater emotional eating and bulimic behaviors, and that this association was partially mediated by weight bias internalization. Finally, Heijens, Janssens, and Streukens (2012) found that a history of weight-related teasing was associated with weight bias internalization in overweight participants, and that teasing and internalization were both linked with body dissatisfaction. These findings suggest that there may be a constellation of risk factors—including weight stigma, internalization, and body dissatisfaction—that all contribute to unhealthy eating patterns. Note, however, that the association between body dissatisfaction and eating outcomes is mixed. Heijens et al. (2012) found that participants with greater body dissatisfaction showed a greater intention to eat healthily, whereas other studies have found that body dissatisfaction is associated with unhealthy eating behaviors (e.g., Lampard et al., 2014). This discrepancy may be due to differences in how the eating-related variables are defined (e.g., intentions vs. actual behavior).

In terms of potential moderators, Farrow and Tarrant (2009) investigated the moderating role of social consensus—beliefs about other ingroup members' attitudes towards overweight people—in the relationship between weight discrimination experiences and maladaptive eating behaviors and cognitions. Weight-based discrimination was more strongly associated with emotional eating when participants believed that their ingroup had negative attitudes towards overweight people. Furthermore, as noted earlier, Puhl et al. (2007) found that it was specifically individuals who had internalized negative obesity stereotypes who were more likely to binge eat and less likely to diet in response to stigmatizing experiences. Thus, there may be individual differences in the extent to which weight stigma will be associated with negative outcomes.

3. Experimental studies

Correlational studies documenting the association between stigma experiences and eating behaviors are informative, but causal inferences cannot be drawn from those studies. Experimental research in this area is admittedly challenging because of the ethical concerns that arise when one wishes to deliberately stigmatize an individual because of her or his weight as a means of documenting the anticipated ill effects of that stigma. Nonetheless, researchers have used a range of experimental methodologies that get us closer to understanding the effects of weight stigma on eating outcomes.

3.1. Priming stereotypes associated with overweight individuals

One approach that researchers have used is to prime negative stereotypes about people who are overweight and obese, and examine the impact of this prime on participants' eating intentions or behavior. For example, Seacat and Mickelson (2009) conducted a study over the phone in which a community sample of overweight women ($n = 100$) listened to a vignette describing a fictional study linking poor dietary and exercise habits with negative health outcomes. In the stereotype-prime condition, the vignette included a statement indicating that there are specific individual characteristics that distinguish women who are more likely to have poor

dietary and exercise habits from those who are not (but there was no explicit mention of weight); this statement about individual differences was absent in the control condition. Participants in the stereotype-prime condition also reported their height and weight to increase the salience of the overweight stereotype. All participants then responded to measures of healthy eating and exercise intentions, as well as dietary and exercise self-efficacy (i.e., participants' beliefs in their ability to engage in healthy diet and exercise behaviors). Women in the stereotype-prime condition reported lower intention to maintain a healthy diet than did those who were not primed, and participants' self-efficacy was a significant mediator for this relationship.

Brochu and Dovidio (2014; Study 1) conducted a similar experiment, examining choice of food as an outcome of stereotype exposure. Participants ($n = 176$; 63% female) recruited through Amazon's Mechanical Turk completed the study online, and read a vignette similar to the one used by Seacat and Mickelson (2009) to prime overweight stereotypes (although, again, weight was not mentioned in the vignette). As in Seacat and Mickelson's study, participants in the prime condition also reported their height and weight in order to increase the salience of the stereotype prime. Participants were then shown a restaurant menu, and were asked to make their personal dinner choice as if they were actually ordering at the restaurant (given that this was an online study, participants were aware that they would not be eating the food that they ordered). The number of calories from the chosen foods was calculated as the dependent variable. Priming condition had an effect on number of calories ordered, but only for participants with a BMI in the overweight range: among participants who were overweight, those primed with the stereotype ordered more calories than did those in the control condition. Together, these two studies indicate that (a) there is an overweight stereotype related to eating, and (b) activating that stereotype leads to stereotype-consistent behavior among individuals who are overweight. Note, however, that neither of these studies measured actual food intake (they assessed intentions or hypothetical behavior), and there is also the potential for demand effects in both cases (i.e., presenting the prime immediately before asking about intended behaviors may have influenced participants' responses).

Other studies have primed stereotypes of overweight individuals using a different methodology, and have directly observed food choice and eating behavior. For example, Campbell and Mohr (2011; Experiment 1) showed participants ($n = 59$; 36% female) an image of a woman who was overweight, an image of a woman who was of normal weight, or an image of a lamp, and asked participants to list the first three things that came to mind in response to the specific image they were shown. When participants were subsequently offered candies from a bowl as a reward, those in the overweight-exposure condition took significantly more candies than did those in the other conditions. Participants' BMI did not influence the results, indicating that the priming did not only impact participants who were overweight. A follow-up experiment (Experiment 2; $n = 139$; 29% female) showed that the increased intake in the overweight prime condition was at least in part due to lower health goal commitment among those participants. That is, reported health goal commitment partially mediated the effect of stereotype activation on food intake. Campbell and Mohr (Experiment 3; $n = 106$; 100% female) also found that, when participants had written about their goals and health goal accessibility was high, the stereotype prime had no effect on food intake. Thus, they provided evidence that exposure to images of an individual who is overweight activates negative weight-based stereotypes, and that health motivation might be one of the mechanisms through which these stereotypes influence participants' food intake.

3.2. Exposure to weight-stigmatizing content

Another approach that has been used in this domain of research is to expose participants to weight-stigmatizing content. For example, Major, Hunger, Bunyan, and Miller (2014) had female undergraduate students ($n = 93$) read an article stating that employers are reluctant to hire people who are overweight (weight stigma condition), or read an article about employers' reluctance to hire smokers (control condition). Participants were then given incidental access to snack foods (Skittles, M&Ms, and goldfish crackers) while they watched a movie, and also completed a measure of self-efficacy for dietary control. Participants who perceived themselves to be overweight consumed more calories in the weight-stigma condition than in the control condition, and also reported less self-efficacy for dietary control. In contrast, calorie intake did not differ between conditions for those who perceived themselves as average weight or thin, and participants who perceived themselves as average weight or thin actually expressed greater self-efficacy for dietary control in the weight-stigma condition than in the control condition. Major et al. (2014) also found that, in contrast to perceived weight, participants' actual BMI did not moderate the effects of stigma condition on food intake. These findings suggest that perceived weight may be more important than objective weight in determining vulnerability to weight stigma and its consequences.

Aubie and Jarry (2009; Study 1) had female undergraduate students ($n = 88$) read a vignette describing a social interaction in which the main character interacts with two peers. In the teasing condition, the main character is teased with the phrase "Hey fatty". The vignette in the control condition was identical except that there was no teasing phrase. After reading the vignette, participants took part in a cookie taste test. Participants who read the teasing vignette ate more than did those who read the neutral vignette, but only if they also scored high on a self-report measure of binge eating tendency (participants' BMI was unrelated to intake). The results also showed that participants who were exposed to the weight-related teasing vignette reported greater negative affect than did those exposed to the neutral vignette, but negative affect was not directly tested as a mediator. A second experiment ($n = 114$; 100% female) found that both weight-related teasing and academic-related teasing vignettes led to greater negative affect, but increased food intake among binge eaters was observed only in the weight-related teasing condition, suggesting that the effect is due to weight-related teasing rather than general negative affect.

The impact of weight stigmatizing messages on food intake was also examined using film depictions of negative weight-based stereotypes (Schvey, Puhl, & Brownell, 2011). Female participants ($n = 73$) watched either a control video depicting neutral scenes such as insurance commercials, or a weight stigmatizing video. The weight stigmatizing video consisted of clips from popular television shows and movies depicting women who are overweight behaving in ways consistent with negative weight-based stereotypes, such as being clumsy, loud, or lazy, and included scenes of interpersonal weight discrimination and weight-related teasing in the workplace. After watching the film clip, participants were given three bowls of snack foods (M&Ms, jellybeans, and SunChips) that they could eat while completing questionnaires. Participants who were overweight and who were exposed to the weight stigmatizing video consumed significantly more calories than did the other groups, and consumed three times as much as did overweight participants exposed to the neutral video. Despite the fact that participants were randomly assigned to condition, the overweight/stigma-exposure group had a mean BMI that was significantly higher ($M = 35$) than was the mean BMI of the overweight/control group ($M = 28$). However, Schvey et al. noted that their results were

identical when they controlled for BMI, suggesting that the group difference in BMI could not explain the group difference in food intake. There were also no group differences observed in positive affect, suggesting that the effects were not due to the differential emotional impact that the videos had.

3.3. Social exclusion manipulations

A number of studies have directly examined the impact of social exclusion on eating behavior, which is more closely tied with the individual's own personal firsthand experiences than are the manipulations described above, but the exclusion in these studies is not specific to weight. For example, [Baumeister, DeWall, Ciarocco, and Twenge \(2005\)](#); Experiment 2; $n = 38$; 37% female) found that participants who had been rejected by a peer following a get-acquainted conversation ate approximately twice as many cookies as did those who had been accepted. Baumeister and colleagues argued that social exclusion impairs self-regulation which, among other things, can lead to increased intake of unhealthy foods. These results provide preliminary evidence that interpersonal rejection can impact eating behavior, but the manipulation was not related to weight and participants' BMI was also not examined as a potential moderator, and thus the results do not speak to the effects of weight stigma on eating behavior.

Three other studies used Cyberball as a means of manipulating ostracism and investigated its effect on food intake. Cyberball is a computer-based ball-tossing game that involves throwing and catching a ball among several computerized confederates ([Williams & Jarvis, 2006](#)). In a typical Cyberball manipulation, the participant is either included and receives the ball equally as often as the other players, or is ostracized and is excluded from the game after the first few ball tosses. In a study by [Oaten, Williams, Jones, and Zadro \(2008\)](#), undergraduate participants ($n = 73$; 68% female) took part in the Cyberball game and then participated in a cookie taste test. They found that, similar to [Baumeister et al. \(2005\)](#), participants who had been rejected in the Cyberball game ate significantly more than did those who were included. Also like the Baumeister et al. study, however, Oaten et al. did not consider participants' BMI as a moderator of the effect of exclusion on food intake.

[Salvy et al. \(2011\)](#) had a group of adolescents ($n = 59$; 49% female) take part in the Cyberball task, after which they completed an operant computer task to assess their motivation for food. Participants were then given a large bowl of snack food and were told that they could eat as much or as little as they liked. Overweight participants who had been ostracized showed greater motivation for food on the operant computer task, and also ate more of the snack, than did overweight participants in the included condition; there was no effect of the Cyberball manipulation on participants who were normal weight.

In contrast to Salvy and colleagues, [Hayman, McIntyre, and Abbey \(2015\)](#) did not find any effect of participant BMI on food intake following exclusion in the Cyberball paradigm among African American women ($n = 124$). African American women who were excluded by Caucasian women (the outgroup) consumed more potato crisps than did those who were included by the outgroup; there was no difference in consumption between participants who were included and excluded by other African American women (the ingroup). Their results further showed that the increased intake was not due to any differences between groups in the affect they experienced following the Cyberball manipulation. Thus, there was no evidence that negative affect mediated the relationship between weight stigma and eating behavior.

3.4. Potential mediators and moderators

BMI does not appear to be a consistent moderator of the effect of experimental manipulations on food intake. This finding is consistent with the results from correlational studies and indicates that experiences with weight stigma are associated with dysfunctional eating regardless of individuals' BMI. Other related measures, such as perceived weight, might prove to be more useful individual differences that moderate the effect. In terms of potential mediators of any association between stigma and eating, the main variable that has been examined to date is negative affect, and it does not appear to consistently predict eating outcomes (in contrast to what is found in correlational studies).

Although negative affect in general does not appear to mediate the effect of stigma on eating behavior, it is possible that more specific discrete emotions (such as shame) could be involved. For example, [Chao, Yan, and Chiou \(2012\)](#) examined the effect of shame on food intake (although not in the context of weight stigma). Participants were asked to recall and write down an event that induced either feelings of shame or feelings of guilt (or, in the control condition, to write about a typical weekday). Participants were then given two bowls of nougat in different flavors and made taste ratings. Participants in the shame condition ate more than did those in the other conditions, and the food intake of participants in the guilt condition did not differ from those in the neutral control. These findings suggest that the emotion shame, beyond the effects of general negative affect, can influence eating behavior. Although weight stigma was not directly manipulated in this study, the findings suggest that shame could be explored in future research examining the impact of weight stigma on eating behaviors.

4. Stigma experiences in everyday life

Experimental studies have an advantage over correlational studies in that they can demonstrate causal effects on eating behavior. However, although tightly controlled, laboratory studies often lack external validity and can be fairly artificial. There are a range of methods that are used by researchers to capture people's experiences in their daily lives (see [Smyth & Heron, 2012](#)). These methods have the advantage of minimizing the recall biases that are often present in cross-sectional research, providing a more ecologically valid assessment than is possible in experimental studies, and providing information about the temporal order of variables. Only two studies to date have used these approaches in the context of weight stigma.

[Vartanian, Pinkus, and Smyth \(2015\)](#), for example, had a group of 46 community adults (52% female) who were overweight or obese take part in a two-week ecological momentary assessment study during which they were asked to record any experiences they had with weight stigma as soon as possible after the event occurred. At the end of each day, participants also reported their motivation to diet and to lose weight. This study showed that the more experiences with weight stigma that participants had on a particular day, the less motivated they were to diet and to lose weight. Another study used a daily diary approach to assess people's stigma experiences ([Seacat, Dougal, & Roy, 2016](#)). Community participants ($n = 50$; 100% female) who were overweight or obese were asked to complete a diary before going to bed each night for one week, recording their experiences with weight stigma, as well as rating the overall healthiness of their diet on that day. More frequent experience with stigma throughout the day was associated with worse self-report diet quality on that day. Together, these studies indicate that experiences with weight stigma in people's everyday lives can negatively impact their motivation and eating behavior.

5. Summary and limitations of previous research

Correlational studies consistently show that experiences with weight stigma are associated with unhealthy eating behaviors, particularly with disordered eating (e.g., binge eating or symptoms of bulimia). However, the strength of the association does appear to vary somewhat based on the specific constructs being assessed (e.g., effects appear to be strongest for weight stigma that was perceived as hurtful), and results also seem to vary based on the specific sample being assessed. In particular, certain ethnic groups (e.g., Hispanic and African Americans) and clinical samples (i.e., individuals seeking weight-loss treatment) do not tend to show the stigma-eating association as consistently. Correlational studies also suggest that negative affect, internalized weight bias, and health motivation might all be mechanisms underlying the association between stigma experiences and eating behaviors, although these mechanisms have been tested in relatively few studies. The primary limitation of correlational studies is the inability to draw any causal inferences. At present, there is only one longitudinal study of the impact of weight stigma experiences (Eisenberg et al., 2012), and that study suggests that stigma might have relatively short-term effects.

Evidence from experimental studies consistently shows that priming overweight stereotypes, exposure to stigmatizing content, and social exclusion all influence participants' eating intentions and behavior, but more tenuous is the direct link between these manipulations and weight stigma. No studies to date have experimentally induced weight-based stigmatization among individuals who are overweight and obese and examined its impact on eating behavior. Instead, researchers have used a variety of methods that stand as proxies for weight stigma. For example, priming an overweight stereotype leads to increased food intake, but some studies show that these effects emerge both for individuals with a high BMI and a low BMI (e.g., Campbell & Mohr, 2011). Thus, it may be that these manipulations are simply activating an association between a particular group ("overweight people") and a particular behavior (overeating) much in the same way that research in social psychology demonstrates that priming the concept "the elderly" leads participants to walk more slowly down the corridor (Bargh, Chen, & Burrows, 1996).

Other studies have exposed participants to weight-stigmatizing content and have found increased food intake only among individuals who are overweight (Schvey et al., 2011), who perceive themselves as overweight (Major et al., 2014), or who have a tendency toward binge eating (Aubie & Jarry, 2009). This latter study did not find that the effect of the manipulation varied by participant BMI, but it is possible that self-perceived weight is a more important predictor than objective weight (Major et al., 2014), and thus perhaps those who are high in binge eating tendency would also be high in self-perceived weight. Although these studies do not provide a direct test of the impact of first-hand experiences with stigma, these types of manipulations might evoke concerns about discrimination that one might receive because of one's size, and those concerns have been shown to play an important role in the association between weight stigma and health outcomes (Hunger & Major, 2015). Another limitation of these studies is that, although each of these studies provides a control condition, none of those control conditions involved stigmatization of another marginalized group. Thus, the observed effects may be attributable to the negative emotional state evoked by observing discrimination toward others.

There are a few experimental studies that have used direct manipulations of exclusion, but the exclusion in those studies was not specifically based on weight. Furthermore, two of those studies did not assess participants' BMI (Baumeister et al., 2005; Oaten

et al., 2008), and only one study (Salvy et al., 2011) found effects of exclusion on food intake only among participants who were overweight. Even if effects were consistently observed only among individuals who are overweight or obese, this does not necessarily mean that weight-stigma effects are being observed—it could simply be that individuals who are overweight or obese respond differently to exclusion. Thus, even direct manipulations of exclusion do not provide a clear indication of how weight stigma, per se, affects eating behaviors.

Finally, novel methods for tracking the impact of weight stigma in ecologically valid contexts have found that stigma experiences in people's everyday lives are associated with decreased motivation to diet and with less healthy eating behaviors. Research using these approaches is only just emerging, and the existing studies have not fully capitalized on the benefits of ecological momentary assessments in examining the link between weight stigma and eating outcomes, but they do provide further support for the notion that stigma experiences are associated with unhealthy eating behaviors.

6. Recommendations for future research

6.1. Correlational studies

Having established an overall association between weight stigma and unhealthy eating behaviors, there are a number of important questions to be addressed in future correlational studies:

- (a) What specific forms of stigma (e.g., in terms of the type of experiences and also the source of the stigma) are associated with which specific eating-related variables? With respect to "sources" of stigma, one emerging concept that has received relatively little attention in the weight stigma literature is that people can stigmatize themselves. Although existing measures of self-stigma (e.g., Lillis, Luoma, Levine, & Hayes, 2010; Rudolph & Hilbert, 2015) tend to reflect internalized attitudes more than specific instances or frequency of self-stigma (and thus seem to lack parallel with other stigma measures, such as the SSI), it would be worth exploring in future research how self-stigma can also contribute to maladaptive eating patterns.
- (b) What measures are best suited to capture the stigma experiences and eating outcomes? As is apparent from our review of the literature, there is a wide variety of measures used to assess these constructs. It would be helpful for future research to introduce more consistency in the measures used by identifying those constructs that most reliably capture the stigma-eating association.
- (c) Which groups (based on age, gender, ethnicity, or other characteristics) are at greatest risk for the negative consequences associated with stigma? Relatedly, are there individual differences that moderate the association between stigma experiences and eating outcomes? For example, the negative effects of weight stigma might be particularly pronounced among individuals high in weight bias internalization, or individuals who perceive themselves to be overweight.
- (d) What are the mechanisms underlying the stigma-eating link? Relatively few studies have examined mechanisms, and those that have tend to focus on negative affect or internalized weight bias. What other factors could explain the connection between weight stigma and eating?

In addition to addressing these questions in cross-sectional studies, longitudinal studies are needed to determine the long-term effects of stigma experiences.

6.2. Experimental studies

More experimental work is needed to better understand the causal impact of stigma on health behaviors, but future research should strive to more closely capture the impact of personal experiences with weight stigma. Here we offer a few suggestions for how researchers might approach this task. Of course, in each case, proper care needs to be taken to ensure the wellbeing of the participants, including thorough debriefing, post-experimental follow-ups, and referral to services as appropriate.

One approach could be to have participants recall a previous experience with weight stigma, and then follow that up with an eating-related task. These types of experiential-recall manipulations have often been used in social psychological research in order to induce particular emotions (e.g., [Lench & Levine, 2005](#)), and may also be useful as a means of inducing the experiential component of weight stigma. Note, however, that writing about the emotional content of past experiences can reduce the negative outcomes associated with that experience ([Smyth, 1998](#)), so this approach might provide an underestimation of the impact of stigma experiences. Furthermore, as with any experimental studies in this area, the issue of demand characteristics and response biases would be of concern, but there are a number of steps that can be taken to minimize their impact on the results (e.g., framing the eating task as a separate study, conducted in another room by a different researcher, etc.).

It could also be possible to modify the types of exclusion manipulations used in previous research in order to better understand the impact of weight stigma on eating behavior. For example, in studies that use interpersonal rejection, simply asking participants if they thought that they were excluded because of their weight would provide some insights into whether the effects are specific to the experience of weight stigma. In addition, steps could be taken to enhance the salience of participants' weight in relation to the exclusion, such as providing photographs of lean/heavy players in a Cyberball task, asking participants to report their height and weight immediately prior to the manipulation, having them recall previous experiences of weight stigma, and so on.

A third approach could be to use direct rejection based on weight. In a study on appearance-based rejection, [Park and Pinkus \(2009\)](#) had participants engage in a get-acquainted conversation with another participant. After the interaction, they were randomly assigned to receive feedback that was rejecting based on their appearance (low scores on measures of attractiveness, low ratings of the quality of the interaction, and low ratings for a desire to interact in the future) or accepting based on their appearance (high scores on measures of attractiveness, high ratings of the quality of the interaction, and high ratings for a desire to interact in the future). A similar manipulation could be used with an emphasis on weight in the appearance feedback. Given the evidence that perceived weight is more important than actual BMI in the stigma process ([Major et al., 2014](#)), and that even individuals who are in the healthy weight range report the negative effects of stigma experiences ([Vartanian & Shaprow, 2008](#)), these types of manipulations could be tested with samples of individuals who are not overweight or obese.

Finally, experimental studies need to assess the mechanisms underlying any observed effects of stigma on eating outcomes. Although negative affect emerged as a mediator in correlational studies, there is no evidence as yet from experimental studies that affect explains the impact of the manipulations on participants' eating behavior. Further research is needed to clarify the role of overall affect, and also to explore other potential mechanisms (including discrete emotions, such as shame).

6.3. Studies of daily life

The studies examining weight stigma experiences in everyday life provide initial insights into the phenomenology of weight stigma, but have not taken advantage of the full scope of these methodologies. For example, previous studies have only asked participants to report on their stigma experiences. Including assessments of non-stigma experiences (e.g., by having participants complete questionnaires in response to random signals throughout the day) would allow researchers to directly assess the consequences of stigma experiences relative to some baseline. Ecological momentary assessment can also provide rich data that can be used to answer questions such as: What are the temporal dynamics of stigma experiences (e.g., how long does the negative impact of the stigma experience last, are the effects of stigma cumulative, etc.)? What characteristics of the situation (e.g., who the perpetrator was, how hurtful the comment was) and of the person (e.g., level of weight bias internalization) lead to the most negative outcomes following a stigma experience? By assessing stigma experiences as they occur in daily life, ecological momentary assessment could also be used to provide a clearer picture of the mechanisms involved in the stigma-eating link. For example, researchers could test in vivo whether changes in negative affect (or perhaps shame in particular) both follow a stigma event and precede an episode of overeating or binge eating (cf. [Smyth et al., 2007](#)). Finally, ecological momentary assessment data can be synchronized with other sources of information to provide a broader perspective on the factors that influence responses to a stigma experience. For example, the GPS feature of a smartphone can be used to determine what food cues are available in the environment (cf. [Zenk et al., 2011](#)), and researchers could assess whether the presence of these food cues influences responses to stigma experiences. In short, there are an endless number of questions (both practical and theoretical) that can be addressed by assessing stigma experiences as they occur in people's daily lives.

7. Conclusions

Weight stigma is a pervasive social problem with the potential to negatively impact the health and wellbeing of stigmatized individuals. There is consistent evidence that stigmatizing experiences are associated with unhealthy eating patterns, but evidence of a causal link between weight stigma and eating is still tentative. None of the experimental studies provide evidence that is *inconsistent* with the stigma-eating link, but whether or not those studies capture the impact of weight stigma experiences per se is less clear. Given the potential for stigma experiences to exacerbate the health problems of individuals with obesity, future research is needed to determine who is most vulnerable to those negative effects, and what can be done to minimize the negative impact of stigma experiences.

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