THE IMPLICATIONS OF WEIGHT BIAS INTERNALIZATION

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THE IMPLICATIONS OF WEIGHT BIAS INTERNALIZATION

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EDITORIAL
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Editorial: The Implications of Weight Bias Internalization

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Editorial on the Research Topic

The Implications of Weight Bias Internalization

INTRODUCTION AND EDITION PURPOSE

Weight stigma and discrimination have become a topic of global importance. Indeed, this is underscored by the evidenced impact of these experiences on physical and mental health and health related behaviors such as avoidance of healthcare environments and reduced healthcare seeking behaviors (e.g., Puhl and Suh, 2015). Extant research (e.g., Latner et al., 2013) has focused on weight bias internalization (WBI) and the associated implication, which include reduced quality of life and maladaptive behavioral response. WBI refers to "internalization of negative weight stereotypes and subsequent self-disparagement" (Pearl and Puhl, 2018, p. 1141). Although people across the weight spectrum experience WBI, it is most commonly experienced by people with a higher weight status. The commonality of weight stigma and discrimination experiences for people with overweight and obesity means that internalization of weight bias is likely, and, with the associated impacts on health and health behaviors, is an important consideration across society.

In editing this Research Topic, we have sought to present emerging empirical and theoretical contributions that advance current understanding of the impact of WBI, specifically on health and health behavior and the underlying mechanisms that lead to WBI. Thus, we present a range of research contributions from across the world, which hold important implications for policymakers and healthcare practitioners.

SUMMARY OF CONTRIBUTING ARTICLES

First, Noonan-Gunning presents a critical qualitative exploration to understand parents' lived experiences of food policy and resistance to stigma. Her empirical study demonstrates how stigma and resistance develop as a response to policy. With specific attention to parents' interactions with child policy, Noonan-Gunning provides insight into the interaction of notions of responsibility and morality.

The second article is a two-study investigation of the impact that body size has on daily life activities of women with obesity. First, using ethnographic techniques and interviews based on video recordings, Urdapilleta et al. provide in-depth information about the behaviors of women with, or previously with, obesity in response to embarrassing experiences related to body size and stigma. Second, Urdapilleta et al. reported that in a mirrored condition, women with obesity overestimated their body size by 30%, and that estimations of body size were least accurate for women who had bariatric surgery.

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The third article presents a narrative inquiry of weight bias and obesity stigma to explore the experiences of people living with obesity, in order to develop counter stories and identify opportunities for change. Ramos Salas et al. presented 10 counter stories to personal, familial, professional, and social contexts where people living with obesity experience weight bias and obesity stigma. They reported that internalization of weight bias led to emotional responses including shame, depression and suicidal thoughts and actions. They also argue that WBI led to maladaptive responses including healthcare avoidance. When working with individuals with obesity, the authors highlighted the importance of developing self-compassion and self-acceptance, whilst resisting damaged social identities and demanding respect, dignity, and fair treatment.

Meadows and Higgs examined the impact of WBI on objectively measured food intake. After completing a batch of questionnaires, participants read either a bogus news article on the negative consequences of weight or smoking before 15 min exposure to a selection of sweet and savory snacks. The authors reported that internalization of weight bias did not predict total energy intake. They did however, find that participants of higher weight, who had high levels of WBI, consumed fewer snack calories after reading the news article about the negative effects of weight compared to reading an article focused on negative effects of smoking. No effects were observed for participants of normative weight.

Williams and Annandale provide an opinion article that aims to broaden the way that internalization is defined and analyzed in weight stigma research, purporting that this will increase understanding of the implications of WBI. As such, Williams and Annandale challenge the current application of internalization terminology, arguing that it is largely embodied, and therefore to fully understand the implications of WBI, an understanding of how and in what ways these experiences "get under the skin" is warranted.

Essential to research exploring the WBI is the quality of measures. The Weight Bias Internalization Scale is an 11-item measure, developed from an original pool of 19-items. The original scale was created based on a unidimensional structure, however Meadows and Higgs postulated that there is a multi-dimensional nature to WBI. To explore this, they conducted an exploratory and confirmatory analysis of the original 19-items. They reported that the internalization of weight bias is a multi-dimensional concept where two-factors of the WBI scale are suggested for use to explore the relationships between different aspects of internalized weight bias.

Whilst evidence highlights that experiences of WBI are associated with reduced global quality of life, less is known about weight specific domains of quality of life. Walsh et al. recruited 178 adults with obesity from a weight loss trial, who completed measures of WBI, weight specific domains of quality of life, and, patient health and depression. Walsh et al. reported a relationship between WBI and mental and physical aspects of weight-related quality of life, independent of any effect of gender or race. This study provides further evidence to highlight the need to end weight stigma and discrimination, and given the commonality of such experiences, consider the effects of internalization of weight bias within healthcare.

In another study seeking to extend the current evidence base around the impact of WBI and mental and physical health, Puhl and Himmelstein conducted a cross sectional study recruiting adolescents seeking weight loss treatment. The authors reported that both male and female participants seeking weight loss treatment had high levels of WBI, and that higher levels of WBI were reported by adolescents engaging in binge eating and eating to cope with distress. They also found that mothers' weight-related comments and dieting frequency predicted adolescents' WBI. This study highlights the potential impact of parent communication about weight and dieting behavior for adolescents and their families seeking weight loss treatment.

Finally, Täuber et al. compared the impact of framing overweight and obesity as incompetence or immoral. First, Täuber et al. experimentally compared exposure to weight stigma framed as immoral vs. incompetence. They reported that people with overweight and obesity respond by defending their moral social-image but that this is less effective for encouraging weight loss. Exposure to weight stigma framed as incompetence led to an increased likelihood of engagement in weight loss behaviors. Second, they examined the notion that WBI primarily revolves around moral concerns, which is likely to lead to less self-determined behavioral regulation. They found that WBI was associated with less self-determined and more other-determined regulation of dieting and exercising. This suggests that WBI leads to maladaptive behavioral regulation, contributing to lower psychological functioning and well-being of people with overweight and obesity.

EMERGENT RECOMMENDATIONS

We offer several recommendations. First, that when healthcare professionals work with people living with obesity considerations are made for WBI and that efforts are made to reduce this internalization given that it is a key contributor to mental and physical health concerns and is associated with maladaptive health behaviors. This could include standardized/compulsory training and improved educational resources. Second, that policymakers, media and other disseminators of information avoid the moralization of weight given its debilitating effect on health and health behavior. Third, that researchers explore methods to reduce WBI and identify coping methods that could be employed both in society and healthcare environments.

AUTHOR CONTRIBUTIONS

SF, JR, and JH drafted, revised, and finalized the content of the manuscript. All authors have read and approved the final manuscript.

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ORIGINAL RESEARCH
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Weight Bias Internalization: The Maladaptive Effects of Moral Condemnation on Intrinsic Motivation

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Weight stigma typically focuses on suggestions that people with overweight and obesity are incompetent and immoral. Integrating so far unconnected lines of research, the current research presents two studies that examine the motivational relevance of these aspects of weight stigma. Specifically, we tested the proposition that people with overweight and obesity respond differently to the public viewing them as incompetent compared to immoral, as these aspects of weight stigma differ in reparability. We expect that threats to competence are more acceptable and thus related to a constructive response that is more effective in losing weight in the long-run. By contrast, we propose that threats to morality elicit an acute urge to defend one's moral image, thereby prompting responses that are more visible to the social environment, but potentially less effective for losing weight. Study 1 experimentally compared exposure to weight stigma focused on morality vs. weight stigma focused on competence in a sample of adults with overweight and obesity (N = 122; M_{BMI} = 31.89, SD_{BMI} = 4.39). We found that when exposed to weight stigma focused on morality, people with overweight and obesity respond by defending their moral social-image but that this is less effective for encouraging weight loss, while exposure to weight stigma focused on competence led to an increased likelihood of engagement in weight loss behaviors. Complementing and extending the findings, Study 2 (N = 348, M_{BMI} = 26.78, SD_{BMI} = 6.78) tested the notion that internalized weight bias predominantly revolves around moral concerns, and thus will lead to less self-determined behavioral regulation. We found strong support for the moral core of weight bias internalization. In line with our predictions, greater weight bias internalization was associated less self-determined and more other-determined regulation of dieting and exercising. This suggests that weight bias internalization operates as a facilitator of maladaptive behavioral regulation following weight stigma, contributing to lower psychological functioning and well-being of people with overweight and obesity. The current research presents novel findings about the underlying mechanisms of weight stigma and weight bias internalization and identifies strategies to avoid maladaptive and facilitate adaptive health behaviors.

Keywords: weight stigma, moralization, incompetence, weight bias internalization, motivation, maladaptive and adaptive functioning

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INTRODUCTION

Weight has become a pervasive topic that is typically framed in moral terms such as in policy discourse, media portrayal, and public settings (e.g., Rozin, 1999; Townend, 2009; Flint et al., 2016b). For many years, scholars and politicians alike have offered opinions and debated the morality of public health as a means of increasing motivation in those targeted to engage in "healthier behavior" (Conrad, 1994; Bossy, 2010; Brown, 2013). However, rather than a decrease in the prevalence of overweight and obesity, which one would expect if the above strategy was successful, there has been a steady increase in prevalence rates (World Health Organisation [WHO], 2017). In addition, previous literature (e.g., Jackson et al., 2015) has reported that weight stigma leads to maladaptive health behaviors such as unhealthy eating and avoidance of exercise settings. Moreover, people with overweight and obesity of all ages and backgrounds report experiences of weight stigma and discrimination (e.g., Puhl and Luedicke, 2012; Flint et al., 2015). Weight stigma typically refers to depictions of people with overweight and obesity as lacking willpower, being lazy, unintelligent, and gluttonous (Puhl and Brownell, 2006). In all domains of life and work, stigma has been associated with discrimination (Link and Phelan, 2001). For instance, previous research (e.g., Roehling et al., 2007; Bartels and Nordstrom, 2013; Flint et al., 2016a) has reported that people with overweight and obesity applying for employment are assessed as less suitable and as lacking leadership qualities compared to applicants without obesity. Two fundamental elements of weight stigma are perceptions that people with overweight and obesity lack competence (i.e., unintelligent) and are immoral (i.e., gluttonous). In this regard, the – unsuccessful – moralized framing of overweight in political and public discourse (Rozin, 1999; Townend, 2009; Flint et al., 2016b) reflects an emphasis on the moral aspect of overweight. Taken together, the emerging picture is one where ongoing and pervasive weight moralization fails to achieve the desired changes in weight status. On the contrary, weight moralization appears to demotivate and trigger maladaptive responses to weight stigma. The main aim of this research was to advance scholarly understanding of the mechanisms underlying maladaptive behavioral responses to weight stigma (e.g., Haines et al., 2006). To achieve this aim, we integrate previously unconnected lines of research on moral motivation with insights into self-defense, self-improvement, and weight bias internalization. Based on this integration and the findings flowing from it, we offer strategies to support psychological functioning and well-being of people with overweight and obesity.

Adaptive and Maladaptive Responses to Weight Stigma

In conceptualizing adaptive and maladaptive responses to weight stigma, we build on Self-Determination Theory (SDT; Deci and Ryan, 1985). SDT offers a fruitful theoretical framework to approach eating pathologies (e.g., Pelletier et al., 2004; Pelletier and Dion, 2007) and exercise behavior (Markland and Tobin, 2004). SDT is based on the premise that types of human motivation predict outcomes related to performance, relationships, and wellbeing (Deci and Ryan, 2008). These types of motivation reflect the extent to which the desire to perform a behavior is rooted in the person themselves (autonomous motivation) vs. in others (controlled motivation). On a continuum, intrinsic motivation reflects completely autonomous behavioral regulation, while external motivation reflects completely controlled behavioral motivation. Amotivation stands for a lack of motivation and is thus not associated with behavioral regulation (Ryan and Deci, 2000). Importantly, when autonomously motivated, people experience volition and self-endorse their actions (Deci and Ryan, 2008). By contrast, when under controlled motivation, people experience "pressure to think, feel, or behave in particular ways" (Deci and Ryan, 2008, p. 182). Unsurprisingly, autonomous and controlled motivation lead to vastly different outcomes, with autonomous motivation associated with greater psychological health, persistence, and greater adherence to healthy behaviors than controlled motivation (Deci and Ryan, 2008). Extant research using SDT as a theoretical framework has demonstrated the benefits of autonomous motivation in the context of weight loss. For instance, Pelletier and Dion (2007) found that women with autonomous motivation were more likely to eat healthy and less likely to eat unhealthily. Similarly, Williams et al. (1996) observed more regular attendance and greater weight loss in weight loss program attendees' who reported greater autonomous motivation. Thus, in stimulating lasting efforts and intrinsic commitment to weight loss, practitioners should attempt to instill a sense of autonomous motivation in clients as this facilitates adaptive strategies to weight loss. On the other hand, practitioners should avoid instilling a sense of controlled motivation in clients, as this appears to be associated with less adaptive strategies to weight loss. The question for policy makers and practitioners alike is, how can "the right kind" of motivation be achieved? To answer this question, we examine the motivational relevance of morality- and competence-related aspects of weight stigma.

The Motivational Relevance of Threats to Morality

The observation that moralization fails to achieve the desired changes in people's health outcomes, aligns with research that challenges the effectiveness of moralized persuasion. Specifically, Täuber and van Zomeren (2012, 2013) and Täuber et al. (2015) demonstrated that framing shortcomings as related to people's morality is likely to result in a refusal to engage in the desired behavior. By contrast, framing the same shortcoming as related to people's competence motivates people to engage in the desired behavior. This effect has been shown in diverse contexts such as climate change (Täuber and van Zomeren, 2013; Täuber et al., 2015), poverty reduction (Täuber and van Zomeren, 2012), and immigration politics (Täuber and van Zomeren, 2013). The underlying reason for the observed asymmetric impact of competence and morality on motivation is the primacy of morality in impression formation (e.g., Fiske et al., 2007; Täuber and van Zomeren, 2012). While both competence and morality

are fundamental dimensions in social judgment, morality is more important (e.g., Wojciszke, 1994, 2005; Leach et al., 2007) both for the understanding of who one is as a person (Gausel and Leach, 2011) and for the impression that others have of oneself (Gausel and Leach, 2011; Ellemers and van den Bos, 2012). Moreover, morality is also key to the maintenance of social bonds (Gausel, 2013) and is viewed as more essential than competence in relation to survival and social inclusion in groups (e.g., Täuber, 2018). This reasoning is supported by research showing that people actively search for cues of immorality in others (e.g., Gantman and Van Bavel, 2014, 2015). Furthermore, cues of immorality are more resistant to counter-information than cues of incompetence (Skowronski and Carlston, 1992). Finally, people make faster and more extreme judgments when morality is concerned (Van Bavel et al., 2012).

Based on the above, it is unsurprising that being perceived as immoral is an aversive experience, and more so than being perceived as incompetent (e.g., Tetlock, 2002; Monin, 2007). Therefore, people try to act morally in the eyes of others (Gausel and Leach, 2011; Gausel, 2013). The idea that emphasizing the moral core of an issue will lead to increased motivation in those targeted to change their behaviors in the desired ways is based on these insights. Unfortunately, an increasing body of research shows that questioning others' morality is likely to lead to self-protective responses (Monin, 2007; Gausel et al., 2012, 2016; Täuber et al., 2015). Indeed, in a theoretical response to climate change researchers' plea to frame the urge to act as a moral imperative (Markowitz and Shariff, 2012), Täuber et al. (2015) suggested that because the evaluative relevance of morality is so strong for humans, questioning morality can lead to "defensive overkill" (see also Tetlock et al., 2000).

Thus, when people feel that their moral image is threatened, they may not simply refuse to show the desired change in behavior, but they might disengage from the behavior altogether. The "defensive overkill" response to moral threats might be reflected in maladaptive responses to weight stigma such as binge eating (e.g., Duarte et al., 2014). Indeed, two fundamental elements of weight stigma are perceptions that people with overweight and obesity lack competence (i.e., unintelligent) and are immoral (i.e., gluttonous). In this regard, the – unsuccessful – moralized framing of overweight in political and public discourse (Rozin, 1999; Townend, 2009; Flint et al., 2016b) reflects an emphasis on the moral aspect of overweight and might thus be partly responsible for maladaptive responses to weight stigma. In sum, while moral framing is often used with the intention to intrinsically motivate others to show a desired behavior, moralization will likely achieve the opposite effect, namely disengagement and withdrawal from the behavior. Together, based on this line of inquiry we expect that emphasizing the moral elements inherent to weight stigma will be demotivating.

Shame, Self-improvement, and Self-defense

Another stream of research is focused on people's reactions to failure. Public discourse typically depicts people with overweight and obesity as failing to live up to social norms and standards (Duarte et al., 2015; Täuber, 2018). While a conception of people with overweight and obesity as failures does not reflect the authors' view, we believe that recent research into how people respond to failure might be valuable in understanding responses to weight stigma. This reasoning is based on the notion that, reflecting public opinion, people with overweight and obesity likely perceive themselves as having failed with respect to their weight status (Durso and Latner, 2008). In recent years, research concerning motivational and behavioral responses to failure has aimed to explain why failure leads to self-improvement in some situations while in others leads to self-defensive withdrawal (Gausel and Leach, 2011; Gausel et al., 2012, 2016; Gausel, 2013). Specifically, in their social psychological model, Gausel and Leach (2011) argue that after a self-relevant failure people tend to appraise this failure in two main ways: first, by appraising how the failure affects one's understanding of oneself (i.e., one's self-image); and second, by appraising how the failure affects what others think of oneself (i.e., one's social-image). The feeling of shame is a self-critical feeling (Tangney and Dearing, 2002) that is likely to surface when the self has been associated with a failure (Gausel and Leach, 2011) or when the threat to the self is deemed acceptable (Tetlock, 2002; Monin, 2007; Täuber et al., 2015). Indeed, Leach and Cidam (2015) conducted a meta-analysis to examine the situations in which shame will lead to more constructive approaches (i.e., stimulating self-improvement) and in which situations it will lead to less constructive (i.e., avoidance, withdrawal) behavioral responses. These authors found strong support for the suggestion that self-improvement results from failures that are considered repairable, while self-defense results from failures that are perceived to be less repairable (Leach and Cidam, 2015).

These insights align with research exploring shame in a functionalist perspective (de Hooge et al., 2010; Gausel and Leach, 2011), suggesting that the primary function of shame aims at motivating people to restore a positive self-image. This motivation, however, is moderated by people's perception of how repairable a failure that leads to shame is (Leach and Cidam, 2015). Since incompetence is more repairable than global immorality (e.g., Skowronski and Carlston, 1992), we expect that when weight stigma focuses on incompetence, people with overweight and obesity will experience feelings of repairable shame for the self-related failure to be competent (e.g., de Hooge et al., 2010). The difference in repairability closely resembles the difference between traits and states: Morality is assumed to reflect people's true self and inner character and is therefore perceived as stable and resistant to change (Aristotle, 1985; Tangney and Dearing, 2002; Leach et al., 2007; Gausel and Leach, 2011). Competence, on the other hand, is seen as reflecting people's abilities, which are assumed to be malleable and therefore possible to change through practice and training (Cole, 1991; Harter, 1992). Thus, even though being depicted as incompetent is unpleasant, it is more likely to promote reformatory responses (for a discussion, see Gausel and Leach, 2011; Leach and Cidam, 2015) than being depicted as immoral. It thus seems plausible to assume that people with overweight and obesity who feel shame will be motivated to lose weight for shame-related internal reasons meant for self-change

(Gausel and Brown, 2012; Lickel et al., 2014).[1] On the other hand, overweight and obesity are pervasively moralized in public discourse (e.g., Rozin, 1999; Townend, 2009; Flint et al., 2016b). Morality is strongly associated with ascriptions of control and leads to an often-incorrect assumption that an outcome is representative of effort (Täuber, 2018). This means that a core public assumption regarding overweight and obesity is that it reflects a lack of effort in the regulation of eating and exercising. In addition, being seen as immoral is less repairable than being seen as incompetent (Skowronski and Carlston, 1992). This aligns with prior research suggesting that being immoral is perceived as a much more global flaw than being incompetent (Gausel and Leach, 2011) and therefore much more problematic than incompetence. Consistent with this, de Hooge et al. (2010) showed that shortcomings in the competence domain often lead people to prove their competence. We thus propose that when weight stigma predominantly suggests that people with overweight and obesity are globally immoral, being overweight will elicit a constant fear of being morally condemned by the public, especially given that overweight is a visible stigma (Crocker and Major, 1989; Weiner, 1995).

A direct way to minimize anticipated condemnation is to engage in social appeasement or pleasing strategies that might better ones standing with others (Gausel and Leach, 2011; Gausel, 2013). Such strategies aim to communicate to others that one is morally exemplary, thereby seeking to contrast the (anticipated or actual) public condemnation of people with overweight and obesity as immoral. These can involve relatively ineffective, low-cost behavior such as promising to search for information on healthy lifestyles, but they might also involve complete disengagement from the topic, as suggested by the "defensive overkill" sometimes prompted by threats to morality (see Täuber et al., 2015). As noted above, research showing that weight stigma leads to binge eating (e.g., Haines et al., 2006; Duarte et al., 2014) and refusal to diet (Puhl et al., 2007) might provide a tentative reflection of such "defensive overkill" in the weight domain. Observing maladaptive or relatively less effective behavioral responses, when weight stigma suggests that people with overweight and obesity are immoral, thus likely reflects a functional approach to managing an extremely adverse threat to one's moral image. We suggest that in such situations, to deal with the threat, people will prefer more visible strategies that can be implemented quickly (such as getting brochures about healthy eating) over less visible strategies that require more time (such as losing weight). Visibility in this context refers to how easily observable a behavior is to the social environment. While dieting might be more effective in the long-run when trying to lose weight, it is less easily observable to the social environment than getting and reading brochures about healthy eating. In this sense, there might be an important trade-off, where the effectiveness of signaling to the social environment that one is working at losing weight comes at the cost of the effectiveness of the method chosen to lose weight.

[1]Note that the authors are by no means suggesting that shaming people with overweight and obesity is legitimate. Our starting point is the observation that weight stigma predominantly revolves around notions of incompetence and immorality, and we aim to examine the, as we predict, different motivational responses to these aspects of stigma.

Weight Bias Internalization

There are strong reasons to believe that weight bias reflects a moral stance on weight. For instance, in their development of the original weight bias internalization scale, Durso and Latner (2008) contend that the main difference between anti-fat attitudes and internalization of weight bias is the type of attribution made. In particular, Durso and Latner (2008) suggest that because internalization of weight bias involves making harmful assumptions about the self rather than about the other, it potentially harms those who internalizes weight bias. However, the beliefs underlying self-directed bias will parallel the beliefs underlying other-directed bias. Thus, while we are not aware of explicit attempts to associate weight bias internalization with morality, research into other-directed stigma converges in the notion that controllability beliefs are a crucial determinant of stigma (e.g., Weiner et al., 1988; Weiner, 1995). This holds for all stigma but has also been demonstrated for obesity (Tiggemann and Anesbury, 2000). Importantly, controllability and responsibility attributions are paramount to seeing an issue as moral. If an outcome is not under people's control, failing to achieve the outcome will not lead to others attributing this failing to a lack of morality (Weiner, 1995). Thus, based on the established link of controllability attributions with anti-fat attitudes (e.g., Weiner et al., 1988; Crandall, 1994; Crandall et al., 2001), we suggest that internalized weight bias is also based on attributions of controllability, and thus is inherently associated with morality. Following this reasoning, we predict that, besides own BMI, which has been shown to be associated with weight bias internalization in prior research (for a systematic review, see Pearl and Puhl, 2018), a moral focus on weight stigma rather than a focus on competence, and fear of condemnation will predict weight bias internalization. To the extent that internalized weight bias reflects morality-related concerns more than competence-related concerns, our review above suggests that it should be associated with more controlled and less autonomous motivation. In particular, people with high internalized weight bias should report less self-determined motivation and more other-determined motivation, reflecting their concerns about their social image.

The Present Research

We designed two studies to test the predictions derived from integrating the different lines of research reviewed above. In a sample of adults with overweight and obesity, Study 1 experimentally varied whether the public's stigmatized view revolved around people with overweight and obesity being immoral vs. incompetent. We measured respondents' shame (reflecting self-image concerns), their fear of condemnation (reflecting social image concerns), as well as their preference for more or less visible responses to weight-stigma. Our theoretical integration suggests that the greater reparability of competence-related weight stigma should be reflected in a preference for less visible responses in people with overweight and obesity that require more time, such as losing weight (Hypothesis 1a).

This effect should be mediated by experienced shame, thus by concerns about self-image (Hypothesis 1b). On the other hand, the lower reparability of morality-related weight-stigma should be reflected in a preference for more visible responses in people with overweight and obesity that can be implemented quickly, such as getting brochures about healthy eating (Hypothesis 2a). This effect should be mediated by fear of condemnation, thus by concerns about social image (Hypothesis 2b).

In Study 2, we conducted a survey focused on weight bias internalization sampling adults across the weight spectrum. This study testing the suggestion that internalized weight bias predominantly reflects threats to morality (Hypothesis 3). Further, we also measured motivation with specific scales building on SDT (Ryan and Deci, 2000; Deci and Ryan, 2008), to test the notion that internalized weight bias operates as a powerful antecedent of self-determined vs. other-determined behavioral regulation. Specifically, we explored the notion that, due to its strong moral connotation, weight bias internalization is related to less self-determined and more other-determined behavioral regulation of dieting and exercising (Hypothesis 4).

STUDY 1

Participants and Design

Respondents were approached through a research assistant's network. Specifically, a random sample of 4310 people from a Dutch panel on public transport were invited to participate in a questionnaire about health and lifestyle. After providing informed consent, respondents completed the questionnaire. Of the people invited, 1300 started the questionnaire (response rate 30.16%). Respondents were first asked to indicate whether they considered themselves a person with normal weight (1), with a little overweight (2), with overweight (3), or with a lot of overweight (4). Of the sample, 455 (43.1%) identified as persons with normal weight, 352 (33.3%) identified as persons with a little overweight, 212 (20.1%) identified as persons with overweight, and 37 (3.5%) identified as persons with a lot of overweight. Respondents identifying as normal weight or a little overweight were redirected to another study. Respondents identifying as persons with overweight and a lot of overweight (N = 249) were forwarded to the present research. Of those initially starting the study, respondents who did not fill in the complete questionnaire (N = 36) were not considered for the analyses, leaving a final sample of 213 respondents who self-identified as overweight (111 female, 102 male; M_{age} = 58.50, SD_{age} = 11.43; M_{BMI} = 31.89, SD_{BMI} = 4.39).

The study was presented using the online survey tool Qualtrics^{TM}, and respondents were randomly assigned to the conditions of a one-factorial between-subjects design with two levels [the public's view on overweight: immoral (N = 111) vs. incompetent (N = 101)].

Measures

Respondents read an article ostensibly published in an online journal about how lifestyle partly affects the rising healthcare costs. Depending on the experimental condition, the article concluded that "In recent years, public opinion is that an unhealthy lifestyle and therefore also people with an unhealthy weight, are immoral/incompetent." **Supplementary Appendix A** provides a detailed overview over all measures, as well as the manipulations used in Study 1. The public's view on overweight was measured by four items, two of which tapped into morality (r = 0.65, $p < 0.001$), and two into competence (r = 0.80, $p < 0.001$). Shame and concern for condemnation were measured with three items each, adapted from Gausel et al. (2012; 2016, $\alpha = 0.90$ and $\alpha = 0.92$, respectively). Wanting to improve lifestyle in general was measured with two items ($r = 0.53$, $p < 0.001$). This measure reflected a more visible, but in the long-run less effective, response to weight stigma. Wanting to lose weight was measured with two items (r = 0.74, $p < 0.001$). This measure reflected a less visible, but in the long-run more effective, response to weight stigma. In a review of weight loss maintenance and weight regain, Elfhag and Rössner (2005) suggested that an internal motivation to lose weight is important for weight maintenance. Likewise, the importance of motivation to lose weight on overall effectiveness of losing weight has been reported (Silva et al., 2011) and has led to programs being designed that focus on increasing weight loss motivation in patients and attendees (for an example, see West et al., 2011). The desire to lose weight can also be conceived of as an implementation intention, which have been shown to be effective in reducing the intention–behavior gap (Gollwitzer and Sheeran, 2006).

Results

Manipulation Checks

An ANOVA with experimental condition as between-subject factor and weight stigma as the dependent variable revealed a significant effect for weight stigma as immoral, $F(1,211) = 10.75$, $p = 0.001$, $\eta^2 = 0.05$. Respondents reported that the public views people with overweight and obesity as immoral to a significantly greater extent in the immoral weight-stigma condition (M = 2.94, SD = 1.06) than in the incompetent weight-stigma condition (M = 2.49, SD = 0.94). Further, a significant effect of weight stigma as incompetent was evident, $F(1,211) = 24.66$, $p < 0.001$, $\eta^2 = 0.11$. Respondents reported that the public views people with overweight and obesity as incompetent to a significantly greater extent in the incompetent weight-stigma condition (M = 2.81, SD = 1.09) than in the immoral weight-stigma condition (M = 2.08, SD = 1.03). The manipulation can thus be considered successful.

Descriptive Analyses

Table 1 displays means, standard deviations, and correlations between the measured constructs. First, respondents' sex and age were uncorrelated with the dependent variables, except for shame: females and younger respondents reported marginally more and significantly more shame, respectively. Respondents' BMI was strongly associated with shame and concern for condemnation. Shame was highly correlated with concern for condemnation and with both the quicker and more visible response (seeking information) and with the slower and less visible (losing weight). Concern for condemnation was related only to the quicker and more visible response (seeking

TABLE 1 | Descriptive statistics and correlations, Study 1.

		M (*SD*)	1	2	3	4	5	6	7
Control variables	1. Gender (1 = male, 2 = female)	1.52 (0.50)	1.00						
	2. Age	58.50 (11.43)	−0.11	1.00					
	3. BMI	31.89 (4.39)	0.04	−0.04	1.00				
	4. Condition[a]	0.50 (1.00)	−0.01	−0.01	−0.01	1.00			
DVs	5. Shame	2.35 (1.03)	0.13^{+}	−0.18**	0.25***	−0.02	1.00		
	6. Fear of condemnation	2.15 (1.00)	0.09	−0.12	0.23**	−0.04	0.78***	1.00	
	7. Seek information	2.70 (0.76)	−0.01	0.13	0.00	−0.09	0.14*	0.19**	1.00
	8. Lose weight	4.04 (0.62)	0.10	−0.10	0.03	−0.01	0.17*	0.09	0.23**

[a] *1, public views overweight people as immoral (N = 111), −1, public views overweight people as incompetent (N = 101).* $^{+}p = 0.05$, *$p < 0.01$, **$p < 0.001$.

information) but unrelated to the slower and less visible (losing weight).

Hypotheses Testing

We predicted that weight stigma focusing on morality leads to a preference for quicker and more visible, but potentially less effective responses, and that this effect is mediated by concern for condemnation, but not for shame. By contrast, we expected that weight stigma focusing on competence leads to a preference for slower and less visible, but potentially more effective responses, and that this effect is mediated by shame, but not by concern for condemnation. We tested these predictions using structural equation modeling.

Structural Regression Modeling

In line with our hypotheses, we specified a structural regression model using AMOS 23 with maximum-likelihood estimation where the two public views of people with overweight and obesity represented as manifest variables were allowed to predict the two manifest variables of felt shame and the concern for condemnation. Again, this predicted our two main latent variables for this first study; the motivation to change one's body weight (adaptive behavior aimed at self-betterment) and the motivation for a healthy lifestyle (maladaptive behavior aimed at pleasing others). **Figure 1** displays the model. The structural regression model fit the data very well as indicated by a non-significant chi-square, $\chi^2(9) = 4.59$, $p = 0.87$ ($\chi^2/df = 0.51$), as well as other fit indices, IFI = 1, CFI = 1, RMSEA = 0.000. As expected, the feeling of shame was significantly predicted by the public view that people with overweight and obesity are incompetent ($\beta = 0.29$, $p < 0.001$), but it was not predicted by the view that people with overweight and obesity are immoral ($\beta = 0.04$, $p = 0.61$). In contrast the concern for one's social image was mostly predicted by the public view that people with overweight and obesity are incompetent ($\beta = 0.23$, $p < 0.001$), and to a lesser degree; the view that people with overweight and obesity are immoral ($\beta = 0.15$, $p = 0.029$). In line with our hypotheses, the feeling of shame was a positive, significant predictor of the desire to change one's body weight ($\beta = 0.26$, $p = 0.020$), and it was a negative, non-significant predictor of the desire for a healthy lifestyle ($\beta = -0.15$, $p = 0.22$). Also, in line with our hypotheses, the concern for social image (i.e., the concern for public condemnation) was a positive predictor of a desire for a healthy lifestyle ($\beta = 0.38$, $p = 0.009$) and a negative, non-significant predictor of a desire to change one's body ($\beta = -0.09$, $p = 0.43$).

Discussion

Study 1 provides support for our proposition that weight stigma focusing on immorality facilitates a social threat of condemnation. For people with overweight and obesity, the social threat of condemnation appears to lead to preferences for quickly implementable and visible responses to weight-stigma. We have suggested that preference for such response reflect a functional approach to managing extremely adverse threats to moral social image. Because the threat to moral image is so unpleasant (e.g., Monin, 2007), the urge to appease others might be so strong that it comes at the expense of less visible but potentially more effective responses. In other words, when fearing condemnation, people with overweight and obesity might feel urged to publicly demonstrate their moral motivation to change. These strategies, while potentially successful in managing the acute moral social-image threat, will often be less effective in the long run. On the other hand, when weight stigma focuses on incompetence as a less global flaw (de Hooge et al., 2010; Gausel and Leach, 2011), the self-critical experience of shame appears to stimulate a preference for slower and less visible responses to weight stigma, such as weight loss. This strategy is less visible to the social environment, but potentially more effective in long term. Thus, fear of being condemned by others seems to impair, while the self-critical experience of shame seems to facilitate, a slower but more efficient route to healthier living, and by such, self-change.

These findings align with earlier theorizing (e.g., Gausel and Leach, 2011; Gausel, 2013) and research on the concern for condemnation and defense strategies to minimize further condemnation or to escape current condemnation (e.g., Gausel et al., 2012, 2016, 2018). Our findings are consistent with the suggestion that perceived reparability of a shortcoming determines whether people respond more or less constructively (Leach and Cidam, 2015). Importantly, both responses should be considered functional with respect to their potential in managing the threat that results from being confronted with weight-stigma (e.g., de Hooge et al., 2010). While the experience of shame is unpleasant (e.g., Tangney and Dearing, 2002), it can be a motivator of positive change (Gausel and Leach, 2011) that may result in contemplation to change (Gausel and Brown, 2012;

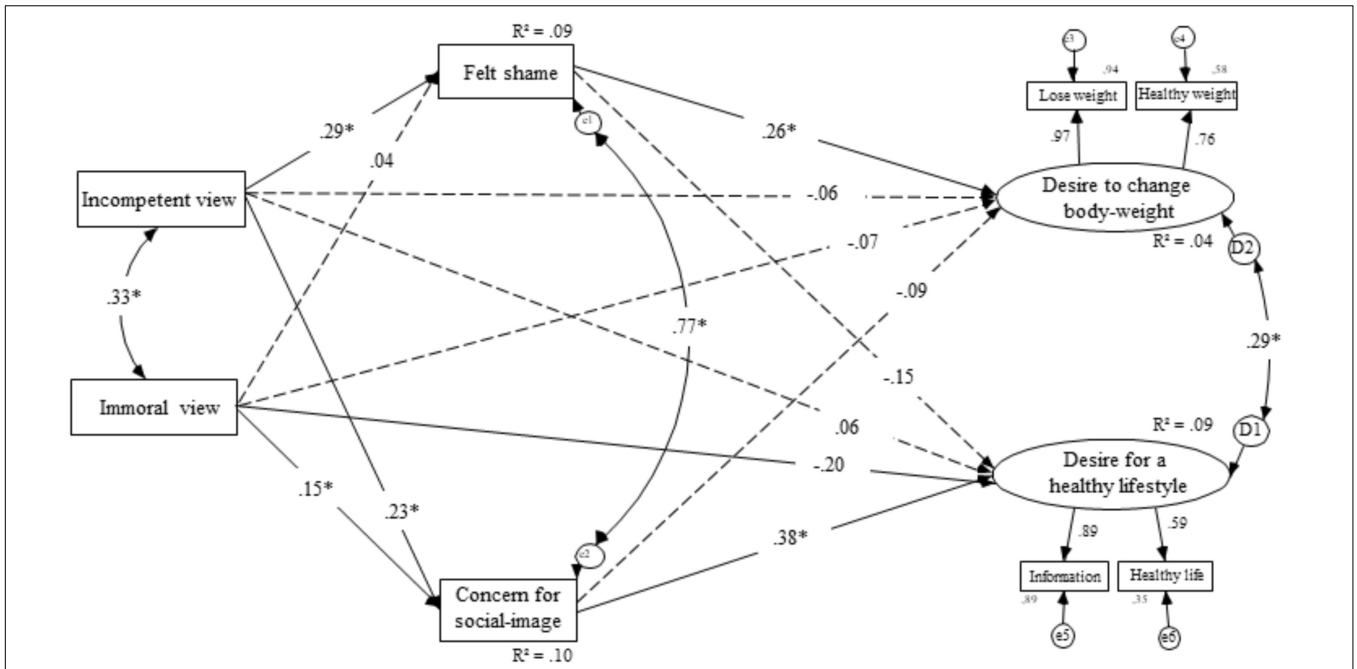

FIGURE 1 | Structural equation model for the effects of feeling morally judged on willingness to improve lifestyle in general through restitution motivation and self-defensive motivation for Study 1.

Lickel et al., 2014) and where relevant engage in constructive behavior (e.g., Gausel et al., 2012, 2016, 2018; Leach and Cidam, 2015).

Our second study was designed to address two main aims: First, we empirically test our reasoning that weight bias internalization predominantly reflects moral judgments, by considering BMI, weight stigma focusing on morality and competence, as well as concern for condemnation as antecedents of weight bias internalization in people across the weight spectrum. To the extent that weight bias internalization indeed reflects moral aspects of weight stigma, previous contributions suggest that it should be strongly associated with other-determined regulation of relevant behaviors such as dieting and exercising. By contrast, weight bias internalization should decrease self-determined regulation of relevant behaviors in the context of weight (Pelletier and Dion, 2007; Deci and Ryan, 2008).

STUDY 2

Materials and Methods

Participants and Design

Three-hundred-fifty-one U.S. American respondents were recruited using MTurk. Of those, three were excluded because their reported weight and height resulted in physically implausible BMI values (0.19, 3.87, and 11.08 kg/m^2, respectively). The resulting sample of 348 respondents consisted of 181 females (52%) and 167 males (48%), M_{Age} = 37.15, SD_{Age} = 11.15, M_{BMI} = 26.78, SD_{BMI} = 6.78, range 15.34–65.10. The study was presented using the online survey tool Qualtrics^{TM} (see **Supplementary Appendix A** for the complete introduction). Prior to participating, respondents were informed that study participation was voluntary, that their individual responses would be completely anonymous and that filling in the questionnaire would take approximately 15 min. Based on this information, respondents were asked to provide informed consent before proceeding to the questionnaire. Respondents received $2 as compensation for their effort.

Measurements

Supplementary Appendix A provides an overview of all items assessed in this study. Besides the demographic variables reported above (age, sex, as well as weight and height to calculate BMI), the measures reflected three clusters of interest. First, we measured respondents' perception of the public's views on people with overweight and obesity as immoral and incompetent, as well as their concern for condemnation by others. Second, we measured the extent to which respondents had internalized weight bias using the Modified Weight Bias Internalization Scale (WBIS-M, Pearl and Puhl, 2014; α = 0.95) to gain more insights into the interplay between weight bias internalization and behavioral regulation. Third, to test our predictions concerning motivation more rigorously, we assessed respondents' agreement with statements about their underlying motivation for dieting and exercising using scales that reflect the full spectrum from autonomous to controlled behavioral regulation (Ryan and Deci, 2000; Pelletier and Dion, 2007). Specifically, we assessed respondents' agreement with statements about dieting (General Motivation Scale, GMS; Pelletier et al., 2004) and exercising (Behavioral Regulation in Exercise Questionnaire,

TABLE 2 | Means and standard deviations for Study 2.

	M	*SD*
Sex (1 = male, 2 = female)	1.48	0.50
Age	37.15	11.15
BMI	26.78	6.78
Public view immoral[a]	4.10	1.54
Public view incompetent[a]	4.79	1.52
Concern for condemnation[a]	3.16	1.97
WBIS-M[a]	3.17	1.54
Dieting[b]		
Intrinsic motivation	3.52	1.00
Integrated motivation	3.31	1.06
Identified motivation	4.02	0.72
Introjected motivation	2.97	0.96
External motivation	2.02	0.96
Amotivation	1.75	0.86
Exercising[b]		
Intrinsic motivation	2.90	1.21
Integrated motivation	3.05	1.13
Identified motivation	3.48	0.98
Introjected motivation	2.48	1.12
External motivation	1.78	0.91
Amotivation	1.59	0.86

[a]*Scale 1–7.* [b]*Scale 1–5.*

BREQ-3; Markland and Tobin, 2004). Both instruments consist of six subscales reflecting SDT's regulatory behavior along the continuum of self-determination (motivations for dieting: intrinsic $\alpha = 0.95$, integrated $\alpha = 0.94$, identified $\alpha = 0.86$, introjected $\alpha = 0.80$, external $\alpha = 0.91$, and amotivation $\alpha = 0.94$; motivations for exercising: intrinsic $\alpha = 0.97$, integrated $\alpha = 0.93$, identified $\alpha = 0.88$, introjected $\alpha = 0.92$, external $\alpha = 0.94$, and amotivation $\alpha = 0.97$). **Table 2** provides an overview of the means and standard deviations of all measurements.

Results

Descriptive Analysis

Table 3 provides an overview of the correlations between demographic variables, weight stigma focus, weight bias internalization, and motivation for dieting. **Table 4** provides the same correlations with respondents' motivation for exercising. Below, using structural equation modeling, we test the prediction that weight bias internalization reflects moral aspects of weight stigma and is thus associated with less self-determined and more other-determined regulation of dieting and exercising.

Structural Regression Modeling

As in the first study, we specified the structural regression model using AMOS 23 with maximum-likelihood estimation. However, due to the manifold of the relations in this study, we specified two models; one for dieting and one for exercising.

Dieting Model

In the first model (**Figure 2**), we tested our hypothesis that through BMI, immorality, incompetence, and fear

TABLE 3 | Correlations between demographic variables, BMI, weight stigma focus on morality and competence, concern for condemnation, weight bias internalization (WBIS-M), and types of motivation for dieting, Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex[a]	1.00											
2. Age	−0.14*	1.00										
3. BMI	−0.01	0.00	1.00									
4. Public view immoral	−0.01	−0.20***	0.16**	1.00								
5. Public view incompetent	0.01	−0.23***	0.14**	0.67***	1.00							
6. Concern for condemnation	−0.06	−0.08	0.52***	0.27***	0.28***	1.00						
7. WBIS-M	−0.15**	−0.10	0.52***	0.29***	0.27***	0.83***	1.00					
8. Intrinsic motivation	−0.08	0.01	−0.13*	−0.06	−0.01	−0.17**	−0.20**	1.00				
9. Integrated motivation	−0.05	0.03	−0.28***	−0.04	−0.02	−0.30***	−0.32***	0.71***	1.00			
10. Identified motivation	−0.10	0.04	0.05	−0.04	0.05	−0.02	−0.05	0.55***	0.48***	1.00		
11. Introjected motivation	−0.11*	−0.15**	0.04	0.21***	0.21***	0.33***	0.41***	0.20***	0.16**	0.30***	1.00	
12. External motivation	0.07	−0.22***	0.19***	0.20***	0.06	0.29***	0.38***	−0.02	0.01	−0.05	0.32***	1.00
13. Amotivation	0.04	−0.15*	0.26***	0.28***	0.12*	0.44***	0.48***	−0.26***	−0.26***	−0.35***	0.14*	0.51***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. [a]*1 = female, 2 = male.*

TABLE 4 | Correlations between demographic variables, BMI, weight stigma focus on morality and competence, concern for condemnation, weight bias internalization (WBIS-M), and types of motivation for exercising, Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex[a]	1.00											
2. Age	−0.14*	1.00										
3. BMI	−0.01	0.00	1.00									
4. Public view immoral	−0.01	−0.20***	0.16**	1.00								
5. Public view incompetent	0.00	−0.23***	0.14**	0.67***	1.00							
6. Concern for condemnation	−0.06	−0.08	0.52***	0.26***	0.28***	1.00						
7. WBIS-M	−0.15**	−0.10	0.52***	0.29***	0.27***	0.83***	1.00					
8. Intrinsic motivation	0.14**	−0.06	−0.20***	−0.02	−0.07	−0.28***	−0.28**	1.00				
9. Integrated motivation	0.17**	−0.07	−0.26***	−0.04	−0.03	−0.29***	−0.32***	0.78***	1.00			
10. Identified motivation	0.09	0.00	−0.23***	−0.03	0.01	−0.27	−0.30***	0.68***	0.80***	1.00		
11. Introjected motivation	−0.04	−0.13*	−0.01	0.15**	0.16**	0.18**	0.29***	0.20***	0.35**	0.42***	1.00	
12. External motivation	0.10	−0.22***	0.12*	0.25***	0.11*	0.26***	0.35***	−0.04	0.02	−0.05	0.27***	1.00
13. Amotivation	−0.05	−0.12*	0.10	0.22***	0.05	0.28***	0.30***	−0.24***	−0.27***	−0.43***	−0.09*	0.41***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. [a]1 = female, 2 = male.

of condemnation (i.e., social-image concerns), weight bias internalization will negatively predict self-determined, autonomous regulation strategies (i.e., intrinsic, integrated, and identified motivation) and positively predict other-determined, controlled regulation strategies (i.e., introjected, amotivation, and external motivation). Even though the complexity of the model provided a significant chi-square, $\chi^2(24) = 83.04$, $p < 0.001$ ($\chi^2/df = 3.46$), our other fit indices indicated a good fit of the model (IFI = 0.965, CFI = 0.964, RMSEA = 0.084) according to Kline (2005) and MacCallum et al. (1996).

As expected, the concern for condemnation was a significant predictor of weight bias internalization (β = 0.76, $p < 0.001$), along with BMI (β = 0.12, $p < 0.001$) and the public view that people with overweight and obesity are immoral (β = 0.08, $p = 0.032$). Consistent with expectations, the public view that people with overweight and obesity are incompetent proved to be a non-significant predictor of weight bias internalization (β = −0.02, $p = 0.60$). These findings support our proposition that internalized weight bias reflects essentially moral concerns. Weight bias internalization was, as expected, a significant, negative predictor of intrinsic motivation (β = −0.20, $p < 0.001$) and of integrated motivation (β = −0.32, $p < 0.001$). However, it was unrelated to an identified motivation (β = −0.05, $p = 0.33$). In line with our hypotheses, weight bias internalization was a significant, positive predictor of introjected motivation (β = 0.41, $p < 0.001$), external motivation (β = 0.39, $p < 0.001$), and to amotivation (β = 0.48, $p < 0.001$).

Exercising Model

In the second model of Study 2 (**Figure 3**), we tested a similar model to the first, but this time exercise was the outcome variables. Again, our hypothesis was that weight bias internalization would negatively predict adaptive regulation strategies (i.e., intrinsic, integrated, and identified motivation) and positively predict maladaptive regulation strategies (i.e., introjected, amotivation, and external motivation). Despite a significant chi-square, $\chi^2(24) = 62.57$, $p < 0.001$ ($\chi^2/df = 2.60$), our main fit indices indicated a good fit of the model (IFI = 0.980, CFI = 0.980, RMSEA = 0.068) according to Kline (2005) and MacCallum et al. (1996).

Of course, the first part of our model was identical to the first model of Study 2. As expected, weight bias internalization was a significant, negative predictor of intrinsic motivation (β = −0.28, $p < 0.001$), integrated motivation (β = −0.32, $p < 0.001$), and to an identified motivation (β = −0.30, $p < 0.001$). In line with our hypotheses, weight bias internalization was a significant, positive predictor of introjected motivation (β = 0.29, $p < 0.001$), external motivation (β = 0.35, $p < 0.001$), and to amotivation (β = 0.30, $p < 0.001$).

Discussion

Aligning with prior research (e.g., Latner et al., 2014), we found that people with overweight and obesity report more weight bias internalization. Study 2 advances our understanding of weight bias internalization by showing that it results from aspects of weight stigma that are related to morality, but not to competence, as well as concern for condemnation by others. In line with our

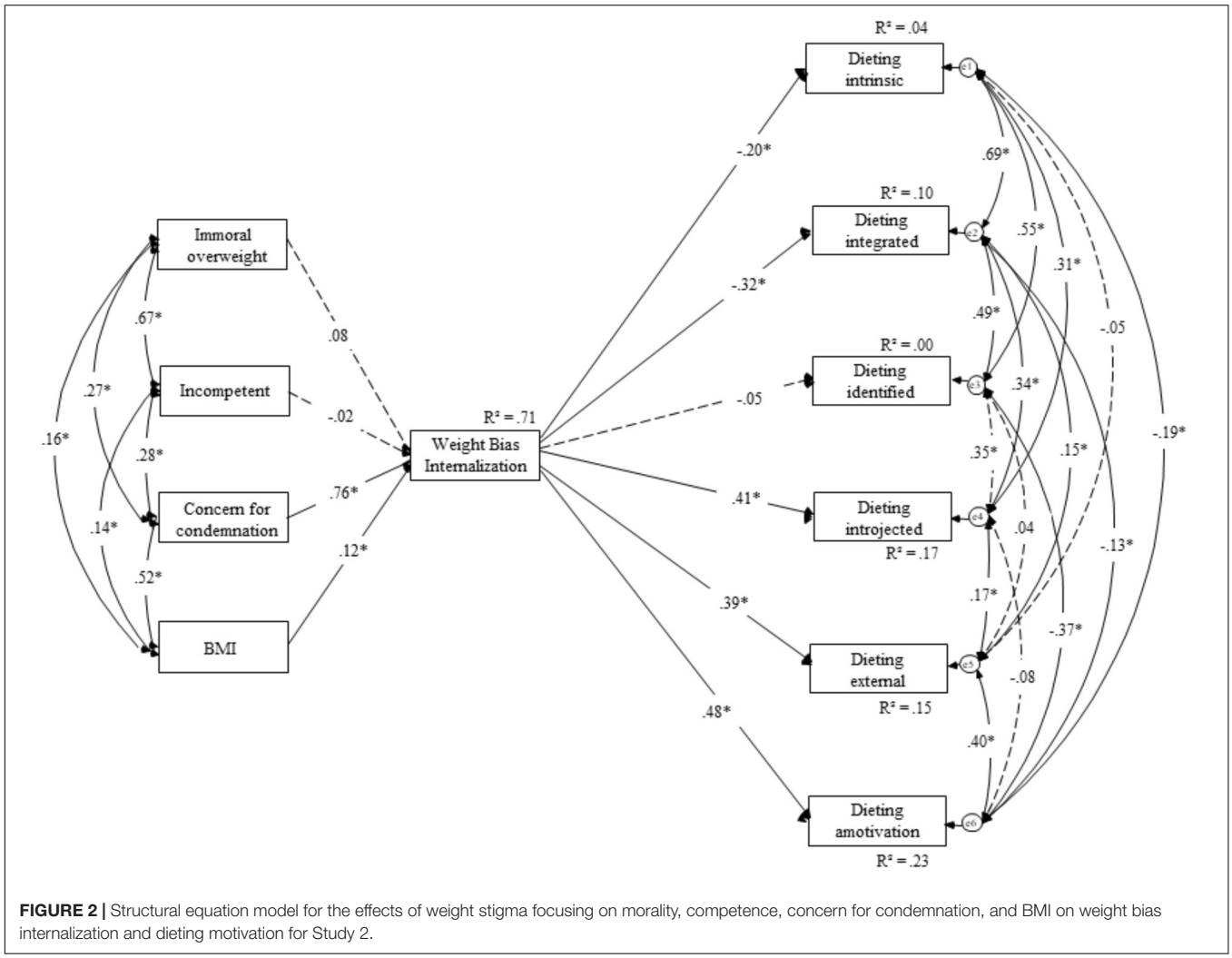

FIGURE 2 | Structural equation model for the effects of weight stigma focusing on morality, competence, concern for condemnation, and BMI on weight bias internalization and dieting motivation for Study 2.

hypothesis, concern for condemnation was a very strong and positive significant predictor of weight bias internalization. This means that people with overweight and obesity, who focus on the moral dimension of weight stigma and are concerned that others could condemn them, report the highest levels of weight bias internalization. As the model explains 71% of the variance in weight bias internalization, it suggests that these variables are the dominant reasons for weight bias internalization. Importantly, and consistent with our hypotheses, weight bias internalization was negatively associated with autonomous motivation and positively associated with controlled motivation. Thus, weight bias internalization impairs behavioral regulation that stems from intrinsic motivation and boosts behavioral regulation that is motivated by others' judgments about the self (Ryan and Deci, 2000; Deci and Ryan, 2008). While this aligns with prior research showing that SDT is a viable theoretical framework for investigating motivation in people with overweight and obesity (e.g., Pelletier and Dion, 2007), it valuably advances prior research by identifying weight bias internalization as a crucial explanatory variable for motivation in people with overweight and obesity.

GENERAL DISCUSSION

The current research aimed to advance scholarly understanding of underlying mechanisms explaining more or less adaptive responses to weight stigma. To this end, we integrated different strands of so far unconnected research on SDT (Deci and Ryan, 2008), moral motivation (e.g., Täuber and van Zomeren, 2012, 2013; Täuber et al., 2015), and shame (e.g., Gausel and Leach, 2011). Study 1 demonstrated that when people with overweight and obesity are confronted with weight stigma suggesting they are immoral and thus globally flawed (de Hooge et al., 2010; Gausel and Leach, 2011), they report increased fear of condemnation (i.e., their social-image). Fear of condemnation was associated with a preference for quickly implementable, highly visible responses to weight stigma. We have suggested that the observed preference for such responses reflects a functional approach to managing acute threats to moral image. Thus, fear of condemnation does not appear to be beneficial in supporting people with overweight and obesity to change their body weight. This finding is in alignment with previous research (e.g., Vartanian and Novak, 2011; Jackson et al., 2015),

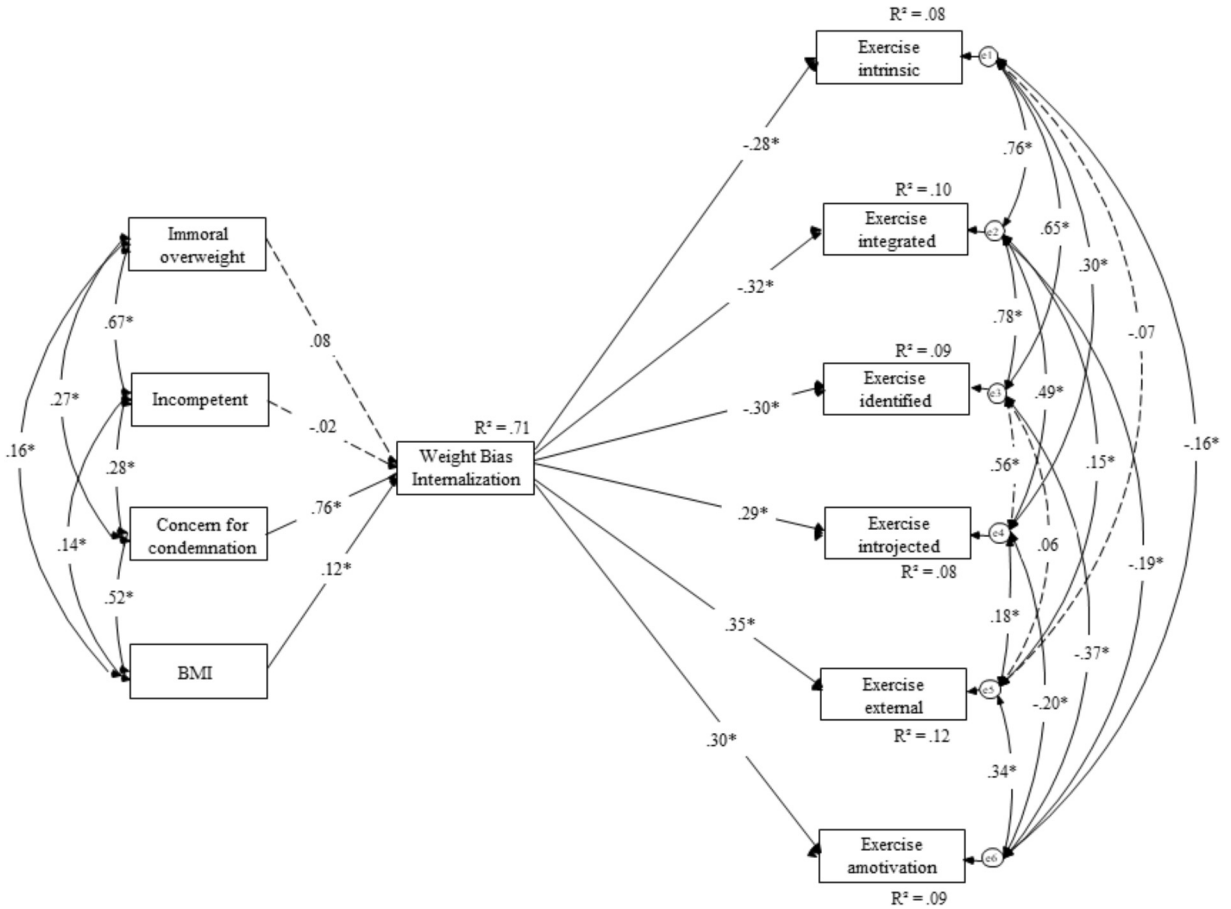

FIGURE 3 | Structural equation model for the effects of weight stigma focusing on morality, competence, concern for condemnation, and BMI on weight bias internalization and exercising motivation for Study 2.

that experiences of weight stigma lead to maladaptive responses. On the other hand, Study 1 demonstrated that when people with overweight and obesity are confronted with weight stigma suggesting they are incompetent and thus less globally flawed (de Hooge et al., 2010; Gausel and Leach, 2011), they experience shame. Shame motivated a slower, less visible, but probably more efficient route to healthier living, and by such, self-change. This finding supports earlier theorizing (Gausel and Leach, 2011) and empirical research (Gausel et al., 2012, 2016, 2018; Lickel et al., 2014) that felt shame is an unpleasant, yet positive predictor of constructive motivation and self-change. Our findings also align a recent meta-analysis on the association of shame with constructive responses (Leach and Cidam, 2015), which demonstrated that the crucial factor determining whether people want to improve vs. defend the self after failure is the extent to which the failure is seen as repairable. Study 1 findings thus align with our notion that weight stigma is perceived as less repairable when it revolves around immorality compared to incompetence. Therefore, weight stigma that emphasizes that people with overweight and obesity are immoral elicits fear of condemnation and will lead to preferences for responses that allow to quickly and visibly show others that one is willing to improve and change behavior (Gausel and Leach, 2011; Gausel, 2013). These responses, we suggest, are functional to manage an acutely threatened moral social image, but potentially less effective in achieving long-term successes in healthier eating and living. Given that the discourse about obesity is highly moralized (e.g., Townend, 2009), Study 1 findings therefore strengthen the argument that weight stigma is not beneficial in supporting people with overweight and obesity to change their body weight. By contrast, our findings highlight that there is a need to change the discourse relating to overweight and obesity as seen in public policy, media, and heath campaigns to reduce feelings of condemnation.

Study 2 findings extend our understanding of weight bias internalization and the reasons it is associated with maladaptive responses. Our findings demonstrate that weight bias internalization results from moral, but not competent, aspects of weight stigma, as well as concern for condemnation by others. Concern for condemnation, reported by people with overweight and obesity, was a very strong predictor of weight bias internalization. Thus, weight bias internalization appears to reflect a view of the self as immoral. As we have outlined in our theoretical rationale, threats to morality are experienced as very

averse and will likely promote responses that are quick to perform and visible to the social environment, but potentially less effective to lose weight in the long-run. Our findings also extend recent research (Romano et al., 2018) reporting that weight stigma leads to increased food intake because it poses a threat to social identity. We offer an important qualifier of these findings by showing that not any threat, but moral threats in particular, will likely lead to maladaptive responses to weight stigma.

Further, because weight bias internalization appears to reflect an internalized image of oneself as immoral and thus as globally flawed (de Hooge et al., 2010; Gausel and Leach, 2011), people who have internalized weight bias are likely to experience a constant state of acute threat to their moral social image, thereby focusing on behaviors that demonstrate to their social environment that they are indeed moral people. Unfortunately, these behaviors are likely to be less efficient in losing weight or eating healthier. Indeed, Study 2 provided strong support for the proposition that weight bias internalization promotes less self-determined and more other-determined regulation of dieting and exercising. Ample research has demonstrated that other-determined behavioral regulation is associated with lower psychological functioning and well-being (e.g., Ryan and Deci, 2000; Pelletier and Dion, 2007). Thus, our findings might valuable advance scholarly understanding of why weight bias internalization is related to medical comorbidities, greater impairment in the physical and mental domains of life (Latner et al., 2013, 2014), as well as to variance in eating disorder psychopathology (Durso et al., 2012).

Strengths, Limitations, and Future Research

By integrating so far unconnected lines of research, we have derived innovative predictions concerning the mechanisms underlying responses to weight stigma among people with overweight and obesity. We have further advanced insights into weight bias internalization, showing that it is essentially a moral threat, thereby shedding light on the motivational consequences of weight bias internalization. The two studies complement each other in their methods (experimental and survey approach), in their focus on people with overweight and obesity (Study 1), and on the complete weight spectrum (Study 2). Both studies offer valuable insights into mechanisms underlying maladaptive and adaptive responses to weight stigma. Study 2 further provides valuable insights into the etiology of weight bias internalization, pointing out the relevance of moral construal and social image concerns.

Due to the study design, to collect information about participants' weight status, they self-reported their height and weight so that we could establish their BMI. Body mass is typically prone to underreporting and therefore might be inaccurate. Another potential limitation, in line with previous research (Rothman, 2008), is the use of BMI as an indicator of overweight and obesity. Another study design might have allowed for more direct and thus, accurate measures of body fatness to have been used. Future research should tease out the findings of the current research through real-world application of competence rather than morality-based discourse. Research should examine the impact on behavior change to explore whether the findings of the current study are translatable to, for instance, supporting public health campaign engagement and public response to media discourse (e.g., potentially reduced internalization of weight bias).

Relatedly, future research should investigate factors that might protect people from the negative effects of weight-stigma. Such factors concern, for instance, cultural differences and subjective perceptions of weight. Specifically, overweight is not considered negative in all countries and cultures (Hebl and Heatherton, 1998; Padgett and Biro, 2003), which should affect whether weight is moralized, but might also affect how people with overweight and obesity respond to moral weight-stigma. Likewise, Major et al. (2014) showed that people feel less threatened by weight-stigmatizing messages when they don't perceive themselves to be overweight – even when they are objectively overweight. This research suggests that there are factors besides objective weight that affect how people respond to weight-stigma, which have not been considered in the present research.

Practical Implications

Our findings highlight the potential implications of weight bias internalization, where discourse that informs that overweight and obesity is immoral – as discussed in previous literature (e.g., Crandall, 1994; Crandall and Schiffhauer, 1998; Crandall et al., 2001; Hoverd and Sibley, 2007) – appears to be an influential factor in why people internalize weight bias. Our research indicates that to reduce weight bias internalization and potentially the associated impacts of weight bias internalization (e.g., anxiety and depression), suggestions that overweight and obesity are immoral needs to be removed. Importantly, while our research offers strong pointers toward replacing the moral construal of weight by an emphasis on competence as a strategy to avoid maladaptive behaviors, we wish to nuance this conclusion. We have examined the motivational relevance of different aspects of weight stigma, revolving around incompetence and immorality, respectively. To suggest that strategies aiming to motivate weight loss and healthier eating should emphasize incompetence rather than immorality is based on our findings, but simply means picking the lesser of two evils associated with a stigmatized discourse about weight.

Indeed, we strongly encourage the counter-moralization of weight-related discourse and campaigning, rather than substituting suggestions of immorality with suggestions of incompetence. In contrast to moralizing information about weight, counter-moralizing information has been shown to motivate people with obesity to snack more healthily (Mulder et al., 2015). This aligns with findings by Täuber and van Zomeren (2012) showing that in comparison to moralization, morally neutral information elicited greater motivation for change after a shortcoming. We suggest that the public, governments, and the media elicit morally neutral, non-threatening beliefs about overweight and obesity, as these appear to facilitate behavioral regulation bolstering psychological functioning. It is our suggestion that the widespread moral discourse about

health and weight should raise red flags among politicians, doctors, and the broader public and its implications for behavioral regulation in people with overweight and obesity. It appears that such discourse, rather than being motivating, will lead to vigilance for moral condemnation and social exclusion in people with overweight and obesity, thereby resulting in maladaptive behavior. We consequently call for more research on interventions targeting communication by the public, politicians, and institutions, that will prevent maladaptive responses to weight stigma reported in the present research.

CONCLUSION

The two studies presented above provide innovative insights concerning strategies to bolster resilience and psychological functioning of people with overweight and obesity, and they offer a strong pointer to public's responsibilities to use unbiased, morally neutral language. The current studies have novel findings that highlight the impact of concerns of condemnation and influence of presenting overweight and obesity as immoral. Our findings provide further evidence of the detrimental impact of exposure to stigmatizing and discriminatory portrayal of weight stigma and offer valuable insights into the moral core and thus motivational relevance of weight bias internalization. Given the impact of internalized weight bias on physical and mental health outcomes and maladaptive behavioral responses, the current research holds strong implications for the design and communication of public health policy and campaigns, healthcare, and media portrayal. The complexity of obesity as evidenced in the Foresight Report (Butland et al., 2007) demonstrates the vast array of contributing factors, many of which are outside of an individual's control. This highlights the inaccuracy of presenting overweight and obesity as immoral. Coupled with the current research findings that demonstrate perceptions of overweight and obesity as immoral is a key contributor to internalized weight bias and extent literature that internalized weight bias leads to health decrements and maladaptive coping, we call for an end to debates about the morality of overweight and obesity. Our research underscores the need to change the narrative and discourse relating to obesity. Moral debates about overweight and obesity should be replaced with a focus on supporting positive health behaviors through morally neutral language.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Ethical Commission of the Behavioral Research Lab of the Faculty of Economics and Business (University of Groningen) with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethical Commission of the Behavioral Research Lab.

AUTHOR CONTRIBUTIONS

ST contributed to the conception and design of Study 1, and wrote the first draft of the manuscript. NG performed the statistical analyses of Studies 1 and 2. NG and SF wrote sections of the manuscript. All authors conceived and designed Study 2, and contributed to manuscript revision, and read and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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Weight Bias Internalization Among Adolescents Seeking Weight Loss: Implications for Eating Behaviors and Parental Communication

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Background: Emerging evidence has demonstrated a high prevalence of weight bias internalization (WBI) among adults, as well as consistent links between internalization and adverse psychological and physical health. However, research examining WBI in youth and its impact on their health is scarce, especially among youth seeking weight loss treatment who may be particularly vulnerable to weight stigma from peers and parents. To address this research gap, the present study assessed WBI in a weight loss treatment-seeking sample of adolescents, examining associations between internalization and adolescents' eating behaviors and parental weight-related communication.

Methods: Adolescents (N = 148, M_{age} = 15.97 years), completed online self-report measures to assess WBI (using the modified version of the WBI Scale), body weight, binge eating, eating as a coping strategy, and weight teasing from peers and family members. Adolescents also reported on the frequency of parental comments about body weight, parental dieting, and parental encouragement of adolescent dieting.

Results: Adolescents expressed a high mean level of internalized weight bias (M = 5.45, SD = 0.88). Higher levels of internalization were observed across increasing body weight categories; no differences were observed for gender or history of weight teasing. WBI was significantly higher among adolescents who reported binge eating and eating to cope with distress. Regression analyses showed that weight-related comments from mothers (but not fathers) significantly predicted adolescents' WBI (including frequency of mothers' comments about adolescents' body weight, comments about their own body weight, and encouragement of their adolescent to diet), as did increased dieting frequency among mothers.

Conclusion: The present study provides novel insights to the scant literature on WBI in youth. Findings indicate that WBI is high in both girls and boys engaged in weight loss, and is associated with maladaptive eating behaviors, higher frequency of maternal dieting, and mothers' comments about body weight. These findings have

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important clinical implications for youth and families engaged in weight loss treatment, and underscore the need for research to clarify adverse effects of internalization on weight-related health in youth and to better understand the role that parental weight communication may have on adolescents' internalization.

Keywords: internalization, weight, youth, eating behavior, parent-child relations

INTRODUCTION

Children and adults with higher body weight are vulnerable to societal bias and stigma because of their weight (Puhl and Heuer, 2009). Individuals who experience weight bias face societal devaluation, negative stereotypes, prejudicial attitudes, and unfair treatment from others because of their weight. For youth and adolescents, these experiences most often occur in the form of weight-based teasing, bullying, and victimization from peers and family members. Recent studies of adolescents, parents, and educators consistently show that weight-based bullying is one of the most prevalent forms of youth bullying in our society (Puhl et al., 2011, 2013a, 2016 ; Bradshaw et al., 2013). Youth with obesity appear to be particularly vulnerable to these experiences, with some research indicating that among adolescents seeking treatment for obesity, as many as 90% report weight-based victimization from peers, and 60% from family members (Puhl et al., 2013b; Puhl and Himmelstein, 2018). In addition, over a third of these youth report that weight-based victimization has persisted for at least 5 years (Puhl et al., 2013b). With increasing research attention to the commonality of weight-based victimization among diverse groups of youth (Bucchianeri et al., 2013), studies have also examined the impact of these experiences on quality of life for children and adolescents; over a decade of evidence has demonstrated links between weight bias and negative health consequences for youth (Goldfield et al., 2010; Puhl and Luedicke, 2012; Bucchianeri et al., 2014; Warkentin et al., 2017), including multiple indices of psychological distress and poor physical health, and longitudinal associations between weight-based teasing from peers and family members and adverse weight-related health in late adolescence and adulthood (Eisenberg et al., 2006; Haines et al., 2006; Quick et al., 2013; Hunger and Tomiyama, 2014; Puhl et al., 2017b).

Adding complexity to this problem is that individuals who are vulnerable to experiences of weight bias may also internalize bias and direct it toward themselves. Known as *weight bias internalization* (WBI) (Durso and Latner, 2008; Pearl and Puhl, 2018), this process of self-stigma involves becoming aware of negative stereotypes about one's stigmatized identity, agreeing with these stereotypes, applying stereotypes to oneself, and engaging in self-devaluation because of one's stigmatized identity (Corrigan et al., 2006). As a result, this process leads people to engage in self-disparagement and self-blame in response to weight bias expressed and enacted by others.

Internalized weight bias has received increasing research attention in recent years, especially in adults. Recent evidence with national samples of Americans suggest that as many as 40% of adults with overweight and obesity have internalized weight bias, and 20% express high levels of internalization, with more women than men reporting high levels (Puhl et al., 2017a). In addition, an amassing literature has demonstrated consistent links between internalization and adverse psychological and physical health. The first systematic review of this literature published in 2018 examined 74 studies assessing the relationship between WBI and health in both community and treatment-seeking samples of adults (Pearl and Puhl, 2018); results showed that WBI was consistently related to adverse mental health indices including depression, anxiety, poor body image, health related quality of life, and disordered eating behaviors. While fewer studies have examined links between WBI and physical health, clear associations were observed between WBI, increased severity of obesity, lower self-efficacy for engaging in healthy behaviors, and worse dietary adherence (Pearl and Puhl, 2018). Furthermore, mediational analyses indicate that WBI explains the relationship between experiences of weight bias and adverse health indices (e.g., eating pathology) (Durso et al., 2012a; O'Brien et al., 2016). Collectively, this evidence highlights that internalized weight bias is both common and potentially damaging for health, independent of body weight and experiences of stigma.

In contrast to the rapidly emerging literature on WBI in adults, very little is known about WBI in youth. Of the few studies in this area, two cross-sectional studies have focused on validating an existing measure of WBI frequently used in adult populations (the Weight Bias Internalization Scale; WBIS) in samples of adolescents, including a U.S. sample of 57 adolescents (80% girls) seeking bariatric surgery (Roberto et al., 2012), and testing a modified version of the WBIS in a German sample of 191 adolescents (51% girls) seeking weight loss treatment (Ciupitu-Plath et al., 2017). These studies showed that the WBIS is an appropriate and suitable measure for assessing WBI in adolescents seeking treatment for obesity, and that internalized weight bias was related to poorer psychological functioning, such as depression, anxiety, psychiatric problems, disordered eating, binge eating, poor body image and lower self-esteem. Of note, the U.S. study found no gender differences in levels of WBI, while the German study observed higher WBI in girls compared to boys. A third validation study focused on a different measure of WBI (the Weight Self-Stigma Questionnaire; WSSQ) in a sample of 156 Canadian (French-speaking) adolescents, also demonstrating suitability of this measure and significant correlations with disordered eating, depression, anxiety, and poor self-esteem, but not BMI (Maïano et al., 2017).

The only prospective research examining WBI in youth is a German study that followed a community-based sample of 1,047 children (ages 7–11 years) for 2 years (Zuba and Warschburger, 2017). Findings showed that WBI mediated the

relationship between BMI and psychosocial problems (such as restrained eating, emotional and conduct problems), and that this pattern of findings held regardless of children's gender or weight status. While baseline levels of WBI were higher in children with overweight and obesity compared to children with lower body weight, no gender differences were found for associations between WBI and BMI or other psychological health indices.

While these several studies provide initial evidence that WBI may begin in youth and potentially contribute to similar adverse health consequences that have been documented in adults, there is a clear need for more research in this area and key questions remain. First, given high rates of weight-based victimization reported by adolescents with obesity, it seems especially warranted to study WBI and its associations with health behaviors in this vulnerable population. Second, no research to date has examined whether different sources of weight-based victimization (e.g., teasing from peers versus family members) have differential associations with internalized weight bias in youth. Third, although previous research indicates that parental comments and/or teasing about weight can contribute to emotional distress and adverse eating behaviors in adolescents (Kluck, 2010; Neumark-sztainer et al., 2010; Bauer et al., 2013; Mustillo et al., 2013), no research has examined these types of parental factors in the context of WBI in youth. Many parents report engaging in weight-focused communication with their adolescents (Berge et al., 2015; Winkler et al., 2018), and many adolescents report that their parents make critical or judgmental comments about their weight (Keery et al., 2005; Fulkerson et al., 2007; Lo et al., 2009; Neumark-sztainer et al., 2010; Berge et al., 2016). "Thus, as part of research efforts to better understand the nature and extent of WBI in youth, it is important to determine whether relevant parental factors contribute to this issue, such as whether youth are more likely to internalize weight bias if they are exposed to parental weight comments. To begin to address these understudied issues, the present study assessed WBI in a weight loss treatment-seeking sample of adolescents. Specifically, this study explored the following research questions: (1) is WBI positively related to binge eating and eating to cope with stress, and (2) is WBI positively predicted by sources of weight-based victimization (peers and family members), and adolescent reports of parental weight-related comments (parental comments about weight and dieting).

MATERIALS AND METHODS

Study Participants

Participants in the present study were comprized of adolescents (N = 148) who were enrolled in a national commercial weight loss camp (Camp Shane) in 2017. Camp Shane focuses on behavioral weight loss and weight loss maintenance for youth and young adults, and requires that all campers have a documented medical history and physician's appointment in order to attend camp. The camp has six locations in the U.S. (Arizona, California, Georgia, New York, Texas, and Wisconsin), and data collection occurred between April and July of 2017. Upon camp registration, parents of adolescents between the ages of 13–18 years at each camp location were provided with a two-page permission form describing the study, inviting their son or daughter to participate in the present study. Parents indicated their permission on this form if they consented to allow their adolescent to participate, and this form was submitted online by parents as part of all other required camp registration forms. Parents who indicated consent were then emailed a weblink to an online survey (hosted by Qualtrics.com) to share with their adolescent so that he/she could complete the survey. When adolescents clicked on the weblink, they were presented with an introductory webpage providing information about the study's purpose and procedures; it was made clear on this page that the survey aimed to understand adolescents' experiences and perspectives about weight-based teasing and bullying. Only after reading this page, and providing assent to participate (by clicking an icon indicating their agreement that they had read this information and accepted the conditions of the study) could adolescents access the survey. Participation was voluntary, and it was made clear to participants that they could stop the survey at any time without any consequences. Adolescents were asked to complete the survey online in a private setting (e.g., at home). Following survey completion adolescents received a gift card to a national online retailer.

In total, there were 459 campers registered across all camp locations, of which 309 adolescents were in the eligible age range to participate in the study; the response rate was 48% (N = 148). Compared to the total number of campers (M_{age} of 15.26 years, SD = 1.63), adolescents who chose to participate in the present study were slightly older (M_{age} of 15.87, SD 1.25). In addition, study participants were primarily from the New York (43.9%) and California (31.8%) camp locations, followed by Georgia (12.2%), Texas (6.1%), Arizona (4.7%), and Wisconsin (1.4%). The study protocol was approved by the University of Connecticut's Institutional Review Board and parents of all adolescents provided written informed consent in accordance with the Declaration of Helsinki.

Survey Measures

Participant Demographic Characteristics and Body Weight

Adolescents reported their age, gender, race/ethnicity, and current height and weight. BMI percentiles for age and sex were calculated and categorized using tools provided by the Centers, 2012. Weight categories corresponding to BMI percentiles include healthy weight (≥5th to <85th percentile), overweight (85th to <95th percentile), and obesity (≥95th percentile).

Weight Bias Internalization

Adolescents completed the modified, validated version of the Weight Bias Internalization Scale (WBIS-M), a widely used measure to assess WBI (Pearl and Puhl, 2014; Durso et al., 2016). The WBIS has been used previously in adolescents with obesity seeking weight loss (Roberto et al., 2012), and assess the degree to which people apply negative weight-based stereotypes to themselves and judge themselves negatively due to their weight. The original WBIS-M consists of 11 items; in accordance with recent research on the psychometrics of this measure (Durso

et al., 2016; Lee and Dedrick, 2016), the first item was dropped, resulting in a 10 items-scale in which adolescents rated their extent of agreement with statements such as "I don't feel that I deserve to have a really fulfilling social life, because of my weight." Items were rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicative of higher levels of internalized weight bias. Cronbach's alpha in the present sample was $\alpha = 0.86$.

Weight-Based Victimization

Perceived weight-based teasing and bullying was assessed with two previously established yes/no questions tested in samples of adolescents: "Have you ever been teased or bullied because of your weight by your peers or other students?" and "Have you been teased or treated unkindly by family members because of your weight? (Neumark-Sztainer et al., 2006, 2012; Puhl et al., 2013b)" These questions were slightly adapted from two questions previously used and widely published from Project EAT, a longitudinal cohort study examining weight-related experiences of adolescents. If participants indicated "yes" to either or both of these questions, they were prompted with additional questions about the frequency of these experiences happening in the past year (5-point scale ranging from *never* to *very often*), with higher scores indicating a greater frequency.

Eating as a Coping Strategy

Eating to cope with stress was measured using the validated 5-item Coping Subscale from the Motivations to Eat Measure (Jackson et al., 2003), which has been used in adolescent populations (Thogersen-Ntoumani et al., 2009). Participants were asked how often they eat because they are depressed or sad, feel worthless or inadequate, as a way to help them cope, as a way to comfort themselves, or as a way to avoid thinking about something unpleasant or to distract themselves. Items were rated using a 5-point scale of 0 (*almost never*) to 4 (*almost always or always*), with higher scores indicating a higher frequency of using food to cope with stress. Cronbach's alpha in the present sample was $\alpha = 0.61$.

TABLE 1 | Sample characteristics ($N = 148$).

Variable	Range		*M*	*SD*	α
Age	13	18	15.97	1.25	
BMI	18	40	27.06	4.39	
BMI percentile	14	99	85.92	16.69	
Weight bias internalization mean	2	7	5.45	0.88	0.86
	N	**%**			
Race/ethnicity					
White	134	90.5			
Black	3	2.0			
Asian	4	2.7			
Latino	7	4.7			
Sex					
Male	74	50.0			
Female	74	50.0			
BMI category					
Normal weight	42	28.4			
Overweight	55	37.2			
Obese	51	34.5			

Binge Eating

Binge eating was measured using four previously established and validated questions (Yanovski, 1993) used in large samples of adolescents (Neumark-Sztainer et al., 2004, 2006), assessing the presence of binge eating in the past year (yes/no), with or without loss of control (yes/no), frequency of binge eating with loss of control (4-point scale from *every day* to *less than once per month*), and distress over binge eating (4-point scale from *not at all* to *a lot*). Following previous research (Neumark-Sztainer et al., 2006), these items were combined to determine a severity score, with lower scores indicating more binge eating severity. Specifically a score of 1 represented binge eating episodes occurring at least once per week with loss of control and emotional distress in response to overeating; a score of 2 reflected binge eating with loss of control and at least some distress over binge eating; a score of 3 equated to the presence of binge eating but no loss of control and no distress over binge eating; and a score of 4 equated to no binge eating.

Parental Comments About Weight and Dieting

Questions assessing adolescents' perspectives of parental comments about weight and dieting were modified from previously used survey measures used with adolescents in Project EAT (Neumark-sztainer et al., 2010; Bauer et al., 2013). Adolescents were asked "how often does your mother make comments to you about you weight" and "how often does your father make comments to you about your weight?" Responses to these questions were rated on a 5-point scale from *never* to *very often*. Participants were then asked to indicate how much their mother and father each talk about his or her own weight, engage in dieting (defined as "diets to lose weight or keep from gaining weight"), and encourages the adolescent to diet. These questions were rated on a 4-point scale from *not at all* to *very much*.

Analytic Strategy

Independent samples *t*-tests assessed differences in WBI as a function of sex, and a one-way ANOVA assessed differences in WBI as a function of BMI categories based on BMI percentiles for age and sex. We tested for sex × BMI category interactions on WBI using 2 × 2 ANOVA, but none emerged. For parsimony we only report the independent *t*-test and one-way ANOVA below. Linear regressions assessed the relationship between WBI and binge eating severity as well as WBI and eating as a coping strategy for dealing with stress. A linear regression examined relationships among the presence of WBV (family, peers), frequency of weight-teasing (family, peers), frequency of parental comments about weight, frequency of parental encouragement to diet, frequency of parental comments about their own weight, and frequency of parental dieting. All regression models controlled for participant sex (male as reference group), BMI

TABLE 2 | Differences in weight bias internalization by weight category and gender.

	Gender								
Weight bias internalization	Males		Females						
	M	SD	*M*	*SD*	*t*	*df*	*p*		
	5.49	0.78	5.40	0.97	0.62	145	0.535		
	Weight category								
Weight bias internalization	Healthy weight		Overweight		Obese				
	M	SD	*M*	*SD*	*M*	SD	*F*	*df*	*p*
	5.02[a]	0.59	5.40[b]	0.87	5.85[c]	0.92	11.82	2, 147	0.000

*Note: Superscript letters (a, b, c) indicate significant differences in means between BMI groups. There were no significant interactions between sex and BMI.

percentile for age and sex, age, and race (white as the reference group).

RESULTS

Sample Characteristics

Table 1 displays demographic and weight-related characteristics of participants. The total sample included 50% boys and 50% girls, and 90% were White. The mean BMI percentile of adolescents was 27.06 (SD = 4.39); the distribution of weight categories according to BMI classifications included 34.5% in the obese range, 37.2% in the overweight range, and 28.4% in the healthy weight range (reflecting adolescents who had achieved significant weight loss and were returning to camp for weight loss maintenance). Almost all participants (93.9%) reported experiencing weight-based bullying from peers, and 60.1% reported being teased about their weight from family members.

Weight Bias Internalization

The mean score on the WBIS-M was 5.45 (SD = 0.88) on the 7-point Likert scale, suggesting a high level of internalized weight bias in this sample. As depicted in **Table 2**, there were no significant gender differences in WBI, but differences were present across BMI. Specifically, higher levels of internalization were observed across increasing body weight categories, with the highest mean WBI scores present in adolescents with obesity compared to those at lower body weights.

Associations Between WBI and Eating Behaviors

Table 3 presents results of linear regressions on binge eating severity and eating as a coping strategy as a function of WBI. Binge eating severity accounted for 14% of the variance [R^2 = 0.14, $F(5,147)$ = 4.70, $p < 0.001$] and eating as a coping strategy accounted for 39% of the variance [R^2 = 0.39, $F(5,147)$ = 17.86, $p < 0.001$] in each dependent variable. WBI was significantly higher among adolescents who had more severe levels of binge eating (as reflected by lower scores; β = −0.18, $p = 0.036$) and eating to cope with distress (β = 0.50, $p < 0.001$).

Associations Between WBI and Parental Weight-Related Comments

As displayed in **Table 4**, the regression model (accounting for controls) explained 68% of the variance in WBI (R^2 = 0.68, $F(16,143) = 16.75$, $p < 0.001$). Frequency of weight teasing from peers, but not family members, was associated with higher WBI in adolescents (β = 0.38, $p < 0.001$). Weight-related comments from mothers, but not fathers, also significantly predicted adolescents' WBI. Specifically, frequency of mothers' comments about their adolescent's weight (β = 0.24, $p = 0.002$) and their own weight (β = 0.22, $p < 0.001$) were associated with higher levels of WBI in adolescents. In addition, more frequent dieting efforts to lose weight among mothers (but not fathers) (β = 0.20, $p = 0.006$) was associated with higher levels of WBI.

TABLE 3 | Linear regressions on binge eating severity and eating as a coping strategy as a function of weight bias internalization.

	Binge eating severity (lower scores = increased severity)				
Variable	***B***	**SE**	**β**	***t***	***p***
Female	−0.34	0.13	−0.23	−2.70	0.008
BMI percentile	−0.01	0.00	−0.18	−1.97	0.051
Age	0.07	0.05	0.12	1.42	0.158
Race (white)	−0.39	0.20	−0.15	−1.91	0.058
WBIS_mean	−0.15	0.07	−0.18	−2.12	0.036
	Eating as a coping strategy (mean)				
	B	**SE**	**β**	***t***	***p***
Female	0.13	0.07	0.12	1.71	0.090
BMI percentile	0.00	0.00	0.13	1.67	0.097
Age	−0.08	0.03	−0.18	−2.54	0.012
Race (white)	0.12	0.12	0.07	1.03	0.305
WBIS_mean	0.29	0.04	0.50	6.99	0.000

WBIS, Weight Bias Internalization Scale.

DISCUSSION

The present study provides new insights about internalized weight bias in youth, contributing to the scant literature in this area. In this sample, adolescents exhibited high levels of WBI; the mean WBIS score was higher in comparison to the few existing studies with adolescents in the U.S. and Germany (Roberto et al., 2012; Ciupitu-Plath et al., 2017) using the WBIS measure. Furthermore, we found that adolescents (both girls and boys) endorsed higher levels of internalization across increasing body weight categories. It is unclear why WBI was considerably higher in our sample, as the few comparison studies in this area included both community samples and weight-loss treatment-seeking samples of similarly aged adolescents. This finding highlights the need for additional research to examine levels of WBI in community samples of youth and those seeking different types of weight loss treatment (e.g., behavioral weight loss versus bariatric surgery). Furthermore, we found no gender differences in WBI among adolescents in our study; this is similar to findings by Roberto and colleagues who found no gender differences in WBI among adolescents seeking weight loss surgery, but contrasts with two studies of German youth documenting higher WBI in German girls compared to boys using a modified version of the WBIS (Ciupitu-Plath et al., 2017; Zuba and Warschburger, 2017), as well as the broader literature on WBI in adults which typically shows higher levels of WBI in women compared to men (Pearl and Puhl, 2018).

Our findings suggest that internalized weight bias is important to consider in the context of maladaptive eating behaviors in adolescents. Levels of WBI were significantly higher among adolescents who reported binge eating and eating as a coping strategy. These findings persisted regardless of adolescent BMI, and binge eating severity was higher for girls relative to boys in this sample regardless of internalization. Existing research with adult samples suggests moderate to strong correlations between WBI and binge eating symptoms (Durso et al., 2012b; Pearl et al., 2014; Schvey and White, 2015; Douglas and Varnado-Sullivan, 2016; Palmeira et al., 2016, 2017a), which have also persisted after controlling for BMI (Durso and Latner, 2008). While few studies have assessed adult gender differences, some research has found correlations between WBI and binge eating in both men and women (Boswell and White, 2015). In light of this previous evidence and links between higher WBI and eating pathology observed in our sample, additional research is warranted to better understand the relationship between internalization and maladaptive eating. Given that our sample was comprized of adolescents seeking weight loss, it seems particularly important to determine whether WBI exacerbates eating pathology and ultimately affects weight-related treatment outcomes.

To our knowledge, our study is the first to examine associations between WBI in youth and different sources of weight-based teasing. Results showed that more frequent weight-based teasing from peers, but not from family members, was associated with higher WBI in adolescents. While the reason for this finding is unclear, it may be that the heightened salience and importance of peer relationships and social networks during adolescent development contribute to a stronger impact of weight-based teasing from peers (compared to parents) on adolescents during this time period, which could in turn elevate their levels of internalization in response to these experiences. It will be helpful for future research to examine links between WBI and different sources of weight-based victimization across multiple age groups of youth, to better understand what role peers and family play in WBI for younger and older children. Furthermore, recent work has demonstrated that experiences of weight-based victimization from both peers and family members are associated with adverse emotional and eating-related outcomes, especially for girls (Puhl et al., 2017b). Thus, additional research is needed to clarify whether links between WBI and adverse health indices in youth are attenuated or worsened depending on the perpetrator (family versus peers) of weight-based teasing.

At the same time, our study provides the first evidence of links between parental comments about weight and internalized weight bias in adolescents. While weight-based teasing from parents was not associated with WBI in our study, we found that adolescents' perceptions of their mothers' comments about weight and dieting significantly predicted adolescents' WBI. Specifically, higher levels of WBI in adolescents were associated with a higher frequency of mothers' comments about their own body weight, comments about their adolescent's body weight, and encouragement of their adolescent to diet, as well as increased dieting frequency among mothers. These findings remained regardless of adolescents' gender or body weight. While some previous work has found that maternal comments about weight may play a stronger role in contributing to adverse eating behaviors in youth than comments from fathers (Keery et al., 2005; Neumark-sztainer et al., 2010; Palmeira et al., 2017a), other evidence has found no differences in child outcomes according to parent gender (Gillison et al., 2016). A recent meta-analysis of research examining parental weight talk indicated that critical weight comments from parents and parental encouragement of children to lose weight were associated with poorer physical self-perceptions, more dieting, and dysfunctional eating in children (Gillison et al., 2016). In addition, a recent study of 546 parents found that weight-focused conversations were more common among parents who themselves had recently dieted and perceived their child to be overweight (Winkler et al., 2018). Findings of the present study add new insights to this literature, suggesting that maternal comments about weight may have negative implications for internalization of weight bias and self-blame in youth. It could be that WBI mediates the relationship between poor self-perceptions and eating pathology among children in response to negative parental weight talk; this is an important question for future research. In addition to maternal comments about weight, mothers' own dieting behaviors were associated with higher WBI in adolescents. Thus, maternal weight-related behaviors, in addition to communication, may be important to study in efforts to better understand WBI in youth. It is unclear whether maternal comments about weight and/or dieting behaviors lead to increased levels of WBI in adolescents, or whether adolescents with higher WBI are more sensitive to and/or aware of their mothers' weight-related comments and actions. Longitudinal

TABLE 4 | Linear regressions on weight bias internalization as a function of weight-based victimization and parental weight-related comments.

	Weight bias internalization				
Variable	***B***	**SE**	**β**	***t***	***p***
Female	0.07	0.11	0.04	0.62	0.539
BMI percentile	0.00	0.00	0.02	0.28	0.783
Age	−0.04	0.04	−0.06	−0.97	0.335
Race (white)	−0.17	0.17	−0.05	−0.95	0.343
Weight-based victimization by peers (yes/no)	−0.35	0.22	−0.10	−1.58	0.116
Weight-based victimization by family (yes/no)	−0.09	0.13	−0.05	−0.68	0.497
Frequency of peer weight teasing	0.33	0.07	0.38	4.55	0.000
Frequency of family weight teasing	−0.04	0.06	−0.05	−0.72	0.476
Frequency of mother's comments about adolescent's weight	0.30	0.09	0.24	3.22	0.002
Frequency of father's comments about adolescent's weight	−0.10	0.06	−0.10	−1.63	0.105
Frequency of mother encouraging adolescent to diet	0.07	0.09	0.05	0.73	0.465
Frequency of mother talking about her own weight	0.27	0.07	0.22	3.68	0.000
Frequency of mother dieting	0.21	0.07	0.20	2.81	0.006
Frequency of father encouraging adolescent to diet	−0.03	0.08	−0.03	−0.38	0.702
Frequency of father talking about his own weight	−0.02	0.07	−0.02	−0.36	0.723
Frequency of father dieting	0.12	0.07	0.11	1.76	0.081

research is necessary to determine the direction and nature of these associations.

Limitations

The cross-sectional nature of our study prevents conclusions about the directionality of WBI and eating behaviors in youth. The lack of longitudinal research is a limitation in the literature on WBI more broadly (Pearl and Puhl, 2018), and our findings highlight a clear need for experimental and prospective studies to help establish when WBI begins in youth development, it's progression over time, and the role that it plays in the development and/or reinforcement of unhealthy eating behaviors. Our data relies on self-reports of adolescents, including their reports about parental comments related to weight and dieting. It will be important for future research to examine parent-child dyads to determine whether their perspectives about weight-related communication align. The alpha for the scale assessing coping with stress via eating was lower than anticipated. Measurement in this topic area is a general limitation of this research, and the lack of measures available to assess eating-related coping strategies in youth indicates the need for measure development. As such, the present results should be interpreted with caution as more studies on the relationship between WBV and coping are needed. In addition, our sample was comprized of primarily white adolescents, and given financial costs to families to send their child to a weight loss camp, our sample of adolescents may reflect a higher sociodemographic level than other groups of youth seeking weight loss. Studies are needed to examine the nature and extent of WBI in racially and economically diverse samples of youth across different ages, and in both community and clinical samples of youth. Our sample response rate of 48% suggests that there could be potential response bias; while sample comparisons showed only slight differences in age and geographical location between adolescents who participated in the survey and those who did not, it will be important for future research to improve methods to maximize participation. Finally, our sample consisted of some adolescents at a healthy body weight, who had previously achieved weight loss and were no longer trying to lose weight. We know little about WBI in youth who have obtained a healthy weight status after substantial weight loss, or what role WBI may play during weight loss maintenance in youth. Given that WBI remained high in this group, more research is needed to better understand WBI and its links with eating behaviors as body weight changes, and whether internalization may linger in youth even after they lose weight. Despite these limitations, this study contributes new knowledge to the sparse literature on WBI in youth, points to novel associations with parental factors, and highlights specific areas for future research that can help advance this field of study.

Clinical Implications

The present findings suggest that it may be useful to inform pediatric health care providers that some youth who seek treatment for weight loss may have elevated levels of WBI, and that WBI may be associated with maladaptive eating behaviors. As more research is conducted on WBI in youth and adolescents, it may be warranted to assess strategies to help reduce WBI. Preliminary studies with adults enrolled in BWL programs have found that clinical intervention approaches (e.g., using cognitive behavioral strategies or acceptance and commitment therapeutic approaches) can be effective in reducing WBI (Pearl et al., 2016; Palmeira et al., 2017b; Levin et al., 2018). It may be useful to extend this research to samples of youth, especially in light of our observed associations with WBI and

maladaptive eating behaviors, which could impair treatment efforts in adolescents seeking weight loss. Part of such efforts to reduce WBI could involve addressing parental comments about weight and health, given both the present study's findings linking WBI to parental weight comments as well as previous evidence demonstrating consistent associations with parent-child weight conversations and adverse health behaviors in youth, such as dysfunctional eating (Gillison et al., 2016). Previous research has demonstrated that parent-child conversations that focus on health behaviors such as nutritious eating and physical activity (rather than body weight) are associated with positive child outcomes, such as healthy eating and increased body satisfaction (Berge et al., 2013, 2015; Gillison et al., 2016). Thus, educating parents (especially mothers) about the potential harmful impact of making comments about their own weight or their child's weight, and about the benefits of talking about health behaviors rather than weight, could be useful targets for intervention to assess whether these strategies reduce WBI in youth.

AUTHOR CONTRIBUTIONS

RP conceptualized and designed the study and drafted the initial manuscript. MH oversaw the data collection, carried out the data analyses, and contributed to writing the manuscript. Both authors revised the manuscript and approved the final manuscript as submitted.

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BRIEF RESEARCH REPORT
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Weight Bias Internalization Is Negatively Associated With Weight-Related Quality of Life in Persons Seeking Weight Loss

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Research has shown a negative relationship between weight bias internalization (WBI) and general measures of health-related quality of life (QOL), such as the Short Form–36. Less is known about the impact of WBI on weight-specific domains of QOL. This study examined the relationship between WBI and weight-related QOL, as measured by the Impact of Weight on Quality of Life (IWQOL-Lite) scale. Participants were 178 adults with obesity [71.3% black, 87.6% female, mean body mass index (BMI) = 40.9 ± 5.9 kg/m^2] enrolled in a weight loss trial testing the effects of lorcaserin on weight loss maintenance. At baseline, participants completed the Weight Bias Internalization Scale (WBIS), the IWQOL-Lite and the Patient Health Questionnaire (PHQ-9, to assess symptoms of depression). Total scores for the IWQOL-Lite and its five subscales (Physical Function, Self-Esteem, Sexual Life, Public Distress and Work) were calculated. Linear regression analyses showed that WBIS scores were associated with the IWQOL-Lite total score and all subscales above and beyond the effects of demographic variables, BMI, and depressive symptoms (beta values = −0.18 to −0.70, p values < 0.019). The relationship between WBIS and the IWQOL-Lite scales did not differ by gender or race. WBI was associated with mental and physical aspects of weight-related QOL in a predominantly black and female treatment-seeking sample of patients with obesity. Prioritizing the development of interventions to reduce WBI may be important for improving weight-related QOL.

Keywords: depression, obesity, weight-related quality of life, weight, weight bias internalization

INTRODUCTION

Health care professionals, employers, co-workers, parents, passing strangers, and even young children have been found to hold negative attitudes towards persons with overweight and obesity, describing them, for example, as lazy, worthless, awkward, ugly, and lacking in self-esteem (Puhl and Brownell, 2001). These biased attitudes, and the resulting societal devaluation of individuals with overweight and obesity in society (i.e., stigmatization), may be accompanied by discrimination, in which people are treated unfairly in educational, employment, or social settings due to their

weight (Puhl and Brownell, 2001). A substantial literature, for example, suggests that both men and women with obesity are paid less than their average-weight counterparts when doing the same work (Baum and Ford, 2004; Cawley, 2004; Puhl and Heuer, 2009).

Some persons with overweight and obesity report sharing society's biased attitudes toward excess weight, believing that they, in fact, are lazy, undisciplined, or otherwise undesirable because of their weight (Rudman et al., 2002). This form of self-criticism is referred to as weight bias internalization (WBI), or self-directed stigma (Durso and Latner, 2008). A significant minority of persons with overweight or obesity report elevated levels of WBI, with higher levels of WBI among individuals seeking treatment for or engaged in weight loss (Puhl et al., 2018). Those with WBI report significantly greater symptoms of depression, anxiety, and disordered eating than their weight-matched counterparts without WBI (Pearl and Puhl, 2018). WBI is also associated with poor health behaviors (such as avoidance of physical activity) and with increased cardiometabolic risk (Pearl and Puhl, 2018). Prior research also has suggested that individuals with WBI report reduced quality of life (QOL) in both their physical function and mental health, as assessed by general measures such as the Medical Outcome Survey, Short-Form-36 (SF-36) (Latner et al., 2014; Pearl et al., 2014). The SF-36 has been used to assess QOL in a variety of different populations, but it was not constructed to assess impairments in function potentially related to excess body weight. Prior work has shown a relationship between WBI and negative general mental health outcomes (Latner et al., 2013, 2014; Pearl et al., 2014; Hübner et al., 2016), but the relationship between WBI and negative physical health outcomes is less established (Pearl and Puhl, 2018).

The present study examined the relationship between WBI and QOL specific to weight by using the Impact of Weight on Quality of Life-Lite scale (IWQOL-Lite). The scale provides a total score and values on five subscales: Physical Function, Self-Esteem, Sexual Life, Public Distress, and Work (Kolotkin et al., 2001). A previous study by Hübner et al. investigated the relationship between IWQOL and WBI; however, they only examined the IWQOL-Lite Total score and the Self-Esteem subscale and did not examine the relationship among the four other subscales (Hübner et al., 2016). Evaluating the relationship between WBIS scores and physical functioning, sexual life, public distress, and work would provide a more comprehensive understanding of how WBI may influence QOL. We predicted that greater reports of WBI would be associated with greater impairments in weight-related QOL, as measured by the IWQOL-Lite Total score and all five subscales.

MATERIALS AND METHODS

Study Design

The current study represents a secondary analysis of data from a randomized controlled trial that assessed the efficacy of the weight loss medication lorcaserin, compared with placebo, for maintaining weight loss achieved with a low-calorie diet. The methodology and results of the study, which was approved by the University of Pennsylvania's Institutional Review Board, have been described previously (Shaw Tronieri et al., 2018). The present study is limited to the analysis of participants' baseline characteristics pertaining to WBI, weight-specific QOL, and symptoms of depression.

Participants

Participants were recruited by print, online, and radio advertisements and were eligible to participate in the study if they were 21–65 years of age and had a body mass index (BMI) of $\geq$33 kg/m^2 and $\leq$55 kg/m^2 (or $\geq$30 kg/m^2 with an obesity-related comorbidity). Major exclusion criteria included current major depression; pregnancy or lactation; types 1 or 2 diabetes; use of medications that cause weight loss or gain; and a history of bariatric surgery. Participants deemed eligible based on a phone screen completed an in-person behavioral evaluation (of their eating, activity, and mood) and provided written informed consent. Eligible participants then met with a physician or nurse practitioner who completed a history and physical examination. Participants who remained eligible were enrolled in the program.

Measures

At the screening visit, height was measured in duplicate using a stadiometer (Veeder-Root, Elizabethtown, NC, United States), and weight was measured using a digital scale (Detecto, model 6800 A). Weight was measured again at week 1 of the intervention, from which baseline BMI was calculated. Participants received questionnaires 2 weeks prior to the first group treatment session to be completed online (via REDcap) or via mail. Questionnaires were completed prior to the first treatment visit. Measures included the Weight Bias Internalization Scale (WBIS), the Patient Health Questionnaire (PHQ-9), and the IWQOL-Lite. The 11-item WBIS evaluates the degree to which people assign weight-based stereotypes to themselves (e.g., "I am less attractive than most other people because of my weight") and devalue themselves due to weight (e.g., "I hate myself for being overweight"). Participant responses are rated on a scale of 1 *(strongly disagree)* to 7 *(strongly agree)*, with higher scores indicating greater WBI (Durso and Latner, 2008). The American Psychiatric Association recommends the PHQ-9 as an optimal brief screening inventory for assessing symptoms of depression (American Psychiatric Association, 2018). Respondents rate the frequency of symptoms of depression during the previous 2 weeks, using a scale from 0 (not at all) to 3 (nearly every day). The higher the total score, the greater the severity of symptoms of depression. Scores $\geq$15 reflect severe symptoms of depression. The reliability and validity of the PHQ-9 have been shown to be excellent (American Psychiatric Association, 2018). The 40-item IWQOL-Lite provides an overall measure of QOL as affected by weight (Total score), as well as scores on the five subscales of Physical Function, Self-Esteem, Sexual Life, Work, and Public Distress.

TABLE 1 | Linear regression analyses.

Variable	IWQOL-Lite Total Score			IWQOL-Lite Physical Function			IWQOL-Lite Self-Esteem			IWQOL-Lite Sexual Life			IWQOL-Lite Public Distress			IWQOL-Lite Work		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
WBIS	−8.48	1.06	**−0.50*** **	−3.58	1.51	**−0.18***	−16.32	1.37	**−0.70*** **	−10.32	1.92	**−0.40*** **	−7.37	1.60	**−0.33*** **	−7.93	1.42	**−0.40*** **
Female	−0.72	3.52	−0.01	−2.32	5.00	−0.03	−3.09	4.54	−0.04	2.62	6.35	0.03	1.29	5.29	0.02	1.81	4.71	0.03
Black	−0.20	2.50	0.01	0.52	3.56	0.01	2.32	3.22	0.04	1.12	4.52	0.02	−1.09	3.76	−0.02	−3.65	3.35	−0.07
Educ	0.71	0.54	0.08	0.86	0.77	0.08	0.59	0.69	0.05	0.93	0.97	0.07	1.08	0.81	0.09	−0.15	0.72	−0.01
Age	−0.20	0.09	**−0.12***	−0.47	0.13	**−0.24*** **	<0.01	0.12	<0.01	−0.44	0.17	**−0.17*** *	0.21	0.14	0.09	−0.11	0.13	−0.06
BMI	−0.94	0.18	**−0.28*** **	−1.42	0.26	**−0.37*** **	0.08	0.24	0.02	−0.44	0.33	−0.09	−1.85	0.28	**−0.43*** **	−0.70	0.25	**−0.18*** *
PHQ−9	−5.99	1.31	**−0.28*** **	−5.60	1.86	**−0.23*** *	−5.14	1.68	**−0.17*** *	−8.72	2.36	**−0.27*** **	−4.13	1.97	**−0.15***	−8.22	1.75	**−0.33*** **

*Note. WBIS, Weight Bias Internalization Scale; Educ, Education; PHQ-9, Patient Health Questionnaire-9; IWQOL, Impact of Weight on Quality of Life. *$p < 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$ Ns ranged from 161 to 162.*

Scores are transformed and scored from 0-100, with higher scores representing a higher weight-related QOL. The IWQOL-Lite has excellent reliability (Kolotkin and Crosby, 2002).

Analytic Plan

Bivariate correlations were computed between the WBIS and the IWQOL-Lite Total score and all IWQOL-Lite subscales (the findings for which are shown in **Supplementary Table 1**). Linear regression was used to test the effects of WBIS scores on the IWQOL-Lite Total score and each subscale above and beyond the effects of participant gender, race, age, BMI, and depression (PHQ-9) scores. Based on prior evidence of different effects of WBI based on gender and race (Puhl et al., 2018; Boswell and White, 2015) separate hierarchical regression models were constructed with interaction terms between WBIS scores and gender and race (one model for race and another for gender for the IWQOL-Lite Total score and each subscale, with all of the same covariates described above). PHQ-9 scores were transformed with the natural log to meet assumptions of normality, and all continuous predictor variables were centered at their means. Because all participants completed questionnaires at baseline, missing score values can be attributed to participants skipping individual items within scales. Scale scores were prorated for participants with ≤15% missing values for scale items.

RESULTS

A total of 178 adults with obesity were enrolled in the trial and completed baseline assessments. Participant characteristics have been previously reported (71.3% black, 21.9% white, 87.6% female, mean age = 44.2 ± 11.2 years, mean BMI = 40.9 ± 5.9 kg/m^2) (Shaw Tronieri et al., 2018). The mean WBIS score at baseline (n = 172) was 3.6 ± 1.1, and the mean PHQ-9 score (n = 176) was 4.9 ± 4.8, indicating minimal symptoms of depression.

Regression Analyses

As shown in **Table 1**, WBIS scores were significantly associated with the IWQOL-Lite Total score and all subscales above and beyond all covariates. The strongest association was between WBIS scores and the Self-Esteem subscale (β = −0.70, $p < 0.001$), and the smallest effect size was between WBIS scores and the Physical Function subscale (β = −0.18, $p = 0.019$). **Table 1** also shows that greater symptoms of depression, as measured by the PHQ-9, were associated with lower IWQOL-Lite Total scores, as well as lower scores on all five subscales (with β values ranging from −0.15 to −0.33). Similarly, higher BMIs tended to be associated with lower overall weight-related QOL (i.e., Total score), as well as lower scores on the physical function, public distress, and work subscales (with β values ranging from −0.18 to −0.43). The interactions between WBIS scores and gender

and WBIS scores and race were not significant in any analysis (p values > 0.10, R^2 change values ≤ 0.01; see **Supplementary Tables 2, 3**).

DISCUSSION

The results of this study showed that, in treatment-seeking patients with obesity, those who reported higher levels of WBI also reported lower overall weight-related QOL. The present findings are consistent with prior reports of an association between WBI and lower general QOL, as measured by the global mental and physical health-related QOL scores of the SF-36 (Latner et al., 2013, 2014; Pearl et al., 2014), as well as a report of negative associations between WBIS scores and the IWQOL-Lite Total and Self-Esteem subscale scores (Hübner et al., 2016). Our results extend these findings by documenting relationships between WBI and impairments in several domains of function that are specific to individuals with obesity. In addition to predicting lower overall weight-related QOL, WBI was associated with lower weight-related physical function, self-esteem, sexual life, public distress, and work. These associations highlight that there is a negative relationship between WBI and both mental and physical weight-related outcomes.

Consistent with prior studies, we observed that both higher BMI and greater symptoms of depression were associated with lower overall weight-related QOL and lower weight-related physical function, public distress, and work. Higher body weight and symptoms of depression are well known to adversely affect QOL (Kolotkin et al., 2009). Levels of WBI and depression were relatively low for a treatment-seeking sample (Latner et al., 2013; Pearl et al., 2014), which may be due to study exclusion criteria of major depression or the use of anti-depressant medication. Additionally, our sample consisted predominantly of black participants, who have been shown to have lower levels of WBI than white adults with obesity (Puhl et al., 2018), so our findings may not generalize to other weight loss treatment-seeking samples. We found that WBI further added to impairment in weight-related QOL after controlling for the effects of BMI, symptoms of depression, and demographic characteristics. This finding suggests that the relationship between WBI and weight-related QOL is not fully accounted for by higher body weight or depression scores among patients with greater WBI. Clinical interventions may be needed to reduce WBI in persons with obesity to achieve optimal improvements in weight-related QOL and in related subdomains of functioning.

Given that most prior studies in this area of research have been limited to predominantly white participants, the high proportion of black participants represents a strength of the current study. However, the small number of males in this study may limit the generalizability of these results. We did not find that the relationship between WBI and QOL differed by race or by gender in this sample. Further research with larger, diverse samples is needed to replicate these results. This study also cannot determine the causal nature of the association between WBI and weight-related QOL (or between QOL and BMI and symptoms of depression). We believe that WBI likely contributes to reduced weight-related QOL, both overall and in specific domains of functioning. However, longitudinal studies are needed to demonstrate a causal relationship between WBI and impaired QOL.

In summary, high WBI in persons with obesity was associated with greater impairments in overall weight-specific QOL and in weight-related physical function, self-esteem, sexual life, public distress, and work. These relationships were maintained after controlling for BMI and depression, suggesting that WBI has an independent effect on weight-related QOL. This may suggest that treatments targeting WBI would improve weight-related QOL.

AUTHOR CONTRIBUTIONS

OW was one of the study coordinators, participated in conceptualizing this specific study, and held primary responsibility for drafting the manuscript. TW was responsible for the conception and design of the trial, participated in conceptualizing this specific study, and participated in editing of the manuscript. JT served as one of the study interventionists, organized the trial database, and participated in editing the manuscript. AC served as a medical monitor for the trial and participated in editing the manuscript. RP served as one of the study interventionists, participated in conceptualizing this specific study, conducted the statistical analyses for this manuscript, and participated in editing the manuscript.

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SUPPLEMENTARY MATERIAL

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The Multifaceted Nature of Weight-Related Self-Stigma: Validation of the Two-Factor Weight Bias Internalization Scale (WBIS-2F)

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Background: Internalized weight stigma (IWS) is generally operationalized as self-devaluation due to weight in higher-weight individuals. The most commonly used measure of IWS, the Weight Bias Internalization Scale (WBIS), was developed from an original pool of 19 items. Item selection was guided by statistical techniques based upon an *a priori* hypothesized unidimensional factor structure. The resulting 11-item scale mostly assesses appearance-related attitudes, fear of stigma, affect, and desire for change, all of which may be a natural response to societal weight stigma, even in the absence of self-devaluation. Items pertaining to self-blame, stigma awareness, perceived legitimacy of weight stigma, and most items pertaining to self-worth, were excluded from the final scale. It is unclear whether an *a priori* assumption of multi-dimensionality would have produced different results.

Methods: Exploratory and confirmatory factor analysis of the original 19-item questionnaire was conducted in 931 higher-weight individuals.

Results: A 13-item two-factor structure was identified. Factor 1 comprised seven items that could be loosely conceived as weight-related distress. Factor 2 comprised six items, all of which pertained to weight-related self-worth. Tested individually, the six items making up the self-devaluation factor were an excellent fit for the data on all fit indices.

Conclusion: IWS is a multi-dimensional construct. The two-factor WBIS (WBIS-2F) provides options to explore the relationships between different aspects of IWS and upstream and downstream variables. The Self-Devaluation subscale is suitable for standalone use when weight-related self-devaluation *per se* is the construct of interest.

Keywords: internalized weight stigma, internalized weight bias, self-stigma, anti-fat attitudes, factor analysis, Weight Bias Internalization Scale

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INTRODUCTION

Weight stigma can be broadly defined as exposure to negative attitudes, behaviors, or structural indignities that befall higher-weight individuals because of their weight or size. Higher-weight individuals experience weight stigma in practically every domain of daily life (Puhl and King, 2013). In addition to being stigmatized by others, some individuals internalize society's anti-fat attitudes

and stereotypes – that is, they devalue themselves because of their weight, with concomitant detriment to their self-worth and social identity (Hunger et al., 2015). Internalized weight stigma (IWS) has been linked with a wide range of negative health outcomes, including mood disorders, psychological distress, worse body image, lower self-esteem, poorer health-related quality of life, metabolic dysfunction, disordered eating, avoidance of exercise, and social isolation and experiential avoidance (for a review, see Pearl and Puhl, 2018). Importantly, IWS appears to be an important mediator in the relationship between experienced stigma and maladaptive coping behaviors including disordered eating (Durso et al., 2012; O'Brien et al., 2016; Meadows and Higgs, unpublished) and reduced physical activity (Pearl et al., 2015), and between BMI and health-related quality of life (Lillis et al., 2011). IWS also moderated the relationship between BMI and physical health-related quality of life in a sample of 81 higher-weight women recruited from weight-related Internet sites, such that the negative association was observed only in those individuals with high levels of IWS (Latner et al., 2014). Thus, IWS appears to be a critical consideration in understanding negative health outcomes in higher-weight individuals.

Operationalizing Internalized Weight Stigma

One of the major issues facing researchers of IWS is that of operationalization – that is, how the construct is defined. IWS is most commonly defined as not just awareness, or even endorsement, of negative stereotypes, but also as applying those negative attributes to yourself, *and* subsequently devaluing yourself because of it (Durso and Latner, 2008). For example, while IWS does include a component of negative appearance evaluation, this is specific to facets of body image related to weight. Additionally, there is a strong element of self-blame involved in IWS. For example, while one might have poor body image related to a specific body part, such as height, or a disliked facial feature, this is unlikely to be tainted by a belief that one is to blame for that aspect of one's appearance. Similarly, self-esteem that is specific to the domain of weight does not preclude higher self-worth in other domains, and vice versa. Finally, IWS is a self-directed attitude, whereas anti-fat attitudes generally pertain to evaluations of fat others. Thus, IWS is related to, but distinct from, the constructs of body image, self-esteem, and attitudes toward other high-weight individuals (Durso and Latner, 2008; Carels and Musher-Eizenman, 2010; Carels et al., 2013). Unusually among marginalized groups (Tajfel and Turner, 1979; Crandall et al., 2000; Dasgupta, 2004), there appears to be little protective ingroup bias among higher-weight individuals; that is, fat people are as likely to hold negative explicit and implicit anti-fat attitudes as are slimmer people (Crandall and Biernat, 1990; Crandall, 1994; Rudman et al., 2002; Wang et al., 2004; Schwartz et al., 2006). Further, negative attitudes toward other higher-weight individuals are not necessarily reflected in one's views of oneself (Carels et al., 2011). In a study of 53 higher-weight adults enrolled in a weight-loss intervention, participants demonstrated high levels of both explicit and implicit negative attitudes toward higher-weight individuals in general; however, implicit attitudes testing suggested that despite their self-assigned "overweight" status and their participation in a weight-loss intervention, they saw themselves as significantly thinner, better, and more attractive, active, disciplined, and likely to eat healthily than fat others (Carels et al., 2011). In fact, it appears that many fat people do not self-identify as fat – perhaps envisioning themselves as thin people in merely temporarily fat bodies (Quinn and Crocker, 1998; Murray, 2005; Kyrölä and Harjunen, 2017).

Measures of Internalized Weight Stigma

To date, three validated measures of IWS have been published, all using slightly different conceptualizations of the construct. Although not formally depicted as a measure of IWS, the Weight- and Body-Related Shame and Guilt Scale (WEB-SG; Conradt et al., 2007), assesses feelings of shame at one's size and guilt at failing to engage in supposed weight-changing behaviors. A typical item on the Guilt subscale is, "When I can't get a grip on my weight, I blame myself." Lewis (1971) proposed that the related emotions of shame and guilt differ primarily in the role of the self: whereas guilt represents a state of negative affect relating to, for example, a specific deviant behavior (e.g., lying, stealing), with the behavior being the focus of judgment, shame represents a more trait-level attribution to negative self-worth, whereby moral transgressions are transmitted into a global devalued self (Lewis, 1971; Tangney et al., 1996). Thus, shame, rather than guilt, should be more aligned with the conceptualization of IWS as a self-devaluation status. More recent conceptualizations of the construct of shame have identified two aspects of shame – one that concerns global self-defect and one relating to appraisal of condemnation by others (Gausel and Leach, 2011; Gausel et al., 2016). Most of the six items on the Shame subscale of the WEB-SG refer specifically to anticipated rejection by others, for example, "When I am in a situation where others can see my body (e.g., pool, changing room), I feel ashamed." Thus, this subscale primarily captures perceptions of damaged social image, rather than specific self-defect. Although both subscales explained additional variance in scores on body self-acceptance, depressive symptoms, and self-esteem, beyond that accounted for by shame and guilt related specifically to eating (Conradt et al., 2007), a study involving a weight-diverse sample of Canadian young adults found that the Shame, but not Guilt, subscale, mediated the relationship between objective measurements of weight status (BMI, skinfolds, and waist circumference) and global self-esteem (Pila et al., 2015).

A second validated measure of IWS is the Weight Self-Stigma Questionnaire (WSSQ; Lillis et al., 2010). The WSSQ comprises two subscales, which differentiate between self-devaluation and fear of being stigmatized by others. The Self-Devaluation subscale assesses guilt, shame, and self-blame with respect to body weight, and includes items such as, "I feel guilty because of my weight problems," and "I caused my weight problems." Three of the six items relate to a global self-defect, but all pertain to willpower, for example, "I became overweight because I'm a weak person." No items relate to other aspects of a devalued self. The Fear of

Enacted Stigma subscale assesses worries about being stigmatized by others because of weight, for example, "Others are ashamed to be around me because of my weight," and "Others will think I lack self-control because of my weight problems." It should be noted, then, that although the authors of the scale denoted this subscale as "fear of stigma," the subscale could also be characterized as anticipation or expectation of weight stigma – that is, fear of rejection and feelings of inferiority due to other-condemnation, and overlaps considerably with the Shame subscale of the WEB-SG. It could be argued that devaluing oneself due to a stigmatized characteristic may lead to expectations that others will do the same, but it is not a necessary pre-requisite (Link et al., 2015). Nevertheless, using the WSSQ, Almenara et al. (2017) reported that self-devaluation, but not fear of stigma, was associated with recent dietary restraint and eating and weight concerns in higher-weight women. Thus, while studies using these measures are clearly telling us *something* about the relationship between weight-related self-beliefs and health and behavioral outcomes, interpretation of these findings is constrained by the lack of clear agreement on the theoretical underpinnings of the construct.

The third validated measure of IWS is the Weight Bias Internalization Scale (WBIS; Durso and Latner, 2008). The WBIS was developed from an original pool of 19 items encompassing several potential aspects of weight-related self-stigma, including appearance-related attitudes, social status, fear of being stigmatized by others, affective impact of weight status, desire for change, and weight stigma awareness and perceived legitimacy of weight stigma. Item selection for the final scale was guided by statistical techniques based upon a hypothesized unidimensional construct, producing a final scale comprising eleven items. These items mostly assess attitudes related to appearance, fear of stigma, affect, and desire for change. Notably, all items pertaining to self-blame, stigma awareness, and perceived legitimacy, and several of the items pertaining to self-worth, were excluded from the final scale.

Given that the key underlying concept involved in IWS is one of self-devaluation, it could be questioned whether the standard WBIS, here denoted WBIS-11 for clarity, optimally captures this construct. Although the WBIS-11 is widely used, Schvey et al. (2013) used the full 19-item version of the WBIS (WBIS-19) in an online sample of 656 overweight and obese adults and the scale demonstrated excellent internal reliability and convergent and discriminant validity. Scores on the WBIS-19 were significantly correlated with eating disordered cognition and behavior, history of high-weight status, weight cycling, and depressive symptoms, even after controlling for BMI. Additionally, WBIS-19 scores discriminated between participants who engaged in binge/purge behavior and those without eating pathology (Schvey et al., 2013). However, the factor structure of the WBIS-19 has not been tested. The aim of the present study was to conduct the first exploratory and confirmatory factor analysis of the WBIS-19 using split samples from the same population of higher-weight individuals to establish its latent variable structure. This analysis was conducted as part of a broader study on individual differences in response to weight stigma.

MATERIALS AND METHODS

Sample

A purposive recruitment strategy was implemented, designed to provide a sample likely to have a range of views on the acceptability of societal weight stigma, both positive and negative emotions about their own body weight, and to differ in their levels of fat identity. As such, adult participants (age 18–69 years) who self-identified as "overweight," "obese," or "fat"[1] were recruited to complete an anonymous online survey on the "Life experiences of overweight individuals," and invitations to participate in the survey were posted on social media and Internet forums related to weight, weight-loss, health, nutrition, fitness, plus-size fashion, and the size acceptance movement.

The choice to use these three terms to describe weight status was a deliberate one. Higher-weight individuals have different preferences for the terminology used to describe their bodies, often finding one or more of the terms offensive. For example, members of the "size acceptance" community – one of the groups targeted in the recruitment process – prefer the word "fat" and dislike medicalized terms of body weight (Meadows and Daníelsdóttir, 2016). Although evidence suggests that various weight-related terminology carries different meanings to different people, including more normative terms with medically designated definition such as "overweight" and "obese" (Vartanian, 2010; Brochu and Esses, 2011; Ellis et al., 2014), this approach augments the diversified recruitment strategy, helping to address the limitations of non-generalizability of findings from, for example, treatment-seeking populations, and also increasing the likelihood of attaining sufficient variation on the measure of interest to conduct reliable psychometric testing.

A two-step inclusion criteria was used, involving both self-classification of higher-weight status, and having a BMI consistent with the standard definitions of high-weight status – that is, a self-reported height and weight producing a BMI greater than or equal to 25 kg/m^2. Extensive evidence testifies to the fact that self-identification of body size is either an equally or more consistent predictor of cognitive, affective, and behavioral correlates than is objective BMI (Major et al., 2014; Lee and Dedrick, 2016; Lin et al., 2018). However, this double-classification method has been used previously as a more conservative sample selection procedure (Durso et al., 2012; Pearl and Puhl, 2016).

The survey was conducted using a dedicated survey platform[2]. After providing consent, participants completed a series of questionnaires and provided demographic data. All participants were entered into a prize draw to win one of two £50 Amazon voucher (or local equivalent). The study was approved by the University of Birmingham Ethical Review Committee.

[1]The word "obese" was added to recruitment materials in the present study as a result of a number of emails received from potential participants in a previous study that recruited "overweight" individuals. Respondents had queried whether they were eligible to participate if they were "obese" rather than "overweight."

[2]http://Qualtrics.com

Measures

Internalized weight stigma was measured with the WBIS-19 (Durso and Latner, 2008) (see **Table 1**). Items were scored on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating greater weight-related self-stigma. Internal reliability of the WBIS-19 was 0.92. Participants were asked to provide age, gender, and ethnicity, and to report height and weight measurements, which were used to calculate BMI. The option to decline to answer any of these questions was provided.[3]

Handling of Missing Values

Fifty-one participants (5.5%) were missing height and/or weight information such that BMI could not be computed. Three participants (0.003%) had missing responses on one (n = 2) or two (n = 1) items on the WBIS-19. Missing values analysis indicated no overall pattern of missingness, Little's MCAR test $\chi^2(75) = 91.7$, $p = 0.09$, indicating that these data were missing completely at random. Independent samples t-tests confirmed no response differences between participants with or without BMI data available. As BMI was collected predominantly for descriptive purposes, and was not included in the hypothesized model, missing BMI values were not imputed. Given the very low prevalence of missing data on the WBIS-19, no imputation was used and factor analyses were conducted with listwise deletion. Missing values on demographic variables (race/ethnicity 8.1%, age, geographic location, education, and profession all <3.8%) were also not imputed.

Data Analysis

The data were split randomly into two groups, each including approximately 50% of cases. Exploratory factor analysis was conducted on one half of the data (N = 481), using principal axis factoring and direct oblimin rotation with Kaiser normalization. It was stipulated that item factor loadings >0.3 represented a substantive contribution of the item to a factor. Given the large sample size, factor extraction decisions were based on the scree plot, rather than eigenvalues (Field, 2013). Internal reliability was calculated for each derived factor.

Confirmatory factor analysis was conducted with the other half of the data (N = 450) using maximum likelihood estimation. Model fit was assessed using χ^2 values, comparative fit index (CFI), and standardized root-mean-squared residuals (SRMR). Cut-off values of 0.95 for the CFI and 0.08 for SRMR, respectively, are generally considered to indicate a relatively good fit of the hypothesized model to the observed data (Hu and Bentler, 1999). However, CFI tends to decline with increasing number of indicators in the model (Kenny and McCoach, 2003). In the present analysis, the maximum number of variables per factor was 19, thus, following Chen et al. (2012), a less stringent cut-off of 0.90 was used for the CFI to indicate goodness of fit in models with higher number of factor loadings. Additionally, as the sample size approached 500, root-mean-square error of approximation (RMSEA) and its 90% confidence interval would be more reliable than in smaller samples (Hu and Bentler, 1999), and was included as an additional measure of model fit. The RMSEA is an indicator of the proportion of variance not explained in the model. A value of RMSEA of 0.06 or lower is considered indicative of good model fit, below 0.08 a reasonable fit, and values above 0.10 indicate poor model fit (Browne and Cudeck, 1992; Hu and Bentler, 1999). Model comparison (i.e., selection of superior models) was assessed using fit indices (CFI, RMSEA, SRMR) plus χ^2 difference tests. A reduction in χ^2 greater than the critical value for the change in degrees of freedom

TABLE 1 | Exploratory factor analysis of WBIS-19.

Item	*F*1	*F*2	*F*3
1. It is my fault that I am overweight	0.48	0.46	–
2*. As an overweight person, I feel that I am just as competent as anyone[a]	–	–	0.74
3. I am less attractive than most other people because of my weight[a]	0.69	–	–
4. I feel anxious about being overweight because of what people might think of me[a]	0.72	–	–
5. I wish I could drastically change my weight[a]	0.84	–	–
6. If only I had more willpower, I would not be the weight that I am[a]	0.59	0.48	–
7. Whenever I think a lot about being overweight, I feel depressed[a]	0.79	–	–
8*. I feel that being overweight does not interfere with my ability to be a good and decent person	–	–	0.55
9. I hate myself for being overweight[a]	0.76	–	–
10. My weight is a major way that I judge my value as a person[a]	0.61	–	–
11. I do not feel that I deserve to have a really fulfilling social life as long as I am overweight[a]	–	–	0.47
12*. I am OK being the weight that I am[a]	0.74	–	–
13*. As an overweight person, I feel that I am just as deserving of respect as anyone	–	–	0.78
14*. It really bothers me that people look down on overweight people	–	0.74	–
15. Because I am overweight, I do not feel like my true self	0.76	–	–
16*. I feel that being an overweight person does not make me unworthy of a loving relationship	–	–	0.34
17. Because of my weight, I do not understand how anyone attractive would want to date me[a]	0.61	–	–
18*. I believe that society's prejudice against overweight people is unfair	–	0.70	–
19. If other people do not treat me with respect, I should put up with it because of my weight	–	–	0.61
Internal reliability[b]	0.93	0.80[c]	0.77

*N = 481. Standardized factor loadings displayed. WBIS = Weight Bias Internalization Scale. *Items marked with an asterisk are reverse-scored. [a]Items included in standard WBIS-11. [b]Internal reliability statistic is Cronbach's α except for two-item F2, which is Spearman–Brown coefficient. [c]Items 1 and 6 not included – assumed to load onto F1 only. Alpha with items 1 and 6 included = 0.76.*

[3]While not included in the present analyses, other measures included in the full study were: Rosenberg Self-Esteem Scale (Rosenberg, 1965); Stigma Consciousness Questionnaire (Pinel, 1999); Multicomponent Ingroup Identification Scale (Leach et al., 2008); three items from the Anti-Fat Attitudes Questionnaire-Revised Willpower subscale (Quinn and Crocker, 1999); Stigma Resistance Scale and Perceived Legitimacy of Anti-Fat Discrimination – created for study and available from authors. These measures correlated with WBIS-19 scores in the expected directions, and internal reliability and validity of all questionnaires was high.

indicates a significantly better model fit. Confirmatory factor analysis was conducted using Mplus version 8 (Muthén and Muthén, 1998–2017). All other analyses were conducted using IBM SPSS for Mac v25.

RESULTS

Sample Characteristics

A total of 1154 participants began the study and 963 (83.4%) completed it. Twenty-six participants (2.7%) had a BMI less than 25 kg/m^2 based on self-reported height and weight and these participants were excluded from subsequent analyses. Five participants were aged over 69 years (70–80 years) and one was aged 17. These participants fell outside the age range specified in the approved ethical application for this study and were also excluded. The final sample size was therefore 931.

The sample was predominantly female (85.5%; 9.7% male, 1.9% other, 2.9% missing) and White (83.7%; 1.9% Black, 1.5% Hispanic, 1.2% Asian, 2.1% multi-racial, 8.2% other, 8.1% missing). Age range was 18–69 years (M = 40.2, SD = 11.4; 3.8% missing), and BMI range was 25.0–95.0 kg/m^2 (M = 40.2, SD = 10.8). Further breakdown of BMI distribution indicated 14.1% had BMI between 25.0–29.9 kg/m^2, 21.4% between 30.0–34.9 kg/m^2, 17.9% between 35.0–39.9 kg/m^2, 27.8% between 40.0–49.9 kg/m^2, and 13.3% had BMI greater than or equal to 50.0 kg/m^2. Just over one-third were living in the United Kingdom and just over a half in North America – no other region accounted for more than 5% of the sample. Participants were also highly educated, with three-quarters having a college degree or higher, and 61.3% listed their occupation as managerial, administrative, or professional; 9.5% were students, 5.2% unemployed, 20.9% other, 3.2% missing.

WBIS-19 scores were normally distributed (minimum = 1.1, maximum = 6.4, M = 3.6, SD = 1.1) with low skewness (−0.174, SE = 0.08) and kurtosis (−0.554, SE = 0.16), indicating a good distribution of IWS scores. Small but significant correlations were observed between WBIS-19 and BMI ($r = -0.13$, $p < 0.00$).

Exploratory Factor Analysis

Exploratory factor analysis based on a random half (approximate) of the sample (N = 481) suggested a three-factor structure for the WBIS-19, explaining 54.8% of the total variance (see **Table 1** for individual items and factor loadings; see **Supplementary Material** for scree plots). The first factor ($F1$) included 11 items and was almost identical to the standard WBIS-11. While these items appear conceptually diverse, this factor could be loosely conceived as "weight-related distress" – negative cognitive and affective states resulting from weight status, for whatever reason, whether related to how you look, how others treat you, if you blame yourself for getting that way, and so on. Corrected item-total correlations for the 11-item factor ranged from 0.55 to 0.81. The second factor ($F2$) initially comprised four items, two pertaining to the perceived legitimacy of anti-fat attitudes – "It really bothers me that people look down on overweight people" and "I believe that society's prejudice against overweight people is unfair" (items 14 and 18 in the original WBIS-19), and two pertaining to self-blame – "It's my fault that I'm overweight" and "If only I had more willpower, I wouldn't be the weight I am" – that had similar factor loadings across both $F1$ and $F2$ (items 1 and 6 on the original WBIS-19. The third factor ($F3$) comprised six items, all of which pertained to weight-related self-worth, and this factor was labeled "weight-related self-devaluation." Corrected item-total correlations for this six-item factor ranged from 0.36 to 0.66. $F1$ and $F3$ correlated 0.530, but $F2$ did not correlate strongly with either of the other factors (rs = 0.146 and 0.225, respectively). Additionally, $F2$ contributed the least proportion of total variance explained (rotated sum of squared loadings $F1$ = 6.94, $F2$ = 2.10, $F3$ = 4.91).

Of the four items loading onto F2, the two items pertaining to perceived legitimacy did not correlate strongly with any of the other items on the scale (15 and 14 correlation coefficients, respectively, below 0.3). In contrast, the items pertaining to self-blame correlated greater than 0.3 with 11 of the remaining 17 items. Given the imbalance of the number of items across the three factors, the low correlation of F2 with the other two factors, the very low correlations between items 14 and 18 and the remaining 17 items, and the relatively small contribution to the total variance explained, it was decided to delete the two items pertaining to perceived legitimacy but to retain items 1 and 6 at this stage. Thus, the analysis was re-run with the remaining 17 items.[4]

EFA of the WBIS-17 again produced three factors, explaining 56.0% of the total variance, with the items pertaining to self-blame no longer cross-loading, but now loading uniquely onto their own factor. However, as these items have previously loaded onto $F1$, the EFA was re-run pre-specifying a two-factor extraction. This analysis produced a clear pattern of factor loadings, with 11 items loading onto a weight-related distress factor (including the items pertaining to self-blame), and six onto a weight-related self-devaluation factor. Internal reliability of the weight-related distress factor was 0.926. Internal reliability of the weight-related self-devaluation factor was 0.768. Item 16 – "I feel that being an overweight person does not make me unworthy of a loving relationship" (reverse-scored) had a lower item-total correlation than the other items on the factor (0.360), and its deletion would have increased the internal reliability to 0.794. However, given the relatively small size of this improvement, that deletion would also have a large impact on scale variance – reducing it from 39.4 to 27.6, and the smaller number of items on this factor, a decision was made to retain this item at this stage.

Confirmatory Factor Analysis

Confirmatory factor analysis using the remainder of the sample (N = 450) tested the 17-item two-factor model identified by

[4]To determine whether the two items on $F2$ could be incorporated into a two-factor structure, EFA was repeated on the WBIS-19 but with a pre-specified two-factor extraction. This resulted in a confused pattern matrix with the two items loading onto one factor, 12 items onto the other factor, four items cross-loading across both factors, and one item not loading onto either factor above a loading value of 0.3.

exploratory analysis. The factors were allowed to covary. The two-factor structure of the WBIS-17 was a poor fit to the data (**Table 2**).[5] As the factors remained unbalanced in terms of item number, with *F*1 comprising 11 items and *F*2 only 6, an alternative 15-item structure was tested, which involved removal from *F*1 of the two items pertaining to self-blame that had loaded onto their own factor when the number of factors to be extracted was not pre-specified. The resulting two-factor WBIS-15 was an acceptable fit for the data and superior to the WBIS-17 model on all fit indices. Investigation of modification indices (MIs) indicated nine pairs of items with values above 10. The highest of these was for item 12 – "I am OK being the weight I am" (reverse-scored) and item 5 – "I wish I could drastically change my weight," MI = 77.8. Item 5 had slightly higher estimated factor loading and estimate/standard error, and was slightly more strongly correlated with other items on the scale; thus, item 12 was deleted and the CFA re-run.

The resulting WBIS-14 was a good fit to the data. Five pairs of items had MIs above 10, the largest of which was for item 3 – "I am less attractive than most other people because of my weight" and item 17 – "Because of my weight, I don't understand how anyone attractive would want to date me," MI = 38.4. Item 17 had slightly higher factor loading and estimate/standard error value. Additionally, while item 3 could be described as reflecting body image, item 17 additionally includes a component of self-worth. Thus, item 3 was removed and the CFA repeated.

[5]A unidimensional 17-item model was also a poor fit to the data: $\chi^2(119) = 936$, RMSEA = 0.124 (90% CI = 0.116, 0.131], CFI = 0.797, SRMR = 0.079.

TABLE 2 | Confirmatory factor analysis of two-factor WBIS-17.

Model	χ^2	Df	RMSEA [90% CI]	CFI	SRMR
Two-factor WBIS-17	694	118	0.104 [0.097,0.112]	0.857	0.061
Two-factor WBIS-15	365	89	0.083 [0.074,0.092]	0.920	0.049
Two-factor WBIS-14	259	76	0.073 [0.063,0.083]	0.941	0.047
Two-factor WBIS-13 (WBIS-2F)	180	64	0.064 [0.053,0.075]	0.957	0.045
WBIS-2F Subscales					
Weight-related distress	42.1[a]	14	0.067 [0.044,0.090]	0.984	0.022
Weight-related self-devaluation	16.2[b]	9	0.042 [0.000,0.075]	0.988	0.022
WBIS-11 (standard scale)	285	44	0.110 [0.098,0.123]	0.917	0.046

N = 450. Compared with the original 19 items, WBIS-17 excludes items 14 and 18; WBIS-15 further excludes items 1 and 6; WBIS-14 further excludes item 12; WBIS-13 further excludes item 3. CFI = comparative fit index; CI = confidence interval; df = degrees of freedom; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-squared residual; WBIS = Weight Bias Internalization Scale. All χ^2 $p < 0.0000$ unless otherwise stated. [a]$p = 0.0001$. [b]$p = 0.06$.

The resulting two-factor WBIS-13 (WBIS-2F) was a very good fit to the data. Three MIs had a value above 10, but none involved overlap on face validity, and no further changes were made. The final 13-item scale therefore included a seven-item weight-related distress factor and a six-item weight-related self-devaluation factor (**Figure 1**).[6] Additionally, the two subscales individually were a good (weight-related distress) to excellent (weight-related self-devaluation) fit for the data.[7] By comparison, the standard unidimensional WBIS-11 was an acceptable (CFI, SRMR) to poor (RMSEA) fit for the data.

Using the full sample, scores on the two factors indicated higher levels of weight-related distress ($M = 4.6$, $SD = 1.5$) than weight-related self-devaluation ($M = 2.1$, $SD = 1.0$). Weight-related distress and self-devaluation were moderately correlated ($r = 0.58$, $p < 0.00$). Cronbach's α for the two subscales was 0.910 and 0.763, respectively.

DISCUSSION

The present study utilized a large, diverse sample of non-treatment-seeking higher-weight individuals to conduct the first examination of the latent variable structure of the original pool of 19 items that produced the standard WBIS-11 (Durso and Latner, 2008). As noted above, the WBIS-11 was derived based upon the assumption that the construct of IWS was unidimensional. However, the items in the resulting 11-item scale appear to represent a combination of underlying concepts, including fear of how one might be judged by others, desire for change, and psychological distress, all of which may be a natural response to societal weight stigma, even in the absence of self-devaluation. Removing the assumption of unidimensionality resulted in a three-factor scale, the dimensions representing weight-related self-devaluation, weight-related distress, and perceived legitimacy of weight stigma. Interestingly, item 1 on the standard WBIS-11 (Q2 on the WBIS-19: "As an overweight person, I feel that I am just as competent as anyone"), which has often been found to have low item-total correlation with the remaining 10 items and is frequently dropped from the scale (Durso et al., 2016; Lee and Dedrick, 2016), here loaded onto the self-devaluation factor rather than the weight-related distress factor that closely resembles the standard WBIS-11.

Only two of the original 19 items described beliefs about perceived legitimacy of weight stigma and loaded onto an independent factor that did not correlate strongly with the others, despite the face validity of the construct for a measure of weight-related self-stigma. It is possible that individuals may have strong views about social-justice issues, independent of their thoughts and feelings about their own bodies. Similarly, two items pertaining to self-blame loaded onto a separate factor when the

[6]A unidimensional 13-item scale was not a good fit for the data: $\chi^2(65) = 400$, RMSEA = 0.107 (0.097, 0.117), CFI = 0.867, SRMR = 0.074.

[7]Deleting item 16 from the weight-related self-devaluation factor, despite its lower factor loading (standardized loading 0.393) and relatively low proportion of variance explained ($R^2 = 0.154$), did not improve the model and produced deterioration in several fit indices; thus, this item was retained.

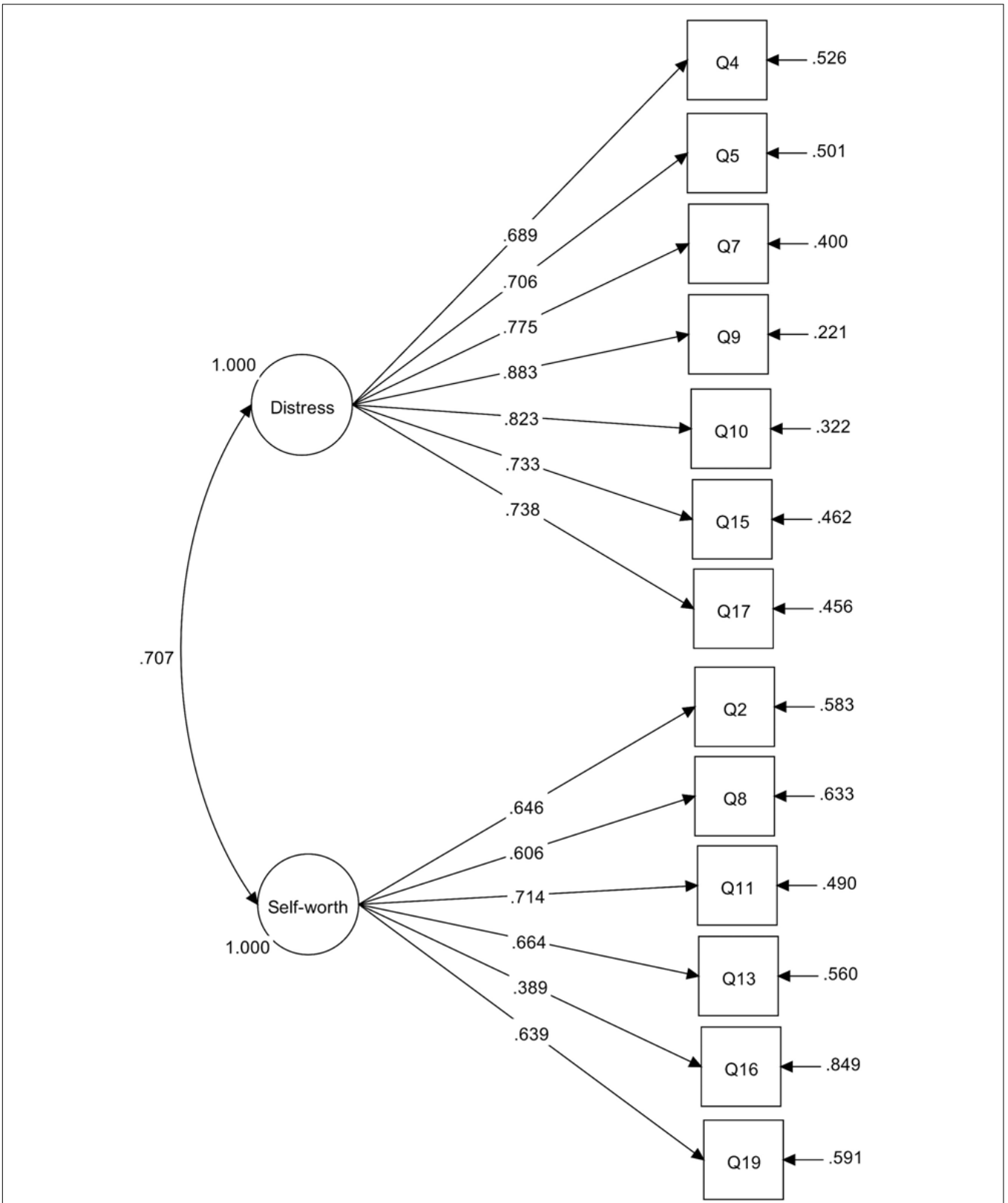

FIGURE 1 | Measurement model for WBIS-2F subscales. Standardized parameter estimates are shown, all $p < 0.000$. Item numbers refer to numbering in original 19-item WBIS (Durso and Latner, 2008).

number of factors extracted was not constrained. Forcing a two-factor extraction to avoid another two-item factor, these items loaded acceptably onto the weight-related distress factor, but confirmatory factor analysis indicated that the model was a better fit to the data without them. Thus, both perceived legitimacy of weight stigma and perceived controllability of weight, while related to IWS, can be excluded from a parsimonious scale that comprises weight-related distress and weight-related self-worth.

Confirmatory factory analysis indicated that a two-factor 13-item WBIS (WBIS-2F) was a good fit to the data. Exploring participants' scale scores, the fact that scores on the weight-related distress subscale were notably higher than those on the self-devaluation subscale provides support for the contention that these items are measuring something different to self-devaluation. It could be that the weight-related self-devaluation subscale provides a true measure of perceived internal worthiness, or lack thereof, whereas the weight-related distress subscale represents feelings and thoughts associated with fears of not fitting into society. Thus, this multi-dimensional scale structure provides a more nuanced representation of internalized weight-related cognitions and affect than does the standard WBIS-11.

The Weight-Related Self-Devaluation factor provided the best statistical fit to the data when tested individually, suggesting that these six items could be used as a standalone scale when the research question focuses specifically on weight-related self-worth. Although the Weight-Related Distress factor was a good fit for the data when tested independently, its similarity to the standard WBIS-11 may negate any benefit of using it in this way, and it may be preferable to continue use of the standard WBIS-11 when a broader conceptualization of weight-related self-stigma is of interest, in order to retain comparability with the extant literature. Additionally, a small number of items on the weight-related distress subscale do refer to self-worth. Future work on IWS may benefit from revisiting this construct, using a larger number of pool items, possibly generated with input from the target population, a large, diverse sample, and a thorough psychometric validation of the resulting scale(s).

This study has a number of strengths. First, the large sample size permitted cross validation of the factor structure in two groups of non-treatment-seeking higher-weight individuals. Second, the participants represented a good range of body sizes across the higher-weight spectrum and diverse weight-related attitudes. However, there are also a number of limitations. The sample lacked gender, ethnic, and geographic diversity, which precluded testing of measurement invariance and latent mean differences on factor scores across groups. Subjects may have been prone to social desirability responding, particularly with regard to the perceived legitimacy questions. As no measure of social desirability responding was used, it was not possible to test this. Additionally, if the WBIS-2F and its subscales are to be used in future research, further assessment of the psychometric properties of the scale(s) will be needed.

CONCLUSION

Internalized weight stigma may usefully be conceptualized as a multi-dimensional construct, encompassing both weight-related self-devaluation and more generalized cognitions and emotions related to living in a high-weight body in an anti-fat environment. The two-factor WBIS-2F could be used to explore the relationship between specific aspects of weight-related self-stigma and other upstream and downstream variables. Additionally, the six-item Self-Devaluation subscale aligns most closely with the original conceptualization of IWS, as a measure of reduced weight-related self-worth. This scale is suitable for standalone use when self-devaluation is the construct of interest.

ETHICS STATEMENT

This study was carried out with written informed consent from all subjects in accordance with the Declaration of Helsinki. The protocol was approved by the University of Birmingham Ethical Review Committee.

AUTHOR CONTRIBUTIONS

AM conceived the study and was responsible for data acquisition and analysis. AM and SH contributed to the design of the study and interpretation of the data. AM drafted the initial version of the manuscript. Both authors were involved in critical revision of the manuscript, approved the final manuscript, and agreed to be accountable for all aspects of the work.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00808/full#supplementary-material

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OPINION
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Weight Bias Internalization as an Embodied Process: Understanding How Obesity Stigma Gets Under the Skin

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INTRODUCTION

This *Opinion Article* contributes to this Special Issue a supportive critique of the weight bias internalization analysis. The explicit aim is to broaden the ways in which "internalization" is currently defined and analyzed in research on weight bias and to encourage interdisciplinary research endeavors to increase our understanding of its implications. Both authors are sociologists who understand and analyse the individual condition as embodied[1]. In short, we are interested in how and in what ways the social world "gets under the skin" and thus has psychosomatic implications. It is for this reason why, despite commending much of the scholarship on weight bias internalization and accepting the validity of the research findings, we feel it necessary to challenge the current application of the "internalization" terminology. Our argument is that weight bias internalization research is limited in that it is largely disembodied. This is considered problematic because to fully understand the *implications* of weight bias internalization (the express concern of this Special Issue), it is necessary to appreciate both *how* and *in what ways* it gets under the skin.

WEIGHT BIAS: DISCRIMINATORY, DETRIMENTAL AND COUNTER-PRODUCTIVE

Weight bias and obesity stigma are terms commonly used synonymously in research literature. Both describe a cultural framing that emphasizes the role of individual behavior or "lifestyle" as the cause and cure of "obesity" (Crossley, 2004) and forefronts an economic rationale to moralize and individualize the issue (i.e., implying that those who are classified as "overweight" and/or "obese"[2] are irresponsible individuals who are placing an avoidable burden on national health systems). As evidenced elsewhere (Williams and Annandale, 2018), our analysis sits within the tradition of Critical Obesity Studies recognizing that (i) obesity and overweight are socially constructed clinical categories—established via the Body Mass Index (BMI)—which offer crude and flawed indicators of health and (ii) the metabolically healthy but obese phenotype has been demonstrated empirically with physical activity and diet (independent of weight) acting as more reliable indicators of overall health status than BMI (e.g., Ortega et al., 2013). We endorse Rich's (2011, p. 16) argument that dominant cultural framings of people of higher weights "not only position individuals as blameworthy, but moralize and decontextualize health inequalities by glossing over the social and

[1] We have defined embodiment elsewhere as depicting "the fusion of the mind and body in a process whereby the society and culture within which we live are experienced in bodily terms and internalized by us: they are embodied" (Williams and Annandale, 2014, p. 1868).

[2] We initially place these terms in inverted commas in recognition that their meaning and use are challenged. In this article these terms are not referred to uncritically but are used to be consistent with the wider literature.

structural contexts." Because obesity has been consistently shown to follow social gradients in wealth and inequality (e.g., Pickett et al., 2005; Krueger and Reither, 2015; Baker, 2018), this depiction is often tantamount to victim blaming. Even outside of the influence of social inequalities, the logic of motivating people to comply with official health guidelines by moralizing behaviors and promoting the internationalization of weight-based stigma is highly questionable (see e.g., LeBesco, 2011; Täuber et al., 2018). Therefore, the implications of weight bias/stigma are important from both health promotion and social justice perspectives and have thus predictably become significant research inquiries.

The study of weight bias/stigma is a truly multidisciplinary field and despite significant disciplinary differences, the research findings are characterized by coherence. Review articles have concluded that not only is weight bias/stigma an ineffective means by which to reduce the incidence of obesity but that it actually promotes weight gain and has additional iatrogenic consequences (Puhl and Heuer, 2009; Brewis, 2014; Rees et al., 2014; Phelan et al., 2015). Weight bias/stigma has been shown to have significant detrimental mental health and behavioral implications, e.g., increasing vulnerability to stress, depression, low self-esteem, poor body image, maladaptive eating behaviors, and exercise avoidance (Hayward et al., 2018; Tomiyama et al., 2018; Tomiyama, 2019). Tomiyama et al., 2018 review outlines the rapidly growing evidence base that indicates the detrimental impact of weight bias/stigma cannot simply be explained away by higher bodyweights leading to poorer health and/or greater likelihood of perceiving weight-related discrimination. Rather, the review highlights that negative characterization of people classified as overweight/obese has led to simply *perceiving* oneself as overweight to have a prospective association with biological markers of poorer health. Research is in its infancy but findings indicate that the biological implications of weight bias/stigma range from increased secretion of the fat-storage promoting stress hormone cortisol (Jackson and Steptoe, 2018) to higher risk of developing dementia (Sutin et al., 2018); the former linked to the common practice of yo-yo dieting/weight cycling and its associated adverse health effects (Tomiyama, 2014; Madigan et al., 2018). Additionally, weight bias/stigma has been shown to translate into structural inequities, e.g., in employment, healthcare, and education, which reproduces the social disadvantage that drives the uneven distribution of obesity incidence throughout the socioeconomic spectrum (Puhl and Heuer, 2009; Tomiyama, 2019).

Puhl and Heuer (2010) argue that to improve public health it is essential that common societal assumptions that perpetuate weight bias/stigma are challenged and that the deleterious repercussions of weight bias/stigma inform the ways in which obesity is popularly framed and understood. Some will be unconcerned with the ethics of stigma and the imperative to reduce human suffering. However, they may be convinced of the need for change by the evidence demonstrating the ineffective, counter-productive and detrimental outcomes of weight bias/stigma. Consequently, it is vital that researchers analyse the processes through which the sociocultural phenomenon of weight bias/stigma affects people's health; that is, how the social (weight bias/stigma) gets under the skin. Or put another way, the processes by which external social factors are internalized and the psychosomatic consequences that follow. Despite the necessity of this inquiry, when moving from research on weight bias/stigma more generally to the more specific inquiry of weight bias internalization the field is limited in what it can offer. Therefore, it is necessary to critically evaluate the theoretical and methodological traditions that define the study of weight bias internalization.

GETTING UNDER THE SKIN: INTERNALIZATION AS EMBODIMENT

Weight bias internalization has been defined as the "internalization of negative weight stereotypes and subsequent self-disparagement" (Pearl and Puhl, 2018, p. 1141). In short, over time people who are classified as overweight or obese come to accept and endorse derogatory and discriminatory cultural depictions of people who are classified as overweight or obese (i.e., as irresponsible, gluttonous, and lazy). A systematic review of the literature has demonstrated that the empirical study of this phenomenon is in its infancy (Pearl and Puhl, 2018). But early findings illustrate a significant detrimental impact on mental (e.g., depression, anxiety, body dissatisfaction) and physical health (e.g., metabolic syndrome, weight cycling) as well as related health behaviors through rejection of dietary advice, binge eating and exercise avoidance (Ratcliffe and Ellison, 2015; Jackson and Steptoe, 2017; Puhl and Himmelstein, 2018). These are useful and important findings, but in such studies internalization is defined and analyzed predominantly as a cognitive process. Indeed, the *Weight Bias Internalization Scale* is "a measure of belief in social stereotypes relating to obesity and negative self-evaluations due to one's weight" (Durso and Latner, 2008, p. 81). This is an unnecessarily restrictive definition of "internalization" that unhelpfully narrows the parameters of inquiry.

While finding that self-blame and behaviors considered detrimental to one's health result from both self-endorsement of anti-fat attitudes and accepting weight-based stereotypes is certainly one element of weight bias internalization (i.e., a psychological component which subsequently influences patterns of behavior), it is only that: one component of a far more complex process of internalization. However, this component has come to define the field. This helps explain why the only systematic review of this literature (Pearl and Puhl, 2018) found that while there is evidence of strong, negative relationships between weight bias internalization and mental health outcomes, few studies have examined the relationship between weight bias internalization and physical health. Succinctly put, the predominance of psychological analysis is skewing the field.

On the basis of existing research it is fair to argue that in the study of weight bias internalization cognition has taken precedence over other interrelated processes. Given that weight bias has been shown to have social and biological implications, the delimited focus in the field on a cognitive process seems unjustified. The predominantly cognitive component that is currently most commonly referred to and researched

as weight bias internalization could perhaps more accurately be referred to as weight bias "endorsement," "acceptance," or "agreement." This would better reflect its partial (albeit important) role in the broader biopsychosocial process of weight bias internalization—which could alternatively be defined as: detrimental psychosomatic responses caused by exposure to discrimination on the basis of negative stereotypes about people of higher weights. An interdisciplinary approach to understanding weight bias internalization as an embodied phenomenon would go some way to painting a more complete picture of the implications of weight bias internalization.

Crossley (2006, p. 2) succinctly summarizes "reflexive embodiment" by explaining that "human bodies exist in two dimensions. We are our bodies (being) but sometimes perceive them as an object that we possess (having)." Bodies are both subjectively (personally) and objectively (materially) experienced. This is how weight bias/stigma (an external/social factor) can make bodies *feel* particular ways through psychosomatic experience and initiate changes in biological markers of health. For Freund (2011), this is because mind and body do not operate separately but rather we are all "mindbodies" with the potential to self-initiate health states on a conscious-unconscious level. It is this interconnected and dependent relationship between mental and physical, cognitive and carnal, which accounts for the well-established "placebo effect," but it also explains how the social gets under the skin. For instance, on top of the physical repercussions of related behaviors (e.g., maladaptive eating behaviors and exercise avoidance), this is how the depression someone may experience as a result of being/having a stigmatized body can detrimentally impact their physical health (through, for instance, the secretion of cortisol and associated effects—see e.g., Tomiyama, 2019). An embodied analysis of weight bias internalization needs to be inclusive of, but to extend beyond cognitive processes and their behavioral consequences by appreciating the biopsychosocial mechanisms through which weight bias is internalized and has consequence. That is, how the social (weight bias/stigma) comes to have material implications (detrimental health impacts).

Social scientists, particularly those employing a feminist analysis, have been at the forefront of establishing an embodied analysis of obesity (e.g., Bordo, 1993; Murray, 2012; Warin, 2015; Lupton, 2018). This work demonstrates the limits of approaching the study of obesity as primarily a biological, psychological or social and political phenomenon instead highlighting the inextricable interplay of these constituent factors and strengthens the analysis, methodology, and ethics of weight bias/stigma research. For example, the research trend of putting thin people in "fat suits" has been critiqued by Meadows et al. (2017) who highlight the impossibility of replicating the physiological, affective, and behavioral responses to weight stigma outside of the embodied experiences of people of higher weights. Furthermore, it is increasingly appreciated that the physical body does not simply respond to external social forces, but dynamically engages with them in an iterative process (see e.g., Barad, 2007). For example, in her book *Gut Feminism* Wilson (2015) explores the "biological enactments" of bulimia—a condition not uncommon amongst people categorized as overweight and obese (Brownwell and Walsh, 2017)—to think anew about the mind-body relationship. As she explains, especially where girls and women are concerned, bulimia is commonly accounted for as an ideational response to living within patriarchal societies; a visceral response as the individual "wills" the food back up by induced vomiting (antiperistalsis). Wilson (2015, p. 62) argues that in chronic cases, "organic thought" occurs as binging and vomiting become compulsive and not necessarily tied to consciously meaningful and analyzable events in a person's social world. Thus, she argues that the "organism itself is beginning to think" as distress and anger become "primarily organic."

We have used an embodied analysis in a study of three weight-loss groups in England to highlight how obesity stigma can confuse people's objective and subjective experiences of their bodies (Williams and Annandale, 2018). Confusion was primarily evident on occasions when group members *felt* heavier after engaging in negatively moralized behaviors associated with weight-gain but this "weight" did not register on the weighing scales. We conceptualize this as the *weight of expectation* which we take as illustrative of how the morality that characterizes weight-management within a culture that is hostile to those categorized as overweight or obese gets under the skin and is *felt* in the flesh. An embodied analysis allowed us to pay attention to and take seriously an implication of weight bias that would otherwise be unobservable via the *Weight Bias Internalization Scale.* Analyzing the embodiment of obesity stigma also allowed us to demonstrate how weight-loss group participants came to ascribe their experiences of sensations deriving from physiological responses to exercise (e.g., sweating, delayed onset muscle soreness) with positive moral and social significance. These *carnal cues* played an important role in their attempts to negotiate obesity stigma and illustrate how the effects of weight bias extend beyond verbal or written endorsement of discriminatory anti-fat attitudes to include interpretations of physiological processes and bodily sensation. These findings are important to the analysis of the implications of weight bias internalization because they deepen understanding of the lived experience of being stigmatized as well as how and why obesity stigma is an inappropriate and ineffective means of promoting weight-loss and health. However, they are not and cannot be researched within the parameters, and via the methods, established for the study of weight bias internalization. The same is true of the biological markers of poorer health attributable to weight bias internalization.

We contend that an embodied analysis would go some way to necessarily extending the analysis of weight bias internalization but, of course, we do not claim to have all the answers, as no one discipline can. Instead, we argue for an opening up of the definition and analysis of weight bias internalization so as to fully appreciate and measure the implications of weight bias/stigma. This is necessarily an interdisciplinary endeavor. In a demonstration of the potential utility of interdisciplinarity in this field, Tomiyama (2014) took a biopsychosocial approach to create a generative model to explain how and why weight-based stigma is counter-productive: the cyclic obesity/weight-based stigma (COBWEBS) model. The model depicts a "vicious cycle"—with people getting "caught" in COBWEBS—wherein weight-based

stigma is characterized as a stressor that begets weight gain through increased eating and other biobehavioral mechanisms (e.g., elevated secretion of cortisol and associated fat storage). This appears to us to be a useful model through which to engage with revealing one of the biopsychosocial implications of weight bias internalization, but to test its fidelity requires the kind of interdisciplinary research that is as yet outside the scope of current definitions and measures used in this field of study.

CONCLUSION

The dominant definition of weight bias internalization and the associated methods for measuring its effects are limited and thus risk rendering its full impact immeasurable to those working in the field. Relatedly, they elevate mind and rational decision making over body and psychosomatic sensation. Ironically this has the effect that current analysis reveals very little about the process of internalization understood more broadly as a biopsychosocial process—that is, how weight bias quite literally gets under the skin. Presently a preoccupation with internalization as a psychological process has generated evidence that tells us far more about changes in states of mental health and behavioral outcomes than about biological effects and the lived experience of obesity stigma as mediated through the body. This is not to denigrate this contribution, on the contrary, it has greatly advanced understanding of the implications of weight bias. However, developing and strengthening the evidence base now relies upon broadening the definition of internalization to foster the interdisciplinarity necessary to realize the biopsychosocial analysis required to fully comprehend the implications of weight bias.

AUTHOR CONTRIBUTIONS

OW and EA both contributed more or less evenly to the formation of the theoretical argument and the writing of the manuscript.

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ORIGINAL RESEARCH
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Internalised Weight Stigma Moderates the Impact of a Stigmatising Prime on Eating in the Absence of Hunger in Higher- but Not Lower-Weight Individuals

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A considerable body of evidence links internalised weight stigma with higher levels of disordered eating behaviour and cognitions in both normative- and higher-weight populations. However, to date, the impact of internalised weight stigma on objectively measured food intake has not been explored. In the present study, a weight-diverse sample of 158 non-smoking adults (BMI $\geq$ 25 kg/m^2 n = 72, BMI $<$ 25 kg/m^2 n = 86) were recruited to a study on "The effects of hunger and satiety on information processing." Participants first completed a series of online questionnaires, then attended a lab visit in a fed state. Participants were randomised to read a sham news article on the negative consequences of either weight (stigma condition) or smoking (control condition) and answer some questions about the article. Then, under the pretence of a non-study-relevant break, participants were exposed to a pre-weighed selection of sweet and savoury snacks for 15 min. Mood and hunger levels were assessed prior to and after reading the vignette, and after the break. In contrast to the relationship with self-report eating behaviour, internalised weight stigma was not a significant independent predictor of total energy intake and did not moderate the relationship between exposure to the stigma prime and calories consumed. However, differences emerged on the basis of participants' weight status. Higher-weight participants with high levels of internalised weight stigma consumed fewer snack calories following exposure to a weight-stigma prime compared with a neutral prime (B = −137, SE = 58, t = −2.35, p = 0.020, 95% CI −252, −22) whereas those with low levels of internalised weight stigma tended to eat more in the weight stigma condition (B = 118, SE = 62, t = 1.91, p = 0.059, 95% CI −4, 241). In normative-weight participants, no differences in energy intake by levels of internalised weight stigma were observed. These findings suggest differences in the relationships between internalised weight stigma and self-reported disordered eating behaviour versus eating in the absence of hunger (EAH) measured under laboratory conditions. Additionally, internalised weight stigma appears to have differential effects on response to stigma in higher-weight and normative-weight individuals.

Keywords: weight stigma, self-stigma, internalised weight stigma, eating behaviour, eating in the absence of hunger

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INTRODUCTION

Higher-weight individuals face prejudice and discrimination in employment, education, healthcare settings, and a wide range of everyday interpersonal situations (Puhl and King, 2013). In addition to being the target of weight stigma from others, some individuals internalise society's anti-fat attitudes and stereotypes – that is, they devalue themselves because of their weight (Durso and Latner, 2008; Lillis et al., 2010). Studies have consistently found associations between both experiences of weight stigma and internalised weight stigma and a wide range of problematic eating behaviour in both adults and children, even after controlling for body mass index (BMI), self-esteem, mood disorders, and other potential confounds (for reviews, see Menzel et al., 2010; Nolan and Eshleman, 2016; Vartanian and Porter, 2016; Pearl and Puhl, 2018). Internalised weight stigma also appears to mediate the relationship between experiencing stigma from others and downstream problematic eating (Durso et al., 2012; O'Brien et al., 2016; O'Hara et al., 2016). However, the majority of the literature linking weight stigma with eating behaviour consists of cross-sectional studies using entirely self-report measures. While there are obvious pragmatic reasons for this, attempts should be made to confirm findings using measures of objective eating behaviour, and to utilise experimental designs that allow for determination of causal mechanisms.

To date, only four studies have explored the impact of exposure to weight-related stigmatising material on actual energy intake (Schvey et al., 2011; Major et al., 2014; Mulder et al., 2015; Shentow-Bewsh et al., 2016), with conflicting results. In a lab-based study of 34 "overweight" and 39 "normal-weight" females, fasted subjects watched either a weight-stigmatising or a neutral video, before being given access to a large amount of snack food (Schvey et al., 2011). The "overweight" women in the stigma condition ate over three times as many calories as those who watched the neutral video, and significantly more than "normal-weight" women in either video condition. In another study, Major et al. (2014) randomised 93 fasted female university students to read a sham news article about how either weight or smoking status could negatively impact on employment prospects, which was partly explained by greater healthcare insurance costs for higher-weight or smoking employees, who were deemed more likely to suffer ill health. On subsequent exposure to snack foods, self-perceived "overweight," but not "non-overweight" women in the stigma condition consumed more calories than those in the neutral condition. The authors proposed that this effect was driven by social identity threat, which occurs when an individual is reminded or made aware that a group they belong to is socially devalued (Steele et al., 2002; Major and O'Brien, 2005). Coping with such threats to one's social identity can involve a range of strategies, including suppression of negative emotions or attempts to present oneself more positively (Miller and Kaiser, 2001), all of which require effortful self-control, and which have been demonstrated to deplete the cognitive resources required for subsequent self-control, for example, when presented with highly palatable but "unhealthy" snack foods (Hofmann et al., 2009). However, the vignettes used in the study by Major et al. (2014) discussed both employment and health problems often associated with being higher-weight; it is therefore not possible to determine whether subsequent eating behaviour was being driven by weight-related social identity threat or by non-identity related stress arising from more pragmatic concerns around actual or potential health or employment problems.

Also using a self-relevant threat paradigm, Mulder et al. (2015) exposed undergraduate students to one of three sham magazine articles about "obesity," which included either a moralising discourse about "obesity," a counter-moralising discourse about "obesity," or a control condition with no moralising or counter-moralising content. The dependent variable was choice of a healthy versus unhealthy snack post-experiment. Broadly speaking, across two experiments, counter-moralising arguments tended to induce greater healthy snack choice in higher-weight individuals, but more frequent unhealthy snack choice in lower-weight individuals. Statistical analyses were not performed on the control versus moralising condition, but data on percentages choosing healthy snacks suggest that higher-weight individuals exhibited similar or slight increase in healthy snack choice in the moralising condition compared with the control condition. Findings for lower-weight individuals suggested either increase, decrease, or no difference between the two conditions and are thus difficult to interpret (Mulder et al., 2015). It should be noted that given the pervasiveness of anti-"obesity" messages in society, even the supposedly neutral article – which noted the rising prevalence of "obesity" – may have implied moralisation and so unintentionally induced threat, which could explain the generally minor differences in snack choice between the control and moralising conditions among high-weight individuals. Thus, these studies may not provide a true comparison between exposure to a stigmatising versus a non-stigmatising stimulus.

A more recently published study randomised 120 weight-diverse female undergraduates to either a weight-stigma condition or one of two control conditions (Shentow-Bewsh et al., 2016). In the weight-stigma condition, participants read a sham newspaper article about the "obesity epidemic" that portrayed the burden to individuals and the economy of higher-weight peoples' poor choices, repeated several negative stereotypes about higher-weight individuals, and gave first-person accounts of interpersonal stigma experiences. In a subsequent taste-rating task of high-caloric snacks, lower-weight participants tended to eat more in the weight-stigma condition than in the control conditions, although the effects were small and not statistically significant. In contrast, higher-weight participants tended to eat more than lower-weight participants in both of the control groups, but did not differ in energy intake from their lower-BMI counterparts after reading the "anti-obesity" article, suggesting that exposure to this stigmatising prime was causing them to moderate their food intake. One possible explanation is that higher-weight participants were engaging in impression-management behaviour – that is, eating in such a way as to produce a more positive impression on others (Vartanian et al., 2007; Vartanian, 2015). The salience of the stigmatised identity in the weight-stigma prime condition may have prompted heavier individuals, whether consciously or unconsciously, to engage in stereotype-relevant self-presentation techniques

(Neel et al., 2013), in this case, moderating their snack intake in order to counter stereotypes that higher-weight individuals are greedy and lacking in self-control (Allon, 1982; Puhl et al., 2005; Lewis et al., 2010).

Importantly, none of these studies explored the role of participants' own internalised weight stigma in determining their response to weight-based stigma or identity threat. As noted above, a considerable body of evidence now links internalised weight stigma with patterns of disordered eating behaviour and cognitions in diverse populations, both independently, and as a mediator of the relationship between experienced weight stigma and maladaptive eating. Thus, an understanding of the impact of internalised weight stigma on objective eating behaviour may be of importance in developing effective individual and public health interventions aimed at tempering non-physiological energy intake. It is possible that exposure to societal weight stigma may have differential effects depending upon the degree to which an individual has previously internalised weight stigma. Thus, the deleterious effect of weight stigma may be particularly pronounced in a person who believes that stigma is deserved and appropriate, whereas an individual with low internalised weight stigma may discount a stigmatising experience as simply an indicator of prejudice in the perpetrator, with no detrimental impact on their own self-worth, and a consequently reduced or even null effect of the stigma on eating behaviour compared with high internalisers.

Thus, the present study sought to explore the impact of a weight-related stigma prime on food intake under laboratory conditions and the potential moderating role of internalised weight stigma in a weight-diverse sample of adult men and women. As noted above, the studies by Major, Schvey, and colleagues both used fasted subjects. The findings from these studies likely represent the phenomenon of eating more than needed to satisfy hunger when exposed to weight-related stigmatising situations, and may have more ecological validity for predicting excessive intake at meal times. The study by Shentow-Bewsh et al. (2016) did not use fasted or fed subjects, but participants were more hungry than full. However, people frequently eat when they are not hungry. An alternative measure of non-physiological energy intake is the Eating in the Absence of Hunger (EAH) paradigm, which is perhaps more comparable with the concept of hedonic eating. EAH studies are usually conducted in two stages: participants are first allowed to eat until sated, before being told that a short break is required prior to the second part of the study. During this break, participants are given access to either a second meal or a large amount of highly palatable snack foods, with energy intake at this point being the outcome of interest (Fisher and Birch, 2002). In a number of stress-manipulation studies conducted using the EAH paradigm, participants consumed an *ad libitum* meal and were then randomised to complete either a simple or an unsolvable maths puzzle, intended to increase stress and anxiety, prior to the break period (Rutters et al., 2009; Lemmens et al., 2011). These studies found that stress increased subsequent EAH in both "normal weight" and "overweight" adults, particularly those with higher levels of disinhibited eating; however, the effect was significantly amplified in "overweight" participants (Lemmens et al., 2011).

In the present study, we first explored the impact of internalised weight stigma on energy intake following exposure to a weight-related stigmatising prime or a neutral prime. We utilised an interpersonal relationship paradigm, whereby the stigmatising prime discussed the detrimental impact of high-weight status on personal relationships. This paradigm was intended to situate the stressor specifically within a social identity setting, without incurring potential non-identity related stress associated with economic or health concerns in general. We predicted that individuals higher in internalisation would eat more following exposure to the stigma prime than those low in internalisation. We further explored whether this relationship would be moderated by participants' objective or self-classified weight status – that is, would the relationship differ for individuals with higher-weight versus normative BMI and/or self-classified "overweight" versus "non-overweight"[1]. Three contrasting but plausible outcomes could be predicted for the three-way relationship between experimental condition, internalised weight stigma, and weight status on energy intake. First, higher-weight individuals with higher levels of internalised weight stigma could experience more distress in the weight stigma condition and engage in non-physiological eating behaviour as a coping mechanism – i.e., eating more in response to stigma exposure compared with those lower in internalised weight stigma, consistent with the findings from self-report measures, and more than lower weight participants, consistent with findings from laboratory studies of objective eating behaviour. Alternatively, higher-weight individuals with elevated internalised weight stigma would be both more aware and more ashamed of their stigmatised status, and engage in impressions management behaviour, consuming fewer calories. If this were the case, we would expect a significant three-way interaction between condition, internalised weight stigma, and weight status such that objective or self-classified "overweight" participants with high levels of internalised weight stigma would eat less in the stigma condition compared with the control condition. Finally, it was possible that levels of internalised weight stigma would capture most of the variance associated with being higher-weight and exposed to stigma, in which case, we would expect no significant three-way interaction between condition, internalised weight stigma, and weight status. Thus, this

[1]The term "higher-weight" is preferred over "overweight" or "obese," as these latter medicalise body weight, and mark heavier bodies as "diseased," even in the absence of any other biological perturbations (Meadows and Daníelsdóttir, 2016). Where specific BMI categories apply to participants in previously published studies, these terms have been reproduced in this manuscript within inverted commas. As the present study assesses the impact of a weight stigma versus control intervention between groups based on the distinct classification between perceived acceptability of their weight status (i.e., within or outside currently acceptable societal boundaries, and whether or not that weight is likely to be stigmatised), the term "normative-weight" (Tylka et al., 2014) is used to contrast with "higher-weight" to distinguish between the two groups.

second analysis was considered exploratory, and no *a priori* hypothesis was proposed.

MATERIALS AND METHODS

Sample

Community and student participants were recruited for a study on "the effects of hunger and satiety on information processing" using a mix of social media, an online classified advertisement website, a free United Kingdom portal for the recruitment of research participants, the university website and departmental noticeboards, a database held by the School of Psychology of individuals who had previously expressed an interest in participating in research, and from the School's Research Participation Scheme. Eligibility requirements were age 18–69 years, a never-smoker, no food allergies, and no eating disorder diagnosis. Additionally, to ensure recruitment across the BMI spectrum, some advertisements were targeted to recruit higher-weight participants, with the additional eligibility requirement that individuals self-classify as being "overweight." The social media channels included groups related to dieting, fitness, healthy living, plus-size fashion, body image, size acceptance, and general interest groups linked to the local area. The use of these different sites was intended to attract a diverse range of higher-weight participants whose feelings about their size might vary between being more positive or negative. Participants recruited through the School of Psychology Research Participation Scheme received course credit for taking part in the study. Other participants were entered into a prize draw to win a £30 gift voucher and paid £5 for their time. The study was approved by the University of Birmingham Ethical Review Committee, and informed consent was obtained from all participants.

Procedure

The study was conducted in two stages, with the first stage completed online, and the second stage taking place in the laboratory (**Figure 1**). All computer-based portions of the study were conducted using the Qualtrics survey platform[2]. For the online component, after providing explicit consent, participants completed an initial screening and package of questionnaires, described below. The screening confirmed that participants were never-smokers, had no food allergies, and had not been diagnosed with an eating disorder. Any participants who did not pass the screening were thanked for their time and exited from the study. On completion of the online portion of the study, participants were emailed and informed that they had been randomised to attend the lab session "full," and were provided a link to an online poll with timeslots available in the morning and afternoon. They were asked to choose a slot as close as possible to the time they usually finished eating either breakfast or lunch.

On arrival at the laboratory, consent forms and allergy cheques were repeated. Participants were asked to confirm that they had recently eaten a meal; those who had not (n = 16) were not excluded, but this information was noted and explored as a possible covariate. Participants were then led to a private room with a computer monitor, and a separate table, chair, some magazines, and a selection of pre-weighed sweet and savoury snack foods. Magazines were selected that did not contain any content or advertising relating to food, weight, or health. Participants were informed, "I'll return in about 20 min. We've got some magazines in case you finish early. Help yourself to snacks – there's plenty." Participants were then left alone to complete the questions on the computer. First they were prompted to enter their unique ID code and reminded that this maintained the anonymity of their responses. Participants were then presented with five visual analogue scales (VAS) related to hunger (Hungry, Full, Thirsty, Desire to eat, Amount they could eat) and five related to mood (Anxious, Relaxed, Happy, Drowsy, Alert). Scales were anchored at 0 and 100 and participants dragged a marker along the scale to indicate their current state. They were then randomised to read either a weight stigma or control vignette, both written in the style of a newspaper article, describing the potential detrimental effects of either "obesity" or "smoking" on romantic relationships. This approach was taken to focus the threat at the level of interpersonal relationships, removing potential confounding effects of structural or institutional stigma. The experimental vignette described findings from scientific studies suggesting that being "obese" had a negative impact on perceived desirability as a dating partner. The description of the studies was taken from a review of research on weight stigma and interpersonal relationships (Puhl and Heuer, 2009). The article was completed by a fabricated "quote" from a fictional person belonging to a genuine United Kingdom-based relationship counselling charity. The quote related how "obesity" created interpersonal problems within existing relationships, even when the matter was not overtly discussed, thus ensuring the vignette was pertinent to individuals regardless of their current relationship status. The control vignette was identical with the exception that all words pertaining to weight were replaced with words pertaining to smoking. The vignettes used are available in the **Supplementary Materials**.

After reading the vignette, participants indicated whether they found the article easy to understand, interesting, and relevant to themselves. They were asked to briefly summarise the article, and then to provide any additional details they remembered. These questions served to support the cover storey, to ensure the details of the vignette were processed and recalled, and also acted as an attention check. Participants then repeated the hunger and mood VAS scales, and were shown a completion screen asking them to await the return of the researcher. Using the Qualtrics platform, the exact time of completion of each survey could be tracked. All participants were left for 15 min after completing the survey[3], after which, the researcher returned and informed the participants that there were a few more questions to complete at the computer. Participants repeated the hunger and mood ratings, and finally, were probed for suspicion as to the true purpose of the study, if and when they had realised that we were

[2]http://Qualtrics.com

[3]Other EAH studies have used intervals of 10–30 min.

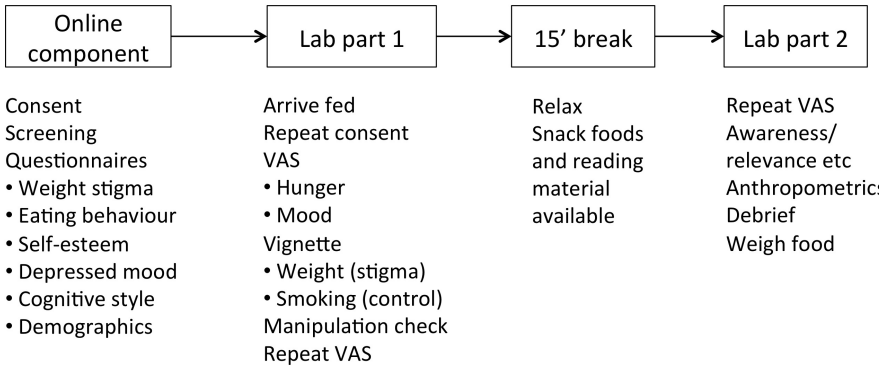

FIGURE 1 | Schematic overview of study design.

interested in their snack consumption, and whether they thought the newspaper article had influenced what they ate. Finally, participants were debriefed, and anthropometric data collected. Height was measured using a stadiometer. Weight and percentage body fat were measured using a Tanita T5896 (Tanita Corporation, Tokyo). Measured height and weight were used to calculate BMI.

Measures

Sample characteristics were determined using the following measures, which were completed online, prior to attending the lab visit. No forced responses were stipulated.

Internalised Weight Stigma

Internalised weight stigma was assessed using the modified version of the 11-item Weight Bias Internalisation Scale (WBIS-M; Pearl and Puhl, 2014), which assesses the extent to which participants devalue themselves because of their weight. While the original WBIS used the wording "because I am overweight," the modified version replaces this with "because of my weight," thus facilitating the use of the scale across the weight range. A sample item is: "Because of my weight, I don't understand how anyone attractive would want to date me." Items are scored from 1 (strongly disagree) to 7 (strongly agree), with a mean score calculated for the full scale. Higher scores indicate greater internalised weight stigma. The WBIS-M had strong internal reliability in a weight-diverse sample, and was strongly correlated with body dissatisfaction, and moderately correlated with disordered eating and psychopathology, controlling for BMI (Pearl and Puhl, 2014). It has been used in US and Australian samples (Pearl and Puhl, 2014; O'Brien et al., 2016). Psychometric properties of the WBIS-M are similar in individuals classified as "overweight" and "non-overweight" by both BMI and self-classification criteria (Lee and Dedrick, 2016). Cronbach's α in the present sample was 0.94.

Experienced Weight Stigma

Prior experienced weight stigma was initially assessed using the Stigmatising Situations Inventory (SSI; Myers and Rosen, 1999), a 50-item questionnaire that measures experiences of weight stigma across 11 domains. However, initial reports of online survey access indicated high rates of attrition, with few participants completing the online portion of the study. In order to reduce participant burden, a decision was made to replace the 50-item SSI with a three-item measure that has been used in a number of studies in recent years (e.g., Puhl et al., 2011; Pearl et al., 2012; Pearl and Puhl, 2016; Himmelstein et al., 2017). Specifically, these questions ask whether participants have ever been teased, treated unfairly, or discriminated against because of their weight. Each question receives a yes or no response, giving a possible range of 0–3. For the sake of brevity, and to distinguish this measure of experienced weight stigma from the SSI, the name EWS-3 will be used in the present study. The EWS-3 has not been psychometrically validated, but has been shown to correlate positively with internalised weight stigma (Himmelstein et al., 2017) and support for anti-weight discrimination policies (Puhl et al., 2011; Puhl et al., 2017). Kuder-Richardson's α in the present study was 0.67 (see section Experienced Weight Stigma Measures for further discussion).

Eating Behaviour

Two measures were used to assess eating habits. The Dutch Eating Behaviour Questionnaire (DEBQ; van Strien et al., 1986) comprises three subscales that look at habitual eating patterns: dietary restraint, emotional eating, and external eating – eating in response to external cues rather than bodily hunger signals. Items are scored on a 5-point Likert scale measuring frequency of the different styles of eating behaviours, ranging from 0 (never) to 5 (very often). The individual subscales are scored separately. Higher scores indicate more frequent disordered eating. The subscales of the DEBQ have good to excellent internal reliability in "obese" and "non-obese" men and women (van Strien et al., 1986), and has been validated in United Kingdom non-clinical samples of men and women and dieting and eating disordered women (Wardle, 1987). Although the factor structures are gender-invariant, women tend to score higher on the restraint and emotional subscales (Wardle, 1987). Cronbach's α for the DEBQ Restraint, External Eating, and Emotional Eating subscales were 0.93, 0.86, and 0.94, respectively.

The Eating Disorder Diagnostic Scale (EDDS; Stice et al., 2000) was used to assess cognitions and behaviours consistent with eating pathology. Items are summed to produce a composite symptom count that can be used as a measure of overall eating pathology, with higher scores indicating more problematic cognitions and behaviours (Stice et al., 2004). The EDDS has good internal consistency in both clinical and non-clinical female samples, high test-retest reliability, excellent concordance with interview diagnoses of disordered eating, and good convergent validity with self-report measures of disordered eating behaviour and general psychopathology (Stice et al., 2000, 2004). While not formally validated in adult males, the EDDS also had strong internal reliability in a sample of male U.S. veterans, and scores were uniquely predicted by military trauma, controlling for other potential confounds (Arditte Hall et al., 2017). Questions relating to height and weight were omitted from the original 22-item scale, as this information was collected elsewhere. Thus, the final questionnaire included 20 questions. Cronbach's α in the present sample was 0.81.

Additionally, current dieting behaviour was assessed with a single item. Participants indicated whether they were currently dieting for weight loss, watching their food intake so as to maintain their current weight and prevent weight gain, or not dieting.

Depressive Symptoms

As depressed mood may influence food intake, depressive symptomatology was assessed with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). This is a 20-item measure that assesses the frequency of affective and behavioural symptoms of depression over the previous week. Items are scored on a 4-point rating scale from 0 (rarely or none of the time) to 3 (most or all of the time), and a sum score is calculated for the whole scale. Higher scores indicate more depressive symptoms. The CES-D has high internal consistency, adequate test-retest reliability, and similar reliability, validity, and factor structure across demographic categories. Although not designed for clinical diagnosis, it has good discriminant validity between clinical and non-clinical populations, and correlates moderately with severity ratings in clinical patients (Radloff, 1977). Cronbach's α in the present sample was 0.91.

Self-Esteem

Global self-esteem was measured with the Rosenberg Self-Esteem (RSE) scale (Rosenberg, 1965). The RSE is the most widely used measure of global self-esteem and has good internal and test-retest reliability and convergent, discriminant, and predictive validity (Donnellan et al., 2015). The RSE correlates negatively with measures of experienced and internalised weight stigma and disordered eating cognitions and behaviours (Griffiths et al., 1999; Friedman et al., 2005; Durso and Latner, 2008). Items are scored on a 4-point Likert scale ranging from 0 (strongly disagree) to 3 (strongly agree). The maximum possible score is 30, and higher scores are indicative of higher self-esteem. Cronbach's α in the present sample was 0.89.

Need for Cognition

Finally, to support the cover storey – that the purpose of the study was to examine the relationship between hunger and satiety and information processing – and help disguise the actual focus of the study, subjects completed the 18-item Need for Cognition Scale (NCS), which assesses an individual's tendency to engage in and enjoy effortful cognitive endeavours (Cacioppo et al., 1984). Items are scored from −4 (very strong disagreement) to +4 (very strong agreement), with higher scores indicating greater need for cognition. The scale has good reliability and convergent validity (Cacioppo et al., 1984; Tolentino et al., 1990). Cronbach's α in the present sample was 0.88.

Anthropometrics and Demographics

Participants self-classified their weight on a 5-point scale: "Underweight," "Normal weight," "A little overweight," "Moderately overweight," or "Very overweight." Self-classified weight status was dichotomised into self-classified "overweight" (those who indicated they were a little, moderately, or very "overweight") and self-classified "not overweight" (those who indicated they were "underweight" or "normal weight"). Demographic data comprising age, gender, ethnicity, education level, and profession were collected.

Eating in the Absence of Hunger Paradigm

Prior to each participant's arrival at the laboratory, six identical small bowls were heaped full of a selection of three savoury and three sweet snack foods[4]. In total, the six bowls of snack foods provided approximately 4500 kilocalories and 200 g of fat. The bowls were weighed before and after the experimental session to determine the amount eaten. The number of grams of each type of snack food was converted into kilocalories, and summed to provide total energy intake.

Data Analysis

All analyses were conducted using the SPSS for Mac Statistical Software package, version 24.0, unless stated otherwise.

Power Analysis

Prior to the start of the study, a power analysis was conducted with G*Power 3.1 (Faul et al., 2007). Given the difficulty in detecting moderator effects with continuous variables (Shieh, 2009), sample size was determined on the basis of the hypothesised three-way interaction between experimental condition, weight status, and internalised weight stigma. All simple effects, two-way, and three-way interactions, and the intercept were included in the analysis, and baseline hunger was included as a covariate. A sample of 146 participants would yield 80% power to detect a small-to-medium effect size ($f^2 = 0.085$) for the tested predictors at the $\alpha = 0.05$ significance level.

[4]Cheese crackers (Jacob's Mini Cheddars, 80 g, 516 kcals and 29.5 g fat/100 g), crisps (salt and vinegar Pringles, 80 g, 512 kcals, and 32 g fat/100 g), pretzels (Penn State sour cream and chive pretzels, 80 g, 443 kcals and 12.9 g fat/100 g), chocolate (Mars M and Ms, 380 g, 485 kcals and 20.4 g fat/100 g), biscuits (ASDA Chosen by You milk chocolate oatie crumbles, 180 g, 497 kcals and 22.7 g fat/100 g, and sweet popcorn (Butterkist toffee popcorn, 80 g, 414 kcals and 8.4 g fat/100 g).

Handling of Missing Data

Missing data analysis was conducted on questionnaire responses. Four participants each had one data point missing, one participant skipped the entire RSE questionnaire and one skipped the DEBQ-Restraint and External subscales. Additionally, 14 participants (8.5%) did not have data for body fat percentage. All of these cases were due to practical considerations; no participants declined to be weighed and measured. Analysis of all study variables against outcome measures indicated that values were missing completely at random, Little's MCAR test $\chi^2(63) = 66.2$, $p = 0.37$, therefore subsequent analyses were conducted with missing values excluded pairwise.

Preliminary Analyses

First, separate linear regression analyses were used to confirm that recruitment group (community versus student participants) was not a significant predictor of experienced or internalised weight stigma, or of total energy intake, after controlling for age, gender, and BMI. All analyses were non-significant; thus, groups were combined in subsequent analyses.

The proposed factor structure for the VAS was confirmed using principal components analysis with varimax rotation. Examination of the scree plot indicated two distinct factors, accounting for 54.6% of the variance. All hunger and mood VAS items loaded > 0.5 onto their respective factors. Items with negative loading were inverted and a mean mood and hunger score was calculated for each time point.

To confirm successful randomisation to weight stigma or control experimental condition, independent *t*-tests and χ^2 test were used to compare distribution of demographic variables, scores on online questionnaire measures, and relevant baseline measures taken in the laboratory. Independent *t*-tests, univariate ANOVAs, and univariate linear regressions were used to explore whether potential confounds were significant predictors of energy intake. Repeated-measures ANOVAs were used to test change in hunger levels, overall mood, happiness, and anxiety by experimental condition and objective and self-classified weight status. Bonferroni correction was used to account for violation of the assumption of sphericity.

Main Analyses

The proposed interaction effect between experimental condition and participants' internalised weight stigma on energy intake, was tested using PROCESS version 3.0 for SPSS, model 1 (Hayes, 2017). The potential three-way interaction between experimental condition, internalised weight stigma, and weight status was tested using PROCESS model 3. The PROCESS macro utilises a robust, non-parametric bootstrap resampling procedure with replacement to produce an unstandardised regression coefficient, and a bias-corrected 95% confidence interval (CI) for each predictor, with 5,000 bootstrap samples utilised in the present analyses. The HC3 estimator was used to ensure heteroscedasticity-consistent standard errors (Hayes and Cai, 2007). All continuous variables were mean-centred. Experimental condition was dummy coded as 1 = Weight-stigma condition, 0 = Control condition. Two measures of participants' weight status were used: objective BMI category (coded $\geq$ 25 kg/m^2 = 1, < 25 kg/m^2 = 0) and self-classified "overweight" status (coded "overweight" = 1, "non-overweight" = 0). Interactions were interpreted by examining simple effects (Aiken and West, 1991). It is recommended that interaction effects be probed at meaningful values of the moderators (Hayes, 2017). Thus, for the dichotomous variables (experimental condition, BMI category, self-classified "overweight"), effects were tested at the two values of the moderator. For internalised weight stigma, slopes were tested at values of 2.5 and 5.5 (−0.9 and 2.1 after mean-centring), representing the lower and upper quartiles of the range of the scale.

RESULTS

Sample Descriptives

Three hundred and twenty participants consented to take part in the study. Nineteen were screened out prior to beginning the survey (10 with food allergies, two smokers, and seven with a diagnosed eating disorder), and a further 12 exited the survey during the screening procedure. Of the 289 participants who began the online survey, 220 (76%) completed all questions and were invited to arrange a laboratory visit. Of these, 164 (75%) attended the lab-based phase of the study. Six participants failed the participation cheque during the lab-based component of the study – that is, they were unable to describe the contents of the vignette, indicating either lack of attention or lack of comprehension, and their data were excluded from further analyses, giving a final sample size of 158.

The sample was predominantly female (78.5%), and White (75.9%; Indian Asian/Asian British 8.9%, Black 3.8%, Chinese 3.2%, South-East Asian 1.9%, other ethnicity 2.5%, missing 3.8%), with a mean age of 26.0 years (*SD* 11.4, range 18–69 years). Three-quarters of the sample were students (75.9%),[5] and 29.1% had an undergraduate or advanced degree. The BMI range for the sample was 14.8–58.2 kg/m^2 ($M = 23.3$, $SD = 6.1$). Eight-six participants (54.4%) had a BMI < 25 kg/m^2 and 72 (45.6%) had a BMI $\geq$ 25 kg/m^2, however, 53.7% of participants self-classified as "overweight."

Experienced Weight Stigma Measures

Of the 158 participants included in the final sample, only eight had completed the 50-item SSI measure of experienced weight stigma. The remainder completed the EWS-3. Depending on the measure used, notable differences were observed in the proportion of participants who reported prior experience of weight stigma. Using the three-item EWS-3, only 38.7% participants endorsed any item. In contrast, using the SSI, all

[5]Of the 120 participants who stated their profession as "Student," 86 (71.7%) were recruited through the School of Psychology; the remainder accessed the study via community recruitment advertisements.

but one (87.5%) endorsed previous weight stigma experiences.[6] Further, correlations between other study variables and EWS-3 were much lower than with SSI scores. Despite being used frequently, the EWS-3 appears to underestimate previous stigma experience, and findings using the two measures are unlikely to be comparable. As a result, and given that only eight participants in the final sample had completed the SSI, results for these two measures were not combined, and only the 150 participants completing the EWS-3 were included in subsequent analyses.

Preliminary Analyses

Demographic variables did not differ by experimental condition. No differences were observed between experimental conditions in BMI, objective or self-classified "overweight," dieting status, self-esteem, internalised weight stigma, depressive mood, need for cognition, self-reported eating behaviour, or baseline hunger and mood. Low baseline hunger levels confirmed the fed state. The percentage of participants who had previously experienced weight stigma was lower in the weight-stigma condition, with approximately one-third having prior stigma experiences, and two-thirds reporting no previous weight stigma experience. In the control condition, the breakdown was 50-50. Thus, experienced weight stigma was included as a covariate in subsequent analyses.

Energy intake did not differ by age, ethnicity, education, profession, time of experimental session, failure to eat prior to the session, dieting status, depressive symptoms, baseline mood, or reported ease of understanding, level of interest, relevance of the vignette, or awareness of true study intent. Statistical tests of energy intake by gender were non-significant, however, mean intake was noticeably different: male M = 201 kcals, SD = 225, female M = 136 kcals, SD = 151, $t(41.5) = 1.60$, $p = 0.12$, and lack of statistical significance may have been due to the much smaller sample size of male participants. Within gender groups, there was no difference in food consumption by experimental condition among male participants (M = 213 and 210 kcals in the control and weight-stigma conditions, respectively), however, mean intake in female participants was 158 kcals in the control condition and 91 kcals in the weight-stigma condition, $t(57) = 1.7$, $p = 0.10$[7]. Although this difference was not statistically significant, a conservative approach was taken and gender was included as a covariate in subsequent regression analyses.

Participants did not differ by experimental condition in how interesting or understandable they found the vignettes (both $p > 0.6$), however, more higher-weight participants in the weight-stigma condition reported that the vignette was personally relevant to them than did those in the control condition: 66.7% versus 33.3%, respectively, $\chi^2(1) = 12.9$, one-sided $p < 0.00$, Cramér's $V = 0.42$. No differences in vignette relevance were observed for normative-weight participants.

Baseline hunger was a significant predictor of energy intake and was included as a statistical control in subsequent regression analyses. No changes in hunger were observed before and after reading the vignettes, but hunger decreased significantly after the food-available break period. Changes did not differ by vignette, weight status, or their interaction. No significant differences in overall mood, happiness, or anxiety were observed at any time point, and there were no differences by experimental condition, weight status, or their interaction. Repeating the analyses separately for those who ate or did not eat during the food-available period did not alter these findings. Overall, 27% of participants did not eat any of the snack foods, but this did not differ by experimental condition, weight status, or their interaction. As the distribution of dependent variables was negatively skewed due to the number of participants who did not eat any of the snack foods, the presence of extreme values was assessed visually using boxplots. A single outlier (weight-stigma condition) was identified: a male participant consumed 1,003 total kcal, with the range of remaining values falling between zero and 658 kcal. A conservative approach was taken whereby this value was replaced with the next highest intake by a male participant in the weight-stigma condition (653 kcal) to bring it closer to the distribution. Replacement of this extreme value in the moderation analyses resulted in small changes in model fit and regression coefficients, but did not alter the pattern of results.

Main Analyses

Baseline hunger, gender, and experienced weight stigma were entered as covariates in all models[8]. Contrary to expectations, moderation analysis with experimental condition, internalised weight stigma and their interaction as predictors of energy intake indicated no significant simple or conditional effects: experimental condition $B = -41$, $SE = 25$, $t = -1.62$, $p = 0.108$, 95% CI −91, 9; internalised weight stigma $B = 15$, $SE = 13$, $t = 1.14$, $p = 0.255$, 95% = −11, 42; interaction term $B = -17$, $SE = 18$, $t = -0.92$, $p = 0.361$, 95% CI = −53, 19. The full model, containing experimental condition, weight status by BMI category, internalised weight stigma, all two-way interactions, the three-way interactions, and all covariates, explained 28.4% of the variance in energy intake. Regression results are displayed in **Table 1**. The three-way interaction between experimental condition, internalised weight stigma, and BMI category was statistically significant, and explained 2.6% of the variance in energy intake. The conditional effect of internalised weight stigma on the relationship between experimental condition and energy intake was statistically significant in the high-BMI group only: $B = -85$, $F(1, 139) = 7.46$, $p = 0.007$. Simple effects analysis indicated that high-BMI participants with high levels of internalised weight stigma ate fewer calories in the weight stigma condition than in the smoking condition (conditional effect = −137, $SE = 58$, $t = -2.35$, $p = 0.020$, 95% CI −252,

[6]Additionally, internal reliability was low for the EWS-3 (Kuder-Richardson's $\alpha = 0.67$). Despite the very low number of participants completing the SSI, Cronbach's α was 0.97. Given the low number of participants who had completed this measure, data from non-completers were revisited. Including data from study non-completers, a total of 22 participants had completed the SSI, and of these, 95% endorsed at least one prior experience of weight stigma.

[7]It was not possible to test if this effect differed by weight status due to low numbers of low-BMI male participants ($n = 2$ in the control condition, and $n = 0$ in the weight-stigma condition).

[8]The unadjusted model is included in the **Supplementary Materials**. Only minor differences in regression coefficients and conditional effects were noted.

TABLE 1 | Effects of experimental condition, internalised weight stigma, and weight status on eating in the absence of hunger.

	B	*SE*	*t*	*p*	LLCI	ULCI
Constant	219	41	5.35	<0.000	138	299
Vignette	−55	36	−1.53	0.128	−126	16
IWS	−1	20	−0.03	0.976	−39	38
Weight status	5	41	0.12	0.902	−76	86
Vignette * IWS	7	27	0.25	0.801	−46	60
Vignette * Weight status	97	56	1.72	0.088	−14	208
IWS * Weight Status	31	28	1.12	0.266	−24	87
Vignette * IWS * Weight status	−92	41	−2.23	0.028	−173	−10
Gender	−70	36	−1.94	0.055	−141	1
Hunger	4	1	5.82	0.000	3	6
EWS	−18	17	−1.01	0.314	−52	17

Unstandardised regression coefficients shown. Vignette coded 0 = Smoking, 1 = Weight; Weight status coded 0 = BMI < 25 kg/m², 1 = BMI ≥ 25 kg/m². EWS, Experienced weight stigma; IWS, Internalised weight stigma.

−22) whereas those with low levels of internalised weight stigma tended to eat more in the weight stigma condition (conditional effect = 118, *SE* = 62, *t* = 1.91, *p* = 0.059, 95% CI −4, 241 (**Figure 2**); contrast between conditional effect of experimental condition at high versus low internalised weight stigma *t* = 2.71, *p* = 0.008). The pattern of results was similar when weight status was defined by self-classified "overweight", however, with the exception of baseline hunger, no significant simple or interaction effects were observed[9].

DISCUSSION

This is the first study to explore the impact of internalised weight stigma on objectively measured eating behaviour. In contrast to consistently documented positive associations between internalised weight stigma and self-reported disordered eating behaviour in both normative- and higher-weight individuals (for a review, see Pearl and Puhl, 2018), no association was found between experimental condition, internalised weight stigma and EAH. Self-report measures capture habitual eating patterns over the longer term, and it is possible that in a given food-available situation, more immediate contextual influences may supersede any potential moderating impact by the factors that shape such behavioural tendencies. However, a significant three-way interaction between experimental condition, internalised weight stigma, and BMI status was observed. Among higher-weight, but not lower-weight participants, there were opposing trends based on levels of internalised weight stigma. Specifically, higher-weight participants with high levels of internalised weight stigma ate less in the weight-stigma condition than in the neutral condition. In contrast, unexpectedly, those low in internalised weight stigma tended to eat more when exposed to the weight-stigma prime, although this effect did not reach statistical significance.

[9]Running the analyses with self-classified weight as a continuous variable did not change the pattern of the results.

A number of possible explanations may account for these results. In terms of reduced intake among higher-weight individuals with high levels of internalised weight stigma, one possibility would be that participants were motivated to represent themselves in a more positive light to mitigate others' potential negative judgments. That is, individuals who feel high levels of guilt, shame, and self-devaluation based on their weight status may be more likely to engage in impressions management behaviour to counter stereotypes of greed and lack of willpower. An alternative possible mechanism underlying the unexpected reduction in energy intake in the weight-stigma condition among high-weight participants who were high in internalised weight stigma could involve conflicting goal motivational processes. Internalised weight stigma has been positively associated with dietary restraint and eating, weight, and shape concerns in some higher-weight community (Schvey et al., 2013) and treatment-seeking individuals (Almenara et al., 2017), although some studies have failed to find any such relationship (Lillis et al., 2010). Restrained eaters, i.e., chronic dieters, appear to be more responsive to environmental food cues, and under normal circumstances, hedonic drives may eclipse longer-term behavioural goals (for a review, see Papies et al., 2008). Under these circumstances, the availability of highly palatable, energy-dense snack foods would present a goal-conflict scenario, where the potential hedonic reward to be obtained from eating the food is incompatible with the desired weight-loss goal. However, priming goal-relevant information may inhibit conflicting goals and instigate conscious self-regulatory processes (Aarts and Dijksterhuis, 2000; Custers and Aarts, 2007). Thus, exposure to the weight-stigma vignette, which highlighted potential detrimental effects of "obesity" on interpersonal relationships, may have served to increase the salience of participants' own weight-loss goals and behavioural intentions – goals more likely to be held by those high in internalised weight stigma (Puhl et al., 2018). Thus, in the present study, participants with high-BMI and high-internalised weight stigma may represent a group of high-restrained eaters. This hypothesis would also explain the relative rise in intake in this population assigned to the control condition; as weight was not made salient and thus weight-loss goals were not primed, intake would have been driven predominantly by the elevated hedonic reward associated with highly palatable foods.

While it is theoretically feasible that high levels of internalised weight stigma are acting as a proxy for high dietary restraint, which could explain why the high-BMI high-internalised weight stigma group specifically ate less in the weight stigma condition and more in the control condition, *post hoc* correlation analyses suggested that internalised weight stigma was associated with dietary restraint and current dieting behaviour in low-BMI participants only; the relationships were non-significant in high-BMI participants (see **Supplementary Materials**). Nevertheless, dietary restraint in the present study was measured with the Dutch Eating Behaviour Questionnaire (DEBQ), which is thought to identify more successful restrained eaters (van Strien, 1999; Stice et al., 2010). In contrast, the Restraint Scale (Herman and Mack, 1975; Herman and Polivy, 1980) is thought to capture unsuccessful restrained eaters (Heatherton et al., 1988; Williamson et al., 2007), and it is possible that use of an

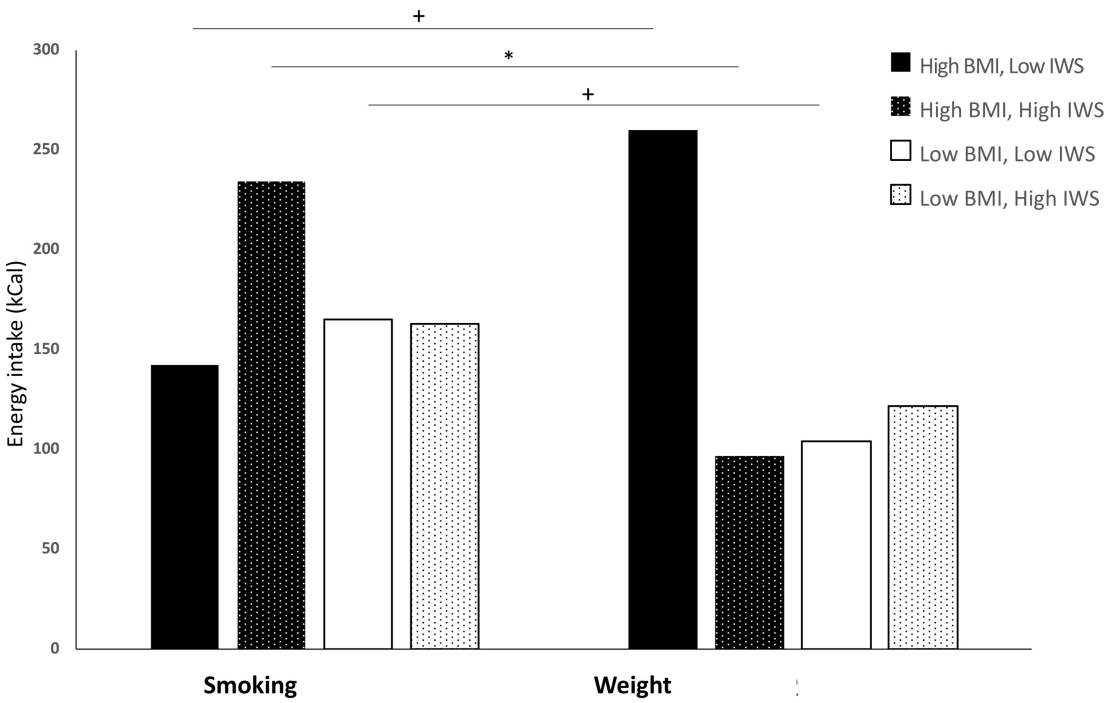

FIGURE 2 | Impact of experimental condition on total energy intake by level of internalised weight stigma and weight status. High BMI $\geq$ 25 kg/m^2; Low BMI $<$ 25 kg/m^2. High and low internalised weight stigma designated by upper (5.5) and lower (2.5) quartiles of modified Weight Bias Internalizstion Scale score range, respectively. BMI, Body mass index; IWS, internalised weight stigma. $^*p < 0.05$. $^+p < 0.08$.

alternative measure of dietary restraint would have confirmed a strong relationship between internalised weight stigma and restraint in the high-BMI group.

A counterpoint to this hypothesis arises from an ecological momentary assessment study conducted in a community sample of 46 higher-weight men and women. Participants used personal digital assistant devices to record responses to perceived stigmatising experiences in real time over a 2-weeks period. Stigmatising incidents were associated with significantly lower momentary (and daily) motivation to diet, to exercise, and to lose weight in individuals with higher levels of internalised weight stigma compared with those who had lower internalised weight stigma (Vartanian et al., 2018). Nevertheless, there is evidence to suggest that where goal-conflict occurs, the presence of others is more likely to result in resisting the unwanted desire and decrease the likelihood that the goal-conflicting behaviour will be enacted – that is, to increase self-control (Hofmann et al., 2012). Thus, it is possible that, in the present study, the laboratory setting and the knowledge that any eating behaviour would be observable by the experimenter may have fortified self-regulatory behaviour in the presence of highly palatable snack foods.

It should also be noted that despite eating less during the study, high-weight participants with high levels of internalised weight stigma in the stigma condition may have engaged in a reactive episode of eating after leaving the laboratory, which would be consistent with the more widely reported positive relationship between perceived stigma and disordered eating patterns. To our knowledge, no studies have been conducted that explore rebound eating effects following laboratory-based studies in which participants restrict their intake, and while such research would provide logistical challenges, a better understanding of eating behaviour subsequent to participation in laboratory studies would be a useful addition to both the theoretical literature and perhaps also to the design of future eating behaviour research. Studies exploring the impact of perceived and internalised weight stigma on eating behaviour in a naturalistic setting could provide a more accurate picture of the relationship. A number of studies have used more ecologically valid techniques, such as ecological momentary assessment or daily diaries, to explore the relationship between experiences of weight stigma and self-stigmatising cognitions and eating-related outcomes in higher-weight individuals. For example, experienced and internalised weight stigma have been shown to negatively correlate with subsequent self-reported diet "healthiness" (Seacat et al., 2016) and reduced motivation to diet or lose weight (Vartanian et al., 2018). However, to date, there have been no studies reporting ecological assessment of the impact of weight stigma on actual eating behaviour. As cognitions and intentions do not necessarily translate into behaviour (Webb and Sheeran, 2006), future studies conducted in naturalistic settings should assess actual eating behaviours.

In contrast to high-weight individuals high in internalised weight stigma, those low in internalised weight stigma tended to eat more in the weight-stigma condition. The WBIS, and consequently its modified weight-neutral version, includes items capturing a complex mixture of cognitions and affect, many

related to how people with higher-weight bodies interact with others or society as a whole (Meadows and Higgs, 2019). It is possible that higher-weight individuals with lower internalised weight stigma, who may not usually dwell on such issues, may react in unhelpful ways when reminded that society considers their bodies to be problematic. Alternatively, recent work on higher-weight individuals who reject and actively resist societal weight stigma have identified a negative relationship between weight stigma resistance and both weight-related self-devaluation and weight-related distress, including concerns about how others perceive one (Meadows and Higgs, 2018). Thus, the increased snack intake in high-BMI participants who were nevertheless low in internalised weight stigma may reflect psychological reactance and engagement in a form of behavioural resistance to the stigmatising material.

Among normative-weight participants, there was a tendency to eat less in the weight-stigma condition compared with the control condition, irrespective of levels of internalised weight stigma. This effect is consistent with previous findings by Major et al. (2014), and may also be a form of impression management – to clearly distinguish themselves from the stigmatised fat others depicted in the weight-relevant stigma prime. Another possibility is that it represents participants' fear of fat. On being made aware of the negative interpersonal consequences experienced by higher-weight individuals, slimmer participants may be motivated to ensure that this fate does not befall them and so restrict their snack intake. A recent cross-sectional study among a weight-diverse sample (BMI $M = 26.5$ kg/m^2, $SD = 6.3$ kg/m^2) of 193 college students found that perceived weight stigma positively predicted maladaptive eating, in particular, dietary restraint, and that this effect was mediated by fear of fat (Wellman et al., 2018). While some population-based studies have demonstrated that stigmatising images in weight-related health campaigns have little effect on higher-weight individuals but do tend to increase healthy behaviour intentions in lower-weight individuals (Young et al., 2016), other studies have reported null effects on health behaviour motivation or implementation across the weight spectrum (Puhl et al., 2013; Simpson et al., 2017). Thus, from a practical viewpoint, stigmatising messages appear to have little to recommend them in terms of health promotion.

Importantly, despite internalised weight stigma often being considered to have similar effects in higher- and normative-weight individuals, perhaps differing only in degree, the present study indicated differential moderating effects of internalised weight stigma in response to stigma exposure dependent on participant weight status. Weight-related stigmatising experiences in Western society do not occur in a vacuum, but rather within a pervasively hostile anti-fat environment in which higher-weight individuals occupy a recognised subordinate status, complicated by aspects of blame and shame, with consequent implications for the inter- and intrapersonal dynamics of such interactions (Fiske, 2010; Barlösius and Philipps, 2015). Attributing negative treatment to prejudice is likely to be more onerous when it targets a stable, genuinely disadvantaged identity (Schmitt and Branscombe, 2002); the lived experience of a fat joke addressed at a very fat young girl, for example, may well not be equivalent to one addressed to a slim girl with body image issues. Studies that have independently assessed the effects of weight-related teasing across different weight groups have produced conflicting results: while all studies consistently report significantly higher frequency of weight-related teasing in heavier participants, some (e.g., Goldfield et al., 2010; Puhl and Luedicke, 2012) have found no difference in affective responses to victimisation by weight status, whereas others (e.g., Quick et al., 2013) found that heavier individuals reported greater distress as a result of weight-based victimisation than did slimmer individuals. Therefore, it should not be assumed that measures of stigma, whether experienced or internalised, are capturing the same qualitative experiences in higher-weight and normative-weight participants (Meadows et al., 2017).

The present study has a number of limitations. First, unlike previous studies using the EAH paradigm, participants were not fed to satiety in the lab but were asked to attend full. It is possible that participants were not sufficiently sated to obtain a true measure of EAH and that hunger may have been driving eating behaviour. However, baseline hunger levels confirmed the fed state in the majority of participants, and all analyses controlled for baseline hunger levels. Secondly, by using an interpersonal-relationship paradigm for the experimental manipulation, we aimed to eliminate the potential confounding by non-identity-related stress that may have been present in the study by Major et al. (2014), in which the vignettes discussed both employment and health problems associated with being higher-weight. However, while all participants in the present study were required to be non-smokers, thus ensuring the neutral control condition was non-personally relevant, it is not possible to rule out that some effects may have been driven by participants' own health concerns becoming salient on reading about smoking, a behaviour known to be highly relevant to health. Such an effect may have translated into control participants eating fewer snacks, and reduced the size of any differences due to experimental condition.

Imbalances also occurred in the combination of high and low weight status and high and low levels of internalised weight stigma, which may have led to increased uncertainty around the estimates of effect size and reduced statistical power. From a methodological point of view, it is more difficult to recruit participants with high BMI and low internalised weight stigma, and low BMI but high internalised weight stigma than the reverse combinations, simply due to the relative prevalence of each in the general population. Future studies are needed to replicate this finding, and to test the hypothesised mechanisms driving differential responses among participants of different weight statuses and levels of internalised weight stigma. Online studies provide opportunities to strategically target individuals likely to endorse a broader array of weight-related attitudes, whereas a laboratory-based study is limited by geographical constraints. However, more complex experimental design would be required to achieve the effect of being observed in an online context. EMA studies with more targeted recruitment designed to capture this less common combination of high weight and low internalised weight stigma, for example by recruiting from

the size acceptance community as well as from the general population, may be one solution to this problem. Further, the relative paucity of male participants made it impossible to test for gender differences in stigma response, and this should also be addressed in future studies.

Finally, internalised weight stigma was assessed as a trait-level variable prior to the lab-based phase of the study. While it is reasonable to expect that existing levels of internalised weight stigma will moderate how an individual responds to a stigmatising prime, it would be of interest to test the effect of the prime on state levels of internalised weight stigma, as well as the mediational effect of the prime on EAH via state internalised weight stigma.

CONCLUSION

In conclusion, this is the first study to explore the role of internalised weight stigma on snack intake in response to a weight-relevant stigma prime. While the findings suggest a tendency for higher versus lower levels of internalised weight stigma to be associated with reduced energy intake in higher-weight individuals in the weight-stigma condition compared with a control condition, it is likely that at least part of this effect was a result of self-presentational motivation, and the possibility of a subsequent rebound effect on eating behaviour cannot be ruled out. Thus, it would be premature to suggest that experienced or internalised weight stigma may reduce intake in a natural environment. Although it could be argued that these findings support a potential role for the use of stigmatising content in health promotion messages, with the goal of encouraging reduced consumption, a growing body of research fails to support such an approach. Stigmatising public health messages have consistently been shown to have paradoxical effects, including increased desire for high-calorie foods (Tomiyama and Mann, 2013) and reduced self-efficacy for healthy behaviour change (Puhl et al., 2013; Simpson et al., 2017). Stigmatising public health messages have also been criticised on ethical grounds, for increasing anti-fat bias in society, for shifting focus away from the far more significant social determinants of health, and even for being inconsistent with a human-rights approach to health (O'Hara and Gregg, 2012; Pausé, 2017; Couch et al., 2018; Medvedyuk et al., 2018). Given the somewhat unexpected nature of the results, at least in terms of the extant literature on the relationship between internalised weight stigma and self-reported eating behaviour, further research is needed to replicate these findings and to elucidate the mechanisms underlying the processes involved.

ETHICS STATEMENT

All subjects in this study gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the University of Birmingham Ethical Review Committee.

AUTHOR CONTRIBUTIONS

AM conceived the study and was responsible for data acquisition and analysis, and drafted the initial version of the manuscript. AM and SH contributed to the design of the study and interpretation of the data. Both authors were involved in critical revision of the manuscript, approved the final manuscript, and agreed to be accountable for all aspects of the work.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01022/full#supplementary-material

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Addressing Internalized Weight Bias and Changing Damaged Social Identities for People Living With Obesity

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Obesity is a stigmatized disease due to pervasive personal, professional, institutional, and cultural weight bias. Individuals with obesity experience weight bias across their lifespan and settings, which can affect their life chances and significantly impact health and social outcomes. The objectives of this study were to: (a) explore weight bias and stigma experiences of people living with obesity; (b) develop counterstories that can reduce weight bias and stigma; and (c) reflect on current obesity master narratives and identify opportunities for personal, professional, and social change.

Methods: Using purposive sampling, we lived alongside and engaged persons with obesity (n = 10) in a narrative inquiry on weight bias and obesity stigma. We co-developed interim narrative accounts while applying the three-dimensional narrative inquiry space: (a) temporality; (b) sociality; and (c) place, to find meaning in participants' experiences. We also applied the narrative repair model to co-create counterstories to resist oppressive master narratives for participants and for people living with obesity in general.

Results: We present 10 counterstories, which provide a window into the personal, familial, professional, and social contexts in which weight bias and obesity stigma take place.

Discussion: A fundamental driver of participants' experiences with weight bias is a lack of understanding of obesity, which can lead to internalized weight bias and stigma. Weight bias internalization impacted participants' emotional responses and triggered feelings of shame, blame, vulnerability, stress, depression, and even suicidal thoughts and acts. Participants' stories revealed behavioral responses such as avoidance of health promoting behaviors and social isolation. Weight bias internalization also hindered participants' obesity management process as well as their rehabilitation and recovery strategies. Participants embraced recovery from internalized weight bias by developing self-compassion and self-acceptance and by actively engaging in efforts to resist damaged social identities and demanding respect, dignity, and fair treatment.

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Conclusion: Narrative inquiry combined with the narrative repair model can be a transformative way to address internalized weight bias and to resist damaged social identities for people living with obesity. By examining experiences, beliefs, values, practices, and relationships that contribute to dominant obesity narratives, we can begin to address some of the socially and institutionally generated negative views of individuals with obesity.

Keywords: weight bias, obesity stigma, internalized weight bias, narrative inquiry, narratitive repair model, counterstories

INTRODUCTION

"*We are never more (and sometimes less) than the co-authors of our own narratives. . .we enter upon a stage and we find ourselves part of an action that was not of our own making.*" *(Alasdair MacIntyre in Linderman-Nelson, p. 55). (Linderman-Nelson, 2001)*

Weight bias is defined as negative attitudes toward and beliefs about others because of their weight (Puhl et al., 2008). These negative attitudes are manifested by stereotypes and/or prejudice toward people with obesity. Ultimately, weight bias can lead to obesity stigma, which is the social sign or label affixed to an individual who is the victim of prejudice (Browne, 2012). Individuals with obesity experience *external stigma*, which can affect their life chances and significantly impact their health and social outcomes (Phelan et al., 2014). External obesity stigma can lead to devalued social identity that increases vulnerability to loss of status, unfair treatment, discrimination and health and social inequalities (Browne, 2012). Experiencing stigma can impact health promoting behaviors such as avoidance of preventive care, which is counterproductive to public health efforts (Puhl and Heuer, 2010). Weight bias and stigma can also increase both morbidity and mortality (Sutin et al., 2015). Self-stigma or *internalized stigma* can also have adverse health outcomes including poorer health related quality of life (HRQoL) (Latner et al., 2014). Holding negative beliefs about oneself because of one's weight or size can have a distinct and direct effect on health outcomes, independent of any obesity-related health impairments (Pearl and Puhl, 2016). Weight bias internalization may also mediate poor mental health scores in persons living with obesity (Pearl et al., 2014).

Despite significant research indicating that obesity stigma significantly affects population health outcomes, it has not been recognized as a key determinant of health (Hatzenbuehler et al., 2013; Alberga et al., 2016b; Link and Hatzenbuehler, 2016; Ramos Salas et al., 2017a). This is surprising considering that obesity itself is a global priority and that public health policies to prevent and manage obesity have been established worldwide (WHO, 2000; PHAC, 2011). There are precedents in public health practice for addressing stigma associated with chronic diseases such as mental illness, HIV/AIDS and diabetes (Ramos Salas et al., 2017a). However, there have been very few efforts, either in the public or health domains, to reduce obesity stigma.

There is a general lack of consistency in theoretical frameworks, methodologies and approaches to reduce weight bias and obesity stigma (Daníelsdóttir et al., 2010; Alberga et al., 2016a). To date, weight bias interventions have been primarily focused on reducing external stigma (i.e., changing individuals' attitudes and beliefs about obesity) and show mixed results. For example, interventions that increase health professionals' understanding and knowledge about the complex causes of obesity can translate into less blaming of the individual. Such interventions, however, have not been evaluated for long-term sustainability, nor have they been assessed for impact on health professionals' practices and behaviors (Teachman et al., 2003). Similarly, few interventions to address internalized weight stigma have been implemented and evaluated (Levin et al., 2018; Pearl et al., 2018).

Through a recent critical review of Canadian public health obesity prevention policies and strategies, we showed that current public health narratives may contribute to weight bias and obesity stigma (Ramos Salas et al., 2017b). Specifically, we found that public health obesity prevention narratives, which focus mainly on individual-based behaviors, can simplify the causes of obesity as unhealthy eating and lack of physical activity and contribute to the belief that obesity can be controlled through lifestyle changes. This narrative can cast shame and blame for individuals living with obesity, because it positions obesity as a lifestyle choice. These findings are consistent with other studies from Canada, the United States, and Australia, indicating that individuals with obesity perceive current obesity public health initiatives as overly simplistic, disempowering and stigmatizing (Puhl et al., 2013; Kirk et al., 2014). Considering that weight bias internalization occurs in the context of experiencing stigma through external sources including media, family, school, work, and institutional structures and systems, changing public health narratives may be one way to address both external and internal stigma.

Since the prevalence of weight bias and obesity stigma continues to increase (Andreyeva et al., 2008) there is an urgent need to develop theory-driven interventions (Alberga et al., 2016b). There are a variety of theoretical models that can support weight bias and obesity stigma reduction interventions (Puhl and Heuer, 2010; Hatzenbuehler et al., 2013; Bombak, 2014; Lee et al., 2014; Puhl et al., 2015a,b). However, to date very few theoretical models have involved persons who have experienced weight bias and obesity stigma (Ramos Salas et al., 2017a). One potential model that could be used to involve persons affected by weight bias and obesity stigma was developed by Linderman-Nelson (2001). The *narrative repair model* stipulates that persons who are affected by stigma can be active agents in changing damaged or stigmatized narratives by creating

counterstories (Linderman-Nelson, 2001). The premise behind the narrative repair model is that social narratives can shape how we think and how we act (Linderman-Nelson, 2001). In other words, social narratives can influence how we identify groups and populations (i.e., social identity) and how individuals act (i.e., individual agency). Social narratives can create damaged identities for certain groups or populations, which can influence how individuals see themselves, how they act and how they are treated in society.

Social narratives that label human differences can result in stereotypes and prejudice, which can drive stigma (Pescosolido et al., 2008; Thompson and Kumar, 2011). These labels reflect dominant cultural beliefs and create degrees of separation between groups. Labeled persons can in turn experience status loss and discrimination that leads to inequalities through reduced access to social, economic and political power (Teachman and Brownell, 2001). Through the power of counterstories, Linderman-Nelson argues that individuals can resist and replace damaged social identities that have been created about them and for them (Linderman-Nelson, 2001). Specifically, a counterstory "is a story that resists an oppressive identify and attempts to replace it with one that commands respect" (Linderman-Nelson, 2001).

Linderman-Nelson's model makes it possible to address the effects of both external and internal stigma. For instance, through the process of telling their own stories of weight bias and obesity stigma, individuals may restore their identity and reframe their lives to create a healthier self (Linderman-Nelson, 2001). In addition, others who read their stories and who may have had similar experiences may find it transformative. Finally, by disseminating counterstories among a broader audience, we may be able to create social and political messages about the way that society defines and treats people with obesity. Thus, counteracting master narratives about obesity and about people with obesity may transform the way we all think about obesity.

OBJECTIVES

The objectives of this study were to:

(a) Explore weight bias and obesity stigma experiences of people living with obesity;
(b) Develop person-centered counterstories to reduce weight bias and obesity stigma; and
(c) Reflect on opportunities for personal, professional practice and social change.

MATERIALS AND METHODS

Narrative Inquiry Methodology

Using narrative inquiry (Clandinin and Connelly, 2000), we engaged participants in conversations about their experiences (stories) with obesity, weight bias and stigma, focusing on personal, public, and health care domains. The goal of narrative inquiry is to allow participants to find meaning in their own experiences (as well as those of many others in similar situations) by telling and retelling their stories over time. The premise of narrative inquiry is that people live storied lives and that by investigating into our experiences (stories), we create a new vantage point from which we can understand and learn from our own experiences and those of others. Together, participants and researchers, may create coherence between the stories and also find meaning within the stories (Clandinin, 2013).

The process of narrative inquiry is inherently relational and collaborative. As participants and researchers lived alongside each other, we (including the lead researcher) shared our experiences with obesity and weight bias across times and settings. The lead researcher kept a journal and recorded field notes. Some participants provided other data sources such as pictures and other memory artifacts that could help us develop in-depth narrative accounts. Each participant met with the lead researcher several times.

After developing *interim research texts* in collaboration with participants, the lead researcher invited participants to provide feedback and to share their personal responses to all the stories. We asked participants to be attentive to their own emotions and to consider the potential silences in the stories, which may also reveal critical meanings. Together, participants and the lead researcher, read and re-read the stories to uncover personal, familial, social and institutional contexts that have shaped our shared experiences of obesity, weight bias and stigma.

We used the *three-dimensional narrative inquiry space* to organize each story according to: (a) *temporality* (i.e., stories are always in transition and are linked through the past, present and future), (b) *sociality* (i.e., stories are informed by the personal and social conditions in which we live) and (c) *place* (i.e., stories happen within physical and topological boundaries where the inquiry and events take place) (Clandinin, 2013). The three-dimensional narrative inquiry space provided a conceptual framework that helped us understand how obesity and weight bias experiences (stories) happen in the context of time, social milieu, and physical space. This framework also allowed us to create coherence between the stories and find meaning within each story. Ultimately, this collaborative analysis and interpretation process helped us realized that some situations were not unique and that many people living with obesity go through similar experiences of weight bias (including internalized weight bias), stigmatization, and discrimination. After identifying coherences and meanings, the lead researcher developed the *final research texts* with full participation from all research participants.

This narrative inquiry process took place over 2 years (**Figure 1**). The prolonged and intensive engagement with participants was central to the research process, as it allowed the lead researcher to interact with participants and determine the degree to which they were comfortable with the final research texts and to gauge how participants' perspectives shifted through the research process.

In this paper, we share counterstories (final research texts) developed by 10 individuals living with obesity who have

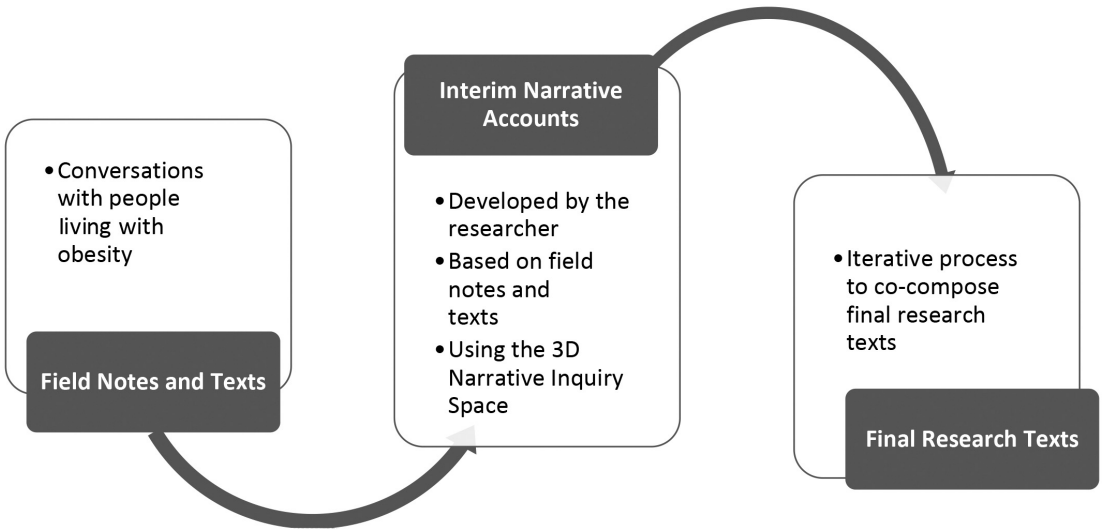

FIGURE 1 | Narrative inquiry process.

experienced weight bias, stigma, and discrimination. We invite the reader to read these stories and to place themselves within them, reflecting on their own stories as well as our collective master narratives of obesity. Examining experiences, beliefs, values, practices and relationships that contribute to dominant obesity narratives has been recommended as a way to address some of the social and institutionally generated negative views of individuals with obesity (Aston et al., 2012). Reflexivity may also help challenge social narratives about obesity and change personal attitudes, beliefs and practices about obesity prevention and management (Aston et al., 2012).

Participants

Using purposive sampling, we engaged persons living with obesity (n = 10) from various Canadian provinces in a narrative inquiry to construct and interpret participants' experiences with obesity prevention policies, weight bias and obesity stigma. Since, the purpose of this study was to explore weight bias and stigma experiences of people living with obesity, we used the Obesity Canada's definition of obesity (OC, 2013) to recruit participants. Obesity Canada defines obesity as a chronic disease characterized by excess or abnormal body fat that impairs health, regardless of body size. All participants in this study self-identified as having obesity and had also been diagnosed with obesity by a qualified health professional. No anthropometric measures were necessary because all participants had clinical obesity.

All participants were over 18 years of age. Participation was voluntary, and participants were recruited through bariatric clinics and through Obesity Canada (formerly the Canadian Obesity Network) – a national registered charity with a mandate to translate research into policy and practice. Participants did not receive financial compensation for their participation in this study. Each participant was assigned a pseudonym.

Ethics Statement

We obtained ethics approval from the University of Alberta Health Research Ethics Board. All participants received a study information package prior to the conversations. All participants also provided written informed consent for the purposes of research participation as well as for the publication of the counterstories. Participants were informed that pseudonyms would be used in the stories.

RESULTS

Catherine: Counteracting My Unhealthy Social Identity

My doctor told me that obesity is a chronic disease, meaning that I will live with obesity for the rest of my life. Right now, he says I am in remission because I am managing my disease well enough that my weight does not impact my health. Even though I am healthy and at my best weight, I am still actively managing my weight because if I stop the treatment, the weight will come back.

However, my friends and family still think I should lose more weight and still make comments about my "unhealthy weight." These unwanted comments never stop. People are well meaning but they have no idea what I am going through. They just see my body and assume that I am unhealthy. I cannot change the size of my body. This is the body I have learned to accept after years of abusing it and trying to make it "*normal*."

I believe the messages about "*healthy weight*" have certainly contributed to my weight bias experiences. Society tells us that obesity is bad and that people with obesity are a burden to society. This narrative has an impact on social attitudes, which has had a direct impact on me as an individual. Wherever I go, the first impression I make in someone is that I am unhealthy. This allows people to treat me differently. When

I walk down the street, strangers tell me: "You should not be eating that" or "You should take the stairs instead of the elevator." My body is identified by others as "*unhealthy*" and over time, I started to believe that my body was unhealthy and that I was unhealthy.

Everything I have done to lose weight is because I wanted to become healthy. As an indoor cycling instructor, for example, I am always looking for new places to work. During a job interview few years ago, an employer asked me if I considered myself to be healthy. I was taken aback with that question and I asked her to clarify what she meant. She asked: "Do you think your weight is healthy"? This is how our society views me. So, I need to make sure that I change that perception by sharing some of my journey with them.

I tell them that I eat healthy based on what my bariatric dietitian has recommended and that I exercise as much as I can. I teach 4–6 cycling classes per week and run in as many races for which I have time in my busy life as a mother, wife and teacher. I take medication to manage my obesity just like people with diabetes take medications to manage blood sugar levels. I see a bariatric doctor regularly and I although I still live in a large body, I am healthy.

I also tell them about my journey in accepting my body and treating myself with respect. I share some of my experiences with weight bias and bullying. Every weight bias experience is like a mini-trauma. It leaves a mark and makes it is harder to recover from them. But I have developed a "thick skin". These mini-traumatic experiences have become part of my life. They have made me stronger. But that does not make it right. Looking back on those experiences of weight bias, bullying, teasing and abuse, I can tell that the stigma scars are permanently imprinted in my brain. Sometimes, I need to put a lot of effort to prevent these scars from affecting my life. Negative self-talk and poor body confidence are barriers to my emotional health and my disease management process.

Another way I use to fight weight bias is to explain to people that shaming people for their body size is not helpful. It has never helped me to change my behavior. The more I feel badly about myself and my body, the more I avoid healthy living activities such as going to the gym. Through this story, I want to let people know that making someone feel bad about themselves is detrimental. We should encourage and support others who feel unwelcomed in fitness facilities, for example, because after all, exercise is good for everyone – not just for people with obesity.

Caroline: Obesity Is Not a Lifestyle Choice!

In grade two or three, I missed a vaccination day in school and my mother had to take me to the public health clinic instead. The nurse weighted me in the waiting room in front of everyone and told my mother that I was obese. I will never forget this experience. Once we were in a private room, the nurse scolded my mother because I was obese. My mother asked the nurse what she should do. The nurse told her that she needed to put me on a healthy diet and exercise program. That was the beginning of my weight loss career. I call it a career because I truly have been working at my weight all my life. But no matter what I tried, the weight always came back.

As an adult, I finally found a doctor that specialized in obesity. She took the time to explain to me what obesity is, and I realized that a lot of what I knew about weight and health was incorrect. I was obsessed with losing weight through diet and exercise because I wanted to be "healthy." In retrospect, I just wanted to be normal. But after all those years of yo–yo dieting and exercising, I had actually damaged both my soul and body. I had convinced myself that there was something wrong with me because I could not manage my weight.

Once I realized that I had a chronic disease, I took every opportunity to learn more about it. I even went to an obesity conference to inform myself about the latest science on obesity. This is when I realized how much damage I had done to my body, my metabolism and my soul.

One of the most important things I have learned is that obesity is a complex chronic disease and not a lifestyle choice. The Canadian Medical Association (since 2015), the American Medical Association (since 2013), the World Health Organization (since 1948), Obesity Canada (formerly known as the Canadian Obesity Network) (since 2011), The Obesity Society (since 2013), the Obesity Action Coalition, the European Association for the Study of Obesity (since 2013) and the World Obesity Federation (since 2017) are just a few organizations that have recognized that obesity is a chronic disease. For years, I have been told by health professionals, friends, family, and the media that obesity is about my lifestyle (unhealthy eating and lack of exercise). Well, I have tried healthy eating and exercise plans all my life and that has not changed my obesity. For 20 years, I tried that. Yet, I still have obesity.

For my mother, having a daughter that had been labeled as obese was devastating. She tried to make me healthy in her own way. She cooked different foods for me. While everyone else was eating regular meals, I was eating soup or raw vegetables. Whatever her friends told her to try, she tried it on me. I resented the fact that everyone could eat whatever they wanted, while I was stuck on an endless diet. My mother put me in dance classes, swimming, power skating, and even made me do exercises at home such as running up and down the stairs or running around the backyard.

When I deconstruct the current narrative about obesity, it says to me that health professionals blamed my mother and me and so they did not need to help me find evidence-based treatments. My mother internalized this message and truly believed it was her fault that I had become obese and that it was her responsibility to fix it. I also internalized the weight loss failures and truly believed that there was something wrong with me.

It took years for me to realize that there is nothing wrong with me as a person. That my identity is not defined by my weight. That I am a human being who deserves respect and dignity. That I have a chronic disease that requires long-term management, and that it is my right to expect respectful and dignified care.

Today I am making it my mission in life to prevent weight bias and obesity stigma. People need to understand that obesity is not a lifestyle choice. I did not choose to have obesity. In fact,

I suspect that my obesity can be linked back to years of yo–yo dieting as a child, which have reduced my metabolism (maybe permanently) and made my body much more energy efficient. Years and years of losing and gaining weight may have also increased my weight set point, which makes my body counteract any weight management by releasing a cascade of hormones designed to protect against weight loss.

Health professionals have a responsibility to educate the public about obesity in a holistic way. Obesity is not just about the food environment and lifestyle changes. We now know that weight is also intrinsically linked to genetic and biological mechanisms. Rather than presenting obesity solutions as "eat less and move more" strategies, health professionals should adopt the consensus of the medical community and international health agencies that obesity is a complex chronic disease that requires prevention and management strategies that are evidence-based. Simply telling people to "eat less and move more" is frankly unethical, considering that yo–yo dieting and exercising can cause major damage to individuals' mental and physical health.

Sarah: Resisting Institutionalized Stigma and Changing the Way We Accommodate People With Obesity – A Story Narrated From the Perspective of a Weight Bias Researcher!

Sarah exudes confidence and happiness as she comes into my office. I welcome her with a hug but the atmosphere changes quickly when I realize my office does not have chairs to accommodate her body. Sarah laughs it off and tells me:

> "*I am used to not finding seating. The first thing I do when I walk into a room is to scan for chairs. If I do not find one that fits my body, I prefer to stand. The looks I get when I try to fit in a chair are just not worth it.*"

I am shocked that this state-of-the-art obesity research institution lacks seats for people with obesity. The next time we meet, it is at a coffee shop with more comfortable seating. But, there I notice people turning to look at us. Their critical faces show judgment.

> "*I am used to those looks too. These looks can become verbal attacks sometimes. Strangers will stop me on the street and tell me that I should eat less and exercise more.*"

I am uncomfortable and want to leave. I want to protect her from this experience, but I realize that this is part of our story. While living along Sarah, I am traveling into her world. Weight bias and stigma are common experiences that have shaped her life. She tells me about her dream to become a teacher and how her dream almost fell apart on the first day of university. As she entered the classroom she realized the chairs had built-in tables around them and that her body would not fit. Before people could notice she was in the room, she left the classroom. She felt like never returning, but her dream of becoming a teacher motivated her to find a solution.

The next day, she placed a regular armless chair in the back of the room. This became one of her safe place on campus. Over time, she found a few more places where she could sit and study. These spaces represented her own resistance to physical barriers that limit her participation in life. As she shares this personal story with me, she knows that she is creating a resistance against the social exclusion of larger bodies.

We discuss how bodies are marginalized in our society and how people of size are affected.

> "*The message is that I do not belong here because I have obesity. The stories tell the world that we are unhealthy, lazy, unmotivated, unintelligent, disgusting and ugly. People make judgements about my moral character because of my size. The assumption is that I did this to myself. It is my fault. I somehow lack the discipline and willpower to be healthy. That I am a burden to society or that I do not contribute to society. This gives people the right to exclude me from participating in society to my full potential. But everything I have done to my body is to become healthy. I had bariatric surgery because I wanted to become healthy. But that is not enough because I will never be considered a "healthy weight.*"

We explore the idea of healthy weight a bit further. As she tells me her experiences with fat shaming from family, friends, colleagues and strangers, she reflects on how she has internalized these harmful stereotypes and attitudes. Unconsciously, she internalized a harmful personal identity which has shaped her life. Despite having lost a significant amount of weight after her surgery, her body is still classified as obese. However, her bariatric physician recommended that she not lose more weight because it could have negative consequences for her overall health.

> "*He told me that I have reached my best weight. He defines best weight as the weight at which I can be healthy and live happily. And I agree with him. But my family doctor keeps telling me to continue to lose weight – to eat less and move more. But how am I supposed to do that when I am already eating the least amount of food that my body needs to function? How am I supposed to fit in more time for physical activity when I am already exercising 2 h each day? Clearly, my family doctor expects me to reach a certain number on the scale as if that number will make me healthier.*"

Sarah believes that the idea of "*healthy weight*" comes from public health messages which are contributing to the internalization of weight bias among people with obesity.

> "*What does "healthy weight" mean? I am healthy right now but when people look at me they assume that I am not. I don't focus on the number on the scale anymore. I count my non-scale victories. I focus on the activities that I can do now which I could not do before, like going on a roller coaster or going on a vacation or getting a new job. I also work hard to be as healthy as I can be by exercising and eating healthy foods.*"

Sarah has seen what internalized weight bias can do to someone. Unhealthy weight loss practices are common. She tells me about a friend that goes to the gym three times per day (before work, at lunch time, and after work).

> "*She became obsessed with her weight loss and alienated everyone in her life in the process. I do not want to do that.*"

We discuss this further and question why people with obesity are held to a different moral standard than others who have chronic diseases such as cancer, heart disease or hypertension.

"*Weight is supposed to be under my control. I have the control to change my body weight because I choose what I eat and how much I exercise. That's what most people believe. I believed that too. It was not until I started learning about obesity that I realized that there are many factors that influence my weight and the choices I have. I used to blame myself every time I gained weight. But I did not know that lack of sleep was affecting my hormones, for example. I did not know that the medication I was taking for depression was making me gain weight. There is such little awareness about obesity in our society.*"

The assumptions we make about people's moral character are based on lack of knowledge about obesity. We discuss this further as we sit in this now crowded coffee shop. The smell of coffee and pastries is filling our senses and we are enjoying each other's company. We are connecting as humans and we are sharing an experience that is filled with empathy and respect. I notice that a family with two young children sits next to us. They are staring at us and whispering to each other. They look at our plates and I notice they are making comments about our lemon pie. I noticed that both the parents and the children keep looking at Sarah's body as she repositions on the couch. Sarah is also aware of the looks. I make a comment about the lemon pie, desperately trying to stop thinking about this family who is staring at us. Sarah senses my discomfort and says:

"*I am aware of the looks. It happens in almost every restaurant. As if I somehow do not have the right to eat pie because I have obesity. Mostly everyone in this coffee shop is eating some kind of pastry with their coffee, but do they feel judged as I do, I wonder? Is this in my head? Am I imagining the stares?*".

No, she is not imagining the judgmental looks. I can see them too. In fact, if I am honest, I tell her, I may have done this myself. In my training as a kinesiologist, I learned all about the "energy in and energy out" model. That is as much as I learned about obesity in my 4 years of undergraduate studies. During my Masters' degree, there was no learning about obesity as a chronic disease. Instead, obesity was seen as a risk factor for other chronic diseases. So, the lack of understanding of obesity in the general public is similar to the lack of training and awareness among health professionals. This is why I am doing this research study, I tell her.

"*I am thankful to you for sharing this experience with me. I can see how it has changed both of us. I wish other researchers would engage people living with obesity in their work to create more change in our society.*"

Louise: Weight Bias and Obesity Stigma – It's About Life and Death!

I had a nice childhood. A nice family. I have a successful career. I am self-disciplined. But, obesity runs in my family. My parents and grandparents had it. However, my sister does not. She can eat whatever she wants and never exercises. I guess I got the obesity genes in the family. I am managing my obesity well. I was lucky to have a good primary care team that helped me. But I still have a high BMI and I feel like there is something wrong with me and that I need to lose more weight. Somehow my value as a human being is lower than someone whose weight is considered "normal."

Thinking back, I realize that my parents have been telling me that I need to lose weight since I was a child. Even though I ate healthy foods and I participated in extracurricular activities such as swimming and running, they told me that I need to eat healthier and exercise more. As a teenager, my parents questioned my eating habits and accused me of hiding junk food in my room. I never hid food in my room. But, I remember going to bed hungry because I was not eating enough before and after my swimming or running practices. It hurt that my parents did not believe me, but they did not know better. If my parents had known what we know today about the biology of weight gain, they would not have done that because they love me. I know that. There is no doubt that I have scars from my childhood. My relationship with my parents was damaged. To this day, they comment on my weight, my eating habits and my appearance.

Public health messages about obesity make weight control sound easy. But, my journey has not been easy. Every day is difficult. I have lost over 100 lbs. and I am managing my disease well, but I still have obesity according to the BMI categories. My goal is to maintain this weight loss. Based on what I am doing now, I cannot eat less and I cannot exercise more. So, I will never achieve the healthy weight range promoted through public health campaigns. I am at my "best weight" and I need to accept that. Why is public health not OK with that?

The idea that we need to pursue a "*healthy weight*" or a "*healthy BMI*" is not relevant to most people living with obesity. There is a lack of recognition in public health that people come in different shapes and sizes. In my view, public health obesity prevention strategies should not emphasize body weight or BMI (size). Public health should aim to improve health. Size and BMI are not health outcomes.

Public health efforts should aim to support people with obesity, but we are not part of the public health policy making process. We are often excluded from health policies. Obesity prevention strategies target individuals who are "normal" weight in order to prevent them from becoming "obese". But what about those living with obesity already? Who will help us?

Finding obesity care in Canada is challenging, to say the least. Most health care professionals have not been trained in obesity and will simply advise their patients to "eat less and move more." So, we are left to fix this ourselves. How is this acceptable? Well, it is acceptable because people with obesity are not valued in society. We are seen as lazy, stupid and dishonest individuals that simply cannot adopt public health messages and strategies. Obesity is our fault. Those are the assumptions that people make about us. Well, it is time for us to change those assumptions. People with obesity deserve to be treated with respect, just like everyone else. What matters is that we need support.

The way health professionals think about obesity has a direct impact on my health and well-being. A direct example of this in my case was when my doctor blamed the back pain I was experiencing on my obesity. He dismissed my complaints and I

lived with pain for over 2 years, until I decided to get a second opinion. I went to see another doctor who has been trained in obesity and he completed a full health assessment, without any moral judgment or preconceived ideas about my weight. After a few weeks of medical tests, we discovered that I had kidney cancer. By the time we discovered the cancer, it had progressed to stage 2. I was angry and upset. The cancer could have been discovered earlier if it was not because my previous doctor believed that I just needed to lose weight and my back pain would go away.

Never mind finding adequate evidence-based obesity treatment and care within the current Canadian health care system. We can't even find dignified health care in general. Every time a medical problem is blamed on obesity, we experience bias and discrimination. This can have serious health consequences for us as individuals.

The majority of the time, health care professionals do not make assumptions about how someone developed diabetes or cancer or heart disease. But they assume that individuals with obesity are eating too much and exercising too little. This thinking leads to disrespectful treatment and poor quality of care. People with obesity need to challenge these assumptions and share their stories. We need to change the social identity that has been created for us and regain our moral value as human beings.

Karen: Does My Life Matter to Public Health Decision Makers?

My grandfather used to bribe me so I would stop eating. He used to give me money if I skipped dinner. He would say – "See? You just need motivation and you can lose weight." But I was starving, and my body became extremely efficient at storing fat. The more I restricted my eating, the more weight I gained. Diets never worked. My parents started telling me that I needed to take responsibility for my own decisions and that they would no longer help me. I never felt supported by my family. Today, I am still hurting because my family believed that I did this to myself.

In school, kids called me names and abused me physically and mentally. One day in grade 6, a boy in my class walked up to me and spit in my face and yelled "you disgust me, why don't you lose some weight?" I was in shock and could not say anything, so I turned around to walk away but he pulled my hair and I fell to the floor. He then proceeded to kick me in the stomach while continuing to yell at me "you are a disgusting pig." Nobody did anything. There were other kids watching the whole thing, laughing I was crying and yelling at him to please stop but he kept kicking me. He eventually stopped and walked away but not before spitting in my face one last time. I started skipping school and avoided being alone around school. I had no friends and so often I hid in the bathroom during recess so that kids would not see me. This abuse went on for years. There were times when I wanted to die. I stopped telling my mother about the bullying in school because she would just put me on another diet. That was her way of trying to help me.

After years of abuse and isolation, I began to comfort myself with food. The weight gain continued. I suffered in silence and I was relieved when my mother's new boyfriend, who also had obesity, joined our family and we could have conversations about our shared experiences with bullying. I trusted him. The first time he raped me, he threatened to tell my mother that I was skipping school. The threats became worse every time he raped me. I was broken. I was alone. I had no one to trust.

By the time I was 15, I had lost the will to live. I ran away from home and had nowhere to go. Soon, the darkness of the streets consumed my life. Drugs, sexual violence, and crime became part of my life. When I was 17, I was raped, beaten, and left for dead on the streets. A public health nurse found me and took me to a safe place. She saved my life. Today, I am working to address homelessness in my community. I found my voice and I want to give a voice to others.

Obesity has been part of my life and I continue to struggle to manage my weight. But the isolation, abuse and violence that I experienced has changed me. As an isolated, lonely child with obesity, I was more vulnerable to sexual predators. We need to protect our children from adverse childhood experiences. We need to help them before it gets out of control. I hope that my personal experience living with obesity and experiencing shame, blame and abuse can help others. There is no question in my mind that obesity stigma can lead to experiences of social exclusion, abuse and discrimination that ultimately leads to health and social inequalities.

Public health could have taken away the pop and junk food from my school cafeteria. They could have influenced the food environment in my community. I am sure that would help many people. But, I would have still gone out to buy these items from the local convenience store. Yes, I ate unhealthy foods throughout my childhood. It was how I coped with the abuse. I did not choose to experience physical and sexual abuse as a child. But I chose to eat junk foods. *It was all I felt I had control over*. So, yes, I guess obesity is my fault. I did this to myself. But does it matter? Does that give people the right to treat me without respect? Does that mean that public health strategies do not need to take me into account? Is it too late for me? Does my life not matter?

I hope my journey helps health professionals understand that there are many causes of obesity. Obesity prevention strategies should address the true causes of obesity. In my case, the underlying factor for my obesity was shame, trauma and abuse. These are psychological factors that should have been addressed early on. Prevention in my journey should have involved psychosocial support – not just diets and exercise programs.

The bottom line is that health professionals need to understand that a healthy lifestyle is just one component of obesity. So, the question is: what is public health doing to specifically prevent obesity (other than promoting healthy lifestyles)? How is public health addressing the many underlying psychosocial causes of obesity? How is it addressing the realities that people with obesity experience?

Steve: Finding a Community and Changing Obesity Narratives

I may not have been here today if I had not had bariatric surgery 10 years ago. When I think back at the 3 months I spent in the

hospital because of complications, I realize that I was put in this world for a specific reason.

My obesity journey did not start with surgery. My journey started so many years ago when I was a young boy living with my mother who raised a family the best way she could. She showed loved with food, and I needed that love so much. I don't think she ever knew how much I needed her love. A mother is the person who is always there for you. But my mother was not able to be there for me due to her experiences with depression. Reflecting on my childhood I realize that so much of my journey started with my mother.

I don't have resentment toward her now. But, for a long time during my teenage years and early adulthood, I resented her for not protecting me from my abuser who inflicted so much pain on me. I was the target of sexual abuse for years. The only thing I could find comfort in was food. I used it as comfort, as love, as a mechanism to change my body and become invisible. The larger my body became, the more invisible I was to the world – I hoped.

I have been ashamed to speak of this to anyone. Until now. I am turning the page. I am free from this past. I am looking to the future where I can share my story to make a difference in this world. Looking back, I can see how my experiences have created a scar in me, like the one from the bariatric surgery. The scars are not just physical. The scars are also emotional. They will always be there to remind me of where I have been and how far I have come.

Reflecting on my childhood, I can see that all I wanted to do was to run away from that world. I tried to erase childhood memories and used food to feel in control. I wanted to have control of my life. And yes, doctors warned me that I was "morbidly obese." I hated hearing those words because it made me sound like a monster. But I am not a monster. I am a human being in search for love and belonging.

I continued to gain weight and along with it came the experiences of bias and stigma. Some would say to me: "*You are being reckless with your body and health. Get a hold of yourself. Wake up or you will kill yourself*." Even when I was waiting for bariatric surgery, strangers, health care professionals, family and friends looked at me with disgust and contempt. They judged me and created their own stories about me. Stories about me lacking discipline, being stupid, and not caring about myself. Stories about my food addiction and my inability to control myself. One day, I realized that these stories about me were hurting my health.

For example, I was accused of lying about my food intake countless of times by healthcare professionals. I was blamed for my obesity over and over again by healthcare professionals who believed I was acting recklessly and did not care about my life. I was shamed for my obesity in hospitals when told that I could not get diagnostic tests because my body did not fit in hospital equipment.

This is why I decided to share my story. This is not who I am. I am an intelligent person, I care about myself, and I want to have a healthier life. Finding a community of people living with obesity who have experienced similar stigmatization and discrimination in schools, workplaces, and health care has helped me. I have re-gained my sense of belonging. By telling and retelling my story, I am reliving my story and I can see the places, times, and relationships that shaped my life and my obesity journey.

The story about me choosing to develop obesity because I didn't care about myself is not true. I did not choose to do this to myself. Nobody chooses to do this to themselves. Obesity is not a choice. Every person with obesity has their own story, which means that each person needs a different type of support. Those of us who can need to share our stories so that we can help our community. People need to hear these stories without judging them and without imposing their own biases on them. We are human beings and we all deserve respect and dignity.

Nancy: You Cannot Empower Me, I Can Empower Myself!

My experiences with weight bias go deeper than I had ever thought. The stories of weight bias are within me. They are part of me. Years and years of bullying in schools, physically abusive relationships and unfair treatment at work led to feelings of isolation, loneliness, and not belonging. These experiences have changed who I am and have shaped my life.

My earliest experience of weight bias was from my mother. My mother loved me and wanted the best for me. She wanted me to be healthy and marry a good husband, so I could have a beautiful and happy family. The love of a mother is undeniable.

My mother put me on my first diet when I was 10 years old. At the time, I did not think I was chubby or fat. I was a normal little girl who played outdoors all day on our family farm. I ate homemade meals with fresh produce. I played sports in school and loved art classes. I was a curious child and would explore my family farm every day. I loved being outdoors and found ways to create a friendly world. I would stay outdoors so I would not have to hear my mother's comments about my weight, to be safe and happy in my own world.

Despite seeing doctor after doctor, trying diet after diet, practicing, and performing dance after dance, my weight continued to increase. My mother was worried about my weight and my health. But she was also worried I would not be able to find a husband who would love me because of my weight. This story went on for years and it became my story. I used to think: "*will anyone love me? is there something wrong with me? how can I be such as disappointment to my mother who loves me so much? I just need to try harder*."

And I did everything I was told. I tried every diet and exercise program she told me to try. I was my mother's project. She tried and tried to change my weight, so I could be beautiful and healthy. But nothing worked. The weight would come off and then it would come back again. I did it again and again, like a yo–yo. Hundreds of pounds gained and lost throughout my life. My ideal of beauty became about weight. My mother never said I was ugly. She just kept trying to make me more beautiful. Her story became my story. I tried and tried to change my body.

Soon, everyone in my family would tell me to lose weight or nobody would love me or marry me. They would recommend diets, exercise programs and/or doctors. Little by little, I started to believe this story. There is something wrong with me. I cannot lose weight because I am stupid, lazy, and unmotivated. I am not like the rest of the world. I cannot do simple things like

eating healthy and exercising long enough to keep the weight off. Everyone else can do it, except me. It is just me. I am alone.

Despite my mother's fear that I would not meet a boy who loved me, I did. I moved in with him only to experience another form of weight bias. My boyfriend said he loved me and then he stopped buying food. We had no food at home and my weight went down, way down. I became underweight. I was at my lowest weight ever because my boyfriend who loved me would not buy food. I had nowhere to go. I thought this was love. This is what my mother wanted me to find. She wanted me to find love. Taking away the food was just the start. Soon the abuse became physical and emotional. How is this love? Why does love feel so lonely? I eventually I left him. This was not the story I wanted to live. I needed to change my story.

I went back to university to finish my degree and started a career in business. I achieved tremendous success as I put all my energy toward my career. Slowly the weight came back. The stressful career and the stories I had left behind just made the weight come back. My brain re-claimed the weight it had lost and put on even more weight. But this time, the weight started to affect my health. Diabetes, hypertension, sleep apnea, bone and muscle pain coupled with anxiety and depression became part of my story.

By this time, I had re-married and had a daughter of my own. I wanted to be there for her. I tried so hard not to make her story about her weight. I wanted her to be strong and confident. But, in re-writing my story, I lost track of my health. It was time to reclaim my health. This time I realized that years and years of yo–yo dieting, shaming, weight bias, abuse, and loneliness had taken a toll on my body and health. My metabolism was destroyed. My weight was out of control and my health was suffering. I took control and empowered myself to seek support. This is something that health professionals needs to understand: they cannot empower others. Empowerment is internal. It cannot be given to others. All health professionals can do is to provide support and respect. I reached out to a medical expert. I refused to try another diet. This time, I realized that I needed help from someone who understands obesity. It is not about looking skinny or beautiful to me. It is about my health. It is because I need to be healthy and live a long life with my daughter, son, and grandchildren.

But, wait. To see the look in my husband's face when I undress. That is also important. He is a loving husband and has never said anything about my weight. But, the looks on his face reinforce all the shame and blame I feel. *Could it be that the person that I trust the most shares the worst beliefs I have about myself? Does he believe the same things about me that the rest of world does? Does he also believe that I don't have self-control and that I did this to myself?*

At work, I tried to implement healthy snacks. But my colleagues tell me that I need to find a way to control my own impulses and that I cannot take it out on them. Just because I need to lose weight does not mean they cannot eat doughnuts. I argued that having healthy meeting snacks is good for everyone, but they don't see it like that. I did it to myself and it is my fault. They don't need to eat healthy. It is my problem.

By now, I have reflected on my story. Weight bias was one of the main drivers of my weight gain. I know that my mother's sense of love for me was expressed through weight bias. I am a human being who deserves to be loved no matter what size I am. I also deserve to have access to the right support to manage and improve my health and to change my future. Today, I am focused on my health and my life. I have a new job that keeps me active and that promotes healthy food environments. I can go to work and trust that people will stop offering me unhealthy foods or any food, for that matter. They respect my journey and my story and want to be supportive. I wish every person living with obesity would have this type of supportive environment, where they can be themselves and where they can be the healthiest and happiest that they can be. Where they are in control of their story!

People with obesity have different stories and cannot be put into one box. We need to listen to those stories and create environments in which every story can flourish. People with obesity want to be healthy, loved and respected just like everyone else. Health professionals cannot just focus on the weight. Obesity prevention and management strategies are needed but they cannot be measured against weight loss or reductions in Body Mass Index.

If health professionals do not change that narrative, people like my mother will continue to believe that to be healthy or loved you need to be skinny. And that people with obesity cannot be healthy or loved. That people with obesity need to change to become "*normal weight*" or "*healthy weight*."

I am living with a chronic disease that I need to manage every day. Every day, I need to think about my food decisions, my exercise levels, my stress levels, my sleep, and my emotional health. I will never be considered a "*healthy weight*" and I will never have a "*healthy body mass index*" but I have lost the weight that was impairing my health and now I can live my life. I can be there for my children and my grandchildren. I can be loved by husband and live a happy life. I don't need to be skinny to be healthy and loved.

Margaret: Shame and Internalized Bias

Shame penetrates every part of your body. It penetrates your mind deeply. Shame triggers deep feelings of inadequacy, guilt, and vulnerability. Shame hides in your mind and you feel out of control. When you feel out of control, you can do a lot of damage to yourself.

Shame also channels into your heart and you stop loving yourself. You start believing that nobody can love you because you don't love yourself. This leads to loneliness. Shame gets into your gut, triggering the shame triggers or the hunger hormones. All you can do is feed those triggers to calm them down.

But every time you feel shame and lose control, you lose a bit of yourself and you feel yourself changing slowly. But you get up and you go to work, you take the kids to school and you start another diet and exercise program. Each time you fail, the shame increases, until one day your weight and shame affect your health and you get sick: a stroke, a heart attack, diabetes, back pain, knee pain, depression. One day, you realize that you could die from obesity and shame. But where do you go for help?

Society tells you it is easy. You just need to eat less and move more. But, how do I deal with the shame in my mind, my heart and my gut? Nobody is there to help me. I am alone.

And I try again, and again, but nobody can do this alone. It is a basic human need to have someone to trust to rely on for help. But all I hear is: "*you did this to yourself and you need to get your act together and figure it out alone*." "*Nobody can help you unless you want to help yourself*," they say. What does that mean? Would you say that to someone who has cancer? Does that work for anyone who has mental health issues? Does it work for anyone out there?

I walk down the street and the stereotypes about obesity are everywhere: in my family, in my school, in my workplace, in my local fitness center. I can never get away from those stereotypes. I even believe these stereotypes. I live those stereotypes.

Weight bias is about shame. I am ashamed of my body. I am ashamed for my failure to control my weight. But the reality is that our brain and gut will work together to counteract weight loss and defend the highest weight at all cost. On one hand, this is a positive scientific finding because it shows that weight regain is not the result of lack of will power, commitment, or effort. Unlike what my friends, family, and bariatric specialists believe, I am not lying about my food intake or physical activity levels. My body is simply very efficient at counteracting my weight loss efforts. That is the bad news about this scientific finding. Significant biological mechanisms will counteract every change I make, making weight loss maintenance even harder.

These compensatory biological mechanisms are not well understood by scientists, but as an individual living with obesity who has tried to lose weight all my life, I can certainly attest to them. Each time I lose weight, I feel hungry and my body temperature goes down. My body becomes way more efficient at storing fat and although I am still running the same distance and eating the same number of calories, my weight loss will either stop or I will start regaining weight. This means that if I want to sustain the weight loss, I need to reduce my calories even more and I need to spend more calories by exercising even more. But, there is a limit to how much I can increase this effort. Any person trying to sustain this effort would struggle. It is not impossible, but it is hard.

When I reflect on the shame that I experience every time I regain weight, I realize that this is unfair. I am not a failure. I simply do not have the right tools and support to manage this chronic, relapsing disease. What if I was living with hypertension? Would I be expected to manage my blood pressure on my own through diet and exercise? No, my doctor would first give me medications and then support me to make behavior changes. But because this is obesity and I should have control of my weight, I am expected to manage obesity on my own. Forget all the compensatory mechanisms working against me. Those are just excuses, and I just need to try harder.

Andrew: It's 'Us' Versus 'Them'

I have a room full of trophies and medals that remind me of my hockey career. I remember the early morning and late evening practices, the weekend journeys to hockey tournaments and the many hockey camps I participated in. But, the memory of the day I broke my ankle is more vivid than any other. It was the end of my hockey career. Everything I had was gone from that moment. Although, doctors, family, and friends supported me and gave me hope that I could play again, I knew this was the end. It felt like it was the end of my life. I developed severe depression and became isolated and alone. Doctors put me on antidepressants but they did not really help. By now, I had missed so much of school that I could not finish the school year. I dropped out and hid away from society for a long time. When I finally came up for air, I weighed over 300 lbs. My body and soul were damaged.

Obesity can be triggered by something like a childhood trauma, an injury, a genetic condition, a mental health condition, a metabolic issue, a socioeconomic issue and even by shame. Whatever triggers obesity, it impacts peoples' lives and health. I hear people say that obesity is not a disease. Fat is just normal. Fat is not killing you. It is the internalized weight bias and shame that is killing you. Where does that shame come from? It comes from social stereotypes. It comes from the bias and stigma we experience on an ongoing basis. Yes, it can be part of it. But, the impact of obesity on my health is real. How can obesity be a social construction? Whether it is a disease, or a social construct matters to academics, but what matters to me is the ability to be here when my kids graduate and get married. What matters to me is my health.

We can debate whether obesity is a disease or not or whether calling obesity a disease will either reduce or increase weight bias and stigma, but it does not matter. These debates are delaying the ability for people with obesity to receive health care services. It can be a matter of life and death for individuals affected by obesity. Our lives are not academic projects. If you really think that obesity is not a disease and that our health is not affected by weight, that is your personal belief. I understand that there are people who identify as fat or as big persons. But do they have the right to question whether I have a disease or not? Even if you believe that it is the shame (weight bias and stigma) that is affecting my health, why do you deny me the right to seek support? Maybe it is the weight bias and shame that made me gain weight. Yes, there are studies that show that experiencing weight bias and stigma can increase obesity. But, so what? I still have to deal with the consequences of obesity because it is now affecting my health. Obesity is real. Obesity impacts my life. We do not need to argue about labels.

There are health professionals and fat acceptance advocates who do not accept that obesity is a disease. These debates seem to ignore that there is a person at the core of the discussion. Who is asking people with obesity what they think? At this point, it is fair to say that the voices of people with obesity are not invited in either the medical or the fat scholar debates. A core social value is to respect the rights of all human beings. Specifically, the Canadian Human Rights Act says:

> *. . . all individuals should have an opportunity equal with other individuals to make for themselves the lives that they are able and wish to have and to have their needs accommodated, consistent with their duties and obligations as members of society, without being hindered in or prevented from doing so by discriminatory practices based on race, national or ethnic origin, color, religion, age, sex, sexual orientation, gender identity or expression, marital status, family status, genetic characteristics, disability, or conviction for an offense for which a pardon has been granted. . .*

Where do the rights of people with obesity fit in the Canadian Human Rights Act? Based on the understanding that obesity is a chronic disease, obesity could fit within the protected area of disability. But disability is also a stigmatized label.

Research shows that stigma is created when people distinguish and label human differences. These labels reflect dominant cultural beliefs and have a particular purpose. By placing people in distinct categories, we create degrees of separation between groups of people. It is an 'us' versus 'them' mentality. I am different than you and therefore you have the right to treat me differently. This idea that people with obesity are different or '*not normal*' gives people the opportunity to treat us as '*abnormal*.' This label has consequences for all of us living with obesity. People believe we did this to ourselves. We are not respected in society. We are seen as immoral persons because we have not taken care of our weight and we are somehow defective. We are not responsible persons and we should be punished for stepping outside of the '*normal boundaries*.'

Stigmatized persons experience status loss and discrimination that leads to various unequal health and social outcomes. Stigma has impacted my life chances. When I finally got help to address my depression, I went back to school to finish my university degree. I had trouble making friends because I could not participate in sports anymore. I did not have a group to belong to, so I was alone most of the time. When I entered the workforce, I went to many interviews and I could see the stares and negative attitudes among employers. I am certain I did not get many jobs because of my obesity. In my current employment, I have been passed for several promotions despite me having higher qualifications and better performance results. One co-worker complained to my manager that I smelled bad and requested an office move because he could not sit next to me. He did not tell me this to my face, but I overheard his comments in the washroom one day.

We must consider the power relations that underlie the ability of dominant groups to act on their biased attitudes and beliefs. We need weight bias and obesity stigma interventions to change institutional practices that work to disadvantage people with obesity in health care settings, workplaces, and schools.

Laura: Shame and Vulnerability

Let's unpack the shame that can trigger negative health behaviors. In my case, I hid in my room and ate until I weighed 250 lbs. The shame came from outside. People shamed me for my size since I was a baby. My parents put me on my first diet when I was about 12 months old because the doctor said I was too big for my age. They put me on a skim milk diet (as per the doctor's advice). I ended up in the hospital. Just imagine what that did to my health. Science shows that yo–yo dieting is bad for your health. Well, I have been yo-to dieting since I was a baby.

The worry and shame that my parents felt about my size has been going on all my life. It made me feel unloved and alone. I have always been told that there is something wrong with my size. I responded to this shame by internalizing it. I believed my body was ugly, useless, worthless and abnormal. I disconnected from my physical body and began to hate it as if it was not part of me. But you cannot disconnect your body from you mind. As you start hating your body, you start hating yourself. You start hating everything about yourself. Not just your body. You hate who you are as a person. What do you think happens when you hate yourself that much? How do you reconcile this hatred in your mind? You simply try to survive. You try to repair the hate. But you do it by trying to change your body. By trying to look "*normal*." By trying to fit into the "*normal BMI*" range. You try and try. You fail and fail. And when you fail, it is your fault.

What happens when you fail so many times is that you internalize the failure and start believing that you are just incapable of doing this. In my case, I developed alcoholism. That is how I coped with the shame. I was able to get help for alcoholism within the health care system because alcoholism is a disease, but I was not able to get help for obesity. I have been a recovered alcoholic for 25 years and I still have not been able to get help for my obesity.

Why is alcoholism a disease and not obesity? My alcoholism was also triggered by something else –the internalization of shame, the feelings of being out of control and that I was not "*normal*." Doesn't this sound familiar? It is the same shame that I have internalized that has led to me having obesity. But alcoholism is a disease. You don't tell someone with alcoholism to deal with it alone. You provide support.

Once I realized that obesity is a chronic disease just like alcoholism, I asked my primary care doctor to refer me to the bariatric program. I was hopeful that I would have access to a team of health care professionals who are trained in obesity management and I finally would be able to get help. But that hope was shattered the moment I enrolled in the program. The bariatric program has basically continued to shame me. I expected these specialized health care professionals to be empathetic, knowledgeable, and supportive. Instead, they are arrogant, provide me with conflicting messaging and tell me that I just need to have bariatric surgery because that is the only treatment that will work for me. But, I don't want to have surgery. So that means the program can't help me. Where is the support?

From the moment, I walk into the bariatric clinic, the staff is rude to me. Nobody says hello. The dietitian implies that I am lying about my food intake because I have not lost weight. She doesn't even look at my Fitbit or food journal. One dietitian told me that Fitbits are inaccurate so not to bother with it. But the first dietitian I met in the clinic told me to get one. Now this dietitian does not even want to look at it? I just spent $200 on this piece of equipment that she now claims is useless.

The psychologist and psychiatrist asked me if I think I need to talk to them. I said no because they just want to put me on antidepressants. Many psychiatric medications make you gain weight. I gained about 35 lbs while on medications. The nurse, on the other hand, tells me that if I don't want surgery, the program can't help me. How is this an obesity management program? We need to do better than this. People with obesity deserve better.

Like obesity, weight bias is always there, lingering. Self-stigma can come back anytime as a result of an experience of external obesity stigma. Unfortunately, obesity stigma can come from anyone, even from health professionals working in an institution that specializes in obesity. Although the goal is to eradicate weight

bias all together, this may not be possible. There is always going to be a process of "us" and "them" at work in social interactions. However, taking examples from racism research, we know that racist ideologies have not changed completely but the manner in which racial prejudice is expressed has changed. It is not legal to discriminate against someone because of the color of their skin. This is where weight bias and obesity stigma interventions at the policy level are necessary. Legislations and policies to protect people with obesity from being discriminated against should be put in place.

MASTER NARRATIVES

Stories are selective, interpretative, and connective representations of human experience over time. They contribute to our self-identity and agency (i.e., our own understanding of who we are and what we do) (Linderman-Nelson, 2001). When we tell stories about our lives, we select elements in a way to represent a process of happening (beginning, middle, and end). We also interpret elements of a story by characterizing people, events, and places. The interpretation is always from a particular perspective or a way of seeing things. When we connect these elements of our stories over time, we create our self-identity.

Our identities, however, are developed through an interaction of how we see ourselves and how others conceive of us. How others conceive of us is influenced in part by master narratives – "*stories found lying about in our culture that serve as summaries of socially shared understandings*" (Linderman-Nelson, 2001). Many master narratives are morally benign and socially necessary. They help us make sense of ourselves and one another. There are, however, oppressive master narratives that can unfairly depict particular social groups (Linderman-Nelson, 2001). Oppressive narratives can create damaged social identities for groups and individuals, which can result in unjust treatment and deprivation of opportunity. This can in turn decrease life chances for individuals of a stigmatized group, resulting in health and social inequities. Importantly, when individuals internalize damaged identities through a process Linderman-Nielsen calls "infiltrated consciousness," they can have implications on their own self-identity and agency (Linderman-Nelson, 2001). In the field of obesity, the concept of infiltrated consciousness had been described as internalized weight bias (i.e., holding negative beliefs about oneself because of one's weight or size). Internalized weight bias has been found to have a distinct and direct effect on health outcomes, independent of any obesity-related health impairments (Pearl and Puhl, 2016). The link between experienced weight bias and internalized bias has important considerations for future interventions.

Through this cluster of individual stories, we can weave together a counterstory – a story that resists oppressive master narratives of people with obesity. Each story demonstrates how oppressive master narratives have been created and how individuals can challenge unjust assumptions that contribute to damaged social identities. The first task in constructing a counterstory for a group that faces stigmatization and oppression is to identify the oppressive master narratives that created damaged social identities. Based on the counterstories shared in this study, we found that the following master narratives may contribute to damaged social identities for people with obesity:

- Obesity is bad and by default people who have obesity are bad persons and a burden to society.
- People with obesity are "unhealthy" and "abnormal" because of their size.
- Obesity is a lifestyle choice.
- Body size or Body Mass Index reflects person's health and/or health behaviors.

These oppressive master narratives are based on a lack of understanding of obesity as well unjust assumptions and stereotypes about individuals with obesity. The individual narratives in this study cast light on some unjust assumptions that create damaged social identities for individuals and groups affected by obesity.

- People with obesity cannot be healthy unless they achieve a "normal weight."
- People with obesity do not exercise regularly and do not eat healthy.
- Individuals choose to be sedentary and to eat unhealthy foods – hence they choose to have obesity.
- Individuals can control their weight by eating healthy and exercising regularly.
- People with obesity lie about their eating and exercise habits.
- People with obesity are lazy, disgusting, ugly, smelly, and do not care about themselves.

These unjust assumptions about individuals with obesity can have significant consequences. The counterstories in this study reveal some of these consequences, including:

- Internalization of weight bias, where individuals with obesity come to believe in biased beliefs and unjust assumptions about obesity. The belief that their bodies are not "normal" and their desire to "fit in" and be "normal" leads to perpetual weight loss practices, as evident by the narratives in this study. Internalized weight bias and stigma can also lead to negative self-talk, feelings of shame and guilt that impacts their ability to engage in health promoting behaviors.
- External stigmatization via institutional and social practices can reduce individuals' participation in education, employment, and in health promotion settings such as fitness and recreational centers.
- External stigmatization can also lead to unjust treatment by healthcare professionals, with serious consequences such as medical misdiagnosis.
- External stigmatization can take many forms, including verbal teasing and physical and mental abuse by family members, peers, health care professionals, work colleagues, and strangers.

Through their personal narratives, we observed that individuals find many ways to resist weight bias and stigma.

Some strategies individuals use to resist weight bias and stigma include:

- Confronting their own internalized weight bias to find self-acceptance and self-respect. This gives individuals a sense of self-empowerment where they can redefine health in their own terms.
- Substituting master narratives of obesity as a lifestyle choice with chronic disease narratives where individuals can negotiate health versus weight. The substitution can be advantageous in many respects, including identifying factors that drive obesity that are beyond individual control, finding evidence-based disease management strategies that are unique to their individual needs, and seeking communities of support that they can use to renegotiate their self-identities.
- Resisting discrimination by identifying the power relations that underlie stigmatization and framing weight bias and stigma as a human rights issue.
- Resisting oppressive master narratives that depict people with obesity as engaged in unhealthy behaviors by inserting themselves in spaces where people with obesity are excluded (e.g., fitness and recreational centers).
- Resisting public bias, shaming and stereotyping by educating themselves and others about the complexity of obesity.
- Creating new communities of support to resist oppressive narratives and damaged identities and to educate themselves and others about the complexity of obesity.
- Contesting master narratives about obesity by opposing them with counterstories, both publicly and systematically. These counter stories are also effective in helping individuals with obesity to challenge their own self-perception, which has been affected by oppressive master narratives. This re-identification process permits people to repair their own damaged identities. It is important to note, however, that a counterstory can be used as a tool to repair a person's internalized weight bias but sometimes it can be very difficult for someone to endorse a counterstory. It depends on the degree of internalization (Linderman-Nelson, 2001).

DISCUSSION

A successful counterstory can serve as an intervention to address damaged social identities for people living with obesity. There are several criteria for a successful counterstory. First, a good counterstory can pull apart master narratives that contribute to damaged social identities for people with obesity and replace them with credible, less morally degrading narratives. A counterstory must also be culturally digestible and widely circulated and taken up not only by those who are on the receiving end of stigma, but also by those who have benefited from it. Finally, a counterstory aims to free not only individuals but the entire group whose identity is damaged by an oppressive master narrative. Although a counterstory cannot end oppression, it can help re-identify a person or a group and in doing so freeing their agency.

Through this narrative inquiry, we intervened by focusing on the quality of lived experience, collaborated with participants to transform the narratives into counterstories and sought to lay the foundation for personal and social change. While conducting this research our lives continued to unfold and helped us see how we compose our lives within our familial, professional, and social situations. As we co-composed these stories with participants, they left an impact on our personal and professional lives. We have compared what we have been trained to "know" about obesity and what we have learned from living alongside individuals affected by obesity. We have questioned where our knowledge about obesity came from and how we adopted that knowledge. We have reflected on our role in contributing to weight bias and reflected on our own internalized weight bias. It has been a difficult journey, but we have developed more empathy and feel even more motivated to address oppressive obesity narratives.

In using interview and conversations recordings, memories, journals, field notes to compose the final research stories, we included actions and practices or things that we experienced together in the field. We composed the field texts over multiple interactions with each other and through reflections of earlier life experiences. Hence these final research products are the result of these research relationships and interactions. The final counterstories may therefore reflect multiple nested stories and reveal key aspects of weight bias and obesity stigma that were important to us as we negotiated the meaning of each story together. In one of the counterstories, the first author included herself in order to share how her own story has unfolded through this narrative inquiry process.

These counterstories offer a door to the personal, familial, professional, and social situations in which weight bias and stigma take place. In public health, we refer to this as context. Through this narrative inquiry, we have come to understand that context also includes personal relationships. Personal relationships impact what we know and what we do. As we lived alongside persons with obesity, we developed strong relationships with participants. These relationships have influenced what we know about weight bias, stigma and obesity and what we will do moving forward. We are now more sensitive to healthy lifestyle narratives, obesity labels and internalized weight bias and stigma, which are so pervasive in our culture. This experience has changed how we think and speak about obesity.

One of the key learnings of this research study for us was the transformative aspect of narrative inquiry. It is clear that both participants and researchers changed during the inquiry process. This research journey has made a difference in our lives, a key characteristic of narrative inquiry.

Implications for Public Health

Using the three-dimensional space of narrative inquiry, we can position participants' stories within place, time and social milieu, helping us to present the stories in a more pragmatic way that can inform future research and practice (Clandinin, 2013). Applying the three-dimensional space to these stories, we can see that individuals with obesity experience weight bias, stigma and discrimination across settings, including in their

homes, schools, workplaces, recreational/fitness settings, and public health/health care settings. Weight bias experiences also take place across the lifespan and are influenced by institutional and social narratives (including public health narratives). These findings are consistent with existing weight bias and obesity stigma literature (Puhl and Heuer, 2009). Weight bias is deeply embedded in our culture leading to experiences of stigmatization, which cause disrespect, moral judgment, physical and mental abuse, social exclusion, and discrimination against people with obesity. Weight bias is used to enforce social norms and to try to get people to stay within normative boundaries. The normative boundaries about "*healthy weight*" or "*normal weight*" in our society can drive internalized weight stigma processes. For individuals who do not stay within the normative weight categories, this social label creates damaged social identities that causes experiences of discrimination, ultimately leading to health and social inequalities (Link and Hatzenbuehler, 2016).

Since weight bias is so ingrained in our culture, public health practice will inevitably be affected. As public health professionals, we need to critically reflect on these socio-cultural and professional biases and consider how they affect our practice. The implications of these counterstories for public health professionals depends on our own critical reflection skills and subjective realities. Below are a few implications for our personal public health practice that have emerged from this narrative inquiry.

- People with obesity experience weight bias across the lifespan and settings (home, school, work, health care settings, and communities), causing anxiety, low self-esteem, poor body image, social isolation, depression, suicidal acts and thoughts, medical illnesses and overall poor quality of life.
- Oppressive obesity narratives have become embedded in social institutions and systems perpetuating weight bias and stigma. Through our own professional practice, we can either reproduce weight bias and stigma or change systems to be more accepting and respectful.
- As public health professionals and researchers we have a responsibility to advocate and act to reduce health inequities for people living with obesity. But, we need theoretically driven and participatory interventions that can be implemented practically within current health and social systems.
- Working with individuals living with obesity to co-create counterstories aimed at changing damaged social identities can be transformative in terms of addressing internalized weight bias and creating empathy.
- Education about the multiple causes (social, cultural, psychological, and biological) of obesity needs to be incorporated into public and health domains in order to reduce weight bias in society.
- Conceptualizing obesity as a complex chronic disease requires comprehensive approaches that include prevention and management strategies. Reductionist approaches are not helpful and do not reflect the realities of people living with obesity. A focus to wellbeing of populations includes a need to support people with chronic diseases to live fulfilling lives.
- Weight bias and obesity stigma have direct and independent impacts on health and social outcomes for people with obesity. As such, weight bias and obesity stigma should be considered as key social determinants of health.

Through this narrative inquiry we learned that the fundamental driver of participants' experiences with weight bias is a lack of understanding of obesity. This lack of understanding can be linked to public health narratives that oversimplify obesity as an unhealthy eating and lack of exercise issue. It also leads to social narratives that obesity is a self-inflicted choice and that it is up to individuals with obesity to address their own chronic disease. This lack of understanding can lead to people experiencing weight bias, stigma and discrimination. This narrative inquiry revealed people with obesity are treated differently by their families, friends, coworkers, health care providers, and even strangers. This lack of understanding of obesity has consequences for individuals' conceptualization of their self-identity. Many participants internalized damaged social identities and felt abnormal. This also affected their self-confidence and self-worth. Weight bias internalization influenced participants' emotional responses and triggered feelings of shame, blame, vulnerability, stress, depression, and even suicidal thoughts and acts. Participants responded to internalized weight bias by avoiding health promoting behaviors, hiding food, eating in secrecy, and isolating themselves from social and health promoting situations. Weight bias and stigma also hindered their obesity management process and rehabilitation and recovery strategies. Participants recovered from weight bias and stigma by developing self-compassion, self-acceptance and by engaging in efforts to resist damaged social identities and demand respect, dignity and fair treatment.

CONCLUSION

Narrative inquiry is rooted in the epistemological assumption that knowledge is relational and that research relationships are built and negotiated. Thus, the understandings or meanings produced through this narrative inquiry are unique and never final. The meanings (findings) generated through this study will always be situated in the relations between the inquirers and the research participants. Our intent is not to make stories fit into a framework to make them easily disseminated as objective pieces of knowledge. We understand that the meanings (findings) from this study may extend beyond the inquiry process based on the position that readers are situated in when they experience the stories. Stories are never fully comprehensive or final because individuals experience stories differently based on their personal, social, and physical contexts. Our goal is not to make participants' stories generalizable but rather to provide a deeper understanding of issues such as obesity, weight bias, stigma, and discrimination.

Based on the experiences of participants and researchers in this study, we conclude that narrative inquiry combined with the

narrative repair model can be a transformative way to address internalized and experienced weight bias. However, future studies could also be implemented using quantitative internalized weight bias measures. This would allow us to quantitatively measure the changes in weight bias internalization before and after the narrative inquiry intervention.

ETHICS STATEMENT

We obtained ethics approval from the University of Alberta Health Research Ethics Board. All participants provided informed consent after receiving a study information package prior to the conversations.

AUTHOR CONTRIBUTIONS

XRS conceptualized and designed the study, coordinated data collection, and drafted the initial manuscript. MF, TC, AS, and KR contributed to the design, data analysis, critical reflection, and contributed to writing and revising the manuscript. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

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Women With Obesity Are Not as Curvy as They Think: Consequences on Their Everyday Life Behavior

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Two studies explore the impact of body size on daily life activities of women with obesity. In the first study, ethnographic techniques (first-person perspective video recordings) and subsequent interviews based on the video recordings were used. Results showed atypical behavior of women with obesity and ex-obese women related to memories of embarrassing experiences regarding personal body size (sitting, passing doors sideways, over-careful navigation in public space, and choosing clothes sizes too large.) Women with obesity seem to behave as if they thought they had a larger body than it actually was. These atypical behaviors are related to memories of embarrassing experiences regarding personal body size and stigma. Overweight women exhibit the same behavior but to a lesser and less systematic degree. In the second study, the represented (imagined) body size was compared to the perceived (in a mirror) body size with digital morphing techniques. In the mirror condition, the perceived image is accurate, while in the absence of a mirror women with obesity overestimate their body size by about 30%. Moreover, overestimation of imagined body size increased according to the weight status. Finally, women who had bariatric surgery had poorer estimates than women who had not. This would result of being continuously reminded of obesity and its stigma by daily embarrassing experiences, by being confronted with an environment designed for normal weight (e.g., narrow seats, turnstiles etc.) that makes obesity salient. We suggest that body size overestimation is a case of accentuation where things that matter are perceived bigger. These results could also been explained by the allocentric lock theory.

Keywords: women, obesity, perceived body, represented body, everyday behavior

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1. INTRODUCTION

Since the 1980s, there has been a dramatic increase worldwide in obesity rates (Finucane et al., 2011; Flegal et al., 2012). Based on the latest estimates in European Union countries, 30–70% of adults are overweight and 10–30% of adults are obese (World Health Organization, 2017). Obesity is one of the greatest public health challenges of the twenty-first century since high body mass has been shown to be associated with multiple domains of poorer health and related quality of life (Doll et al., 2000; Taylor et al., 2013; Latner et al., 2014).

A systematic review (Kroes et al., 2016) of US literature demonstrated that obesity but also overweight status are associated with poorer health related quality of life than normal weight. In Europe (England), Søltoft et al. (2009) investigated the relationship between body mass index (hereafter BMI) and health-related quality of life, and potential differences between men and women. Results show that BMI is negatively associated with health-related quality of life for both underweight and obese individuals. But at higher BMI values, women reported less health related quality of life than men.

Health-related quality of life can be classified into physical and mental or psychological components. Regarding physical components, increased weight is associated with significant health impairment and medical comorbidities (Bray, 2004; Lawrence and Kopelman, 2004; Mitchell et al., 2015). For example, the link between obesity or overweight with an increased risk of cardiovascular disease is well-established (Poirier and Eckel, 2002; Poirier et al., 2006; Caleyachetty et al., 2017). Many other conditions such as type 2 diabetes are more prevalent in overweight and obese individuals (Slagter et al., 2015; Boles et al., 2017). Several cancers are also more prevalent in high body mass individuals (Calle and Kaaks, 2004; Calle and Thun, 2004; Abdulhussein and Amin, 2018). Regarding mental or psychological components, obesity is sometimes associated with depression (Onyike et al., 2003; Faulconbridge et al., 2018) and social discrimination (Puhl and Brownell, 2001) because of the shame and stigma attached to obesity (Puhl and Heuer, 2009; Brewis, 2014; Westermann et al., 2015; Spahlholz et al., 2016; Vartanian et al., 2016). Myers and Rosen (1999) asked obese people to list stigmatizing situations they had encountered then noted the frequency with which they encountered each form of stigmatization. Respondents reported their own experiences with stigmatization in an open ended format. Participants included clinical (consecutive severely obese patients in a gastric bypass surgery program), and non-clinical samples of obese persons (members of an electronic mail list service). These two samples of obese persons were asked to complete an open-ended questionnaire on stigmatizing situations. A total of 50 stigmatization experiences were identified. Authors concluded that "being overweight can cause problems for people, not only medically, but in social situations as well" (p. 223). The three most frequent stigmatizing situations faced were comments from children ("A child coming up to you and saying something like, 'You're fat'"), other people making negative assumptions about the obese person ("having low expectations of you because of your weight."), and encountering physical barriers (such "not being able to sit into seats at restaurants, theaters, and other public places" or "not being able to find clothes that fit.").

Concerning weight status, a review by Puhl and Brownell (2001) investigated years of research examining bias toward overweight and obese individuals. They found that weight discrimination and negative attitudes toward overweight and fat individuals are apparent across various environments (see also Puhl and Heuer, 2009, 2010; Flint et al., 2016). Even, studies using daily diary assessments report much higher rates of stigma experiences in obese than overweight individuals. In fact, as weight increases, weight-related stigma experiences increases (Vartanian and Novak, 2011; Spahlholz et al., 2016). For example, Myers and Rosen (1999) show that individuals within the severely obese range of body mass index (BMI) of 40 kg/m^2 or greater, reported more stigmatizing situations than those with a BMI <40 kg/m^2. Concerning gender status, there are mixed findings in the literature on whether men and women experience weight based stigma. Some studies find no difference in reported rates (Puhl and Brownell, 2006; Vartanian and Novak, 2011; Jackson et al., 2014; Vartanian et al., 2014; Vartanian, 2015), while others have found women experience higher rates of weight stigma than men (Andreyeva et al., 2008; Puhl et al., 2008; Fikkan and Rothblum, 2012; Spahlholz et al., 2016). In fact, men and women experience weight stigma at different levels of body weight (Himmelstein et al., 2018). Women report weight discrimination at lower levels of excess weight than men. For example, men tend to report considerable stigmatization at a BMI of 35 or higher, whereas women report experiencing notable increases in weight discrimination at a lower BMI of only 27 (Spahlholz et al., 2016). Among women, reports of weight stigma tend to follow a linear pattern, with women experiencing more weight stigma as they move into higher BMI categories (Hansson et al., 2010; Judge and Cable, 2011).

People who are exposed to discrimination in their environment may be at risk for body image problems (Myers and Rosen, 1999; Cash, 2004). Indeed these negative weight stigmatization messages can become internalized, reflecting weight self-stigma (Durso and Latner, 2008; Lillis et al., 2010). Weight self-stigma is a construct involving negative emotions and beliefs about being overweight or obese and fear of enacted stigma (i.e., perception of being discriminated against and of belonging to a stigmatized group; Link and Phelan, 2001; Bos et al., 2013). Note that these findings seem to be particularly relevant as weight loss may not necessarily diminish weight-related stigma (Milkewicz et al., 2004; Fardouly and Vartanian, 2012; Latner et al., 2012). Authors have studied how currently overweight, formerly overweight, and never overweight individuals differ in a range of eating and body image measures and report residual body image problems following weight loss. People who have been overweight in the past do not ultimately obtain the same positive body image when they lose weight as someone who has never been overweight (Cash et al., 1990). These observations may be interpreted as being the result of memories of shame and discrimination, but also as *phantom fat* phenomenon (Cash et al., 1990). The phantom fat is a phenomenon where people lose weight and yet still represent themselves as with overweight/obesity; the body has shrunk but the representation has remained the same.

Several constructs have been proposed and studied in the literature. One can distinguish between body image and body schema, i.e., the body as an intentional object of consciousness vs. a non-conscious performance of the body (Gallagher, 1986). Riva (2018) proposed to consider the integration of six different aspects of embodied experience into a single matrix of body representation. Especially interesting for our purpose are the egocentric and allocentric aspects (embodied perspective in the subject as a reference of experience vs. originating in the environment including social). These two aspects resonate

with the Meadean notions of the "I" (experienced by the acting subject) vs. the "Me" (socially constructed) (Mead, 1934). Impairment in integration of the various dimensions of the body could be reflected in many symptoms of eating disorders (Riva, 2014, 2018; Serino et al., 2015). The allocentric lock hypothesis (Riva and Gaudio, 2012; Riva, 2018) suggests that defective ego/allocentric integration locks subjects in an external, enduring, body image.

The focus of this article is to explore the impact of weight/size on daily life. How do women with obesity move and live with their bodies in social space? Are there differences between normal weight, overweight, and obese? What happens after bariatric surgery? The paper presents two studies, an ethnographic one and an experimental one, both using cutting edge techniques. In study 1, a sample of Parisian women record their own mundane activity from the first-person perspective with a miniature wearable camera. The tapes are coded to compare the behavior of the participants to standard cultural behavior in situations known to be challenging for people with obesity: choosing seats in public transport, passing doors, navigating public space, choosing a garment in a shop. We used ethnographic methods to observe and discuss how women (normal weight to obese persons) behave when these occasions occur. These situations refer to physical barriers, the most frequent stigmatization situation identified by Myers and Rosen (1999) in their inventory. These physical barriers seem to be encountered about 18 times per day by individuals with overweight status and obesity (Vartanian et al., 2014). What is their impact on behavior and representations? How does this vary with BMI? To investigate the possible causes of the atypical behavior documented in study 1, we then test in study 2, (a) whether women of larger size have an overestimated representation of their body size, and to what degree and (b) whether this overestimation, if any, is an overestimation in the perception of their own body (with their senses, as is the case in phantom limbs) or in the representation of their body (in their imagination).

2. STUDY 1. OBSERVING BEHAVIOR IN NATURAL SETTINGS

Pilot ethnographic study (Urdapilleta and Lahlou, 2012; Urdapilleta et al., 2017) showed that persons with a high BMI adopt specific behaviors in situations where body size matters (e.g., when sitting on public transportation). It also suggested that behavior is not simply dependent on actual body size, but also on previous personal history (see also Hamlet et al., 2016). Indeed, participants who had recently undergone drastic body size reduction (through bariatric surgery) seemed to continue to behave as they did when their body was large, as if some larger phantom body (Cash et al., 1990) remained in their mind and habits. The issue therefore appears more complex than one of larger bodies being challenged by the affordances (Gibson et al., 1982; Gibson, 2014) of a built environment designed for individuals with normal weight, such as narrow seats. These little details of everyday life contribute to persons with a high BMI being repeatedly identified and stigmatized as obese, with all the detrimental consequences associated with stigma (Hinman et al., 2015; Pearl and Puhl, 2016).

To address the problem, we explore not only what individuals with obesity actually do, but also how they experience situations. This first study investigated this issue by following the daily activities of women in their mundane life, thus going beyond diaries to observe actual behavior *in situ* and collect detailed data about participants' experiences through self-confrontation with their first-person perspective recordings. We compared the mundane behaviors of women with different body sizes and body size histories in order to better understand what experiences and representations drive their behaviors, especially those considered outside of the norm by the standards of the local culture.

2.1. Methods

2.1.1. Participants and Procedure

The study included 14 French women aged 20–48 ($M = 28.36$, $SD = 5.54$). They were divided by physiological characteristics into seven groups of two, according to weight status but also to whether they had bariatric surgery ($n = 6$) or not ($n = 8$). At the time of the study, the non-surgery group (hereafter NS) included two ex-obese women who had class 3 obesity (BMI 40 and above), two women with class 1 obesity ($30 >$ BMI < 34.9), two women with overweight status ($25 >$ BMI < 29.9) and two normal weight women ($18.5 <$ BMI < 24.9). The surgery group (Hereafter S) included two women with obesity class 1 women who had surgery 3 months ago, two women with overweight status who had surgery 8 months ago, and two women with overweight status who had surgery 4 months ago. **Table 1** provides the participants' characteristics

TABLE 1 | Participants' characteristics.

Participant	Age	Current status	Current BMI	BMI before surgery	Weight loss	EBMIL
Laura	33	NS-O3	54.7			
Linda	24	NS-O3	60.3			
Dorothy	26	NS-O1	32.2			
Deborah	25	NS-O1	34.7			
Carol	22	NS-OW	25.1			
Carla	28	NS-OW	28.4			
Mary	27	NS-NW	21.6			
Margaret	36	NS-NW	23.8			
Anita	20	S-O1-3	33.9	39.8	17	39.8
Anna	27	S-O1-3	34.2	42.5	21	44.0
Suzan	38	S-OW-8	29.0	42.8	38	77.4
Sarah	24	S-OW-8	28.4	41.9	39	80.0
Karen	32	S-OW-4	31.1	41.5	30	62.8
Kerry	35	S-OW-4	29.3	38.6	25	67.7

NW refers to Normal Weight women, OW refers to overweight Women, O1 is women with Obesity class 1, and O3 is women with Obesity class 3. NS prefix refers to women who had no surgery, and S Prefix refers to women who had surgery. EBMIL is the percentage of excess BMI still needed to be lost for the participant to be considered out of the "overweight" classification (Deitel and Greenstein, 2003): 100 - [(follow-up BMI-25/Beginning BMI-25) × 100].

(all names were changed). This sample was selected to provide enough diversity in body size and body-size history to allow comparing data obtained using detailed qualitative, behavioral, and experimental methods.

Participants' education level ranged from Business and Technology Education Council (BTEC) First Diploma to Masters' degree in all groups. Women were recruited through the hospital where they registered for surgery, through a call for volunteers among the cohort of patients who had already registered for surgery, and through snowball sampling, starting with a convenience subsample of university employees.

The Subjective Evidence-Based Ethnography (SEBE) was used. SEBE is a digital ethnographic technique that comes in three steps: (1) capture of actual activity in natural settings by the participants themselves, with a wearable, unobstrusive (7 g) miniature camera called subcam (Lahlou, 1999). (2) replay interview where participants are confronted with their tapes and comment it to the researcher. At this stage, the researchers can not only listen to the participants interpretation (emic), but also test if the way they translate these interpretations into their own words (etic) are validated by the participant (Kottak, 2005; Xia, 2011). As the first-person perspective recordings re-immerse the participant in her own perception action loop, the participants access episodic memory (Tulving, 2002) and re-enact the situation: remembrance of actions, emotions, and intentions is outstanding. The technique, and especially its stringent ethics guidelines (Lahlou, 2011, 2018; Lahlou et al., 2015).

2.1.1.1. Phase 1. Capture of actual behavior (subcam)

Participants transparently recorded what they did using a wearable, light, and discreet miniature video camera worn on a pair of glasses, called a subcam. Subcams provide first-person perspective recordings of the visual field with wide-angle lens. Subcam recordings radically differ from classic films, even from the cinematographic point-of-view shot, as the camera follows the rapid head movements of the wearer and therefore attentional focus.

Participants were instructed to take public transportation (e.g., metro, train), to shop for clothes, and to try on at least one garment (e.g., coat or jacket). They were alone and free to choose times and places. Nevertheless, a researcher stayed in the vicinity in case the participant needed support and called on her mobile phone (out of sight but close enough). The subcam recordings lasted between 60 and 98 min ($M = 68.20$, $SD = 14.08$).

2.1.1.2. Phase 2. Replay interviews (RIWs)

Participants were interviewed as they replayed their own subcam recordings. Based on the findings of the pilot study, we clipped excerpts when participants chose a seat, went through turnstiles or doors, or tried on a garment. Replay interviews took place with two psychologists and lasted between 74 and 110 min ($M = 83.20$, $SD = 15.50$). RIWs were video-recorded and fully transcribed. Because the films contain rich situated visual, auditory, and kinetic cues, participants recalled their mental states (goals, interpretations, and even feelings) at the time they acted with pristine accuracy and could verbalize them. Participants apparently re-enacted the situation as they watched their own first-person perspective recordings. Similar effects of situated interviewing on recall have been described in embodied cognition literature (Dijkstra et al., 2007; Barsalou, 2009), especially regarding the positive influence of kinetic cues. The clips were explored with participants during the RIWs, with a focus on the reasons for action and the feelings experienced by participants.

2.1.2. Ethics

The research followed all applicable institutional and governmental regulations concerning the ethical use of human volunteers. The protocol followed the guidelines of the British Psychological Society and the SEBE guidelines, which add specific safeguards against possible issues of video material. This includes a moratorium period, during which the participants keep their film before the researchers see it and consider whether they want part or all of the footage erased. The protocol was validated by the Social Psychology Ethics Committee at the London School of Economics and Political Science (Houghton St, WC2A 2AE, London, UK). All participants were volunteers and were free to withdraw at any stage of the study. No remuneration was given. Finally, all participants were given a special telephone hotline in case they had second thoughts or questions. Written informed consent was signed by the participants.

2.2. Data Analysis

Extracts (clips) were initially selected for analysis if they contained occasions that participants in the pilot study identified as problematic for women with obesity (i.e., choosing a seat, going through a door or turnstile, trying on a garment). Then all data were coded by 10 women aged 22–45 ($M = 29.36$, $SD = 7.54$) who had not participated in any of the two studies (hereafter raters). These are normal-weight women living in Paris area. They were attending adult education in psychology and the coding work was done as part of their training.

We relied on the analysts' native knowledge of local culture (i.e., contemporary France, the Paris area, middle-class adults) to code the behavior based on standard cultural expectations. For example, social conventions assume that doors and turnstiles are passed through frontways, and that people know their clothing size within an accuracy of plus or minus one size. Another example is that, in a metro car in Paris, local social conventions assume that one should not sit close to another person if there is a free seat available nearby that leaves more interpersonal space. As an illustration, choosing the seat marked with an X, rather than the one marked with an O, as Mary does in **Figure 1A**, appears perfectly normal (something Parisians would be expected to do), while choosing the seat next to it, marked Y (**Figure 1B**), would appear unusual according to the local conventions of proxemics, to maintain as much personal distance as possible (1.5–4 feet, according to Hall et al., 1968). For this reason, this behavior (sitting on seat X) can be considered typical in this regard, as containing nothing remarkable, and was coded T (typical). However, it is not necessary to sit further away than the requirements of personal distance dictate, so the closest seat meeting this distance-related requirement will usually be taken.

FIGURE 1 | Examples of choosing a seat. Mary does not take the seats marked O **(A)** or Y **(B)**, and walks to the next row to take a seat marked X **(B)**. The participants to the study have given their agreement in writing for the publication of images from their subcam recordings, such as the above, provided they are not individually identifiable on the picture. Images have been blurred to ensure anonymity.

On the other hand, crossing the entire car to obtain a seat with no neighbors while there are many other closer satisfactory typical choices of empty seats with no neighbor is unusual behavior compared to the cultural norm, and therefore coded atypical. This is what Dorothy did: entering a metro car while there were still many free seats, Dorothy chose to go right to the end of the car to sit on a seat that was on its own (a row of one), with no neighbor, a seat designed for passengers with large items of luggage or baby buggies. There were four free seats (two rows of two) that were closer, and a natural choice, but Dorothy did not sit there. On her way, Dorothy passed several typically acceptable "free seats," and also persons already sitting on such typical seats, her behavior demonstrating she was pickier than the other passengers. Therefore, Dorothy's behavior here can be considered atypical and was coded so ("AT"). Sometimes behaviors seemed ambiguous and were coded with a question mark (?). Raters coded independently the data, and defined themselves, individually, what they considered typical or atypical behavior. We did not give them a specific coding guide.

2.3. Results

Table 2 summarizes the analysis of the subcam recordings and RIWs with the participants.

A Fleiss's kappa analysis (Fleiss et al., 2013; Gwet, 2014) was performed to determine whether there was agreement between the raters' judgment as to whether in each condition (choosing a seat, going through a door or a turnstile, navigating a public space, and trying on clothes) participants exhibited typical, non-typical, or not coded behavior. We followed guidelines from Altman (1991), and adapted those of Landis and Koch (1977), to interpret the level of agreement. The entire analysis is provided in **Table 2**. In the text, the status of each woman is indicated in brackets after her surname: NS prefix refers to women who did not have Surgery, and S Prefix refers to women who had surgery. NW was used for women with normal weight, OW for women with overweight status, and O1 or O3 for, respectively women with class 1 or 3 obesity. For women who had surgery, more information dealing with the number of months after surgery (3, 4, or 8 months) has been added. For example: Laura was a class 3 obesity woman who did not have surgery (NS-O3). Anita was a class 1 obesity woman who had surgery 3 months before she took part in the study (S-O1-3).

2.3.1. Sitting on Public Transportation

There was a substantial agreement between the raters' judgments ($\kappa = 0.72, z = 21.57, p < 0.001$).

Results suggest that, while in contemporary France, in the Paris area, middle-class adults culture prefer to sit away from a neighbor when taking public transportation alone, but accept to be seated next to someone, and prefer to sit next to someone rather than stand, women with obesity do not follow this norm.

Our results show that women with normal weight (NS-NW), women with overweight status who never had surgery (NS-OW) and women with overweight status who had surgery a long time ago (S-OW-8) took a seat with a neighbor if that is all that was available.

In contrast, all women with obesity (NS-O1, NS-O3, S-O1-3) and women with overweight status who had surgery (S-OW-4) avoided taking seats with a neighbor. They anticipated such situations and have built strategies to actively avoid finding themselves in the situation of sitting close to a neighbor on public transportation (see participants' comments in **Appendix A** for more details). Typically they rushed for the specific seats in train or bus that have no neighboring seat, or chose to stand. For example, Deborah (NS-O1) entered a subway car and spotted a free folding seat, but a woman was sitting in the next seat (**Figure 2A**); Deborah preferred to stand alone in the corner (**Figure 2B**).

2.3.2. Going Through Turnstiles and Doors

There was an almost perfect agreement between the raters' judgments ($\kappa = 0.88, z = 23.10, p < 0.001$).

In the French subway, there are doors for exiting the metro and turnstiles for entering it. It is interesting to see how participants deal with their body size in these two situations. Normal weight women, women with overweight status (NS-OW), or women with overweight status who had

TABLE 2 | Number of occurrences attributed for the 10 ratings for the subcam recordings and replay interviews with participants.

Participants' name and status	Situation											
	Sitting on public transportation			Going through turnstiles and doors			Navigating public spaces			Choosing clothing size		
	T	AT	?	T	AT	?	T	AT	?	T	AT	?
Laura (NS-O3)		8	2		9	1		8	2		10	
Linda (NS-O3)		10			10			9	1		10	
Dorothy (NS-O1)	1	9			10			10			10	
Deborah (NS-O1)		10			10			10			10	
Carol (NS-OW)	9		1	8			8		2		8	2
Carla (NS-OW)	9		1	10			10				8	2
Mary (NS-NW)	9		1	9		1	10			9		1
Margaret (NS-NW)	9		1	10			10			10		
Anita (S-O1-3)		10			10			10			10	
Ana (S-O1-3)		8	2		10		2	8			10	
Suzan (S-OW-8)	9		1	10			9		1		10	
Sara (S-OW-8)	10			10			1	7	2		9	1
Karen (S-OW-4)		10			10		7	3			10	
Kerry (S-OW-4)		10			10			10			10	

T, Typical behavior; AT, Atypical behavior; ?, ambiguous behavior. The numbers indicate ratings of each rater's response choices in each situation.

FIGURE 2 | Failing to take a seat because there is someone already sitting in the next seat **(A)**. Deborah prefers to stand in the corner **(B)**. The participants to the study have given their agreement in writing for the publication of images from their subcam recordings, such as the above, provided they are not individually identifiable on the picture. Images have been blurred to ensure anonymity.

surgery long ago (S-OW-8) always went through doors and turnstiles frontways, as is typically expected. But we observed women with obesity (NS-O1, NS-O3) and recent ex-obese women (S-OW-4 and S-O1-3) going through the doors and turnstiles sideways (**Figure 3**; see **Appendix B**).

The case of Deborah (NS-O1) is particularly illuminating as her behavior can be connected to an incident that happened the same day. When leaving the metro station earlier that day, Deborah had to go through a faulty exit door that was half blocked, leaving only a very narrow passage (**Figures 4A,B**). The figure shows how a man who went through the door just before her had to force his way through sideways, and Deborah did the same, with great difficulty. She did not enjoy this incident. She sounded quite angry and swore quietly for a few seconds afterwards, as we can hear on her recording. Then later the same day, she went through a large bank entrance door sideways, in a way typical of women with severe obesity. During the RIWs, Deborah said that this small humiliating episode involving the faulty exit door made her obesity very salient to her, thus contributing to her subsequent passing through the bank door sideways, which would only have been necessary if she had a far higher BMI. The daily occurrence of such embarrassing incidents reminding one of her large size is interesting to flag here for our analysis below.

2.3.3. Navigating Public Spaces

There was a substantial agreement among the raters' judgments ($\kappa = 0.63, z = 19.92, p < 0.001$).

While women with normal weight (NS-NW) and women with overweight status (NS-OW) walked quickly in public space (street, metro corridors, shopping mall, etc.), sometimes passing other people, even at close range, and not hesitating to enter narrow gaps, all women with obesity (NS-O1, NS-O3, S-O1-3) tended to walk slower than the rest of the crowd. They avoided

FIGURE 3 | A woman with obesity passing sideways through the turnstile. The participants to the study have given their agreement in writing for the publication of images from their subcam recordings, such as the above, provided they are not individually identifiable on the picture. Images have been blurred to ensure anonymity.

FIGURE 4 | A man passing sideways through a blocked door **(A,B)**. The participants to the study have given their agreement in writing for the publication of images from their subcam recordings, such as the above, provided they are not individually identifiable on the picture. Images have been blurred to ensure anonymity.

making sharp or fast maneuvers and generally navigated in a way that left ample space between them and obstacles or other people. Observed behavior of women with overweight status who had surgery (S-OW-4, S-OW-8) depended on the participant, being typical for some and atypical for others (see **Appendix C**). For example, Kerry (S-OW-4) showed atypical behavior, walking for 25 s behind a rather slow woman, before passing her although there was ample space on the right to pass her by. Viewers with normal weight (e.g., raters) mentioned they felt somewhat impatient while watching the tape. Kerry herself also mentioned in her RIW her slower and more cautious pace in navigation. However, this behavior was not systematic or constant among ex-obese women (who were overweight at the time of the study).

2.3.4. Choosing Clothing Size

There was an almost perfect agreement among the raters' judgments ($\kappa = 0.74, z = 22.34, p < 0.001$).

One would expect participants to know their clothing size, at least approximately. However, during shopping, while participants with normal weight (NS-NW) selected clothes (coat or jacket) that fit their size, women with obesity (NS-O1, NS-O3, S-O1-3) and ex-obese women (S-OW-4, S-OW-8) tended to select clothes that are larger (see **Appendix D**).

Women with overweight status and women with obesity have problems with selecting the correct size and tend to overestimate their measurements and/or take larger sizes than they need to avoid wearing something tight. They take some garments into the fitting room, but when they try them on, they realize these clothes are much too big for them. For example, Karen (S-OW-4) tried on a coat in a shop and looked in the fitting room mirror. She found that she was thinner than she thought. She then looked into another large mirror at the other end of the fitting room, then walked up to a girl sitting there and said, "Can I ask you something? In your opinion, does this mirror make me look thinner?" The girl looked at the mirror and replied, "Er, uh, I don't know," and then asked another girl in the fitting room, "Hey, do you think the mirror makes you look thinner?" The other girl replied (popping her head out of her fitting room first in the mirror, then at Karen "No (to Karen), it's normal." In our sample everyone except women with normal weight experienced issues with size.

2.4. Discussion

Our observations showed that women with obesity displayed several atypical behaviors. These observations were confirmed by the interviews, where participants acknowledge and explain,

as shown in **Appendices**. (1) Women with obesity actively searched for seats where they would not risk encroaching on their neighbor. They used specific strategies for this. (2) They tended to go through doors and other narrow passages (such as metro turnstiles) sideways, even when they could go through frontways. (3) They navigated the environment more cautiously and slowly: they did not take sharp turns, avoided entering narrow spaces, gave way or left more space when passing other people, hesitated to pass slow people and were themselves passed by most other pedestrians, and rarely moved swiftly and boldly when obstacles were close by or when other people were moving quickly. (4) They had issues with knowing their correct clothing size and tended to overestimate it. The higher the BMI, and the higher the body perception index (BPI), the more these behaviors were salient.

In others groups, behaviors varied depending on the situation. With regard to passing through turnstiles, doors, and narrow passageways sideways, women with obesity and ex-obese women who had recently had surgery (and were overweight at the time of the study) tended to behave atypically, while those who had surgery a long time ago behaved more like normal weight or overweight women. With regard to navigating public spaces, only women with normal weight and two ex-obese women (who had surgery and were overweight at time of the study) moved swiftly. Other groups behaved like women with obesity. Regarding clothing, all but women with normal weight seemed to have difficulties selecting the right size.

Furthermore, it seemed that in the various situations studied, it took time for women with obesity who had surgery to abandon their previous behaviors: only those who had surgery a long time ago (8 months) behaved like normal weight women when sitting on public transportation or going through doors and turnstiles, but they still had difficulty in choosing the right clothing size or, for some of them, navigating public spaces.

These data raise two issues. The first is that obesity, apart from its medical implications, is also a challenge in performing mundane activities because the built environment, designed for normal weight persons, presents challenges for women with obesity. Regarding seats, the problems are obvious. Regarding clothing, that is a classic issue (larger sizes are often mostly a linear extrapolation of smaller sizes, while shapes do not change linearly). Finally, regarding doors, turnstiles, and pedestrian traffic, as we have seen above, they can also be an issue, which is less well-known. In all these situations, women with obesity are reminded, in a negative way, of their body size, and this is likely to create, sustain, or enhance stigma.

Regarding stigma, the RIWs clearly showed that body image issues evoke the social image (looks from others), which is perceived as negative (see **Appendices**). Women with obesity, and to some extent women with overweight status, express the feeling that they are disturbing and cumbersome, take up too much space, do not look good, and are a source of annoyance for others. Discussion of their behavior often referred back to memories of humiliating past experiences. On several occasions, participants mentioned that awareness of their body image was a source of concern continuously present in their mind, at least in some situations. All the above suggests that body image is a matter of concern for women with obesity and overweight status and that mundane activity makes this concern salient quite often (likely, several times a day for those who travel on public transportation).

Another issue arises from our observations that the behavior and experience of participants who have a larger-than-standard body size seem to be *disproportionate* to their actual affordances. This is evident, for example, when going through large doors sideways, navigating more cautiously than the rest of the crowd, and exhibiting concern about encroaching on people sitting next to them more than other passengers, as in the example of Dorothy. In other words, it seems women with obesity (and to a lesser degree women with overweight status) behave as if their body was even larger than it is. The fact that ex-obese women continue, for at least a few months after surgery, to act as if they were individuals with obesity supports this hypothesis. We are not the first to report such finding. For example, Cash (2004) studied how individuals who were currently or formerly with overweight, and individual who were never overweight differ in a range of eating and body image measures. The author reported residual body image problems following weight loss. When they lose weight, people with overweight status in the past do not ultimately obtain the same positive body image as someone who has never been overweight.

This finding supports the idea that body image is an internal construct of a unitary corporeal self that endures in space and time, and it seems that, in the post-surgery period, the representation has more inertia than the body itself. In other words, the represented body image would differ from the perceived body image, that is the image that is objectively perceived by the person (such as in looking at oneself in a mirror). In our case indeed, it seems that the represented image of women with obesity was larger than the perceived image since they behaved as if their bodies were larger than it actually was. This will be one of the hypotheses investigated in study 2. It is also interesting to measure the overestimation, and to see if it varies for different classes of BMI. This will also be investigated in study 2.

3. STUDY 2: BODY SIZE AMONG WOMEN

Study 1 showed behaviors and their rationale as described by the women with obesity, as well as the way they relate them to embarrassing past social experience, suggest (a) that women with large body-size actively avoid situations where their size would expose them to "embarrassing" situations where they would appear to be in the way of others and (b) as these precautions are excessive compared to actual affordances, that they tend to overestimate their size, which is confirmed for instance by their overestimation of clothing size.

Study 2 explores how actual body-size impacts the representations of the body: is there actually an overestimation of body size by larger women, and is this is a matter of perception or representation?

The literature on body size in women with obesity is difficult to summarize, as different studies support three very different

conclusions: the women overestimate, underestimate, and are accurate regarding body size estimation (Schwartz and Brownell, 2004). The inconsistent findings across this literature are potentially due to different methods of measurement and samples that vary in crucial aspects (Mills and Fuller-Tyszkiewicz, 2016; Castro et al., 2017).

Studies differ with regard to methods of assessment (Johnstone et al., 2008): while some studies used traditional figure rating scales, others used the more advanced whole-image adjustment procedures including photo distortion or morphing (Farrell et al., 2003; Urdapilleta et al., 2007), which is the method we use in this second study, in which we investigate the different dimensions of body image.

This distinction between the components of body image is interesting because it may help us to better understand the nature of body size estimation. Authors (Farrell et al., 2003; Docteur et al., 2012) make a difference between body image perception (i.e., perceived body size, as seen in a mirror) and body image representation (i.e., recall body size). To measure body image perception, participants are asked to adjust their modified photograph to match their image in a large traditional mirror, using direct visual information ("perception condition"). For body image representation, participants are asked to adjust their modified photograph in the absence of a photo or mirror at the time of testing. Participants then have to estimate their size from their own memory ("representation condition").

Mirrors allow us to view our own body from a third-person (observer) perspective. However, as mentioned by Preston et al. (2015), how viewing ourselves through a mirror affects central body perception compared with a true third-person perspective is not fully understood.

Moyer et al. (1978) first provided support for the idea that size estimations differ for perceived and remembered sizes and found that estimations from memory tend to be larger than estimations from perception of objects. This finding was replicated in a study by Farrell et al. (2003), within the specific context of body image estimation. In contrast, by comparing body perception and body representation in 55 women with normal weight, Farrell et al. (2003) found the opposite effect, namely, judgments made from perception tended to be larger than those made from memory, but in that case more accurate. The authors noted, "The finding that participants were more accurate in estimating their body size with a mirror in front of them than without is counterintuitive" (p. 169). The same task was performed in a more recent study with 91 women with normal weight (Docteur et al., 2012). Results showed that participants were accurate in the mirror condition (with only 1.15% overestimation for body perception with a mirror) but less accurate in the second condition (5.25% overestimation for body representation, with no mirror).

To our knowledge, only a few earlier studies have used the morphing technique with a mirror to investigate persons with obesity (Shipman and Sohlkhah, 1967; Gardner et al., 1989). Shipman and Sohlkhah (1967) showed that persons with obesity were less accurate in estimating their body size than persons with normal weight, but Gardner et al. (1989) found that even though participants were more accurate with a mirror, there were no significant differences between persons with obesity and persons with normal weight.

Therefore, more data on persons with obesity are needed, as understanding body image and its consequences for a person's life is a key aspect of the issue of behaviors related to body size in obesity. As our Study 1 showed, it seems that the represented image (how people imagine they are) is larger than the perceived image (how people perceive themselves) for women with obesity and overweight status, because they behaved as if their body were larger than it actually was. However, the population concerned by this overestimation process remains undefined. This process could concern all women or only women with a large BMI.

Thus, we hypothesized that (1) all women would overestimate their body size representation (recall condition) more than their body size perception (mirror condition). (2) for all women, the higher their BMI, the more they would overestimate their body size (in perceived and recall conditions). Finally, we hypothesized that (3) the higher the BMI, the greater the difference between body size in perceived and recall conditions.

Because women in our study who had surgery quickly lost weight in a few months, we expected that evaluating body size would be more difficult for them than for women who did not lose weight, because it takes time after weight loss to get used to one's new body and accurately estimate one's body weight. So, we hypothesized (4) that women who had surgery would more overestimate both their perceived and recall body size than women who never had surgery and (5) this overestimation of both perceived and recalled body size according to BMI will be higher for women who had surgery than for women who had never had surgery. Finally, we hypothesized that (6) the difference between body size in perceived and recall conditions will be higher for women who had surgery than for women who had not surgery.

3.1. Materials and Methods

One hundred and forty French women, aged 20–45 ($M = 27.36$, $SD = 5.51$), took part in this study. Participants included women with different BMI (as in Study 1). Some of them never had surgery ($n = 80$) and others had bariatric surgery ($n = 60$). See **Table 3** for participants' characteristics.

Participants' education level ranged from BTEC First Diploma to Masters' degree. Written informed consent was obtained from each participant and the research followed all applicable institutional and governmental regulations concerning the ethical use of human volunteers. The protocol was validated by the Social Psychology Ethics Committee at the London School of Economics and Political Science (Houghton St, WC2A 2AE, London, UK). All participants were volunteers and were free to withdraw at any stage of the study. No remuneration was given. Finally, all participants were given a special telephone hotline in case they had second thoughts or questions. Written informed consent was signed by the participants.

Women were recruited through the hospital where they had or will have surgery, through a call for volunteers, and through snowball sampling, starting with a convenience subsample of university employees.

TABLE 3 | Body Size Index (BSI) in the Recall (R) and the Mirror (M) conditions and BMI for all groups of participants (mean and standard deviation).

	No surgery				Surgery		
	Normal weight (NS-NW)	**Overweight (NS-OW)**	**Obesity class 1 (NS-O1)**	**Obesity class 3 (NS-O3)**	**Overweight 8 months after surgery (S-OW-8)**	**Overweight 4 months after surgery (S-OW-4)**	**Obesity class 1 3 months after surgery (S-O1-3)**
BSI-R	22.30[a] (2.17)	29.21[b] (2.36)	42.34 (2.96)	59.25 (4.04)	34.33 (1.95)	37.62 (2.41)	49.70 (4.05)
BSI-M	22.36[a] (1,92)	28.99[b,c,d] (2.42)	35.62 (2.41)	48.17 (3.22)	28.91[d,e] (1.71)	31.61[c,e] (2.11)	41.27 (3.40)
BMI	21.11 (1.22)	27.05 (1.60)	32.32 (1.62)	42.58 (2.36)	26.42 (1.00)	28.65 (1.40)	34.18 (0.48)

All differences between cells are significant according to Tukey post-hoc tests (all ps < 0.05) with the exception of those indicated in notes below. Only Tukey post-hoc tests comparing groups one by one (BSI-R and BSI-M for Normal Weight, for example) and comparing all groups for only BSI-R or BSI-M are reported in notes below. [a]$t_{(132)} = 0.09$, $SE = 0.56$, $p = 1.00$. [b]$t_{(132)} = 0.40$, $SE = 0.54$, $p = 1.00$. [c]$t_{(192.32)} = -2.99$, $SE = 0.87$, $p = 0.15$. [d]$t_{(192.32)} = 0.09$, $SE = 0.87$, $p = 1.00$. [e]$t_{(192.32)} = 3.08$, $SE = 0.87$, $p = 0.12$.

Each participant was tested individually. First, a woman experimenter took a digital photograph of the participant in street clothes (jeans and T-shirt) in front of a white wall. Then the resulting photograph was randomly enlarged or slimmed down (+25 or −25%) using the previously validated computer program Anamorphic Micro© Software (Urdapilleta et al., 2007, 2010; Docteur et al., 2010). Then, the woman experimenter showed this enlarged or slimmed photographs to the participant, who was asked to modify her enlarged or slimmed photographs onto the computer by sliding a cursor "until the photograph matched her current size." Participants agreed in writing that their photos be processed by computer morphing software image and their photographs be used in the experimental framework of this study, and be the object of communications and publications to the extent that their face will be blurred.

However, the last step of the study (matching the photo) differed as a function of the experimental condition. Half of the participants (condition 1: recall) were asked to adjust their modified photograph in the absence of a photo or mirror at the time of testing. Therefore, participants were asked to rely on their own memory as a reference when adjusting their modified image to match their size. The mental representation served as a basis for comparison since there were no other cues: body size *representation* (how people represented, imagine, how they are) was therefore measured. In condition 2 (mirror), participants were asked to adjust their modified photograph to match their image using existing visual information: a large, full-size classic mirror was provided next to the computer. In the second condition therefore, as participants adjusted their modified image when standing in front of this classic mirror, body size *perception* (how people perceive themselves) was measured.

All participants completed the recall task first, then the mirror task. At the end of the session, each participant's actual weight and height were measured and were used to calculate their BMI. In the present study, the BMI has been considered as an independent variable, in accordance to the recommendations proposed by Smeets et al. (1998). The software provided an estimation score (ES) by comparing the individual's response (the Estimated Size, which is the image as adjusted by the subject) to the actual image. ES = [Estimated Size (in pixels) / True Image Size (in pixels)] × 100. For example, an ES = 101.15 corresponds to a 1.15% overestimation.

The method described by Farrell et al. (2003) was used to analyze these data. These authors calculated a Body Perception Index (BPI) based on the following index: BPI = BMI × ES, where BMI is the Body Mass Index of the participant and ES the Estimation Score defined above. Estimation score is measured in m^2/m^2, and BPI in $kg/m^2 \times (m^2/m^2) = kg/m^2$ (for a detailed discussion of this index, see Smeets et al., 1998). BPI is an indication of participants' subjective perception of their BMI. The BPI is the BMI that would correspond to the estimate given by the participant. Using the BPI is interesting because it provides a way of comparing the response of the participant to a social norm. For example, if a participant has a BPI over 30, one can say that her representation of herself would fall within the obese category, based on socially accepted criteria. **Figures 5A,B** show examples from the photographic manipulation software. Because we need to measure an index for body perception and one for body representation, we used two indexes: BSI-M (how people perceive themselves; i.e., body size perception, BPI calculated in the Mirror condition) and BSI-R (how people imagine they are; i.e., body size representation, BPI calculated in the Recall condition).

BSI as a dependent variable was analyzed using the R software following mixed linear model procedures with random slopes (Pinheiro and Bates, 2000; Bates, 2005). Analyses were performed with the *nlme* package computed by Pinheiro and Bates (2000) in R (3.2). Degrees of freedom were calculated according to Pinheiro and Bates (2000). Conditions was a two levels within factor (recall and mirror), group was a two levels between factor (Bariatric Surgery and No Bariatric Surgery), and BMI was a continuous factor. Results were considered to be significant if $p < 0.05$.

3.2. Results

The first set of hypotheses concerned the effect of conditions. The analyses revealed a main effect of the condition. In the recall condition (BSI-R) the mean was significantly higher than in the mirror condition (BSI-M), with $\beta = 12.33$ ($SE = 1.18$), 95% CI [10.00, 14.66], $F_{(1,136)} = 109.51$, $\eta^2 = 0.45$, $p < 0.001$. In fact, in accordance with our second hypothesis, the BSI (BSI-R and BSI-M) increased as a function of BMI, with $\beta = 1.75$ ($SE = 0.031$), 95% CI [1.69, 1.81], $F_{(1,136)} = 3092.91$, $\eta^2 = 0.96$,

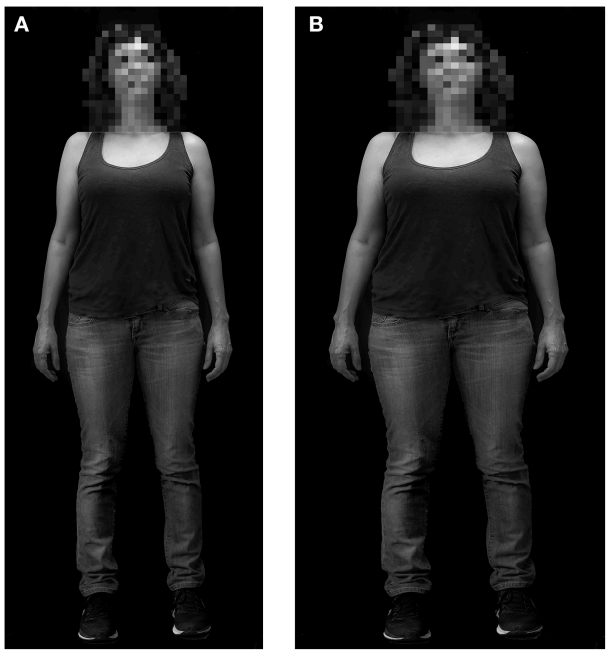

FIGURE 5 | Example output from the photographic morphing procedure **(A,B)**. Participant agreed in writing that their photos be processed by computer morphing software image; and their photographs be used in the experimental framework of this study, and be the object of communications and publications to the extent that their face will be blurred. **(A)** Real photograph of the participant; i.e., the actual body size of the participant (BMI = 21.08). **(B)** Photograph modified by the participant; i.e., the estimated size as adjusted by the participant. In this case, the estimation score is 120%, or 20% larger than the actual size. The BPI is 25.30 (21.08 × 120%).

$p < 0.001$. Finally, concerning the third hypothesis, the higher the BMI, the greater the difference between BSI-R and BSI-M, with β =-0.55 ($SE = 0.04$), 95% CI [−0.62, −0.47], $F_{(1,136)} = 217.74$, $\eta^2 = 0.62$, $p < 0.001$.

The second set of hypotheses concerned the effect of surgery. Contrary to the fourth hypothesis, a non-significant difference was found concerning accuracy in estimating body size (BSI) between women who had surgery and women who had not, with $\beta = -2.69$ ($SE = 2.77$), 95% CI [−8.16, 2.78], $F_{(1,136)} < 1$, $\eta^2 = 0.01$, *ns*. In concordance with the fifth hypothesis, the higher their BMI, the more women overestimate their body size (BSI-R and BSI-M), and this overestimate tends to be higher for women who had surgery than for women who had not, with $\beta = 0.23$ ($SE = 0.09$), 95% CI [0.05, 0.41], $F_{(1,136)} = 6.12$, $\eta^2 = 0.04$, $p = 0.015$. Finally, the difference between BSI-M and BSI-R was higher for women who had surgery than for women who had not, with $\beta = -7.15$ ($SE = 3.25$), 95% CI [−13.58, −0.73], $F_{(1,136)} = 4.85$, $\eta^2 = 0.03$, $p = 0.029$ (see **Table 3** for means and standard deviations).

Tukey *post-hoc* tests were run on the previously studied groups. Linear models allow to studying variables and their interactions. However, for this study to be complete, one should also focus on the comparison between BPIs for the groups examined in Study 1. Results are shown in **Table 3**.

One should also note that the overestimation for women who had surgery was between 28.85 and 35.35% in the recall condition. For other women with obesity who had not surgery, the overestimation was between 29.75 and 39.30%. Only women with normal weight (5.95%) and women with overweight status (7.95%) present a low overestimation. Results are presented in **Table 4**.

3.3. Discussion

The aim of this second study was to answer the following questions. How do women with different BMI, women with obesity and ex-obese women, who had or not bariatric surgery, view their body size? Would the represented body image differ from the perceived body image? This aims at understanding why women with obesity behave as if they had a larger body than they actually have (results of study 1). Is that because they perceive (through their senses) their body size larger than real, or because they represent (in their mind's eye, i.e., recall) their body as larger than real? This matters because representation is socially constructed and involves social judgment. Mead (1972), in personality construction, makes the distinction between the *I* (the subject who acts) and the *Me*. Me is the image of self internalized based on experience of interaction with others, which in the case of persons with obesity might involve social stigma. The recall condition here elicits the "Me" aspect of self.

To answer these questions, body size in a mirror condition was measured to investigate how women saw themselves (perception) and body size in a recall condition to investigate how women imagined themselves to be (representation). Women whose BMI varied from normal weight to obese class 3 (some of them had

TABLE 4 | Estimation Score (ES) in percent (%) in the Recall (R) and Mirror (M) Conditions for the all groups of participants (mean and standard deviation).

	No surgery				Surgery		
	Normal weight (NS-NW)	**Overweight (NS-OW)**	**Obesity class 1 (NS-O1)**	**Obesity class 3 (NS-O3)**	**Overweight 8 months after surgery (S-OW-8)**	**Overweight 4 months after surgery (S-OW-4)**	**Obesity class 1 3 months after surgery (S-O1-3)**
EI-R	5.95[a] (2.17)	7.95[b] (2.36)	29.75 (2.96)	39.30 (4.04)	28.85 (1.95)	30.40 (2.41)	35.35 (4.05)
EI-M	5.05[a] (1.92)	6.10[b] (2.42)	9.10 (2.41)	13.45 (3.22)	9.40 (1.71)	9.35 (2.11)	11.10 (3.40)

All differences between cells are significant according to Tukey post-hoc tests (all ps < 0.05) with the exception of those indicated in notes below. Only Tukey post-hoc tests comparing groups one by one (EI-R and EI-M for Normal Weight, for example) are reported in notes below. [a] $t_{(133)} = 0.65$, $SE = 1.39$, $p = 1.00$. [b] $t_{(133)} = 1.33$, $SE = 1.39$, $p = 0.99$.

bariatric surgery and others never did) were asked to adjust a (modified) photo of themselves to match their actual size.

Results concerning the first set of hypotheses showed that participants perceived their body size as being larger in the recall than in the mirror condition (as predicted in the first hypothesis). Tukey *post-hoc* tests shed some light on these results and, in fact, no differences were observed between women with normal-weight (NS-NW) and women with overweight status who had no surgery (NS-OW), in regard to perception of their body size according to the two conditions.

The larger participants actually were (with higher BMI), the more they seem to overestimate their size in both conditions (mirror and recall), as predicted in the second hypothesis. Furthermore, the more corpulent women are, the greater the difference between representation and perception of their bodies (representation being larger than perception).

One should note that the accuracy of size estimations was quite good for all groups in the mirror condition (about 5–13% in the mirror condition). In the recall condition, for women with normal weight (NS-NW) and women with overweight status with no surgery (NS-OW), the error of size estimation was about 6–8%, but it was about 30–40% for all women with obesity (NS-O1, NS-O3, S-O1-3) and women with overweight status at 4 and 8 months after surgery (S-OW-4, S-OW-8).

Our results support those of a previous study (Docteur et al., 2012) comparing body size estimation in the presence or absence of a mirror, in which the presence of a mirror makes the estimations more accurate. It can be argued that seeing one's image in a mirror and then adjusting one's photograph on a computer does not rely on the memory of one's own life-size image but is rather a stimulus-matching task. In contrast, a recall estimation based on representation involves a memory judgment rather than visual information, and includes cognitive, attitudinal, and affective components (Thompson, 1996) and feelings concerning one's own body (Cash, 2004), which may affect body size estimation (Smeets and Panhuysen, 1995).

Our results also support other previous studies on the effect of one's personal body size on the accuracy of estimating their own body size. Thaler et al. (2018) tested whether one's personal body size predicts the accuracy of body size estimation of own body size. Fifty-four women were presented with their personalized avatars varying in weight in a virtual environment and responded whether the body presented corresponded to their actual body size and adjusted the avatar until it matched the size they perceived their actual body to be. Results show that participants' BMI significantly altered the accuracy of estimated own body size; participants in the overweight status and obese weight range tended to overestimate their body size, but participants with lower BMI underestimated their body size.

Contrary to the fourth hypothesis, a non-significant difference was found concerning the overestimation of both perceived and represented body size between women who had surgery and women who did not had surgery. In concordance with the fifth hypothesis, the overestimation of BSI in both experimental conditions tends to be higher for women who had surgery than for women who did not have surgery. Thus, differences between women can be revealed only if their actual body size (BMI) is considered, which is in line with the recommendation proposed by Smeets et al. (1998). The overestimation in the recall condition compared to the mirror condition was also higher for women who had surgery than for women who never had surgery (the sixth hypothesis).

Finally, unplanned comparisons (Tukey *post-hoc* tests) between groups for the recall condition revealed significant differences. This set of results means that overweight women who never had surgery (NS-OW) had a better accuracy in estimating their body size than women with overweight status at 8 or 4 months after surgery (S-OW-4, S-OW-8). Moreover, women with obesity class 1 (NS-O1) who did not had surgery had better accuracy in estimating their body size than women with obesity 3 months after surgery (S-O1-3). In fact, it seems that women who had bariatric surgery, even when they lost weight and became women with overweight status or obesity class 1, displayed levels of overestimation of their body size. This could be explained by the fact that they do not have the same perception of their body size as women with the same BMI, who were not women with obesity class 3 in the past, before surgery.

It seems that it takes time after surgery to achieve a non-erroneous perception of one's body size. One should consider that the weight of women who had surgery might fluctuate more than the weight of participants with normal weight.

4. GENERAL DISCUSSION

In this paper, two studies were presented. In the first, we investigated how women with obesity act with their body in natural situations. We analyzed the activity of women with obesity and ex-obese women who had lost weight after surgery (we also compared it to that of women with overweight status and normal weight). In the second, using an experimental protocol, we explored the body size representation and perception of French women. Results showed that women with obesity in our sample do behave differently from women with normal weight or overweight status in certain circumstances: they tend to avoid sitting next to other people, go through doors and turnstiles sideways, navigate more carefully in a crowded space, and experience difficulties in selecting the right size of clothing. These behaviors are not systematic, but frequent, and the higher the BMI, the more salient they are. Interestingly, ex-obese women who have recently lost weight tend to continue to behave as if they were women with obesity. However, these specificities seem to vanish with time. It seems that women with obesity, and to a certain extent women with overweight status, behave as if their body were larger than it really is.

Note that other studies including women with low BMI have found similar effects. For example, Guardia et al. (2012a) using an ecological paradigm (Guardia et al., 2010) in which anorexic women required to judge whether or not an aperture was wide enough for them to pass through, show that they significantly overestimated their own passability (relative to a control group) in a simulated body-scaled action. This body overestimation appears to be related not only to the anorexic women's body image but also to an abnormal

representation of the body in action. With anorexic women the body-boundary and the body-orientation representation seem disturbed (Guardia et al., 2012b).

The second study showed that women with obesity and women with overweight status who had surgery overestimated their size when estimations were based on representation (recall condition, without mirror) by around 30–40% but overestimated much less in the mirror condition. This supports the hypothesis that the represented size (rather than the actual size) is the operational body size for behavior and activity. While one could expect that motor behavior would rely on perception (and proprioception) rather than representation, this does not seem to be the case for these women: their behavior seems to correspond to their oversized representation rather than to their body shape perception. This suggests that a possible interpretation of the atypical behaviors observed empirically in persons with obesity is not (or not only) due to the use of perceived size, such as the measure of affordances, but rather due to an excessive margin of behavioral precautions to avoid situations which may be humiliating and stigmatizing (Brewis et al., 2011; Major et al., 2014). In other words, persons with obesity may have larger personal space boundaries than persons with normal weight or overweight; and this would be reflected in the way they move in public spaces. Persons with obesity would maintain a greater distance in order to keep a safe distance and avoid contact.

What seems specific is that this fear of getting too close is not a fear of being touched but rather a fear of intruding into other people's personal sphere and being a nuisance (see comments of participants in **Appendices**). What makes the situations unpleasant would be therefore not only the feeling of being "rubbed against" or squashed, but also the feeling of being stared at by others. Nevertheless, an analysis of the replay interviews suggests that concluding that the only mechanism producing this behavior is that the represented size is the operational size may be too simplistic. Rather, while our experiments are able to attribute a size to the represented body, body image is more than a size, and only by also listening to the interviews can we get a glimpse of what the represented body size means. It comes with negative connotations. RIWs show that the atypical behaviors are connected to memories of embarrassing or humiliating experiences regarding personal body size (see **Appendices**). Participants explicitly said that avoiding repeating such unpleasant experiences is the rationale behind some of the atypical behaviors. This is quite obvious in some of the verbatim quotes provided in **Appendices** regarding seating (e.g., *encroaching* on a neighbor's space). The presence of such key autobiographical events related to the experience of the body confirms the presence of episodic memory in the representation of the body as proposed in the body matrix model (Riva, 2018). It is interesting to note here that these biographic elements which are very social in nature are evoked by a first person-video, showing an integration of allocentric and egocentric frames that is reinforced by the stigma. In this respect the stigma acts as a factor of integration of negative body image, through negative emotional experiences.

However, this goes beyond specific situations: if we turn to the replay interviews, it appears that obesity (whether present, or past) is connected with shame and guilt, and can be linked to memories of unpleasant experiences (see the RIWs in **Appendices**). Some women with obesity commented that they felt anxious in daily interactions with other people. The example of Deborah (NS-O1) with the blocked door described above suggests that the fear of experiencing a size-related unpleasant or humiliating experience could be triggered or reactivated and made salient by some incident that made obesity more salient (e.g., rubbing against door frames, encroaching on neighbors' space, blocking the way etc.). We can assume that women with obesity statistically encounter enough of such reactivating experiences to keep them continuously aware and on guard against such situations. Therefore, women with obesity may actively try to avoid situations in which they may be pointed at or humiliated again. That is why they declare being afraid of overloading lifts, of encroaching on neighbors' space on chairs, and of disturbing people by taking up too much space in public areas.

Exaggerated representations could be considered as having an adaptive value. There is a social psychological cost in making a mistake, and persons with obesity, by extending may extend the safety distance, avoid embarrassment. One may think that persons with obesity are simply using the standard representations of how to use space, and how one should use space, but they use them with an "incorrect" (oversized) assumption of their own body size (they overestimate their body size by about 30%). The result is quite coherent: they would avoid doing a series of things which would indeed have a negative consequence (rubbing against doorposts, encroaching on neighbors' space, blocking the way etc.) if they were as large as they thought they were. Socially, they would feel the need to apologize for the inconvenience that they (think they) represent. Therefore, they would feel they are a special case who obstructs the swift flow of normal activity (slowing traffic in corridors), restrict other people's space (in public transportation or space), and are a danger to furniture (chairs, wheelchairs, etc.) In addition, because obesity is considered to be the result of one's own failings (greediness, laziness, a sign of excess and lack of control), persons with obesity feel they are in the position of someone who is at fault, and act accordingly (Lee and Pausé, 2016; Seacat et al., 2016; Flint et al., 2017).

All this means that persons with obesity may feel they have (in representation) violated social or moral rules, and therefore feel they are guilty and should take a low profile and/or apologize, which is what can be observed. Not only is there a stigma attached to obesity, as there is to many appearances or behaviors that deviate from the norm, but this stigma is probably proportionate to the degree of deviation from the norm (which is consistent with our finding that overestimation grows with BMI). The fact that persons with obesity overestimate their difference creates anticipations of strong stigmas and keeps them on their toes; this increases the stigma. The causality may go both ways: own-body size is likely to be overestimated precisely because obesity is a stigma; but then this overestimation increases the stigma.

In the perspective of integrative models of the body mentioned in discussion, our empirical findings suggest that stigma plays a role in integrating the (egocentric) emotional and kinesthetic experience and the (allocentric social) frames of reference in what seems a self-vicious circle, while the environmental affordances

(e.g., small chairs, narrow turnstiles) provide on a daily basis a reinforcement of negative experiences that feeds this circle. This suggests that using virtual reality (Riva, 2011; Serino et al., 2016) is indeed a fruitful avenue that could compensate reinforcement by the usual environment of the subjects.

Early studies have shown that the mental size of an object can be influenced by its relevance to the viewer. For example, children tend to overestimate the size of coins compared to the size of paper discs of identical diameter (Bruner and Goodman, 1947). Authors referred to this as "accentuation," a central process which leads to systematic tendencies in attributive judgment, increased saliency of the personally relevant (Bruner and Postman, 1949). While this notion did not have a strong follow-up, it seems relevant in our case, where persons with obesity appear to have a heightened sensitivity to what is relevant to their obesity (for example, the looks that other people give them, or their opinions). It is as if there had been some hypersensitization to the issue. The problem is that while these behaviors are excessive, they are not completely unfounded. For example, it is indeed more difficult to navigate with a larger and heavier body; persons with obesity do encroach on the next seat when they sit in narrow seats, etc. Persons with high BMI are aware of this and, as we saw, are oversensitive to these issues. In fact, in interviews women with obesity sometimes explicitly expressed a surprisingly harsh evaluation of themselves, certainly far harsher than persons with normal weight would venture to express. It seems that the issue is simply that the problems, although real, are overestimated. In a way, what is observed is similar to what was evidenced by the photo morphing experiment: persons with obesity do not have an imaginary problem, but they exaggerate its extent, relative to objective affordances and probably to social relations. This accentuation makes their life even more difficult.

4.1. Limitations

However, there are several limitations to our research. Firstly, this study is limited to French women in urban context. Still, body image literature reviews have revealed significant ethnic differences (Dorsey et al., 2009; Hebl et al., 2009). For example, Gramaglia et al. (2018) showed that Japanese women's ideal BMI and body shape are, respectively, lower and thinner than that of American women; or that Hispanic and Black women usually show less anti-fat attitudes than White women. It also seems that in some cultures obesity does not come with the same type of stigma (Hebl and Heatherton, 1998; Greenleaf et al., 2006). As this study is limited to French women of Urban culture, it would be interesting to survey other populations.

We know from pilot studies that men have a somewhat different relation to obesity even if a significant number of men do struggle with body image concerns (Pope et al., 2000; Ricciardelli et al., 2007). They also seem engaged in negative body talk (Engeln et al., 2013) and suffer of weight stigma (Himmelstein et al., 2018). Future research should attempt to study men's behavior and the role of gender or gender socialization on behavior in public space.

Secondly, we must note, on the one hand, that participation was made on a voluntary basis, and therefore there might be a self-selection bias in the sample. Another limitation of the present study relates to the small sample size for study 1 ($N = 14$), even if ethnographic studies often rely on much smaller numbers sample sizes. Replication of these results in a larger sample is desirable. It would have been interesting to include participants who had bariatric surgery very long time ago and managed to keep normal weight for a long time, but such participants are rare and difficult to reach.

Finally, future research should attempt to determine the potential variables associated with obesity-related behavior in daily life and body image problems in persons with obesity. It would be especially relevant to measure the emotional component of body image to assess emotional states associated to the perception of self-images by women. It might enlighten how the various components of body representation affect behavior.

DATA AVAILABILITY

For study 1, the datasets for this manuscript are not publicly available, because the images have been blurred to ensure anonymity, but not the films used. For study 2, raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

AUTHOR CONTRIBUTIONS

IU and SL contributed to the conception and design of the experiments, acquisition of data, analysis and interpretation of data, and drafting of the article. SD contributed to the analysis and interpretation of data, and drafting of the article. J-MC contributed to the conception and design of the experiments.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01854/full#supplementary-material

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Social Implications of Weight Bias Internalisation: Parents' Ultimate Responsibility as Consent, Social Division and Resistance

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Responsibility is a moral quality of caring that is central to child health policies. In contemporary United Kingdom these policies are based on behavioural psychology and underpinned by individualism, an ideology central to neoliberal governance. Amid the complexities of "obesity" and inequalities, there is a multi-layered stigmatisation of parents as moral associates. Few studies consider the lived realities of food policy processes from the standpoint of class. This critical qualitative research draws on theorists who explain processes of power and class: Foucault, Gramsci, Bourdieu, and Marx. Its objectives are: (a) to understand the lived experience of parents as they interact with food policy; (b) to explore how parents resist stigmatisation; and (c) to reflect on implications for policy and practice.

Methods: Using purposive sampling, 31 ethnographically informed interviews were carried out in a London borough, with policy actors: policymakers, implementers, and parents as policy recipients, including 12 working-class mothers.

Results: A core theme of "responsibilities" emerged with four interconnecting sub-processes that provide insight into how stigmatisation and resistance evolve through policy.

Discussion: As have others, this study reveals the idea of responsibility as fundamental to the processes of soft power. Child health is a priority for participants and a "ruling idea." The diffusion of responsibility throughout policy leads to confusion about where it lies. New subjectivities are formed in line with ideas of governmentality. Parents engage with policy at multiple sites that elicit symbolic violence, and stigma sows social divisions. Against this background, working-class parents are left in a state of cognitive dissonance between being made responsible (responsibilisation), and feeling responsible (self-blaming) for their children's weight while lacking the material resources to provide an optimal nutritious diet. Resistance is interwoven and is essentially found in parents' policy alternatives that diverge from United Kingdom government policy.

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Conclusion: Critical qualitative research using multiple theorists is valuable in understanding how parents interact with policy in a complex social world. With United Kingdom policy failing, useful insights are provided into how involving parents in policymaking might determine a meaningful collective responsibility, with a political ethic of care and unity between parents that would advance health equity.

Keywords: parents, stigma, care, responsibility, class, inequalities, moral associates

INTRODUCTION

Children's rights are emphasised in food and health policies. Yet in practice their rights to be free from hunger and poor health are disregarded by United Kingdom governments (Booth, 2019). "Child obesity"[1] is situated in this contradictory context. On the one hand it is the greatest threat to the future of children, a societal burden with huge health and economic costs, and cause of inequalities (Department of Health, 2018). On the other, policies continually fail, resulting in intractable prevalence rates that are accompanied by a deepening social gradient (House of Commons Health Committee, 2018). Such contradictions can be understood in the context of contemporary neoliberal society – a political economic system underpinned by the belief that human advancement is best served by a free market economy and ideology based on individual freedoms, rights and responsibilities. The focus on the individual is central to health psychology, a discipline that together with behavioural sciences has become integral to public policies (Jones et al., 2013). So, "child obesity" policies focus on changing individual parents' food practices rather than addressing the structural influences contained within the physical and social environment.

Neoliberal societies are found to be highly unequal (Schrecker and Bambra, 2015). Inequality and stigma are linked because stigma as a social process plays a key role in producing power relations, social control, and in the devaluation, discrimination and exclusion of specific groups; processes that support the dominant social order (Parker and Aggleton, 2003, p. 16). There is a belief among wealthy elites that inequality benefits their social power; consequently, fear is created, shifting blame to "others" in a "political need to blame the poor" (Dorling, 2018, p. 18). Blame and its internalisation mask the structural factors responsible for the inequalities and injustices generated by neoliberal policies are concealed. Stigma is used to motivate behavioural change (Pont et al., 2017). It is "weaponised" by the state (Scambler, 2018) or emerges as an unintended consequence of policies that, for example, use fear-based messaging (O'Hara, 2014). It also emerges in "othering" processes such as health surveillance programmes that measure and differentiate children as "healthy weight" or obese (Nnyanzi et al., 2016); programmes aimed at identifying population trends, not individual clinical diagnosis (Dinsdale and Ridler, 2010).

Whatever its driving force, the generation of blame and self-blame has harmful effects for children and young people (Pont et al., 2017). The United Kingdom has experienced an increase in stigmatisation and shaming discourses (Bissell et al., 2016; Tyler and Slater, 2018). Weight bias is pervasive and multilayered (Puhl and Latner, 2007; Bresnahan and Jie, 2016), with a greater impact on working-class parents as suggested by the material differences that underpin the social gradient. While the lived effects of weight bias are considered, few researchers explore its intersect with class (Bissell et al., 2016; Zivkovic et al., 2018). Health indicators, such as the social gradient, do not reflect the lived experience of class (Navarro, 2009).

The growth of stigmatisation in the United Kingdom provides a context in which obesity has taken on meaning beyond clinical diagnosis. Obesity is highly stigmatised and includes parents as moral associates, because as primary caregivers they are given core responsibility for their child's weight: "in the West, children's large bodies have become visible markers of parental irresponsibility" (Davis et al., 2018, p. 61).

The Concept of Responsibility in Neoliberalism

Responsibility is a not a straightforward or abstract concept; rather, it is a process involving social relations underpinned by ideology and the material needs around caring for children. It concerns societal ethics and social cooperation in the distribution of responsibilities and care. These are political decisions (Williams, 2005; Tronto, 2013). Neoliberal ethics are based on individualism and rational choice in which only personal responsibility matters. So, tensions would be expected with policies that frame responsibility as "collective" or "shared" between the state, the food industry and parents, as it becomes unclear who has and who escapes the burden of caring responsibilities (Tronto, 2013, p. 60; Gillies et al., 2017, p. 67). There is ambiguity about moral responsibility and who has power to take action to protect child health.

In the neoliberal economy, the state functions to maintain the free market as part of a political-economic project, characterised by privatisation, deregulation and a low-wage economy (Tronto, 2013, p. 38). Working conditions are precarious and real wages have not increased since 2010 in the United Kingdom (Collinson, 2019). The state is restructured and decentred, so that it operates through multiple sites, including the local state, and through collaboration between actors with different interests. However, although hollowed out, it retains an overarching power (Gillies et al., 2017, pp. 66–69). For Jones et al. (2013) it is a "psychological state" that adopts behavioural economics.

[1]Note on language: While child health is of paramount concern, it is recognised that the term "obesity," its derivations, terms relating to categorisation of weight have contested meanings and uses. These are therefore placed in inverted commas when first used. The term "higher-weight" is used in recognition that not all bodies categorised as "obese" are biologically disordered.

Behavioural power is exercised through the concept of responsibility (Peeters, 2019) which shifts between social actors, usually from state agencies onto others (O'Malley, 2008). For example, Ditlevsen et al. (2016) found that responsibility shifts from health professionals onto families. These are not inert processes. They create new subjectivities for policy actors (Monaghan et al., 2010). The state is involved in this subject formation by creating a parent-self who fulfills neoliberal policy requirements (e.g., Gillies, 2011). This competency-based parent, self-governs and socialises children; regulating, monitoring and disciplining to enable healthy choices and bodies, and responsible consumption (Gillies, 2011). But tensions arise based on class, cultural and socioeconomic differences with affordability as a core question. Despite this, parents in poverty are highly resourceful (Caraher, 2016) and juggle caregiving commitments, that Davis et al. (2018) considers to be morality work in which they navigate multiple moral burdens and utilise multiple strategies based upon their own experiences. These lived experiences are lacking in obesity research.

Food Industry and Responsibility

While parents face public scrutiny and sanctions that ultimately can involve child safeguarding, policy only requires voluntarism on the part of the food industry, which is given power in public health policymaking through partnership-working with government (Department of Health, 2011). These tensions are compounded by "irresponsible" market processes that operate in the background as part of political, economic and cultural decision-making (Tronto, 2013, p. 60). For example, choice has flourished, with 20,000 new food products every year (USDA ERS, 2013 cited in Lang and Heaseman, 2015, p. 16), they are "edited" and constructed by advertising, and tracked and targetted by algorithms (Lang and Heaseman, 2015; Mahoney, 2015). Similarly, the needs of the market rather than those of community drive the spatial planning of the food environment; a responsibility of local government. Correlations are found between market liberalisation and increases in fast-food consumption (Winson, 2014; Otero et al., 2015), and mean body mass index (BMI) (De Vogli et al., 2014). Obesity in children in the United Kingdom is correlated with the density of fast-food outlets as well as deprivation (National Obesity Observatory, 2012).

Resistance

Resistance is inherent to social inequalities and stigmatisation. For the individual this can mean the "capacity to resist, counteract or otherwise remain unaffected" by the stigmatisation (Lau et al., 2017, p. 72). It involves stigmatised people distancing themselves from stigmatising labels by negotiating alternative social meanings (De Brun et al., 2014). It takes the form of symbolic protest, refusal to comply with policies, and reframing of moral meanings (Warin et al., 2008; Zivkovic et al., 2018). Parker and Aggleton (2003) focus on how people respond as communities of resistance that challenge stigmatisation and its internalisation.

In relation to food and parents, stigma continually evolves and is amplified, even in resistance. Stigma is attached to working-class foods, as exemplified by the 'Battle of Rawmarsh' (Wainwright, 2006). In Rawmarsh, a United Kingdom working-class community, school menus were changed based on the healthy-eating recommendations of a celebrity chef, but without consultation with parents. Mothers took chips to school to ensure their children ate familiar foods but the national media response was to vilify them as "sinner ladies" (Fox and Smith, 2011). The story illustrates how parents' engagement can produce solutions based on resourcefulness and experience, as well as how resistance can amplify stigmatisation.

This article draws on doctoral research that explored disconnects between parents' social reality and food policy. Stigma was not looked for, but it cut through parents' lives. Its counter-productivity that was in my study is recognised by public health policy thinkers, who called for change "to end the blame game" and for a shift to empathy and support (Hochalf et al., 2019). However, such efforts do not change the trajectory of policy away from individual responsibility and thus would not counter stigma. In contrast, in my research parents' experiences and policy solutions provide insight into a collective community ethic of responsibility and care for children.

This study aims to contribute to transdisciplinary and critical communities within health psychology, dietetics and policy studies. There is little research on parents as moral associates, on their lived experiences, or as a community of resistance that advances policy change to benefit children's health. If policy is to tackle the potentially harmful effects of stigma, it needs to reach beyond psychological and behavioural perspectives to explore structural social relations (Tyler and Slater, 2018). Arguments for participatory health equity in all policies are relevant (O'Keefe, 2000), with this requiring the meaningful involvement of parents in policymaking and a greater reflexivity among policy implementers about our roles in policy processes. Drawing on Murray (2015) this paper examines the connections between the individual, structures and power, and supports a psychology that is socially engaged and historically specific. Change is understood as constant. Ultimately, a critical psychology seeks to improve the "health of the world's masses . . . in doing so, they must address the issues of power and who wields it, of powerlessness and how it is connected to ill health" (Murray, 2015, p. 9).

Critical Research and Power

Multiple theorists are drawn on in this work to understand the complexities of social life (Parker and Aggleton, 2003; Jones et al., 2016). Power and class are considered key social factors involved with stigmatisation as a social process that intersects with policy. This aligns with a critical research approach conceptualised by Kincheloe and McLaren, which assumes "all thought is mediated by power relations that are historically and socially constructed" (Denzin and Lincoln, 2011, p. 164). The critical research agenda aims to empower. Accordingly, this study prioritises parents' views, and how parents might be involved in policymaking. Epistemologically, critical hermeneutics explores the formation of knowledge through language, meanings and interpretations that look for power dynamics. It is relevant to exploring policy processes because "it grounds critical research that attempts to connect the everyday troubles individuals face to public issues

of power, justice and democracy" (Kincheloe and McLaren, 2003, p. 449). The ontology of Marxist dialectics is relevant because its social reality is one of constant change, is relational, and maintains that change is driven by internal contradictions (Ollman, 2003).

Critical Theories of Power and Class

This study draws on theories of soft power, that is, power wielded not through coercion but through consent: Gramscian hegemony, Foucauldian governmentality, Bourdieusian symbolic violence and Marx's "ruling idea." Taken together, these theories provide a powerful understanding of the complexity of the social world. Each theory challenges social oppression, and they complement each other by providing theoretical lenses through which to consider the everyday lives of parents from different viewpoints as they intersect with the policy process. As **Figure 1** illustrates, Marx provides, in relation to class, a macro-level understanding of processes of exploitation that constitute classes within capitalism. This is complemented by a Bourdieusian approach to social practices, according to which social reproduction takes place through "fields" of action and access to capitals – economic, cultural/symbolic, and social – that constitute our class habitus.

In relation to power processes, complementarity is found. Marx maintained that soft power is wielded through ideology as a means of maintaining class relations, notably through "ruling ideas" that appear as common sense and are thus adopted by the working classes and their communities. Similarly, Gramsci (1971) hegemony considers how consent is negotiated and won for the ideas and values that support the dominant class. It involves the state and cultural spheres, and the latter involves civil society. In contemporary society, Gramscian theory considers how cultural life, beliefs and ideas are shaped and reproduced as hegemony, such as in universities and the media. Through the ruling idea and hegemony, a vertical view of power processes is found; this is complemented by the horizontal view of Foucauldian governmentality, which examines power at the micro-person level, and by Bourdieusian symbolic violence.

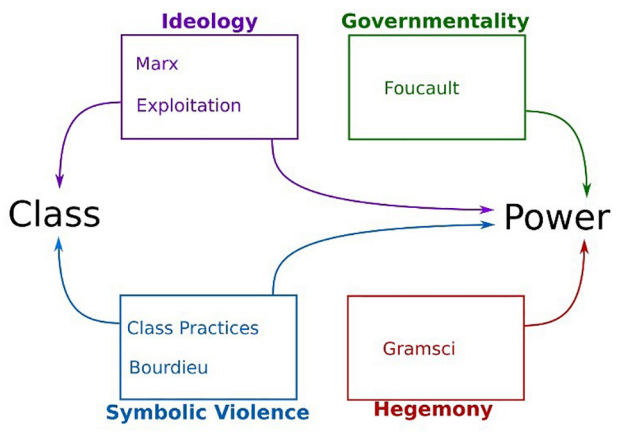

FIGURE 1 | Key theorists' contribution to exploring class and power.

For Foucault, power is examined at the micro-person level and in institutional sites. Its processes are dynamic and relational, they circulate, and they are productive and positive as well as oppressive. Resistance is inherent and becomes productive of change. Foucault examined the historical relationships of power, such as how control is maintained by punishment or discipline. In particular, he considered how the mechanism of self-regulation and the disciplining of the self evolved through the surveillance techniques of modern prisons. His work illustrates how the processes of surveillance lead to perpetual self-surveillance and self-supervision, and to the "internalisation of the supervisor" (Foucault, 1975, p. 146).

Processes of individuation and normalisation work through "various examinations" and assessments, with relevant examples being BMI, including that of children. In assessing and recording the individual, individuation is produced, which reinforces the notion of social division and individual differences, particularly between those who do and those who do not conform (the "other"). The focus on the power process around subjectification enables a perspective on "the ways in which a human being turns his or herself into a subject" (Foucault, 1982, p. 327) Governmentality evolved according to processes by which government achieved its aims through the "conduct of conducts". Using a Foucauldian approach, Miller and Rose (2008) carried out studies in clinical therapeutic settings, which were "laboratories of governmentality." They adopted a Foucauldian focus on subjectivity and considered how this is produced both in personal and in impersonal domains through schedules, work and accounting systems, which become forms of power that operate beyond the state (Miller and Rose, 2008, p. 10). In their analysis, neoliberalism "saw the birth of a new ethic of active, choosing responsible, autonomous individual obliged to be free and to live life as if it were an outcome of choice" (Miller and Rose, 2008, p. 18).

Bourdieusian symbolic violence is power wielded through the symbolic: signs, symbols, language, discourse and pedagogy, the assigning of inferiority, and the denial of resources (Webb et al., 2002). Symbolic processes include how people are labelled and othered through classification and codification. In social spaces there are constant reciprocal acts of unconscious classification of practices, through which status groups, such as social classes, are formed and coded, creating clear symbolic boundaries, legitimising some people and practices and delegitimising others (Bourdieu, 1984; Webb et al., 2002). These contribute to a symbolic order that perpetuates symbolic violence. A key feature of symbolic violence is misrecognition, whereby a person misrecognises the situation as the norm. As this article will show, symbolic violence emerged powerfully throughout the policy processes under study.

In drawing together these theories to understand the parents' experiences, the most contentious might be the integration of Marx, whose theory is often characterised as positivist, reductionist, structuralist, overly focussed on economic and labour relations, and lacking intersubjectivity and reflexity. However, Marx's thinking considered the importance of social meanings, language and ideas; for example, he stated in the *German Ideology* that language and consciousness only exist

in relation to other human beings: "it is man's consciousness of the necessity of association with individuals around him, the beginning of consciousness that he is living in a society at all" (1885/1998, p. 50). Marx illuminated the psychosocial processes of alienated labour. A contrast might be drawn between structural thinking and the social constructionist approach of Bourdieu. However, Bourdieu, provides a bridge between structural and social reproduction in everyday life through a focus on practices and the power of a symbolic order and violence (Webb et al., 2002).

Objectives

(1) To understand the lived experience of parents (as moral associates of children's stigma) as they interact with food policy.
(2) To explore how parents resist stigmatisation.
(3) Reflect on implications for policy and practice.

MATERIALS AND METHODS

This study uses critical research and a qualitative approach to explore and understand the lived experience of parents as they interact with policy processes and their actors: policymakers and implementers. It is set in the context of the local state as a nexus of power relations that manage food policy, public health and local democracy. This provides a bounded terrain for research to explore the parents' social world, food neighbourhoods or foodscapes, and other key influences in the context of power. It was carried out over 18 months during 2013 and 2014, in a London borough with a high prevalence of deprivation and "child obesity," and it was organised into two phases: the first phase focussed on policymakers and implementers, and this informed the second phase by providing a local context, including the role of the local state, for the experience of parents. The core concern was to understand the parents' experiences in context. Other policy actors served to triangulate these findings. The data was thematically analysed. Credibility was further addressed by a study report sent to parents, and feedback was invited.

Semi-structured interviews were the main method of data collection. The interview aimed to be an active process that encouraged the participants to explore perspectives, to conceptualise and to make connections (Holstein and Gubrium, 1997). The researcher is part of this active knowledge construction, so it is important for the researcher to reflexively consider positionality, power and bias. This involves having an understanding of participants' social realities and of the researcher's own insider/outsider positionality. The researcher in this study is working-class and has experience of poverty and community activism; however, it was not taken for granted that these would suffice to make the researcher an insider. Positionality became blurred. The researcher's position as a dietitian and academic – positions that contain power – conveyed an outsider status to parents, but an insider status to policymakers and implementers. To reduce the potential for resulting biases, attention was given to reflexive field notes that considered power dynamics during interviews, and changes were made to subsequent interviews. A further attempt was made to observe society from the participants' points of view by integrating ethnography into the study methods; thus, the interviews were ethnographically informed. This also contributed to the triangulation of data. Immersive techniques involved community observations that used audio recordings, extensive field notes and photography. Throughout the study, the researcher travelled by foot or public transport across the borough, noting observations of people and foodscapes, of food deserts and urban developments, which were sites of regeneration and gentrification. Photographs of foodscapes (not people) provided visual detail of what might be overlooked: the density of fast-food outlets, and the contrast between shopping parades in deprived and affluent areas.

The two topic guides (see **Supplementary Appendix 1**) were informed by the literature and colleagues in the field, and they were piloted. Key questions included icebreakers that asked parents: "One thing about childhood obesity that is important to you, anything at all?" and "Shall we use term overweight, obese or other?" Other questions included: "Thinking about what government says and does, are they helping or hindering parents?", "Thinking about how food decisions are made, . . .Are parents involved – how could they be involved?", and "What would you do if prime minister?"

Stimulus materials were "word cards" developed from key words and phrases used in food and obesity policies. Participants were invited to use these and did so in various ways. For example, some would choose one or two topics to talk about, whereas others used triads to draw contrasts. Public health posters and photographs of local foodscapes (ethnographic data) were also used (see **Supplementary Appendix 2**).

Participants

The sample was purposive, and the recruitment strategy used convenience methods and snowball referrals. Recruitment was desk-based for the first phase. The sample frame was drawn up based on inclusion criteria of policymakers and implementers being involved in child obesity or food policy and delivery (community nutrition workers, obesity service and food providers). Potential participants were identified from local government websites and documents, including minutes of relevant committee meetings from the previous 18-month period, and they were invited to participate through electronic and postal communication. Sixteen participated: six policymakers and ten implementers (**Table 1**).

The recruitment for the second phase (caregiver/parents) involved face-to-face intercept at key community sites that had been identified during the activities of the preceding phase. These sites included community centres, housing offices and major workplaces (bus garages, supermarkets, local government). Requests were made to managers to advertise the research material and the researcher offered healthy-eating advice to staff. For example, a bus garage advertised the research on its electronic noticeboards, while researcher set up a health promotion table in the canteen; this yielded two recruits. Similarly, a table was set up in a housing office. With permission, the researcher was based in and recruited from community venues, in working-class

TABLE 1 | Summary of policy actors: research participants.

Policy actor groups	Definition/inclusion criteria	Sample	No.
Policymakers (local government)	Position in local government with interest or direct involvement in child weight management	Elected representatives, including high level	6
Policy implementers	Role in delivery of food-related obesity policy	Range of community nutrition workers, senior management, chief executives and local business	10
Policy recipients	Parents/caregivers of children with obesity, aged 2–15 years	Mostly working-class (13):12 mothers and 1 father, middle-class (2):1 mother and 1 father, across range of ethnicities.	15

TABLE 2 | Parent-participants' characteristics.

Parent characteristics *n* = 15	
Age range (years)	23–54
Gender	13 females, 2 males
Ethnic group	1 Russian/Azerbaijani, 3 Black/African, 2 Turkish/Cypriot, 2 White/English 1 Black/British, 1 White/Black Caribbean, 1 Pakistani/Arab, 2 Black/Caribbean, 1 Asian/Caribbean, 1 other
MSOA – Index of multiple deprivation	13 reside in deciles 1/2 (high deprivation), 2 in deciles 5/6 (low deprivation)
Occupation	4 childcare workers, 1 adult-care worker, 2 bus drivers, 3 administration, 1 nurse, 1 teacher, 2 full-time homemakers, 1 unemployed
Education	13 secondary level, 2-degree level
Household	7 one-family lone parent, 7 one-family couple, 1 not say
State support	7
Housing tenure	11 social, 3 home owners, 1 not say
Social class	13 working-class, 2 middle-class

Child data reported by parents: Age range: 2–15 years. Child BMI all above 98th centile.

and middle-class areas, such as in cafes and children centres. Health sector referrals were excluded to avoid a treatment-seeking sample that could introduce bias.

The sample frame considered a range of responses from different communities, ethnicities and social classes. Parents had children aged between 2 and 15 years who had been classified by a health professional as "obese"; this data was given by the parent, and the researcher verified the classification. The researcher did not directly measure children because this might shift the focus of the study from parents' experiences of food policy to the children's BMI. Participants lived or worked in the borough and were defined as working-class or middle-class according to occupation (Clement and Myles, 1997; cited in Scambler and Higgs, 1999) and the neighbourhood deprivation score. Parents were excluded if there were underlying medical conditions that promote child obesity. Following initial contact with the researcher, a screening tool confirmed the qualification to participate. Participant characteristics were collected by questionnaire. The information sheet and consent forms were given to participants prior to interview. Following their interviews, participants were asked to "snowball" referrals.

Interviews lasted for up to 1 h, apart from three that were longer. The interview process began with a confirmation of qualification. The interviews were either one-to-one or with a small group, depending on the preference of parents. Of the 15 interviews, 11 were with individual parents. Interviews were carried out at a place of convenience for participants and childcare was provided. As a thank you, dietetic advice was offered to families after the conclusion of interviews.

Of the 15 parents, 13 were mothers aged between 23 and 54 years. Seven were lone parents and 13 were working-class. The range of occupations included bus drivers and full-time caregivers in receipt of welfare (**Table 2**). Ethnicity ranged across nine groups, including Black African and Caribbean.

The Data Analysis and Interpretation

The data analysis was thematic (Braun and Clarke, 2006), and the theming process was both inductive and *a priori*. The latter acknowledges researchers' "prior theoretical understanding of the phenomena under study" (Ryan and Bernard, 2003, p. 88). The analysis plan began with analytical memos which were written following interviews, when transcribing and during subsequent readings. Transcripts were analysed in hard copy, with results transferred to NVivo QSR International Pty Ltd. (2014) for data management. The memos informed codes, themes and interpretation (Saldana, 2009). The first reading recorded initial thoughts and the second employed scrutiny-based techniques that looked for metaphors, transitions, repetitions and indigenous typology (Ryan and Bernard, 2003). Codes were formulated from a mix of the participants' own words and the researcher's conceptual understanding. A systematic approach involved a first stage of coding that used an "eclectic" approach of four coding methods: process, versus, descriptive, and *in vivo* (Saldana, 2009). In stage two, "focussed coding" methods were used: this involved combining initial codes to form concepts, look for connections and establish the major categories and themes. Mind maps were used to explore connections. As themes emerged, it was possible to think about theory for later interpretation. For example, the relevance of the Foucauldian approach to power and Bourdieusian symbolic violence of foodscapes became apparent during the coding process.

Field notes and photographs, as researcher-generated data, were coded and themed in the same ways as the interview transcripts, so they served to triangulate the findings and give them greater credibility.

Results

In exploring the lived experience of parents as they interact with food policy, five core themes were inductively identified. The major theme of "responsibilities" is presented as a dynamic process in interaction with four sub-processes. It emerged as a powerful ideology around child welfare that backgrounded and interconnected with policy actors' thinking and actions. The data shows contradictions and dissonance in how policy actors perceive their responsibilities. These are identified as 'whose responsibility?' and presented below as 'views' in

subsections: policymakers; policy implementers and parents. The parents' views progress to set out processes of responsibilisation, ultimate responsibility and self-blame, and of collective care and resistance. **Figure 2** illustrates the interconnections: a possibility for how these discursive processes interact. The ideological views of individual responsibility lead to discourses of diffusion of responsibility, and processes of responsibilisation which can lead to blame shifting away from policy makers, governments, and industry and toward parents. Blame shifting can then lead to stigmatisation of parents, parent self-blaming and internalised stigmatisation among parents. Throughout these discourses there can be ambiguities and spaces for resistance. As posited by Sum, instability between discursive justifications and reality provides space for resistance through challenging, rejecting and transforming, creating alternative conceptions, and counter-hegemonic subjectivities (Sum, 2012, p. 2).

Responsibilities

The universal concern for child welfare drives the motivation that was captured by the theme of "responsibilities." It is a powerful idea; in this research, its presence was strongly felt and cut through the data. It emerged in processes that unfold through food policies across multiple sites and media, such as in policy literature, local state planning, language, and the foodscapes that impact on parents as the recipients of policy. The welfare of children was of paramount concern to all participants. This concern appeared embedded in discourses of healthy and unhealthy foods and body shapes, and thus in stigmatising processes that distinguish between "self" and "others," and that cast parents as moral associates. For example, it was articulated in blaming parents, with assumptions that parents of higher-weight children lack caregiving competencies and feed children "unhealthily." Data from the researcher's field diary reflected these commonly held assumptions and provided insight into the embeddedness of stigma in communities:

> *Two mums followed me to give their opinion of parents of overweight children, saying "parents are responsible for feeding children properly" – "healthily" – "I don't receive free school meals or benefits and manage" – "people expect to be spoon fed all their life". And they argued it is possible for parents to cook healthily and inexpensively.*

These high emotions around child health were common and further illustrated by a policy implementer who used the term "killing your child." This is a powerful metaphor that constructs parents as a risk to child health and as the problem, while positioning the health worker as the expert who saves the child. This is read as a well-meaning anxiety, but it also exemplifies a

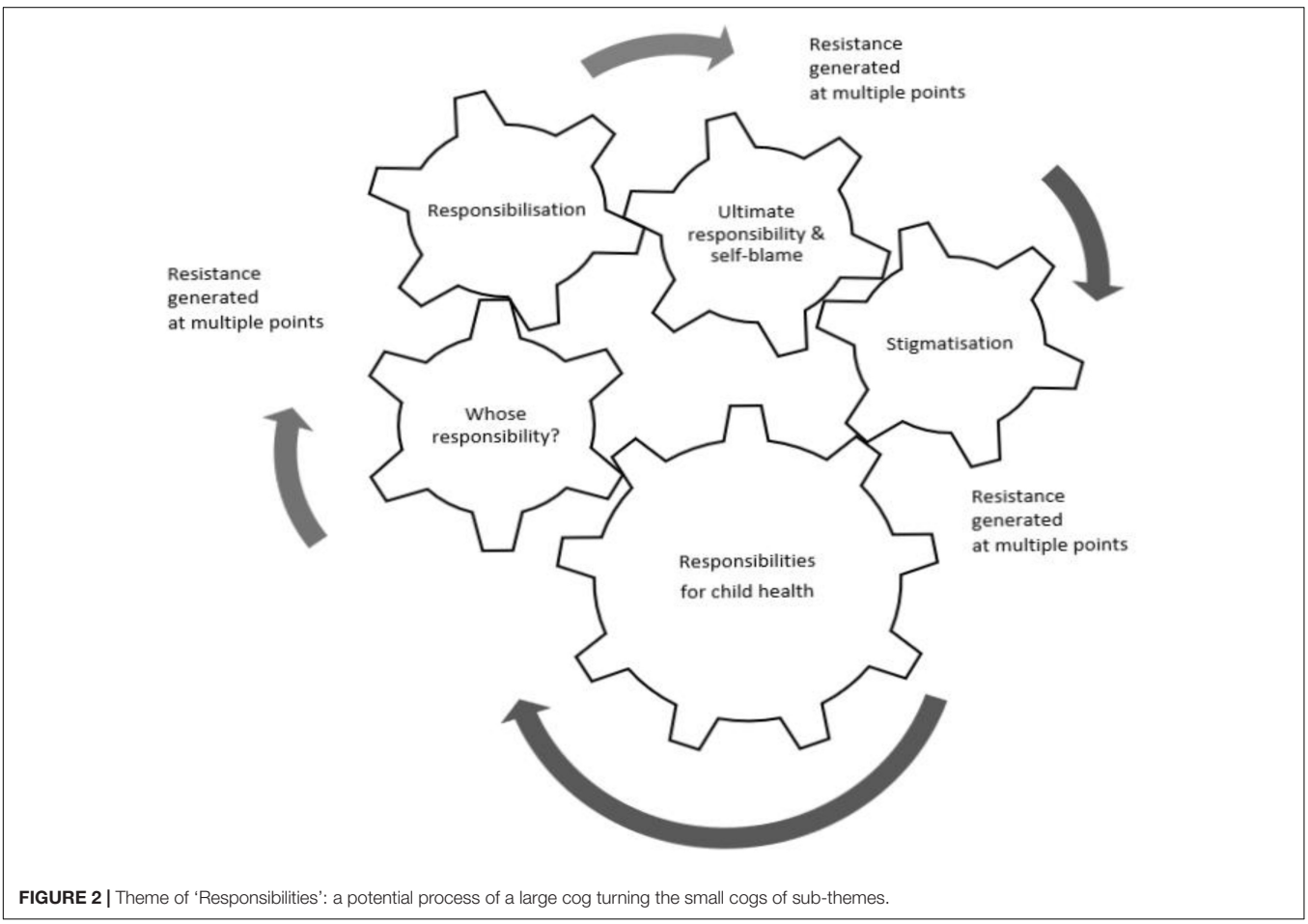

FIGURE 2 | Theme of 'Responsibilities': a potential process of a large cog turning the small cogs of sub-themes.

divisive concept aligned with food and health illiteracy. Anna, a health worker, commented:

> *Wife was definitely. . . overweight. The elder boys were thin. The young guy. . . seriously overweight. . . The daughter was too, and they took pride in feeding her. There was no way I could have a conversation. It was a badge of pride, they showed their love by giving her more things to eat. There was no way that they wanted to hear. . . the idea that you might be killing your child.*

In contrast, parents' concern for child health was "taken for granted," and surprise was commonly expressed that the researcher even asked about this. Most parents volunteered for school or community projects despite the pressures of employment and family. Thus, insight was gained into a collective obligation to care alongside that of the individual. Liz, a bus driver, explained:

> *In classes at the* [community] *centre, we try to teach them about healthy eating. . . but it's us doing it who are volunteers. When parents used to be able to do things with their kids because they had the time to do it. Whereas nowadays they haven't, and I think that's the biggest problem. . . too busy working.*

This bears significance because time-poor working parents volunteer to maintain services that would otherwise close due to spending cuts. This example concurs with the universal concern and contradicts the ambiguous thinking of other policy actors, according to which working-class parents lack competencies and are irresponsible. However, within this overall concern and responsibility for child health, there were tensions in the meanings and attribution of responsibility and what this means in practice: "who is responsible – the policymakers, food industry, implementers and parents?"

Whose Responsibility?

Policymakers' views on responsibility

Among policymakers, there were contradictory views. On the one hand, "everyone is concerned" and wants to protect children; on the other hand, central government demanded that local policymakers make spending cuts, which led to compromises that do not protect child health. Policymakers described their responsibilities to central government and parents, and they adopted a policy of mitigation in attempting to comply with legislation while limiting the severity of funding cuts. For some, this was a cognitive dissonance as compromises were made between the interests of government and those of parents, and they appeared to distance themselves from the consequences, whether intended or not, of their actions. For example, Angie, a policymaker stated: *"We're. . . constantly getting cuts and cuts. It's about trying to mitigate the cuts rather than. . . do as much new stuff as possible."* The crisis local government faced was elaborated by Ken, who said:

> *We haven't implemented all of the savings and the cuts that we're going to need to. . . about eighty-two million pounds worth of savings so far. We've another eighty-five million pounds worth of savings to make that takes us to 2016/18.*

In contrast, Joe, a policymaker, countered the contradictory stance of colleagues in passing on cuts, framing it as hypocrisy:

> *People of* [Labour] *political background would have voted for raft after raft of cuts to people who are the most socially disadvantaged. . . So for me it all feels a bit sort of hypocritical that they can talk about food poverty but they're not doing anything to really ameliorate that!*

There was ambiguity among local policymakers about their responsibility for the composition of foodscapes in which fast food outlets proliferated in deprived areas, unlike in affluent areas. Policymakers argued that the local state was *de facto* powerless, which presupposes no responsibility. They described urban planning as a permissive system that grants requests if they meet planning criteria. This lack of perceived power distanced policymakers from their decisions that had overseen the proliferation of fast food outlets. For example, one policymaker articulated the view that it was a "*chicken and egg*" situation, suggesting that low-income communities might want fast food outlets. This presupposed that deprived communities have power, choice and control over foodscapes; it also indicated "victim" blaming of communities and parents. Consequently, responsibility for providing nutritious foods in poor communities would not lie with the local state; instead, it lay with market forces and parental choice. Although some policymakers distanced themselves from their power in urban planning, they expected parents to exercise personal responsibility for food purchases. There was empathy for those in poverty who ate foods described as "*revolting*" and that would only be consumed if there was no choice. This is illustrated in comments by two policymakers, Mary and Ken:

> (Mary)
> *The other one I can't bear besides McDonald's is Iceland. . . It is the deprived who are going to Iceland. . . They have frozen cheese on toast. You just shove into the microwave. . . and they've got additives. . . It takes 5 min to make cheese on toast. It's shocking really that people pay money for that. . . The very deprived are trapped into that sort of food.*

> (Ken)
> *There* [is] *connection between low pay, poverty and poor diet. . .cheap food is processed food. . . unfortunately, those foods, because of the industrialisation of food, are all too available. . . Some of us wouldn't look at those foods but maybe we would if we had less money and had less skill. . .*

Although the lack of food retailers that support health was acknowledged, blame was shifted to parents by the perception that they are food illiterate. The use of the deficit model of parenting was, for some, highly gendered. For example, Mary talked about the food literacy campaigning of a celebrity chef that neglected to focus on mothers:

> *I mean Jamie Oliver of course tried, starting with school dinners. He was very committed. He did not move on then to educating the mums which is what I think is needed.*

Policy implementers' views on responsibility

The sample included public health nutrition professionals from a range of provider organisations and roles: from management to the "*coal face*". They had responsibility for delivering new ways of working that accompanied spending cuts and privatisation.

Confliction and resistance were apparent, and views were often not clearly demarcated but fluid. They described their responsibility as technical experts to support policymakers and parents by providing evidence, using performance-related management techniques, and delivering interventions. As with the policymakers, there was a dissonance between the reality of spending cuts and the service needs. However, the critique of policy processes by some implementers, showed resistance and challenged the structural factors and ideology of blame. For example, Claire, an implementer, commented on the role of politics in health:

> *this is political, you know there's a mayor, an elected mayor, what I became. . . aware of, is that its politics before health. So. . .there's only certain things you follow, decisions are made on another basis. . . I'm not saying they're necessarily political but I think politics is linked to how they're voted in. . .* [it's] *what they see rather than maybe the evidence base. . . and it's very much who you know as well. . . it's a real shame*

Some argued against blaming parents, instead framing parents in poverty as intelligent and resourceful. Bev, a community implementer, said:

> *Blaming parents, for giving children food they are going to eat!. . .The most important thing we have is our energy. That's the one we die without. To prioritise your energy at the lowest possible price seems to me, to be a really intelligent response to feeding children. . . Parents tell me. . . I can't afford to waste food. I have to give children the food I know they're going to eat. If you change the food of your family, and you risk waste. . .*

Parents' views on responsibility

Parents' views and experiences are read as having little power in a process dominated by national government and the food industry. The food environments – the supermarkets and the local retailers – provide them with few food options. Choice is determined by affordability. By virtue of food being sold, it is assumed to be healthy. Parents were unanimous in their views that government was neither helping nor meeting its responsibilities. Most thought government blamed parents and had a mutually supportive relationship with the food industry, as exemplified by Andrea, a mother:

> *With one breath, the government are blaming those outlets. . . with the next breath – because they make the money from the shops – they're allowing it to happen.*

Parents talked about their cooking skills, that food compromises were made when tired or stressed, and their distrust in manufactured foods, and they questioned the motivations of the food industry and government. Felecia, a mother, commented:

> *They're* [the government] *not helping, I love cooking and find it better to cook at home. . . when tired I go to fast food shops, can't be bothered to cook. But I like to cook stuff at home so I know what's going in. I see my kids growing up. . . fast foods popping up everywhere. I feel the government is allowing all these shops to pop up a couple of yards away from each other, just to give you quick food.*

Many parents described their situation as subject to powerful forces that constructed their food environments and over which they had no control. This may be read as either disavowing responsibility or as lived reality in the face of political and structural constraints. Either way, most parents were aware that they interacted with other social forces. Bedria, a mother, commented:

> *Its. . . the economy. . . and government, everything linked together. . . It's one big chain goes around and we're in the middle.*

Parents spoke about the responsibility of local government in relation to fast food outlets. Their proliferation was assumed to be because they provided an income stream for local government. Parents challenged how and why so many outlets were given permission to open in deprived areas and around schools. Khadra, a mother, said:

> *On every corner, there is a chicken easy shop. They are cheap. I don't think that's very helpful. While children coming from school, they buy French fries or chicken. Not helpful to give a license to everyone.*

Parents believed that the financial interests of the food industry and government took priority over child health. The word "*allowed*" was frequently used to describe the relationship between government and food industry, and parents articulated that certain food products "*shouldn't be on the shelf*" and that food was "*all about money*" and that "*they make fast food easier*". There was anger that this leads to the production and sale of foods that are unhealthy for children. Parents thought that the food industry was not taking responsibility. Food advertising was described as ubiquitous; it was "*like a radio – it's on all around you*". There was distrust and cynicism that the government was choosing not to act, and parallels were drawn with tobacco control. Cynicism was exemplified by Leyla, a mother and childcare worker:

> *government. . . if they put a shut down on what happens, on smoking or whatever, you will see a cut down drastically. . . if they wanted to make a change they could, but they're choosing not to.*

Parents' policy solutions included clear food labelling and product reformulation, a stop to the manufacture of unhealthy foods, and the accountability of the food industry. For example, in talking about the Responsibility Deals (Department of Health, 2011) – the legislation based on voluntarism of the food industry – Andrea, a mother, commented:

> *It shouldn't be voluntary. There should be certain stipulations that these products come up to. It should be illegal for them to not be doing what they should be doing. Like it's illegal for me steal from somebody. Why is not illegal for them? They're being allowed to get away with it. It should be a criminal offence. People are eating this muck!*

At the same time as challenging the ethics of the food industry, some parents voiced a fatalism about the food industry's domination. Syrita, a mother, said:

> *They're a business. So, as I said, supply and demand. . . They can see that if a child wants this. . . then they're going to go for it*

and either make it that bit cheaper or that bit sweeter. . . to entice the kids.

In this fatalism, there is an awareness of exploitation and discrimination. This mother's testimony later described her maternal sacrifice that involved reducing her own food intake to provide fresh chicken and salad for her child.

Responsibilisation: 'We're Getting the Message'

Most of these parents were aware that government actions increased their parenting responsibilities, and they expressed cynicism toward government. This was articulated by Andrea:

We are getting the message, but they still don't seem to be doing anything about it. . . still allowing all these products to be sold because you want the revenue from them.

"Getting the message" relates to the process of transferral of responsibilities by means of convincing parents of the need to change their childrearing behaviour to help child weight management. The evidence that parents were receiving the message was illustrated in their language that embraces behavioural change – "*discipline*," "*monitor*," "*regulate*," "*reading labels*" – and the moral imperative of knowing right and wrong foods. New responsibilities were being created that were in tension with the social reality of material constraints and cultural and class differences. The following quotes suggest that the language of skills-based parenting is part of the everyday language of working-class parents. However, it is socially divisive among parents with higher-weight children, as well as among many of those whose children are categorised as "normal weight". Lena used social learning terminology to contrast the everyday practices of her working-class community:

in area of lower class, people just do what they do without thinking, shaping and monitoring. They just live.

Kerry, a father, suggested the need to chastise other parents:

when you see a child who is very overweight, you look at the parents and say "Why haven't you tried to regulate him and reduce his weight?". . . tell him he can't have this and can't have that. . . it's very important.

Judgement was expressed by some about parents' food choices. Leyla stated:

you can choose what you buy from the supermarkets. . . as adults should know what's right and wrong.

This parenting discourse framed what is normative, although it was contradicted by the classed realities of necessity and "no choice". Leyla commented:

They can afford to go out and buy these organics, healthy foods. . . have nannies that prepare the dinners before they get in. . . told the nanny "make sure you feed them healthily". But when you're thinking every day, what am I going to cook them? Your money's running low. You've got stresses about bills and everything else. The last thing on your mind is "what's the healthy option?" You can't afford to buy the healthy stuff so you're just going to go for the quick fix.

The social division in "knowing" of difference in resources is represented by the "nanny." The knowledge of difference was apparent in everyday lives as affective injury relayed by foodscapes in deprived areas, as illustrated by Leyla, who described the composition of her high street:

it's keeping the adults on their liquor, the kids on the sweets and then the take-aways for dinner. . . It's what we're seeing everyday so all we think about is sweets and drinks. . . It's like the betting shops. a lot more people are doing it. . . it's not good.

The message relayed through the foodscapes was seen as devaluing their children's health. As she looked at a photograph of a supermarket in an affluent area, Felecia, a mother, commented:

Now that looks pretty. It looks like that would be more healthy. it looks like a little health food shop. . . it's not life threatening.

A further mechanism in relaying a message to parents was the National Child Measurement Programme (NCMP), a programme that measured schoolchildren's BMI and informed parents of the result by letter. The NCMP entered the arena of socially embedded stigma that cut into families and communities and was layered with social class and poverty. The stigma attached to parents as moral associates was being backgrounded by safeguarding legislation and policies, such as the NCMP. Leyla described the impact of the "letter":

when you get the letter of your child's measurements you assume it's the parents' fault. . . parents are going to talk. People are going to talk and assume that the parents are obese as well. Or you know, neglecting the child. Don't care. Just feed it to shut it up.

The symbolic power of this message is validated by the earlier reported notion of "killing the child," which was expressed by a policy implementer and tied to the notion of safeguarding. "Killing the child" is read as a message about the knowledge of health risk and preventative action on the part of parents. This exemplifies fear-based messaging that uses the threat of chronic diseases to nudge behavioural change. As the message is received by parents, subjectification occurs as they self-constitute as neoliberal parents who carry out policy requirements. Samina, a young mother in receipt of welfare, used the epidemiological language of risk:

They do say it's a disease. . . scary. I want my children to be healthier. I know it's dangerous for their health. It's a health risk.

This subjectification of becoming the neoliberal parent is played out through the performance of practices, which is a process involving self-judgement against the social norm. Paradoxically, as parents become aware of the health risks, there is a feeling of discrimination. In "getting the message," they know their children's lives are devalued. Yvonne commented:

We don't cost anything when they bury us. . . They never suffer.

The feeling of being devalued was relayed through comments on the material reality of the food environment. For example, Maya said:

They dump those things in our area because they see it as deprived and they think the people who live there don't matter.

Ultimate Responsibility and Its Social Implications

The data reveal an overwhelming presence of responsibilities to protect child health, with tensions in attributing responsibility and the constant emergence of stigma. The internalisation of stigma was articulated as "*ultimate responsibility.*" This phrase was used by all the parents who assigned self-blame. The social implications of this internalisation became clear as data showed collective blame for parents, which led to the blaming of others and social division. Stigma was consented to through performance, and it was resisted by challenging the policy discourses and by actions of unity, by collective care for children, and ultimately by the policy solutions.

Performativity and guilt were powerfully illustrated through parents' self-reported practices. In self-blaming, many parents used the language of performance, such as "*can't blame someone else for what I do," "food on the plate," "in the cupboard."* Most were aware of the powerful influences around the food system, yet they took ultimate responsibility by performing the food duties of taking from the shop shelf and feeding the child. Bedria, a childcare worker, said:

> *we're the one who just picks it up!. . . It's us who's responsible for what goes into my child's mouth.*

In using the language of self-regulation, parents constructed the parent-selfhood of what they should be. They were engaged in a cognitive struggle as they compared themselves with others and internalised blame. This is illustrated by Ferda, a mother, who participated in a community weight management programme for children based on behaviouralism. Although a remarkable cook with a healthy Mediterranean tradition, she criticised herself for not having sufficient control over her child's eating in comparison with her neighbour. Along with her self-blame for her perceived lack of control over her child's diet, she indicated that there are challenges in children accepting prescriptive approaches to diet. She stated:

> *When the parent goes to buy the food they should not get what they* [the children] *want but do the healthy food, or see if they will eat it or not. But in my case if my ones don't, that's very difficult. But I think other children would if, you know, they were on like a schedule. Because our neighbour. . .* [child] *not allowed chocolate and things like that. They've got to have a certain cereal in the morning. They can't have no snacks during the day. It's all healthy food. Vegetables, fruit and then they have the main dinner. . . but it's well controlled. . .very good control and they eat all very healthy. . . she's done a well job for them.*

Ferda established difference by stereotyping her neighbour's good maternal control, compared to which she self-stigmatised as a "bad mother". Ferda also described her lack of financial resources and her maternal sacrifice to feed her children:

> *. . . parents have control. . . can't control the whole 24 h. . . don't give them pocket money to get that kind of stuff and give a proper meal at home. But. . . you might not have no food in. You got to compare everything with your situation. . . how people are living. have money but then maybe they run out. They paid the bills, and they haven't got enough for shopping. I've been in that situation and I know it's very difficult. I pay all my bills first. . . whatever's left will go to shopping. Some days I don't have nothing, and I find it difficult. If it was just myself, that would be fine but when you got kids, they want all the time, so you go to you know. . .. with me, is always kids first. I will go without.*

Social divisions emerged because, in the context of taking ultimate responsibility, the attribution of self-blame was collective. Parents blamed themselves and other parents, and they were blamed by parents of "normal" weight children. Stigma was also attached to welfare recipients who wanted to spend time with their children – that is, they were caregiving – which points to the imbalance between family and working life. Working parents were forced to make food compromises as part of the negative externalities of work. Parents articulated these externalities as resulting from lack of time. Liz, bus driver and mother, argued that working parents had less time for caregiving, with the result that cooking was elevated to quality time:

> *There are people on benefits in this area who've got a good quality of life with their kids because they are at home and are able to cook. I think it's more the working parents that are suffering and the kids of working parents who are suffering.*

In contrast, Felecia, a mother in receipt of welfare, resisted the stigma and argued that she had the right to raise her own children. She articulated a counter-argument to the political economy of neoliberalism in which the state supports a commodification of childcare to increase the workforce, which is part of the neoliberal notion that citizenship is based on paid work (Williams, 2005, p. 28). Felecia considered it economically illogical that mothers are forced into work so they can pay someone else to raise their children:

> *when you're on benefits, they feel you squander it. You've got a roof over your head, paying your bills, doing your shopping, feeding your family as best you can. It's not life-changing money you're getting, its money just to live. . . stereotype people who are on benefits, not worthy. . . very unfair, because sometime is not your fault, certain circumstance. You want women to have children and go back to work. Who's going to raise their children? Then why should you have them? Why should you pay other people to raise your children? That doesn't make sense. I decided that I was going to raise my children. Yes, I was on benefits. . . . I don't want my children to go childcare and the government helps me pay for it. Why? I don't need them to do that. I will do my bit and look after my children because I had them, you see.*

Paradoxically, parents were blamed for lack of care, yet they desired to care more. This appears to be a resistance underpinned by a rights discourse: the right to raise children. Resistance was articulated as anger at the government and the food industry, whom parents perceived as colluding in the interests of the market economy.

Collective Ethic of Care and Resistance

Although, in taking ultimate responsibility, parents self-blamed, they also faced common challenges and shared experiences that united them. A key concern for parents was the stigmatising effect of the word 'obese' and the deleterious effect this stigma

has on the child's well-being. All volunteered in communities, mostly as a result of cuts in council spending. This suggests a collective ethic of care that was reinforced through the policy solutions of parents. These tackled the work–life balance and, at the community level, argued for control of high-street planning, in order that high streets support health and family life. Parents advocated greater control of the food industry so that healthy foods would be the norm in all communities, and they suggested that the food system be fundamentally changed. The parents' policy solutions diverged from those of the United Kingdom government, notably in their argument that there should be community involvement in food policymaking. Some went further and argued for political involvement. A summary of their policy suggestions is as follows:

(1) Employment and welfare reforms, including improved working conditions to support childrearing, food vouchers in or out of work.
(2) Greater control of food industry including mandatory "responsibility deals," advertising restrictions, product reformulation, affordable nutritious foods, avoiding increasing food costs through taxation, honest labelling.
(3) Focus on community and schools, including family eating clubs, redesign of high streets with small retailers and removal of most fast food outlets. In schools: no targeting, nutrition on curriculum, universal free meals, and cooking lessons. Schools and community venues as spaces for parent–peer support, and policy involvement.

In essence, policy solutions diverged from the *status quo*. Parents were not passive policy recipients; rather, they articulated food democracy and sovereignty. Change was articulated by two mothers as a "*food revolution*."

In summary, responsibility emerged not as a singular, linear process, but as multiple, interconnected processes that cut through social lives. Amid concern for child health, responsibility was found to be diffused and ambiguous. The government and food industry were regarded as being irresponsible. However, in a context of stigmatisation, parents self-blamed; at the same time, they participated in collective care in their community as services were cut. Resistance was shown through their anger and awareness of discrimination, and ultimately in their policy solutions.

DISCUSSION

The findings show how the notion of responsibility is central to parents' lived experiences as they interact with food policy. It intersects their lives on multiple levels with tensions, ambiguities and contradictions. Using critical theory provides an understanding of how the findings relate to processes of power, stigmatisation as a social process, and how caring responsibilities are distributed according to neoliberal rationalities rather than by meeting social needs. There are important implications for policy and practice. The findings are consistent with existing literature and theories.

The importance of child welfare was omnipresent among policy actors. The social power of this idea is theoretically treated using the Marxist "ruling idea" of universal "common sense", which exists independently but in actuality conceals the relation of domination (Marx and Engels, 1845/1998). This is a concept used by Mahoney in relation to the notion of individual responsibility for consumption and diet-related health (Mahoney, 2015, p. 47). Gillies et al. (2017) argue that the contemporary "child saving" movement in the United Kingdom is the taken-for-granted thing to do, but that it veils the contradictions in the pro-market system according to which children are exposed to harm rather than protected. This perspective does not underplay the right to good health and the flourishing of children, but it points to the contradictions. Instead, it has a historical context exemplified by the 18th- and 19th-century child rescue movement that rooted child maltreatment in poverty and parent irresponsibility and which, according to Evans et al. (2008), was a means to regulate deviant populations. Furthermore, in present society, health has become a regulatory discourse of "child saving" that uses the language of crisis to shape social norms.

The findings relating to "whose responsibility?" concur with both Tronto (2013) and Gillies et al. (2017), in that the diffusion of responsibility confuses where responsibility for care resides. Although, according to policy, everyone is responsible, the lived experience of parents was that government colluded with the food industry to produce and distribute foods harmful to child health. Ambiguities reflected the diffusion of responsibilities and provided space for attribution of responsibility to others, and thus for the acts of blaming and stigmatisation. The political context for the ambiguities around responsibility echo Tronto's contention that

> *politics [is] about making judgement of the relations that exist and how needs might be met. . . that politics involves meeting needs in a way that permits the pursuit of other goals as well, and . . . it involves making decisions about who does what for whom. (2014, p. 49)*

Confliction arose for policymakers who were charged with tackling child obesity, yet who believed that they had little power to resist spending cuts or to control the foodscapes that promoted unhealthy foods. In Tronto's terms, policymakers were releasing themselves from responsibility through compliance; thus, they embodied a privileged irresponsibility (Tronto, 2013, p. 60). In passing responsibility to others, the policymakers reduced their own responsibility. This was not a passive process; rather, it involved hegemony and governmentality – that is, the soft power that wields stigma.

In a process of Gramscian hegemony, the local state was seen to act as a transmission belt for central government, and this was contested: not all policymakers and implementers consented or complied, since some questioned, challenged and resisted. Subjectivities were being constituted and challenged through their reflexivity. The subjective positions of policy actors in the obesity terrain have been explored by Monaghan et al. (2010). These social theorists used Foucauldian governmentality to identify the construction of six subjectivities of actors

involved in constructing the notion of the "obesity epidemic." As found in the present study, responsibilities were performed by implementers in the enforcement of practices, such as data collection. The ambiguities of policy actors add to Monaghan et al.'s (2010) discussion, as some, for example, countered the stigmatising discourses and challenged the construction of food-illiterate parents. Caraher (2016), for example, argued that parents in poverty are highly resourceful. Parents constructed the entrepreneurial, neoliberal parent-self, with some actively consenting to take personal responsibility – a neoliberal construct – involving self-regulation, monitoring, disciplining and comparing with others leading to self-doubt and blame. This was also challenged by parents, as many stated that it did not correlate with the reality of their time and money constraints and values. As Bowen et al. (2014) found in a large qualitative study with largely working-class mothers in the United States, mothers were poor and time pressed, had the skills to cook family meals but resisted policies that glamourised cooking, because these were disconnected with their reality. These findings suggest a process of negotiation, of consent and provides insight into how counter-hegemony, provides space for ambiguities.

A further example of Foucauldian governmentality was illustrated in the message mediated through the NCMP. In Foucauldian terms, the measurement individuates and "others" the child and parent as moral associates. The letter was found to enter a stigmatised environment, and, against the background fear of child safeguarding, the parent was being marked out as neglectful. This study posits, therefore, that programmes such as the NCMP have unintended consequences that are counterproductive to engaging with parents. As in the present study, Nnyanzi et al. (2016) found that informing parents of the results by letter mediates stigma; parents prefer feedback through personal contact with health professionals. Others have found parents to be supportive of the NCMP, with only small amounts of negative feedback (Steventon et al., 2012) and a negligible stigmatising impact on children (Falconer et al., 2014). However, Falconer et al.'s (2014) study had low response rates, so sample bias may account for their finding. This article suggests that the NCMP may be abstracted from its social context of multi-layered embedded stigmas. In Bourdieusian terms, the process and letter become a symbolic violence that, albeit unintentionally, labels and devalues the caring practices of these parents. It is suggested that it leads to an affective injury on parents as moral associates, with social amplification into communities.

The parents interviewed in this research met their caring responsibilities and all took 'ultimate responsibility,' even though many clearly struggled with resource deficiencies. As Tronto argues, people cannot be blamed if they do not have resources (Tronto, 2013, p. 132). Furthermore, in allocating responsibility of care in society, there is a political responsibility as to whether or not those with the responsibility have the resources to function (2013, p. 55). The ambiguities among policymakers about their power in urban planning and the distribution of retail outlets that provide healthful or harmful foods illustrates the distortions of market forces in providing care (Tronto, 2013, p. 115) as well as their own roles in the management of the local state.

Insight was provided into discursive processes around fear-based public health messaging aimed at behavioural change. These are processes through which the parent embraces responsibilities to manage risk and prevent child ill health. Ramos Salas et al. (2017) point out that using the notion of 'obesity' as a risk factor promotes prevention policies rather than treatment. And, their critical policy analysis of obesity prevention policies, use of categories such as 'healthy' and 'unhealthy' weights contribute to stigma. From a Foucauldian perspective, fear-based messaging was the technology for behavioural change in the cultural sphere, taking the form of texts, images, ideas and the spoken word; the latter were the words of policy implementers and what parents heard every day. This concurs with O'Hara's (2014) critical discourse analysis of Australian weight-related public health initiatives, which found a dominant discourse of "preventative health" was foundational for a number of discourses that are dissonant with the principles of health promotion. These included discourses of health motivation through "alarm and fear" (O'Hara, 2014, p. 222) and discourses of "responsibility." Moreover, notions of risk have been argued to be ineffective, since risk conveys different meanings to different people: statistical probability; subjective and human risk (Speigelhalter and Blastland, 2013, pp. 4–5) and political risk as "a way of ordering social imaginaries" (Warin et al., 2015, p. 309). Risk confers short- and long-term meanings, consideration of which includes class-based parental resources and priorities (Warin et al., 2015). While fear and risk for future child health were articulated by some parents, they also described the more immediate concerns of everyday life. McKenzie (2012), in her study of working-class life on a Nottingham council estate, found that "women's lives were full of risk management" in the everyday, and that they included stigmatisation (2012, p. 131). As with Garasky et al.'s (2012) research in the United States, the "everyday" in this data, included financial and environmental stresses that they found associated with obesity in children. These authors suggest that there is less control over food choices in such scenarios of poverty (2012, p. 127).

Symbolic violence leading to affective injury also related to the foodscapes in deprived areas. The shopping parades consisting of shops that do not support health conveyed a message of lack of worth to parents, in contrast to the health-promoting options available in affluent areas. The food outlets in deprived areas were not a community choice, as some policymakers implied. Mahoney (2015) has shown how the food industry targets post codes, social status and class in its marketing. The foodscapes in deprived areas produced feelings of poor physical and mental well-being, and processes of embodiment were described. This perspective on symbolic violence is of "the knowing"; that is, parents are conscious that they face discrimination through the food options available in their communities and over which they have no control. A similar sense of "knowing" but not having the capacity to resist due to life pressures was found by Atkinson (2017). The parents had not consented to this environment; on the contrary, they articulated that they had no control over or understanding of how fast food outlets had flourished. There was both fatalism in this feeling of no control and a counter-hegemonic space in which anger was voiced as resistance.

Self-blame was most graphically evidenced through the parents' language of performance, which reflected their perception of themselves as having ultimate responsibility in their practices despite the constraints they were under. Thus, they combined self-sacrifice and self-blame. In Foucauldian terms, this is the process of becoming the neoliberal parent-self, which involves the subjectification of "social control not through physical force but the production of conforming subjects and docile bodies" (Parker and Aggleton, 2003, p. 17). In this process, the parent judges, normalises and others the self. It is a power process through which stigma and self-stigma are produced. This self-blame through performance is played out in the popular media in television programmes (Rich, 2011). By blaming themselves, parents were taking "ultimate responsibility." Parents illustrated how they strove to fulfil neoliberal "personal responsibilities" through volunteering and competency-based care. Tensions arose as parents' experiences evolved into bridging the contradictions stemming from inequalities in resources that often left them only with unhealthy choices, maternal sacrifice and stress.

Resistance to stigma and moral association were explored at the level of the parent-self by Davis et al. (2018), who found that stigmatisation is psychologically hindering as a result of self-blame, but that some parents utilise their own experience of body size to protect children's sense of well-being and to limit self-blame. The present study's findings indicate a social layer to parents' resistance, whereby it was presented as both an individual and a shared experience of anger, as collective volunteering, and as articulated politically through policy alternatives that argued for material resources and greater control over foodscapes and the food industry. Paradoxically, resistance was politicised due to the fear generated by public health messaging in an environment over which parents had little control. There was a feeling, therefore, of discrimination and of their children's lives being devalued. Feelings of discrimination and injustice were also found in Sealy's (2010) research on deprived areas of the Bronx, where parents believed that more affluent areas sold foods of better nutritional quality. In addition, there were instances of classed resistance. These were voiced as collective feelings of discrimination and difference, but mostly not as "class." Instead, community had a strong resonance with class, as did taking ownership of the local food supply chains. For many, dealing with the pressures of everyday life was paramount. As Atkinson argues, this constrains the possibilities of resistance or struggle (Atkinson, 2012, p. 29).

This research adopted a critical and transdisciplinary stance that supports an understanding of complexity, including in the political context. The study design and systematic reflexive approach to both study design and theory reduced the interference of bias. The multiple data sources, which enabled triangulation, worked well to support the study's internal validity. The ethnographic preparation served data collection and aided "insider" positionality, which prevented the potential for bias due to the researcher's past experience in community activism. Although an active interview stance was taken, to avoid bias the researcher's voice was minimal and was reflected upon after each interview. A key question is whether the number of interviews was sufficient for the analysis. This involved considering whether the emerging themes were saturated and whether anything new was emerging from the data. The literature recommends a range of 1 to 60 interviews, with an average of 30, but the key is the generation of sufficient data (Baker and Edwards, 2014).

Implications for Public Health

Using critical qualitative research with multiple theorists and methods has provided important insight into the lives of stigmatised parents as moral associates of children's obesity, and has addressed how policy processes in different forms, whether of foodscapes or NCMP, interact with parents' lives and mediate powerful messages that devalue and stigmatise. Stigmatisation through public health obesity discourses is documented with calls for reflexivity in policy and practice, and for a greater involvement of the lay voice to inform policy (Boswell, 2017; Ramos Salas et al., 2017, 2019). This study contributes to this literature through its insights into how individual or personal responsibility becomes ultimate responsibility in the form of self-blaming, diffusion of responsibility and responsibilisation. Whether or not an intended consequence of policy, this does not serve child health well or meet the policy ambition to reduce obesity prevalence. In the context of the social gradient, it could maintain the *status quo*. Given this, the following changes to policy and practice are recommended:

- Ending stigma by using health equity: stigma is mediated not just by people but through a range of policy sites, documents, and places, including foodscapes, so health equity should be integrated with local government, for example, in urban planning.
- Parents' policy solutions: parents have indigenous knowledge of what impacts their children's health and should be treated as "experts by experience."
- Participatory health equity: processes that assess the health equity of policies should involve the expertise of parents in their lived environments.
- Social gradient: revisiting this index in order to include the meanings of the lived effects of class, stigma and discrimination. This would aid the reflexivity of practitioners and policymakers.
- Reflexivity of policy makers and implementers: to consider stigma as a social process involved in social divisions, and how practitioners might unconsciously be part of stigmatising processes.
- To consider obesity terminology, mindful of individual preferences and how the policy narrative could change to support health equity.
- Policy direction: public health policy needs to fundamentally shift from individualised behavioural change to tackling the structural factors of the social determinants of health.

Through this research, an understanding has evolved of the social realities of parents' lives as they interact with food policies. The neoliberal notion of individual responsibility results in stigmatisation, and the internalisation of responsibility results in self-blame. Parents care for their children, but they are cynical about government and the food industry's level of care. They experience a diffusion of responsibility, and they are responsibilised to make up for cuts to community services. Critical theory provided the tools for examining the power processes that influence parents to accept ultimate responsibility. Although accepted, this responsibility is also resisted. Against material constraints, parents blame each other, but under the surface is an argument for the social rights to care – that is, for the material resources to enable care. Despite social division, there is a collective responsibility among parents. This assumes a societal focus through the parents' policy solutions and recommendations for advancing child health, which are based on their experiences. This may not be a fully formed community of resistance taking the form of political action in response to stigmatisation, but this research nevertheless provides insight into potential for such a community of resistance to develop.

CONCLUSION

Critical qualitative research is underpinned by knowledge based on meanings, and it is context bound. In this case, the context is working-class parents living in an inner London borough. The participants reflected the area's demographics of ethnic diversity, the prevalence of women as the main caregivers, and the poor working-class (both in and out of work) social composition of the borough. A shortcoming of this article is that it does not address the questions of intersectionality and gender. The research is not transferable, but this does not diminish its importance. Understanding the social realities of parents as moral associates of child obesity allows for the attribution of blame to be challenged; moreover, in the context of failing policies, it enables new ones to be found based on the experiences of parents who take "ultimate responsibility." A deeper understanding of power processes involved in supporting political ideologies allows practitioners, policymakers and parents to consider alternatives that would reduce the social gradient in child health. Given policy failings, more can be learned about new policy directions by engaging with those who have expertise from experience – that is, the parents themselves. Future studies on changing the obesity narrative could explore forms of resistance, and how these might involve a new generation of food, body and health equity activists. Such activism could lead to policy changes that reduce stigma and promote equity.

ETHICS STATEMENT

Ethics approval was obtained from the City University School of Arts and Social Sciences Research Ethics Committee. Interviews were confidential. Participants were assigned fictional names and they gave informed and written consent. Weight-neutral terms such as "higher-weight" were used, as was the terminology presented in policy or used by participants.

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SN-G is the sole contributor who conceptualised and designed the study and wrote the manuscript.

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SUPPLEMENTARY MATERIAL

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