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The Impact of Weight Bias on Psychological Functioning: The Role of Weight Discrimination and Internalized Weight Bias

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THE IMPACT OF WEIGHT BIAS ON PSYCHOLOGICAL FUNCTIONING: THE ROLE OF
WEIGHT DISCRIMINATION AND INTERNALIZED WEIGHT BIAS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor in Philosophy

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The Department of Psychology

by
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B.A., DePaul University, 2006
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ABSTRACT

Obesity rates in the United States (U.S.) continue to rise with approximately 34.9% of adults considered obese and an additional 34% that are overweight. With the increased prevalence of obesity, there has also been a rise in weight-based discrimination and weight bias in the U.S. The present study examined the association between body mass index (BMI) and psychological functioning, and whether internalized weight bias and weight-based stigmatizing experiences moderated this relationship. In addition, the present study examined if weight bias internalization mediated the relationship between weight-based stigmatizing experiences and psychological functioning. Non-treatment seeking overweight and obese participants ($N = 112$) completed several questionnaires including the Weight Bias Internalization Scale (WBIS), Stigmatizing Situations Inventory (SSI), and Brief Symptom Inventory (BSI). Contrary to expectations, results showed that body mass index (BMI) did not significantly predict participants' overall psychological functioning; however, it did significantly predict the somatization subscale of the BSI. Consistent with predicted hypotheses, BMI, internalized weight bias, and weight-based stigmatizing experiences explained a significant amount of the variance in psychological functioning; however, inconsistent with predicted hypotheses, neither internalized weight bias nor weight-based stigmatizing experiences moderated the relationship between BMI and psychological functioning. As predicted, weight-based stigmatizing experiences was found to be a significant predictor of internalized weight bias, and weight-based stigmatizing experiences was a significant predictor of psychological functioning. Results indicated that the direct effect of weight-based stigmatizing experiences on psychological functioning was significant, indicating that weight-based stigmatizing experiences also affects psychological functioning in ways independent of internalization. Consistent with expectations,

the indirect effect of weight-based stigmatizing experiences on psychological functioning was significantly greater than zero, indicating that individuals who have weight-based stigmatizing experiences were, on average, 0.040 units higher in their likelihood of experiencing psychological distress as a result of the effect of internalized weight bias. Results provide evidence for significant relationships between internalized weight bias and weight-based stigmatizing experiences and psychological functioning, as well as support the predicted hypothesis that weight bias internalization mediates the relationship between weight-based stigmatizing experiences and psychological functioning. Recommendations for future research based on these findings are discussed.

INTRODUCTION

Prevalence rates of obesity continue to rise with approximately 34.9% of adults in the United States (U.S.) considered obese (Ogden, Carroll, Kit, & Flegal, 2014), with a body mass index (BMI) greater than or equal to 30.0 and an additional 34% who are overweight with a BMI of 25.0 to 29.9 (Centers for Disease Control and Prevention [CDC], 2012). Body Mass Index (BMI) is defined as the individual's body mass divided by the square of his or her height. The categories for BMI are as follows: Underweight is below 18.5, Normal (healthy weight) is from 18.5 to 24.9, Overweight is from 25 to 29.9, Obese Class I is from 30 to 34.9, Obese Class II is from 35 to 39.9, and Obese Class III is over 40. Obesity is defined as having an excess of body fat and can cause an increased tendency to develop a number of medical conditions. Obese persons are at a greater risk of suffering health problems compared to non-obese persons, and overweight and obesity are significantly associated with conditions including type 2 diabetes, heart disease, high blood pressure, high cholesterol, asthma, stroke, sleep apnea, arthritis, and certain types of cancers (NIH/NHLBI, 1998). In the U.S., approximately 365,000 deaths annually are attributed to poor diet and lack of physical activity (Mokdad, Marks, Stroup, & Gerberding, 2004), and people who are obese have a 50 to 100 percent increased risk of death from all causes compared with normal weight individuals (NIH/NHLBI, 1998). In addition to health problems, obese individuals report greater psychological distress and are at a higher risk for experiencing negative psychological effects including depression, anxiety, and disordered eating, compared to normal weight individuals (Fabricatore & Wadden, 2006). One recent study found depression rates 37% higher in obese individuals than those of normal weight (Carpenter, Hasin, Allison, & Faith, 2000). Higher BMI has also been associated with poorer health-related

quality of life (HRQoL; de Zwaan et al., 2009; Hassan, Joshi, Madhavan, & Amonkar, 2003; Jia & Lubetkin, 2005) and lower levels of adequate social support (Carr & Friedman, 2006).

Previous studies have found positive linear relationships between BMI and several aspects of health care utilization, including number of prescription medications, frequency of outpatient visits, and total medication costs (Fontaine & Bartlett, 2000). The authors posit that obese individuals tend to have more frequent physician visits and take more medications compared to average weight individuals, due to the number of health complications and diagnoses related to their obesity.

Although obesity rates are high for the U.S. population in general, there appear to be significant disparities in obesity based on race. Non-Hispanic blacks have the highest rates of obesity (47.8%), followed by Hispanics (42.5%), non-Hispanic whites (32.6%), and non-Hispanic Asians (10.8%). Recent prevalence rates have estimated that 58% of White women aged 20 and older are overweight or obese, compared to 75% of Mexican-American women and 81% of African-American women (Ogden et al., 2006). Further, it is estimated that more than 53% of African-American women are obese (Ogden et al., 2006). With the increased prevalence of obesity, there has been a coinciding increase in weight-based discrimination and weight bias in the U.S. Weight-based discrimination, defined as weight bias manifested as actions or behaviors and negative, unequal treatment of people because of their membership in a particular group (Allport, 1954; Brownell, 2005) and weight bias defined as “negative weight-related attitudes and beliefs demonstrated by stereotypes, rejection, and prejudice towards individuals because they are overweight or obese” (Puhl, Moss-Racusin, Schwartz, & Brownell, 2007, p. 347) are both pervasive among overweight and obese individuals (Puhl & Heuer, 2009). Further, it has been documented that these phenomena are associated with negative psychological

symptoms such as depression, anxiety, and disordered eating in overweight and obese individuals (Fabricatore & Wadden, 2006). Although much research has focused on the consequences of weight-based discrimination, it is unknown whether it is the weight-based stigmatizing experiences themselves or the internalization of this weight bias that leads to the experience of negative psychological symptoms. In addition, little is known about which individuals may be more vulnerable to the effects of weight-based stigma.

Stigma

Although the terms stigma, prejudice, and bias are often times used interchangeably, research suggests the terms represent different constructs. Stigma is usually defined as an attribute that conveys a devalued social identity across most social contexts (Crocker, Major, & Steele, 1998) and mistreatment and discrimination of a person because of this devalued trait or behavior. Prejudice is often times defined as “a negative evaluation of a social group, or a negative evaluation of an individual that is significantly based on the individual’s group membership” (Crandall & Eshleman, 2003, p. 414). Lastly, bias usually refers to negative attitudes and stereotypes toward an individual because of some attribute (Crocker, Major, & Steele, 1998). Taken together, Brownell (2005) described bias as the inclination to form unreasoned judgments, with prejudice as a possible outcome, and stigma as the social sign carried by the individual that is the victim of prejudice.

Individuals experience stigma for a variety of characteristics (i.e., race, gender, sexual orientation, and weight) and tend to experience several negative consequences related to this stigma. Previous studies have found that stigmatized individuals are more likely to experience underemployment and have high blood pressure (Guyl, Mathews, & Bromberger, 2001), low self-esteem (Crocker, Voelkl, Testa, & Major, 1991), and greater psychological distress (Brown,

Williams, Jackson, Neighbors, Sellers, & Brown, 2000). Given the significant negative consequences of stigma and the fact that weight bias has been described as the last acceptable form of discrimination (Puhl & Brownell, 2001), more research is needed on weight bias and its negative consequences.

Weight Bias

Despite the fact that a significant majority of individuals in the U.S. are either overweight or obese, the prevalence of perceived weight discrimination has increased by 66% since 1995 (Andreyeva, Puhl, & Brownell, 2008), and overweight and obese individuals are 40-50% more likely to experience major discriminatory events (e.g., nasty comments from others, job discrimination, and inappropriate comments from doctors), compared to non-obese individuals (Carr & Friedman, 2005). In addition, one study found that in a sample of overweight and obese individuals, approximately 75% had experienced seven of eleven types of stigmatizing situations (Friedman et al., 2005). Stigma and prejudice surrounding these individuals is a major problem, as weight-related prejudice and stigma against overweight and obese individuals is still viewed as socially acceptable (Puhl & Brownell, 2001).

Weight bias or weight stigma is defined as “negative weight-related attitudes and beliefs demonstrated by stereotypes, rejection and prejudice towards individuals because they are overweight or obese” (Puhl, Moss-Racusin, Schwartz, & Brownell, 2007, p. 347). It is theorized that weight bias includes three different constructs including prejudice, stereotyping, and discrimination. Weight-based prejudice, which is the attitudinal component, is defined as “a negative evaluation of a social group or a negative evaluation of an individual that is significantly based on the individual’s group membership” (Crandall & Eshleman, 2003). The second construct, stereotyping, is the beliefs component that refers to convictions about the

etiology and maintenance of obesity (Lee, Ata, & Brannick). Lastly, the third construct, weight-based discrimination, refers to weight bias manifested as actions or behaviors and negative, unequal treatment of people because of their membership in a particular group (Allport, 1954; Brownell, 2005).

Weight bias can manifest in many different ways including implicit, explicit, and internalized forms. Implicit attitudes are unconscious, automatically activated evaluations that are beyond an individual's conscious control and are believed to be acquired from repeated messages in the environment (Dovidio, Kawakami, & Gaertner, 2002; Greenwald & Banaji, 1995). Given that people are often reluctant to endorse certain attitudes and beliefs that are inconsistent with values they feel they "should" hold, implicit measures tend to reveal more bias than an individual is willing to admit (Brownell, 2005). Explicit attitudes, on the other hand, are assessed through self-report measures, and usually reflect attitudes endorsed as personal beliefs or negative weight-based attributions made about the "other" that people are aware of and consciously endorse (Brownell et al., 2005; Wilson, Lindsey, & Schooler, 2000). Lastly, different from implicit and explicit weight bias, internalized weight bias is defined as attitudes attributed to the self (Durso & Latner, 2008).

Theories of Weight Stigma

Several researchers have examined the origins of weight stigma including attribution theory and Protestant work ethic. According to attribution theory, attributions are causal explanations about the social world (Heider, 1958), and prejudice and negative attitudes toward individuals have been linked to attributions of controllability, which leads to a moral evaluation of the person (Weiner, 1995). The attribution of controllability is the idea that overweight and obese people are responsible for their weight, and the more people believe that weight is a

function of willpower, exercise, diet, or self-indulgence, the more likely they are to express a negative attitude toward these individuals (Cahnman, 1968; Crandall, 1994). For example, DeJong (1980) conducted a study where participants evaluated photographs of both overweight and normal weight individuals. The participants tended to rate overweight women as more self-indulgent and lacking self-discipline when there was no reason given for her weight compared to when her weight was attributed to a “glandular disorder.” The participants also rated the women with the glandular disorder as more likeable compared to the women with no reason for their weight status. Given these extreme beliefs of controllability on overweight and obese individuals, researchers have explored where these attributes originate. Several authors have argued that attributions towards overweight and obese people come from convictions, attitudes, and values that form a coherent belief system and that these attributions are formed from ideology (Crandall, 1994; Crandall & Martinex, 1996; Crandall & Schiffhauer, 1998). Crandall (1994) argues that this ideology is a set of doctrines or beliefs that form the psychological basis of a political, economic, or social system and that this ideology informs attributions about weight. This belief system is consistent with the idea that people have control and are responsible for what happens to them in life.

In addition to these attributions of controllability, researchers have examined ideological work views, which seem to heighten negative attitudes towards obese people. Crandall and Reser (2005) found that people that endorse the Protestant work ethic, (i.e., the belief that hard work leads to success and that lack of success is caused by self-indulgence and lack of self-discipline) have strong beliefs about personal responsibility and the belief that weight is controllable and that individuals who are overweight became overweight from lack of self-control. Lastly, the belief in a just world and the idea that people get what they deserve in life continues to

exacerbate these negative attitudes (Crandall, 1994). Previous research suggests that these anti-fat attitudes begin early in childhood (Brylinsky, & Moore, 1994; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003).

Consequences of Weight Bias

Obese individuals are often subjected to pervasive and harmful discrimination on a daily basis. Weight bias appears to be apparent among various individuals who express the belief that obese individuals possess negative attributes, such as laziness, ugliness, sloppiness, lack of intelligence, and incompetence (Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). Overweight and obese individuals endorse experiencing weight stigma in several aspects of their lives. Several studies have found that obese individuals face weight bias across interpersonal, employment, educational, and medical settings (Puhl & Heuer, 2009; Puhl & Latner, 2007) and among a range of individuals including health-care professionals, teachers, media, family members, and potential employers (Brownell, Puhl, & Schwartz, 2005; Hebl & Xu, 2001; Himes & Thompson, 2007; Puhl & Heuer, 2009;). Sargent and Blanchflower (1994) also found that overweight individuals make less money than their thinner counterparts for a comparable job. In another study, Puhl and colleagues (2008) found that for many obese individuals, the worst stigma experiences tend to occur at home with family members or friends, usually in the form of verbal bias, which included intentional negative comments or insults about their weight.

The negative consequences of obesity in regard to health and well-being are astounding. Previous research has found several negative psychological consequences related to individuals experiencing weight-based stigma, including an increased risk of depression, anxiety, poor body image, and disordered eating (Brownell, Puhl, & Schwartz, 2005; Friedman, Ashmore, & Applegate, 2008; Puhl & Heuer, 2009; Wott & Carels, 2010). In addition, recent studies have

also found that weight stigma was associated with unhealthy eating behaviors, such as eating in secret, refusing to diet, and binge-eating (Ashmore, Friedman, Reichmann, & Musante, 2008; Friedman, Ashmore, & Applegate, 2008;). Weight bias has been found to be associated with poorer weight loss outcomes in treatment-seeking obese adults, as well as several other negative consequences. Recent studies in samples of treatment-seeking adults participating in a behavioral weight loss program found that weight stigmatization was associated with greater caloric intake, lower energy expenditure, less exercise, inconsistent self-monitoring, higher program attrition, and less weight loss (Carels, et al., 2009; Puhl & Heuer, 2010). Similarly, Vartanian and Shaprow (2008) examined the relationship between experiences of self-reported weight stigma, exercise motivation, and exercise behaviors and found that weight-based stigmatizing experiences were positively correlated with motivation to avoid exercise. One reason suggested by researchers for this increase in eating pathology, is that this may be a way of coping with negative affect following discriminatory experiences, similar to what is seen in other stigmatized groups, such as gay men and lesbians (Heffernan, 1996; Meyer, Blissett, & Oldfield, 2001; Yancey, Cochran, Corliss, & Mays, 2003).

Internalized Weight Bias

In addition to the detrimental effects of weight stigma themselves, internalizing these weight-based attitudes may also contribute to negative psychological symptoms in individuals with obesity. Internalized weight bias is defined as the degree to which an obese person believes in weight-based negative stereotypes and negative beliefs about obese persons. Internalized weight bias is different than anti-fat attitudes in that anti-fat attitudes are attributions made about others, whereas internalized weight bias consists of attributions made about the self (Durso & Latner, 2008). Additionally, weight bias internalization is different from body image in that it is

not a measure of one's internal feelings about one's body, but is more so a measure of belief in social stereotypes related to obesity and negative self-evaluation due to one's weight (Durso & Latner, 2008). Lastly, self-esteem is different from weight bias internalization in that it is a more specific measure of an individual's beliefs about himself or herself that relates to stereotypes about weight and shape (Durso & Latner, 2008).

Internalized weight bias has been shown to be associated with increased vulnerability to the negative psychological consequences of weight stigma. Recent studies have found that internalized weight bias among obese individuals has been associated with negative mental and physical health outcomes such as low self-esteem, depression, lower quality of life, weight and shape concerns, body dissatisfaction, increased likelihood of binge-eating, and increased reports of coping with stigma by refusing to diet and consuming more food (Carels et al., 2010; Puhl & Brownell, 2006; Roberto et al., 2012; Schvey, Roberto, & White, 2013).

In another study examining internalized weight bias in a community sample of overweight men and women, the authors found that a high level of internalized weight bias was associated with increased mood disturbance, body image concern, drive for thinness, binge eating, and decreased self-esteem (Durso & Latner, 2008). Interestingly, one study found that while stigmatizing experiences were not associated with binge eating disorder symptoms, a significant relationship was found between internalization of weight related stereotypes and binge eating frequency (Puhl & Brownell, 2006). Given this finding, it appears there is something specific about internalizing weight bias that can lead to maladaptive eating.

In a recent study examining the moderating role of discrimination from others and self-directed internalized weight-based discrimination in the association between BMI and Health Related Quality of Life (HRQoL), the authors found that the association between higher BMI

and poorer physical HRQoL was found only in individuals reporting high levels of internalized weight bias (Latner, Barile, Durso, & O'Brien, 2014). This study indicates that internalized weight bias may be especially important to poorer physical HRQoL, and that this self-discrimination may be a critical factor in negative health outcomes and physical health impairment. In a previous study, Durso, Latner, & Hayaski (2012) examined the relationship between experiences of discrimination and the occurrence of binge eating among overweight and obese persons. The authors found that weight bias internalization was a partial mediator of the relationship between discrimination and eating disturbance, with interpersonal discrimination most strongly associated with eating disturbances. Such findings support the theory that internalizing weight bias results in negative psychological symptoms.

Only one previous study has examined possible pathways that may increase an individual's vulnerability to weight bias internalization. Pearl, White, & Grilo (2014) evaluated the roles of self-esteem and overevaluation of shape and weight in the internalization of weight bias among treatment-seeking obese individuals with binge eating disorder. The authors found that overevaluation of shape and weight mediated the relationship between self-esteem and weight bias internalization in this population. In other words, lower self-esteem was related to increases in the overevaluation of weight and shape, which was then linked to increased weight bias internalization. Although this study begins to add to the literature on cognitive factors that can contribute to individuals internalizing weight bias, more work is needed with non-treatment and racially and demographically diverse samples. In addition, although weight bias has strong associations with negative mental and physical outcomes in obese and overweight individuals, individual risk factors for the internalization of weight bias have yet to be identified.

Weight Bias and Gender

The existing research on weight-based discrimination has mixed findings, with some studies detecting no differences in weight-based discrimination between men and women and other studies finding gender differences in experiences of weight-based stigma. One previous study found that weight-related discrimination is especially common among obese women, as they experience prejudice and the stigma of obesity more so than obese men (Crocker et al., 1993; Puhl et al., 2008;). Similarly, Puhl and Brownell (2008) found that women were more vulnerable to weight-related discrimination than men, with women being twice as likely as men to report weight-based discrimination. Interestingly, men did not experience serious discrimination until they reached a BMI of 35 or higher, whereas women experienced an increase in weight-based discrimination at a BMI of 27. Lastly, in a study examining weight stigma in men, Hebl & Turchin (2005) found that overweight and obese African American men were stigmatized less than overweight and obese Caucasian men.

However, another study examining experiences of weight stigmatization and sources of stigma in participants in a non-commercial weight loss support group, found no gender differences in types or frequency of weight-based stigmatization, nor in the types or amount of coping strategies they use to deal with stigma (Puhl & Brownell, 2006). In addition, two other previous studies found no differences between men and women in levels of weight stigma (Carr & Friedman, 2005; Friedman, et al., 2005). One possible reason for the different findings between men and women and weight-based stigmatization could be because of the different samples used. Given the discrepancies in the existing literature on weight bias and gender, more research is needed to examine the role of gender as it relates to weight bias, which could determine whether men or women respond differently to weight bias (Durso & Latner, 2008).

Weight Bias and Race

Given the serious negative implications of weight bias and the fact that minorities have higher rates of obesity compared to non-minorities, it is important to examine weight bias in minority populations. One previous study found that weight/height discrimination was most prevalent among minorities, particularly African-American women and men, suggesting that minorities may be at an increased risk of weight-based discrimination (Puhl & Brownell, 2008). Previous research has also found more favorable attitudes toward obese individuals among African Americans within their own culture when compared to Caucasians (Hebl & Heatherton, 1998). In a study examining the stigma of obesity in women, Stevens, Kumanyika, & Keil (1994) found that African American women appeared to be much less concerned about weight than are similarly sized Caucasian women, and they were more than twice as likely to report being satisfied with their weight than were Caucasian women. This research posits that different races may experience weight bias differently; however, it remains unclear whether these attitudes influence internalized weight bias.

Previous research has found that discrimination has been shown to have a negative impact on health in minority populations, such as racial minorities (Pascoe & Richman, 2009). Weight-based discrimination could also affect the health outcomes of obese individuals (Puhl & Heuer, 2010) and obese individuals may be more likely to avoid medical care (Amy, Aalborg, Lyons, & Keranen, 2005) and physical activity (Faith, Leone, Ayers, Heo, & Pietrobelli, 2002), and to exhibit maladaptive eating patterns (Durso, Latner, & Hayashi, 2012). Few studies have examined the vulnerability to weight bias among different racial groups and there has been an overrepresentation of Caucasians in previous research (and subsequently an underrepresentation

of different racial groups). Thus, more research is needed to examine the prevalence of racial differences in weight-based stigmatizing experiences and internalized weight bias.

Weight Bias and Weight Status

Associations between weight stigma and weight status have shown mixed results. In one study, Friedman, et al. (2005) found that, among treatment-seeking obese individuals, greater frequency of stigmatizing experiences was associated with higher BMI. Several other studies (Carr & Friedman, 2005; Myers & Rosen, 1999; Puhl & Brownell, 2006) have found similar results, with more stigmatizing experiences experienced by obese individuals with a higher BMI. Little research has examined the relationship between weight bias internalization and weight status. One study examining the relationship between experiences of discrimination and the occurrence of binge eating among overweight and obese persons found that internalized weight bias was a partial mediator between this relationship and these results remained significant when controlling for BMI (Durso, Latner, Hayashi, 2012). However, another study found that weight-based internalization did not correlate with BMI, suggesting that the degree of internalization of weight bias does not depend on an individual's weight status (Durso and Latner, 2012). Given that those studies examining these constructs reported conflicting results, more research is needed to examine if internalized weight bias is influenced by weight status.

Summary

Obesity rates in the U.S. continue to rise with approximately 34.9% of adults considered obese and an additional 34% that are overweight (Ogden, Carroll, Kit, Flegal, 2014). In addition to increased health problems, obese individuals also report greater psychological distress and are at a higher risk for experiencing negative psychological effects (Fabricatore & Wadden, 2006). Obese individuals are also more likely to experience major discriminatory events and weight-

based discrimination compared to non-obese individuals (Carr & Friedman, 2005). In addition to the detrimental effects of weight stigma themselves, internalizing these weight-based attitudes may also contribute to negative psychological symptoms in individuals with obesity.

Although several previous studies have shown links between weight bias internalization and negative psychological symptoms, little is known whether it is the weight-based stigmatizing experiences themselves or the internalization of this weight bias that leads to negative psychological symptoms. In addition, little is known about which individuals are more likely to internalize weight bias. The present study examined the association between BMI and psychological functioning in 112 overweight and obese non-treatment seeking persons, and whether internalized weight bias and weight-based stigmatizing experiences moderated this relationship. In addition, the present study examined if weight bias internalization mediated the relationship between weight-based stigmatizing experiences and psychological functioning. Lastly, given that little is known about which individuals are more likely to internalize weight bias, the role of gender and race was examined to determine who is more likely to experience weight-based stigmatizing experiences and to internalize weight bias.

PURPOSES AND HYPOTHESES OF THE PRESENT STUDY

Specific Aim 1: To determine the relationship between BMI and psychological functioning.

Hypothesis 1: Participants with a higher BMI will have lower scores on psychological functioning, measured by the Global Severity Index (GSI) of the Brief Symptom Inventory (BSI), indicating more severe psychological distress.

Specific Aim 2: To determine the effect of weight bias internalization and weight-based stigmatizing experiences on the relationship between BMI and psychological functioning.

Hypothesis 2a: Weight bias internalization (measured by the Weight Bias Internalization Scale [WBIS]) will moderate the relationship between BMI and psychological functioning, such that higher BMI will be more strongly linked to poorer psychological functioning among those participants with higher weight bias internalization when compared to those with lower weight bias internalization.

Hypothesis 2b: Participants with higher BMI will have higher weight-based stigmatizing experiences (measured by the Stigmatizing Situations Inventory [SSI]) and this will moderate the relationship between BMI and lower scores on psychological functioning, indicating more severe symptoms.

Specific Aim 3: To determine if weight bias internalization mediates the relationship between weight-based stigmatizing experiences and psychological distress.

Hypothesis 3: Increased weight bias internalization will mediate the relationship between weight-based stigmatizing experiences and psychological distress.

Specific Aim 4: To determine if any gender differences exist in whom experiences weight-based stigmatizing experiences and who tends to internalize weight bias.

Hypothesis 4: Women participants will endorse higher levels of weight bias internalization and weight-based stigmatizing experiences compared to male participants.

METHOD

Participants

Participants were recruited through local advertisements at public libraries in Baton Rouge, LA. The advertisements were tailored to recruit participants interested in volunteering for a study on health behaviors. Inclusion criteria included participants who were 18 years and older and who were overweight or obese, as measured by a BMI ≥ 25 kg/m². Eligible participants were invited to fill out questionnaires related to health behaviors, and their height and weight was taken by an experimenter. All eligible participants were entered into a raffle to win one iPad for participating in the study. For the present study, a total of 112 participants were recruited in order to obtain a medium effect size (based on Cohen's f^2) with a power level of .80 and alpha level of .05 (calculated with G*power; Faul, Erdfelder, Lang, & Buchner, 2007).

Materials

Demographic Questionnaire (developed by the experimenter; see Appendix A).

Demographic information including age, gender, race, relationship status, level of education, income, weight loss attempts, taking medication for a psychological condition, and currently in therapy for a psychological condition was gathered with this form.

Body Weight and Height. Body Mass Index (BMI), used by the CDC (Centers for Disease Control and Prevention, 2012), was used to identify overweight and obese individuals, which was calculated based on an individual's height and weight. Height was measured in inches to the closest 0.5-inch using a height rod. Body weight was measured using a digital scale to the closest 0.1lb. BMI was calculated by dividing weight in pounds (lbs) by height in inches (in) squared and multiplied by a conversion factor of 703.

Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008). The WBIS assesses self-directed internalized weight bias, defined as the degree to which a respondent believes that

negative stereotypes and negative self-statements about overweight and obese persons apply to him or her. The WBIS contains 11 items rated on a seven-point scale. The mean of the 11 items is calculated to obtain the total score, with higher scores representing greater internalization of weight bias. The current study used the WBIS to assess participants' internalized weight bias. The WBIS has been shown to have high internal consistency ($\alpha = .90$; Hilbert, Braehler, Haeuser, & Zenger, 2013). The WBIS has also shown good internal consistency ($\alpha = .90$) and convergent validity in community samples of overweight and obese adults and high internal consistency ($\alpha = .84$) in a clinical sample of overweight and obese adults seeking treatment for binge eating disorder (Latner, Barile, Durso, & O'Brien, 2014; Durso & Latner, 2008; Durso, Latner, White, Masheb, Blomquist, Morgan, et al., 2012). The WBIS yielded good internal consistency ($\alpha = .79$) for eligible participants in the present study.

Stigmatizing Situations Inventory (SSI; Myers & Rosen, 1999). The SSI consists of 50 items measuring the frequency of 11 types of weight-based stigmatizing experiences including: physical barriers, weight-related comments from family members, rude comments from others, job discrimination, comments from children, others making negative assumptions about you, being stared at, inappropriate comments from doctors, loved ones embarrassed by your size, being physically attacked, and being avoided, excluded, or ignored. Items are rated on a 10-point scale ranging from "never" (0) to "daily" (9). The mean of the items is calculated to obtain the total score, with higher scores indicating increased frequency of stigmatizing experiences. The measure was used in the current study to assess participants' weight-based stigmatizing experiences. Psychometric properties of the SSI have been examined and have demonstrated high internal consistency ($\alpha = .95$) and validity (Myers & Rosen, 1999; Puhl & Brownell, 2006).

The SSI yielded excellent internal consistency ($\alpha = .97$) for eligible participants in the present study.

Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983). The BSI is a 53-item measure of psychological functioning derived from the Symptom Checklist-90-R. Each item asks how much the person was bothered by various symptoms in the past week and it is rated on a 5-point rating scale ranging from “not at all” (0) to “extremely” (4). Subscales include phobic anxiety, obsessive/compulsive anxiety, anxiety, psychoticism (social isolation), paranoia, interpersonal sensitivity, hostility, depression, and somatization. Higher scores indicate more severe symptoms. In addition, a Global Severity Index (GSI) measuring general psychiatric symptoms is also yielded and this score was used to measure psychological functioning in this study. The mean of the 53 items is calculated to obtain the total GSI score. The BSI has demonstrated very good reliability, with internal consistency ratings ranging from .71 to .95, with the Global Severity Index demonstrating excellent reliability ($\alpha = .95$; Derogatis & Melisaratos, 1983). The BSI yielded excellent internal consistency ($\alpha = .97$) for eligible participants in the present study.

Procedure

All study procedures were approved by the University’s Institutional Review Board (IRB). Non-treatment seeking community members were recruited for the study through advertisements for a voluntary research project. Participants were recruited from libraries in Baton Rouge, LA. A table was set up at the libraries with a sign advertising for the study. Interested participants were immediately screened in person to determine eligibility for the study by calculating their BMI, which was calculated based on an individual’s height and weight.

Eligible participants were then told that the study would take approximately 1 hour to complete and were invited to fill out questionnaires related to health behavior. Participants who met eligibility criteria first read and indicated their consent to complete the online questionnaires. If they gave their consent to participate, participants then completed the following self-report measures on a laptop computer at the library: demographic questionnaire, WBIS, SSI, and BSI. Completed surveys were submitted electronically. Data was collected and stored through a secure online survey engine, Survey Monkey (<http://www.surveymonkey.com>). Lastly, participants were asked if they would like to enter a raffle for a chance to win an iPad. If they were interested in being entered, their name and phone number or email was recorded for contacting purposes, if they won. This information was kept separate from any data collected from them as part of the study. At the conclusion of the study, a winner was selected and they were awarded an iPad for their participation in the study.

DATA ANALYSIS

Using SPSS 23.0, correlations and t-tests were used to examine associations between demographic characteristics (i.e. gender, age, race, income, education, and BMI) and weight-based stigmatizing experiences, internalized weight bias, and psychological functioning. Any differences in demographics groups were controlled for in subsequent analyses.

Hypothesis 1. To test the first hypothesis that participants with a higher BMI would have lower scores on psychological functioning, (measured by the Global Severity Index (GSI) of the Brief Symptom Inventory (BSI)], indicating more severe psychological distress, a linear regression analysis was used. BMI was entered as the independent variable (IV) and the GSI score of the BSI was entered as the dependent variable (DV).

Hypothesis 2a. To test hypothesis 2a that internalized weight bias would moderate the relationship between BMI and psychological functioning, a hierarchical multiple regression model was created to measure the variables of interest (e.g. WBIS measures internalized weight bias and GSI of the BSI measures psychological functioning). In the hierarchical regression model, WBIS and BMI (IVs) and the interaction between these variables was used to predict psychological functioning (DV). In order to create the interaction term, moderating variables were constructed by multiplying pairs of variables to create their product. WBIS and BMI were entered in the first step and the interaction term was entered in step two. A significant interaction term between internalized weight bias and BMI would indicate a moderating relationship in the model.

Hypothesis 2b. To test hypothesis 2b that weight-based stigmatizing experiences would moderate the relationship between BMI and psychological functioning, a hierarchical multiple regression model was created to measure the variables of interest (e.g. SSI measures weight-

based stigmatizing experiences and GSI of the BSI measures psychological functioning). In the hierarchical regression model, SSI and BMI (IVs) and the interaction between those variables was used to predict psychological functioning (DV). In order to create the interaction term, moderating variables were constructed by multiplying pairs of variables to create their product. SSI and BMI were entered in the first step and the interaction term was entered in step two. A significant interaction term between weight-based stigmatizing experiences and BMI would indicate a moderating relationship in the model.

Hypothesis 3. To test the third hypothesis that weight bias internalization would mediate the relationship between weight-based stigmatizing experiences and psychological distress, a linear regression using PROCESS macro (Hayes, 2013) in SPSS was used. In order to confirm that internalized weight bias is a mediator variable, results need to show the significance of the indirect effect of weight-based stigmatizing experiences on psychological functioning through internalized weight bias (the mediator). In addition, results need to show that the relationship between weight-based stigmatizing experiences and psychological functioning gets smaller when internalized weight bias (the mediator) is included in the model. To test this mediation, four steps are involved using PROCESS macro. In step 1, the significance of the relationship between weight-based stigmatizing experiences (IV) and psychological functioning (DV) was tested. In step 2, the significance of the relationship between weight-based stigmatizing experiences (IV) and internalized weight bias (M) was tested. In step 3, the significance of the relationship between internalized weight bias (M) and psychological functioning (DV) in the presence of weight-based stigmatizing experiences (IV) was tested. In step 4, the relationship between weight-based stigmatizing experiences (IV) and psychological functioning (DV) in the presence of internalized weight bias (M) was tested.

In addition, a bias-corrected bootstrap confidence interval for the indirect effect (paths *ab*) based on 10,000 bootstrap samples was used to test for the indirect effect of weight-based stigmatizing experiences on psychological functioning through internalized weight bias. In order to confirm that internalized weight bias is a mediator variable, results need to show the confidence intervals to be entirely above zero.

RESULTS

A total of 192 participants were screened for the study and 134 were deemed eligible to participate. All 134 participants were invited to participate in the study. Out of the 134 eligible participants, 2 participants were not comfortable completing the study after reading the consent form, and 20 participants were not able to complete the questionnaires due to time constraints. One hundred and twelve participants participated and completed the study. The average age was 42.81 ($SD = 15.13$), 62.5% ($N = 70$) of participants were women, and 37.5% ($N = 42$) were men. Participants identified as 50.9% Caucasian, 43.8% African American, 1.8% Hispanic, 1.8% Indian, 1% American Indian, and 1% other. See Table 1 for all demographic information and Table 2 for weight loss attempts. The average BMI was 35.12 ($SD = 7.49$). The average WBIS score was 3.62 ($SD = 1.16$), and the average SSI score was .78 ($SD = .90$). The average BSI score was .70 ($SD = .65$). See Table 3 for descriptive statistics for internalized weight bias, weight-based stigmatizing experiences, and psychological functioning. The clinical cut-off score for the BSI is $T > 63$. In the present study 36% of males ($N = 15$) and 34% of females ($N = 24$) were above the clinical cut-off for Adult Nonpatient Norms.

Table 1:
Demographic Characteristics of Participants

Variable	<i>M</i>	<i>SD</i>	<i>N</i>	%
BMI	35.1	7.49	112	
Age	42.8	15.1	112	
Sex				
Female			70	62.5
Male			42	37.5
Race				
Caucasian/White			57	50.9

(Table 1 continued)

Variable	<i>M</i>	<i>SD</i>	<i>N</i>	%
African American/Black			49	43.8
Hispanic			2	1.8
Asian			2	1.8
American Indian			1	.9
Other			1	.9
Marital Status				
Single			33	29.5
In a Relationship			23	20.5
Married			36	32.1
Divorced			16	14.3
Widowed			4	3.6
Education				
Less Than High School			1	.9
High School Diploma/GED			16	14.3
Some College			33	29.5
College Degree			32	28.6
Some Graduate School			9	8.0
Graduate Degree			21	18.8
Total Household Income				
Less than 10,000			19	17.0
\$10,000-14,999			8	7.1
\$15,000-24,999			11	9.8
\$25,000-49,999			39	34.8

(Table 1 continued)

Variable	<i>M</i>	<i>SD</i>	<i>N</i>	%
\$50,000-99,999			22	19.6
\$100,000-149,999			7	6.3
\$150,000 or more			6	5.4

Table 2:
Weight Loss Attempts

Variable	<i>N</i>	%
Weight Loss Attempts		
0	11	9.8
1-3	45	40.2
4-6	31	27.7
7-9	10	8.9
10-15	5	4.5
15-20	3	2.7
20 or more	7	6.3

Of the eligible participants, 14.3% indicated they were in therapy for a psychological condition and 25% indicated they were currently taking medication(s) for a psychological condition. Participant comfort level in responding to the personal nature of the questions included in the study was assessed, and 87.5% reported they were comfortable answering questions, 5.4% reported that they were not comfortable answering questions, and 6.3% were undecided. Participants were also asked if they understood the questions, and 94.6% reported yes, 1% reported no, and 3.6% reported they were undecided.

Table 3:
Descriptive Statistics for Average Internalized Weight Bias, Weight-based Stigmatizing Experiences, and Psychological Functioning

Variable	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
WBIS	1.46	6.27	3.62	1.16
SSI	.00	5.52	.78	.90
BSI	.00	3.40	.70	.65

Note. WBIS = Weight Bias Internalization Scale (high scores indicate internalized weight bias), SSI = Stigmatizing Situations Inventory (high scores indicate weight-based stigmatizing experience), BSI = Brief Symptom Inventory (the Global Severity Index of the BSI is used for this study and high scores indicate more severe psychological symptoms).

Given prior research indicating that gender and race are associated with weight bias, independent samples *t*-tests and one-way analyses of variance (ANOVAs) were conducted to determine if there were any differences in gender or race on the WBIS and SSI. Results of the independent samples *t*-test revealed no differences between groups due to gender on the WBIS, $t(110) = .70, p = .49$ or the SSI, $t(110) = -1.26, p = .21$. Results of the one-way ANOVAs revealed no significant differences between groups due to race on the WBIS, $F(5,106) = 1.91, p = .10$ or the SSI, $F(5,106) = 1.22, p = .31$.

Correlations among measures of BMI, internalized weight bias, weight-based stigmatizing experiences, and psychological functioning were examined (see Table 4 for correlations among scores). Contrary to expectations, BMI and internalized weight bias were not significantly correlated ($r = .002, p > .05$), and BMI and psychological functioning were not significantly correlated ($r = .075, p > .05$). However, BMI was significantly positively correlated to weight-based stigmatizing experiences ($r = .240, p < .001$). Psychological functioning was significantly positively correlated with internalized weight bias ($r = .313, p < .001$), and weight-based stigmatizing experiences was also significantly positively associated with internalized

weight bias ($r = .350, p < .001$). Weight-based stigmatizing experiences was significantly positively correlated with psychological functioning ($r = .491, p < .001$).

Table 4:
Correlations among BMI, Internalized Weight Bias, Weight-based Stigmatizing Experiences, and Psychological Functioning

BMI	1.00			
WBIS	.002	1.00		
SSI	.240**	.350**	1.00	
BSI	.075	.313**	.497**	1.00

Note. BMI = Body Mass Index, WBIS = Weight Bias Internalization Scale (high scores indicate internalized weight bias), SSI = Stigmatizing Situations Inventory (high scores indicate weight-based stigmatizing experience), BSI = Brief Symptom Inventory (the Global Severity Index of the BSI is used for this study and high scores indicate more severe psychological symptoms).

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Primary Analyses

Hypotheses 1. Linear regression analysis was conducted to test if BMI significantly predicted participants' rating of psychological functioning. Psychological functioning was measured by the GSI score of the BSI. A non-significant regression equation was found ($F(1,110) = .625, p = .43$). Results are included in Table 5. In addition to the GSI score, the BSI has 9 additional subscales. Follow-up analyses found that BMI did not significantly predict any of the additional subscales except for somatization. A significant regression equation was found ($F(1,110) = 5.63, p = .019$) for BMI significantly predicting participants' rating of somatization.

Hypotheses 2a and 2b. To test the hypothesis that psychological functioning was a function of internalized weight bias, and more specifically whether WBIS moderates the relationship between BMI and BSI, a hierarchical multiple regression analysis was conducted. BMI and WBIS accounted for a significant amount of variance in psychological functioning, $R^2 = .104, F(2,109) = 6.32, p = .003$. The interaction term between BMI and WBIS did not account

for a significant proportion of the variance in psychological functioning, $R^2 = .107$, $F(1, 108) = .441$, $p = .508$ (see Table 6). These results suggest that internalized weight bias did not moderate the relationship between BMI and psychological functioning.

Table 5:
Hypothesis 1. Linear Regression for Relationship of Body Mass Index on Psychological Functioning

Variable			
	B	SE B	β
BMI	.006	.008	.075
R^2		.006	
F for R^2 change		.625	

Note. BMI = Body Mass Index, WBIS = Weight Bias Internalization Scale (high scores indicate internalized weight bias). BSI = Brief Symptom Inventory (the Global Severity Index of the BSI is used for this study and high scores indicate more severe psychological symptoms).

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 6:
Hypothesis 2a. Hierarchical Multiple Regression for Moderating Relationship of Internalized Weight Bias on Body Mass Index and Psychological Functioning

Variable	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Constant	-.158	.335		-.177	.337	
WBIS	.175	.051	.313	.171	.051	.306
BMI	.006	.008	.075	.007	.008	.086
BMI X WBIS				.040	.060	.062
R^2		.104			.107	
F for R^2 change		6.32**			.441	

Note. BMI = Body Mass Index, WBIS = Weight Bias Internalization Scale (high scores indicate internalized weight bias). BMI X WBIS = interaction between two terms.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

To test the hypothesis that psychological functioning is a function of weight-based stigmatizing experiences, and more specifically whether SSI moderates the relationship between BMI and BSI, a hierarchical multiple regression analysis was conducted. BMI and SSI accounted for a significant amount of variance in psychological functioning, $R^2 = .249$, $F(2,109) = 18.04$, $p = .000$. The interaction term between BMI and SSI did not account for a significant proportion of the variance in psychological functioning, $R^2 = .251$, $F(1,108) = .338$, $p = .562$ (see Table 7).

These results suggest that weight-based stigmatizing experiences did not moderate the relationship between BMI and psychological functioning.

Table 7:

Hypothesis 2b. Hierarchical Multiple Regression for Moderating Relationship of Weight-based Stigmatizing Experiences on Body Mass Index and Psychological Functioning

Variable	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Group	.559	.257		.556	.258	
BMI	-.004	.007	-.047	-.004	.007	-.047
SSI	.363	.061	.508	.379	.067	.530
BMI X SSI				-.034	.058	-.053
R^2		.249			.251	
F for R^2 change		18.04***			.338	

Note. BMI = Body Mass Index, SSI = Stigmatizing Situations Inventory (high scores indicate weight-based stigmatizing experience). BMI X SSI = interaction between two terms.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Hypotheses 3. A mediation analysis was conducted using PROCESS macro (Hayes, 2013) to investigate the hypothesis that internalized weight bias mediated the effect of weight-based stigmatizing experiences on psychological functioning. In Step 1 of the mediation model, the regression of weight-based stigmatizing experiences on psychological functioning, ignoring the mediator (internalized weight bias), was significant, $b = .36$, $t(110) = 6.00$, $p < .001$. Step 2 showed that the regression of weight-based stigmatizing experiences on the mediator (internalized weight bias), was also significant, $b = .449$, $t(110) = 3.92$, $p < .001$. Step 3 of the mediation process showed that the mediator (internalized weight bias), controlling for weight-based stigmatizing experiences, was not significant, $b = .089$, $t(109) = 1.82$, $p = .07$, although it was approaching significance. Step 4 of the analyses revealed that, controlling for the mediator (internalized weight bias), weight-based stigmatizing experiences was a significant predictor of psychological functioning, $b = .315$, $t(109) = 5.04$, $p < .001$. There was a significant indirect effect of weight-based stigmatizing on psychological functioning. A bias-corrected bootstrap confidence interval for the indirect effect of weight-based stigmatizing experiences on

psychological functioning ($ab = 0.040$) based on 10,000 bootstrap samples was entirely above zero, CI [.0096 to .0940] with a 95% confidence interval that did not include zero (Hayes, 2013). Weight-based stigmatizing experiences was associated with approximately .04 points higher in psychological distress as mediated by internalized weight bias. These results support the mediational hypothesis. Results are included in Figure 1.

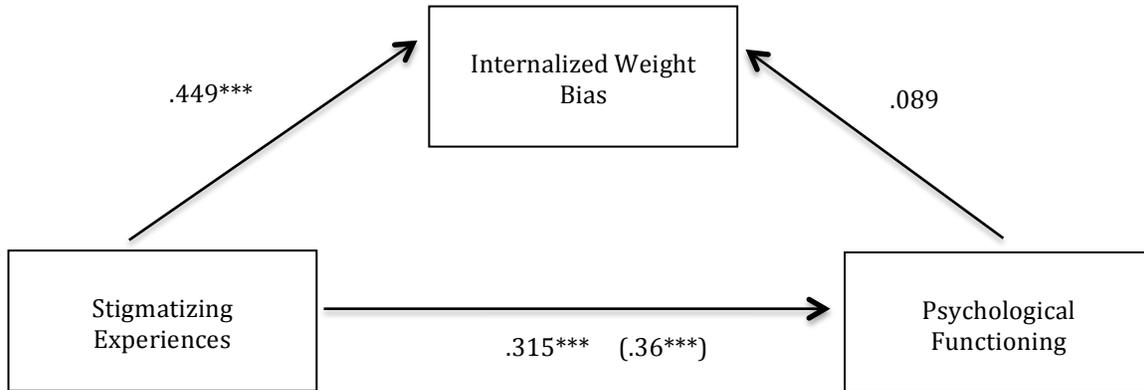


Figure 1. Standardized regression coefficients for the relationship between weight-based stigmatizing experiences and psychological functioning as mediated by internalized weight bias. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Hypotheses 4. Independent samples t -tests were conducted to determine if there were any differences in gender on the WBIS and SSI. Results of the independent samples t -test revealed no difference between groups on gender on the WBIS, $t(110) = .70, p = .49$ or the SSI, $t(110) = -1.26, p = .21$.

Exploratory Analyses.

When examining race in the current sample, Caucasians and African Americans made up the majority of the sample ($N = 104$ or 93%). Given this high percentage, an exploratory independent samples t -test was conducted to see if there were any differences between these two groups on the WBIS and SSI. Results of the independent samples t -test revealed differences between the two groups on the WBIS, $t(104) = 2.92, p = .004$ with those identifying as Caucasian reporting significantly higher levels of internalized weight bias ($M = 3.89, SD = .14$)

compared to African Americans ($M = 3.25, SD = .17$). There were no differences between groups on the SSI, $t(104) = .97, p = .34$.

In addition, given that 33% of the sample is considered low-income, exploratory analyses were conducted to examine any significant differences in income on the primary outcome variables. One-way ANOVAs revealed no significant differences between groups on weight-based stigmatizing experiences, $F(6,105) = 1.95, p = .079$ or internalized weight bias, $F(6,105) = .354, p = .906$. A one-way ANOVA revealed there was a significant difference between groups on psychological functioning, $F(6,105) = 3.08, p = .008$. Post-hoc Scheffe tests revealed statistically significant differences between income levels of less than \$10,000 ($M = 1.12, SD = .879$) and \$50,000-99,999 ($M = .404, SD = .319$). Additional analyses compared low income groups (as defined as below \$24,999) to all other income groups (\$25,000+). An independent samples t -test was conducted and revealed a significant difference between the groups, $t(110) = 2.29, p = .024$. The low income group ($M = .854, SD = .812$) endorsed significantly higher scores on psychological functioning compared to the other income groups ($M = .578, SD = .440$).

DISCUSSION

The present study examined the association between BMI and psychological functioning and whether internalized weight bias and weight-based stigmatizing experiences moderated this relationship. In addition, the present study examined if weight bias internalization mediated the relationship between weight-based stigmatizing experiences and psychological functioning. Lastly, the role of gender was examined to determine if differences exist in who experiences weight-based stigmatizing experiences and who tends to internalize weight bias. This particular research is important, as obese individuals are more likely to experience major discriminatory events and weight-based discrimination compared to non-obese individuals (Carr & Friedman, 2005), and obese individuals report greater psychological distress and are at a higher risk for experiencing negative psychological effects (Fabricatore & Wadden, 2006). Although several previous studies have shown links between weight bias internalization and negative psychological symptoms, little is known whether it is the weight-based stigmatizing experiences themselves or the internalization of this weight bias that leads to negative psychological symptoms.

Contrary to expectations, correlational analyses revealed that BMI was not associated with internalized weight bias or psychological functioning. These results are somewhat unexpected, considering that previous research has found a significant relationship between BMI and psychological functioning and internalized weight bias (Brownell, Puhl, & Schwartz, 2005; Friedman, Ashmore, & Applegate, 2008; Puhl & Heuer, 2009; Wott & Carels, 2010); however, another recent study did not find a significant relationship between BMI and internalized weight bias (Durso & Latner, 2012). In this study, BMI was found to be significantly associated with the somatization subscale of the BSI and weight-based stigmatizing experiences. Results indicated

that BMI was not associated with internalized weight bias, suggesting that some individuals, even at lower levels of overweight may internalize weight bias as much as more obese people. This suggests that, although BMI is associated with weight-based stigmatizing experiences, BMI may not actually influence who internalizes this weight bias, as was found in previous research (Durso & Latner, 2012). Similarly to the present study, participants in this study were non-treatment seeking overweight and obese individuals. Most previous studies have used treatment-seeking participants and this could potentially be a reason for the differences found in the relationship between BMI and internalized weight bias. Among those that did internalize this weight bias, weight-based stigmatizing experiences was significantly associated with internalized weight bias and internalized weight bias was significantly associated with psychological functioning. Future research could add a normal weight reference group to observe the differences on weight bias measures between different weight groups.

While the present study found that internalized weight bias and BMI accounted for a significant amount of variance in psychological functioning, internalized weight bias did not moderate the relationship between BMI and psychological functioning. Similarly, weight-based stigmatizing experiences and body mass index accounted for a significant amount of the variance in psychological functioning, but weight-based stigmatizing experiences did not moderate the relationship between BMI and psychological functioning. These results suggest that perhaps other constructs, in addition to weight-based stigmatizing experiences and internalized weight bias, may influence psychological functioning, such as, self-esteem, disordered eating, and coping skills.

The direct effect of weight-based stigmatizing experiences on psychological functioning was significant, indicating that weight-based stigmatizing experiences also affects psychological

functioning in ways independent of internalization. This provides further evidence that experiencing weight stigma and internalizing weight bias represent two distinct phenomena. These results are consistent with past findings showing that experiencing weight stigma and internalizing weight bias represent two distinct constructs. For example, Pearl, Puhl, & Dovidio (2015) found that weight bias internalization, but not weight stigma experiences, was associated with greater belief in weight controllability and fat phobia. In the present study, the indirect effect of weight-based stigmatizing experiences on psychological functioning was examined and the effect size was 0.040, with a 95% confidence interval that did not include zero. Given these results, individuals who have weight-based stigmatizing experiences were, on average, 0.040 units higher in their likelihood of experiencing psychological distress as a result of the effect of internalized weight bias. The indirect effect, using the bias-corrected bootstrap confidence interval, supports the hypothesis that internalized weight bias mediates the relationship between weight-based stigmatizing experiences and psychological functioning. This provides evidence that internalizing weight bias increases the likelihood of experiencing psychological distress above and beyond weight-based stigmatizing experiences.

In addition, mediation analyses also provided support for some of the expected effects: weight-based stigmatizing experiences predicted greater weight bias internalization, and internalized weight bias was approaching significance in predicting psychological functioning ($p = .07$). Additionally, weight-based stigmatizing experiences and internalized weight bias significantly predicted psychological functioning, accounting for 27% of the variance.

There was little evidence of significant differences in who experiences internalized weight bias or weight-based stigmatizing experiences in regards to gender or race. However, there was one exception in the current study. Caucasians reported significantly higher levels of

internalized weight bias compared to African Americans. This is consistent with previous research showing African American women appeared to be much less concerned about weight than are similarly sized Caucasian women, and they were more than twice as likely to report being satisfied with their weight than were Caucasian women (Stevens, Kumanyika, & Keil, 1994). In addition, previous research also found more favorable attitudes toward obese individuals among African Americans within their own culture when compared to Caucasians and that African-American communities generally hold less negative cultural values about being heavy (Hebl & Heatherton, 1998; Ofose, Lafreniere, & Senn, 1998). Lastly, exploratory analyses found significant differences between income levels and psychological functioning with low income groups endorsing significantly higher scores on psychological functioning (indicating higher levels of psychological distress) compared to other income groups. These results support previous research showing a significant relationship between low SES and negative health outcomes, including negative psychological effects (Adler & Ostrove, 2006; Adler et al., 1994; Gallo & Matthews, 2003).

Limitations of the present study include the correlational design, as casual inferences cannot be drawn about the relationship between the study variables. In addition, the reliance on self-reports of participants weight-based stigmatizing experiences, internalized weight bias, and psychological functioning is a significant limitation of the data. Future research could conduct experimental studies examining the causal impact of weight-based stigma and internalized weight bias on psychological functioning. Regarding the construct of psychological functioning, one measure of general psychological functioning was used. Given this limitation, specific aspects of psychological functioning and other constructs known to be influenced by weight-bias (e.g. quality of life, self-esteem, disordered eating) were not able to be examined to determine

their influence on internalized weight bias. Future research could aim to include these additional constructs. Using BMI is another potential limitation as it is a measure of excess weight rather than body fat. In addition, age, sex, ethnicity, and muscle mass can influence the relationship between BMI and body fat and BMI does not distinguish between excess fat or muscle mass. Alternatives to using BMI include using skinfold thickness and underwater weighing; however, although these measures may provide a better indication of an individual's body fatness, they can be expensive and intrusive compared to BMI. Lastly, average SSI scores were .78 (SD =.90) and average BSI scores were .70 (SD =.65). These scores are relatively low and a lack of significant effects in some analyses could be due to a floor effect on these measures. Given that the current study used a community sample and not treatment-seeking individuals, this could be the reason for the low scores on these measures.

The present study has several strengths, including being the first study the author is aware of to examine the role of weight bias internalization and its relationship between weight-based stigmatizing experiences and psychological functioning. In addition, the present study included a diverse sample of individuals from the community, including 51% Caucasian, 44% African American, and 37.5% men. Lastly, BMI was measured by an experimenter, as previous studies have found self-report of height and weight to be significantly different when compared to measuring height and weight by an experimenter.

Implications and Future Directions

Future research should consider examining additional constructs that could be influenced by internalized weight bias such as body image, disordered eating, and self-esteem, given that these constructs are somewhat distinct from internalized weight bias but may also influence psychological functioning. Previous research has found that individuals who experience

discrimination based on personal characteristics, such as race, gender, or age experience stress and sadness and may engage in health-risk behaviors, including disordered eating, to cope with this stress and sadness (Pascoe & Richman, 2009; Johnson, Risica, Gans, Kirtania, & Kumanyika, 2012). Given these findings, it is important for future research to see how internalized weight bias influences disordered eating. Further, given that experiencing weight stigma has been found to be significantly related to internalized weight bias, it would be interesting to examine additional pathways to internalized weight bias besides experiencing weight stigma, such as media exposure. Additionally, future research could examine how one copes with weight-based stigmatizing experiences and if certain coping strategies are helpful in not internalizing this weight bias. Lastly, given weight-bias is a relatively new area of research, additional research is needed on what measures are best suited to examine forms of stigma, as well as what specific forms of stigma appear to influence psychological functioning the most.

Given the findings of the present study and previous research, several areas of future directions are discussed. Psychoeducation on weight bias is needed not only in weight-loss treatment programs but also in healthcare settings, where obese individuals experience a significant amount of weight bias. Given the finding that BMI was not associated with psychological functioning, it may also be important for clinicians to assess and treat not just patients' body weight, but also the psychological meaning that patients may attribute to their weight. Identifying protective factors (e.g., support, self-esteem, specific cognitive skills), which might prevent internalization of weight bias could be helpful, as well as learning more effective ways to cope with social prejudice.

Given that internalized weight bias was found to be positively correlated with psychological functioning, interventions that reduce the effects of internalized weight bias are

also needed. Acceptance and mindfulness therapies may help reduce the impact of weight stigma. Initial research on these types of interventions are promising and may be effective in reducing the psychological distress and other weight-related outcomes from experiencing weight stigma (Lillis, Hayes, Bunting, & Masuda, 2009). Future research could expand on these studies and add to the literature on acceptance and mindfulness-based therapies for weight stigma and weight bias internalization. Furthermore, another intervention that may be beneficial is having open discussions with a mental health practitioner (or even other types of health care providers) about stigmatizing experiences and using cognitive restructuring strategies to discuss and challenge negative weight stereotypes may help alleviate the damaging effects of weight-related stigmatization, as cognitive restructuring has been found to be effective for reducing body dissatisfaction (Farrell, Shafran, & Lee, 2006). Lastly, future research could examine histories of weight-based discrimination to determine whether internalized weight bias is associated with actual events, making an individual more vulnerable to the negative effects of discrimination.

In summary, the current study found that BMI, internalized weight bias, and weight-based stigmatizing experiences explained a significant amount of the variance in psychological functioning. In addition, the indirect effect of weight-based stigmatizing experiences on psychological functioning was significantly greater than zero, indicating that individuals who have weight-based stigmatizing experiences were, on average, 0.040 units higher in their likelihood of experiencing psychological distress as a result of the effect of internalized weight bias. Results provide evidence for significant relationships between internalized weight bias and weight-based stigmatizing experiences and psychological functioning, as well as support the predicted hypothesis that weight bias internalization mediates the relationship between weight-based stigmatizing experiences and psychological functioning. Future research based on the

results of this study could include examining additional constructs that could be influenced by internalized weight bias, additional pathways to internalized weight bias, and research on interventions that reduce the effects of weight bias.

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Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008)

Please rate your agreement with each item.

1	2	3	4	5	6	7
Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree

1. As an overweight person, I feel that I am just as competent as anyone.
2. I am less attractive than most other people because of my weight.
3. I feel anxious about being overweight because of what people might think of me.
4. I wish I could drastically change my weight.
5. Whenever I think a lot about being overweight, I feel depressed.
6. I hate myself for being overweight.
7. My weight is a major way that I judge my value as a person.
8. I don't feel that I deserve to have a really fulfilling social life, as long as I am overweight.
9. I am OK being the weight that I am.
10. Because I am overweight, I don't feel like my true self.
11. Because of my weight, I don't understand how anyone attractive would want to date me.

Stigmatizing Situations Inventory (Myers & Rosen, 1999)

Below is a list of situations that people encounter because of their weight. Indicate whether, and how often, each of these situations happens to you. In the spaces below, write the number which best describes how often you encounter each situation. Use the scale below:

0-----	1-----	2-----	3-----	4-----	5-----	6-----	7-----	8-----	9-----
Never	Once in your life	Several times in your life	About once/yr.	Several times/yr.	About once a month	Several times/mo.	About once/wk.	Several times/wk.	Daily

- ___ 1. A child coming up to you and saying something like, "You're fat!"
- ___ 2. A doctor blaming unrelated physical problems on your weight.

- ___ 3. A parent or other relative nagging you to lose weight.
- ___ 4. A spouse/partner calling you names because of your weight.
- ___ 5. A spouse/partner telling you to lose weight in order to be more attractive.
- ___ 6. As an adult, having a child make fun of you.
- ___ 7. Being called names, laughed at, or teased by other children when you were young.
- ___ 8. Being glared at or harassed by bus passengers for taking up "too much" room.
- ___ 9. Being hit, beaten up or physically attacked because of your weight.
- ___ 10. Being offered fashion advice from strangers.
- ___ 11. Being passed up for a promotion, given bad assignments, or otherwise discriminated against at work.
- ___ 12. Being sexually harassed (cat-calls, wolf-whistles, etc.) because of your weight.
- ___ 13. Being singled out as a child by a teacher, school nurse, etc. because of your size.
- ___ 14. Being stared at in public.
- ___ 15. Being the only heavy person, or the heaviest person, at a family gathering.
- ___ 16. A doctor saying that your weight is a health problem, even when you are in good health.
- ___ 17. Being told, "All you really need is a little willpower."
- ___ 18. Being unable to get a date because of your size.
- ___ 19. Children loudly making comments about your weight to others.
- ___ 20. Friends, acquaintances, co-workers, etc. making fun of your appearance.
- ___ 21. Groups of people pointing and laughing at you in public.
- ___ 22. Having a doctor make cruel remarks, ridicule you, or call you names.
- ___ 23. Having a doctor recommend a diet even if you did not come in to discuss weight loss.
- ___ 24. Having a romantic partner exploit you, because s/he assumed you were "desperate" and

would put up with it.

- ___ 25. Having a spouse or partner be ashamed to admit to being with you.
- ___ 26. Having family members feel embarrassed by you or ashamed of you.
- ___ 27. Having friends not notice weight loss, or not encourage your efforts to lose weight.
- ___ 28. Having people assume that you overeat or binge-eat because you are overweight.
- ___ 29. Having people assume you have emotional problems because you are overweight.
- ___ 30. Having strangers suggest diets to you.
- ___ 31. Having strangers take photographs of you, as if you were an exhibit.
- ___ 32. Having your children tease or insult you because of your weight.
- ___ 33. In the supermarket, having people criticize or make comments about your food choices.
- ___ 34. Losing a job because of your size.
- ___ 35. Not being able to find clothes that fit.
- ___ 36. Not being able to find medical equipment in a size that works for you.
- ___ 37. Not being able to find sports equipment in a size that fits you.
- ___ 38. Not being able to fit into bus or airplane seats, into small cars, or into standard seatbelts.
- ___ 39. Not being able to fit into seats at restaurants, theaters, and other public places.
- ___ 40. Not being able to fit through turnstiles, on amusement park rides, or other places not already mentioned.
- ___ 41. Not being hired because of your weight, shape, or size.
- ___ 42. Other people having low expectations of you because of your weight.
- ___ 43. Overhearing other people making rude remarks about you in public.
- ___ 44. Parents or other relatives telling you how attractive you would be, if you lost weight.
- ___ 45. People telling you that you will never find a partner if you don't lose weight.

- ___ 46. Seeing bumper stickers, t-shirts, advertising, etc. that ridicules fat people.
- ___ 47. Strangers asking intrusive, personal questions about your weight.
- ___ 48. Strangers making abusive remarks to you (e.g. saying you are disgusting, or that you don't deserve to live).
- ___ 49. When eating in public, being told "You really shouldn't be eating that."
- ___ 50. When walking outside, having people drive by and laugh or shout insults.

Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983)

- 1 Not at all
- 2 A little bit
- 3 Moderately
- 4 Quite a bit
- 5 Extremely

1. Nervousness or shakiness inside.
2. Faintness or dizziness.
3. The idea that someone else can control your thoughts.
4. Feeling others are to blame for most of your troubles.
5. Trouble remembering things.
6. Feeling easily annoyed or irritated.
7. Pains in heart or chest.
8. Feeling afraid in open spaces.
9. Thoughts of ending your life.
10. Feeling that most people cannot be trusted.
11. Poor appetite.
12. Suddenly scared for no reason.
13. Temper outbursts that you could not control.

14. Feeling lonely even when you are with people.
15. Feeling blocked in getting things done.
16. Feeling lonely.
17. Feeling blue.
18. Feeling no interest in things.
19. Feeling fearful.
20. Your feelings being easily hurt.
21. Feeling that people are unfriendly or dislike you.
22. Feeling inferior to others.
23. Nausea or upset stomach.
24. Feeling that you are watched or talked about by others.
25. Trouble falling asleep.
26. Having to check and double check what you do.
27. Difficulty in making decisions.
28. Feeling afraid to travel on buses, subways, or trains.
29. Trouble getting your breath.
30. Hot or cold spells.
31. Having to avoid certain things, places, or activities because they frighten you.
32. Your mind going blank.
33. Numbness or tingling in parts of your body.
34. The idea that you should be punished for your sins.
35. Feeling hopeless about the future.
36. Trouble concentrating.

37. Feeling weak in parts of your body.
38. Feeling tense or keyed up.
39. Thoughts of death or dying.
40. Having urges to beat, injure, or harm someone.
41. Having urges to break or smash things.
42. Feeling very self-conscious with others.
43. Feeling uneasy in crowds.
44. Never feeling close to another person.
45. Spells of terror or panic.
46. Getting into frequent arguments.
47. Feeling nervous when you are left alone.
48. Others not giving you proper credit for your achievements.
49. Feeling so restless you could not sit still.
50. Feelings of worthlessness.
51. Feeling that people will take advantage of you if you let them.
52. Feelings of guilt.
53. The idea that something is wrong with your mind.

**APPENDIX B
INSTITUTIONAL REVIEW BOARD APPROVAL**

ACTION ON PROTOCOL APPROVAL REQUEST



Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

TO: Amy Copeland
Psychology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: June 2, 2015

RE: IRB# 3619

TITLE: The Impact of Weight Bias on Psychological Functioning

New Protocol/Modification/Continuation: New Protocol

Review type: Full ___ Expedited X **Review date:** 6/2/2015

Risk Factor: Minimal X Uncertain _____ Greater Than Minimal _____

Approved X **Disapproved** _____

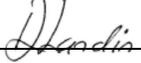
Approval Date: 6/2/2015 **Approval Expiration Date:** 6/1/2016

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 122

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable) _____

By: Dennis Landin, Chairman 

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:**

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE:** Use bcc when emailing more than one recipient

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

VITA

Krystal Marie Waldo was born in Livonia, Michigan. She earned her Bachelor of Arts degree in psychology from DePaul University in 2006. She later earned a Master of Arts degree in clinical psychology from Roosevelt University in 2008. She completed an APA accredited internship in clinical psychology, with specialization in health psychology, in June 2016 at the Battle Creek Veterans Affairs Medical Center in Battle Creek, Michigan. She will begin a postdoctoral fellowship at the Veterans Affairs Pittsburgh Healthcare System in August 2016. Her primary clinical and research interests include health psychology, weight management, and health behavior change.