

ASSOCIATION OF MOTIVES FOR WEIGHT LOSS
WITH LONG-TERM WEIGHT CHANGE

By

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To my parents, my shining examples of
unconditional love, compassion, and perseverance

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Abstract of Thesis Presented to the Graduate
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Most obese individuals are motivated to lose weight to improve their physical appearance. Some theorists posit that failure to achieve substantial progress towards this objective may lead to abandonment of changes to diet and physical activity and ultimately to weight regain. We examined these propositions in the context of an 18-month randomized trial of obesity treatment. We hypothesized that a) body image dissatisfaction at pretreatment would be associated with higher levels of desired weight loss, b) decreases in desired amounts of weight loss during initial treatment would be associated with improved weight maintenance during follow-up, and c) self-rated improvements in physical appearance at posttreatment would be inversely associated with weight regain during follow-up. Participants were 298 obese women ($M \pm SD$, age = 59 ± 6 [range = 50 to 75], BMI = 37 ± 5 [range = 29 to 51]). Results indicated that higher levels of body image dissatisfaction were associated with higher amounts of desired weight loss at pretreatment ($r = .29, p < .01$). Contrary to our hypothesis, we also found no association between changes in desired amounts of weight loss during initial treatment and weight regain during follow-up ($r = .00, p = 0.98$). Similarly, self-rated improvements in physical appearance at posttreatment were not associated with

weight regain at follow-up ($r = -.14$, $p = .30$). Collectively, these findings suggest that while body image dissatisfaction may be related to desired weight loss, neither change in desired amounts of weight loss nor improvements in physical appearance are associated with the regaining of lost weight.

CHAPTER 1 INTRODUCTION

Obesity

Prevalence and Health Risks

According to recent data from the Centers for Disease Control and Prevention (2008), a larger portion of the United States adult population currently meet criteria for classification in the overweight (33%) and obese (an additional 34%) categories than for designation as normal weight (33%). The numerous physical health problems associated with excess body weight have been well-documented and well-publicized. Obese individuals face an increased risk for developing hypertension, hypercholesterolemia, diabetes mellitus, certain forms of cancer (especially breast, prostate, endometrial, and colon cancers), coronary heart disease, congestive heart failure, stroke, osteoarthritis, pulmonary disease, gallstones, and sleep apnea (National Heart, Lung, and Blood Institute, 1998). It has been estimated that approximately 300,000-400,000 yearly deaths are attributable to obesity within the U.S. (Allison, Fontaine, Manson, Stevens, & VanItallie, 1999; Mokdad, Marks, Stroup, & Gerberding, 2004).

Weight-based Bias and Discrimination

Less well-documented and well-publicized is the weight-based bias and discrimination faced by many obese individuals in the workplace and in education, healthcare, and social relationships (Puhl & Brownell, 2001; Puhl & Latner, 2008). It has been suggested that bias towards obese individuals is one of the few remaining culturally-acceptable biases in the United States (Neumark-Sztainer & Haines, 2004). It has also been argued that television has been the most pervasive mode of transmission

of the “thin ideal,” as well as the resulting biases towards obese individuals who fall well short of meeting this standard (Greenberg, Eastin, Hofshire, Lachlan, & Brownell, 2003; Himes, 2007). For example, Greenberg et al. (2003) conducted a systematic examination of 1,018 television characters from five episodes of the top 10 rated prime-time television shows from six networks from 2000-2001. The results revealed that 14% of female characters and 24% of male characters were overweight or obese, which significantly under-represents the true prevalence of obese individuals in the general population. Furthermore, compared to normal-weight female characters, overweight and obese female characters were less likely to express physical affection, to be regarded as physically attractive, and to be portrayed with a romantic partner. Similarly, overweight or obese men were less likely to be portrayed as having a romantic partner and were more often shown eating.

Regarding weight-related biases in the workplace, experimental studies suggest that obese managers are rated as significantly less desirable employees than non-obese managers (Decker, 1987), and that obese managers’ less desirable behavior (e.g., assuming credit for business successes) is also judged more severely compared to their non-obese counterparts (Klassen, Jasper, & Harris, 1993). A comprehensive meta-analysis conducted by Roehling (1999) revealed that many undesirable characteristics are attributed to overweight employees, including laziness, emotional instability, incompetence, and aversive personality traits. Outside of the workplace, there are also numerous anecdotal reports related to obese individuals being the subject of weight-related ridicule in restaurants, grocery stores, and other public settings (Puhl & Brownell, 2001).

Body Image and Obesity

Given the pervasiveness of weight-related biases and discriminatory practices, it is not surprising that many obese individuals report greater body image dissatisfaction compared to their normal-weight peers. A study conducted by Sarwer, Wadden, & Foster (1998) compared body image dissatisfaction between 79 obese and 43 non-obese women. Results revealed that the obese women displayed significantly greater body image dissatisfaction, and furthermore, that approximately 50% of the obese women were most dissatisfied with the sizes of their waist and hip regions. In this same study, the researchers found that compared to normal-weight women, obese women are significantly more likely to camouflage their bodies with clothing and to experience weight-related embarrassment in social situations. Another study conducted by Adami, et al. (1998) also found that obese individuals reported greater body image dissatisfaction compared to normal-weight controls. Obese individuals also reported greater body image dissatisfaction compared to previously obese individuals who had successfully undergone bariatric surgery and were of normal weight at the time of assessment.

While numerous studies have suggested that obese individuals commonly express greater body image dissatisfaction, the literature is less clear as to whether the degree of body image dissatisfaction shares a linear relation to degree of obesity. That is to say, research has not sufficiently elucidated whether body image dissatisfaction increases from lower to higher body mass indices (BMIs). A study conducted by Hill and Williams (1998) examined this question among a non-clinical sample of obese women. When examining the relation of body image dissatisfaction and class of BMI (i.e., Class

1 BMI = 30.0-34.9; Class 2 BMI = 35.0-39.9; and Class 3 BMI \geq 40), they found that body image dissatisfaction increased significantly from the lower to higher BMI classes.

However, other studies have found that the association between body image dissatisfaction and BMI is more nuanced. For example, Wilfley, Schwartz, Spurrell, & Fairburn (2000) conducted a study looking at psychopathology among overweight and obese individuals with binge eating disorder. In this population, they did not find evidence to support an association between body image dissatisfaction and degree of overweight or obesity. Another study conducted by Eldredge and Agras (1996) examined a population of obese women participating in a commercial weight loss program. The researchers found that, while obese women with binge eating disorder displayed greater body image dissatisfaction compared to their non-eating-disordered peers, body image dissatisfaction was not related to degree obesity.

Lifestyle Treatment for Obesity

Lifestyle interventions utilize principles of behavior modification to produce reductions in caloric intake (e.g., 500-1000 Kcal/day) and increases in physical activity (e.g., 30 minutes per day), which create a negative energy balance and lead to subsequent weight loss. Compared to surgical and pharmacologic interventions, the relative safety, efficacy, and effectiveness of lifestyle interventions make them the preferred first line of treatment for the majority of obese individuals (National Heart, Lung, and Blood Institute, 1998). Lifestyle interventions generally take the form of 14 to 24 weekly group sessions and utilize cognitive behavioral techniques such as diet and physical activity self-monitoring, goal-setting, cognitive restructuring, stimulus management, and principles of reinforcement (Wing, 1998).

Lifestyle interventions typically produce weight losses of approximately 5-10% of body weight over the course of initial treatment (Wing, 2003; National Heart, Lung, and Blood Institute, 1998), which is sufficient to produce significant improvements in numerous risk factors for disease, including hypertension, hypercholesterolemia, and glucose control (Cena, Toselli, & Biino, 2004; Diabetes Prevention Program Research Group, 2002; Mertens & Van Gaal, 2000). Importantly, some research suggests that weight loss is associated with significant improvements in body image dissatisfaction and physical self-appraisal (Annesi, 2007; Grave et al., 2007; Cash, 1994a). However, other studies suggest that changes in body image occur independent of weight changes (Foster, Wadden, & Vogt, 1997a; Rosen, Orosan, & Reiter, 1995).

While lifestyle interventions produce clinically significant weight losses and favorable physical and psychological effects over the short-term, most individuals tend to regain approximately 30-50% of their lost weight over the following year (Jeffrey et al., 2002; Perri & Corsica, 2002), with a gradual return to pretreatment weight over the next 3-5 years (Kramer et al., 1989). Much of the current research in obesity treatment is focused on understanding and modifying potential factors that may be responsible for the difficulty many individuals experience in their efforts at weight loss maintenance. The current study attempted to examine aspects of one such theory that focuses on the potential impact of how much weight individuals want to lose, as well as primary motives for wanting to lose weight, on their ability to maintain their weight losses over the longer term.

Appearance Motivation Hypothesis of Weight Loss Maintenance

Obese individuals entering weight loss treatment typically desire to lose 22-34% of their body weight (Foster, Wadden, Phelan, Sarwer, & Sanderson, 2001; Foster, Wadden,

Vogt, & Brewer, 1997b), which is considerably greater than the 5-10% weight losses typically achieved through lifestyle interventions (Wing, 2003; National Heart, Lung, and Blood Institute, 1998). Additionally, individuals enter treatment with a “primary” motive for wanting to lose weight, which is typically a desire to improve their appearance or health (Cooper & Fairburn, 2001). While men more often cite health reasons as their primary motive for weight loss (Hankey, Leslie, & Lean, 2002), some studies suggest that women, regardless of age, are more likely to cite improvement in physical appearance as their primary motive for weight loss (Clarke, 2002).

Cooper and Fairburn (2001) have hypothesized that if individuals do not achieve their desired amount of weight loss during initial treatment, they will then view their efforts as ineffective in producing meaningful progress towards achieving their primary motive for weight loss. The researchers contend that such individuals will then be inadequately motivated to continue engaging in their diet and physical activity changes, slowly abandon these healthy behaviors, and subsequently regain the lost weight.

A few studies have attempted to formally examine this hypothesis, with mixed results. Ames et al. (2005) randomly assigned obese individuals to either a “reformulated cognitive-behavioral” condition (based in part on Cooper and Fairburn’s recommendations) or a standard behavioral treatment for weight loss. The researchers reported that while individuals in the reformulated cognitive-behavioral condition significantly decreased both their weight loss expectations and their motivation to lose weight as a means of improving self-confidence (compared to standard treatment), there were no significant between-group differences in either mean posttreatment weights nor amount of weight regain at 6-month follow-up.

In the STOP Regain trial, researchers examined a group of 314 obese individuals who had successfully lost 10% of their body weight in the previous 2 years (Gorin et al., 2007). These individuals were then randomly assigned to one of three weight maintenance conditions (i.e., face-to-face, internet, or a control group) for a period of 18 months. At the beginning of the study, 86% of the individuals desired an additional mean 13% loss of body weight. However, at the conclusion of the study, success in weight loss maintenance and additional weight loss were unrelated to weight loss expectations at the beginning of the study.

In contrast to these findings, a study conducted by Linde, Jeffrey, Finch, Ng, and Rothman (2004) revealed that women with less realistic weight loss expectations (i.e., desiring larger losses) actually achieved greater overall weight reductions at the conclusion of a 2-year weight-loss study as compared to women with more realistic expectations. However, among male participants, pretreatment weight loss expectations were found to have no association with long-term weight loss outcomes.

Specific Aims and Hypotheses

The first aim of the study was focused on determining the association between pretreatment body image dissatisfaction and how much weight individuals wanted to lose. We hypothesized that individuals who reported greater body image dissatisfaction prior to treatment initiation would also report larger amounts of desired weight loss. Furthermore, we also sought to determine how a relation between pretreatment body image dissatisfaction and desired amount of weight loss may be moderated by individuals' pretreatment BMI. We hypothesized that individuals with higher BMIs would express greater body image dissatisfaction and greater amounts of desired weight loss.

The second aim of the study was to determine how changes in desired amounts of weight loss during initial treatment may be related to individuals' ability to maintain their weight losses over the longer term. We hypothesized that decreases in amounts of desired weight loss during initial treatment (i.e., individuals moving closer to a realistic weight loss target) would be associated with less weight regain during follow-up.

The final aim of the study was to determine how changes in individuals' satisfaction with their physical appearance may be related to their ability to maintain their weight losses over the longer term. Among individuals for whom improvement in physical appearance was their primary motive for weight loss, we hypothesized that individuals with greater self-rated improvements in physical appearance during initial treatment would experience less weight regain during follow-up.

CHAPTER 2 MATERIALS AND METHODS

Research Methods and Procedures

The TOURS Intervention

The current study was a secondary data analysis that utilized data from the Treatment of Obesity in Underserved Rural Settings (TOURS) study (Perri et al., 2008). The TOURS study was aimed at determining the effectiveness of three models of extended care for weight loss maintenance. The study was conducted in six rural counties in northern Florida and consisted of two phases. The initial treatment phase (i.e., months 0 to 6) involved 6 months of weekly lifestyle group sessions that focused on aiding individuals in achieving weight losses of approximately 0.4 kg per week. The lifestyle intervention utilized food and physical activity records that enabled participants to self-monitor and set goals related to their food intake and physical activity. Dietary goals focused on decreasing caloric intake by approximately 500 to 1000 Kcal per day, while improving diet quality, i.e., increasing fruit and vegetable intake to five servings per day and increasing whole grain intake to at least three servings per day. Individuals were also encouraged to set goals for physical activity and to consistently achieve an average of 30 minutes per day of walking at least six days per week. The physical activity aspect of the intervention also utilized pedometers to allow participants to track their “steps,” with the goal of increasing their daily steps by a minimum of 3,000 steps from their pretreatment level.

The second phase of the TOURS study consisted of random assignment to one of three extended care conditions: Face-to-Face counseling, Telephone-based counseling, or an education control condition delivered via direct mailings. The

extended care phase of the study lasted for 12 months (i.e., months 6 to 18), and in each of the three conditions individuals were encouraged to continue keeping self-monitoring records of their dietary intake and physical activity. Individuals in all three conditions received contact twice per month, in the form of a Face-to-Face session, an individual Telephone session, or a direct Mailing/newsletter.

Participants

The current study included 298 healthy, obese women between the ages of 50-75 ($M = 59.3$, $SD = 6.2$) with a mean pretreatment weight of 96.5 kg ($SD = 14.9$) and a mean BMI of 36.8 ($SD = 5.0$). The majority of women self-identified as either Caucasian ($n = 225$, 75.5%) or African American ($n = 61$, 20.5%), with another 1.7% identifying as Hispanic or Latino ($n = 5$) and 2.3% identifying as “other ethnicity” ($n = 7$). The majority of women had completed trade or vocational school or had an associate’s degree ($n = 129$, 43.4%). An additional 36.6% of women had 12 or fewer years of education ($n = 109$), 10.4% had obtained a bachelor’s degree ($n = 31$), and 9.7% had post-baccalaureate education or training ($n = 29$).

Women included in the study were required to have a BMI ≥ 30 and could not weigh greater than 159 kg (350 lbs). Women were also required to be weight-stable (i.e., had not lost ≥ 10 lbs in the preceding 6 months). Women were excluded from participation if they reported a condition that was likely to influence treatment outcomes, their ability to participate in the treatment protocol, or for which the eating and physical activity behavior changes were contraindicated. Such exclusionary conditions included a reported a history of cancer within the past 5 years (with the exception of non-melanoma skin cancer), serious infectious disease, myocardial infarction, stroke, uncontrolled angina within the past 6 months, congestive heart failure, chronic hepatitis,

cirrhosis, chronic malabsorption syndrome, chronic pancreatitis, irritable bowel syndrome, history of bariatric surgery, history of solid organ transplantation, history of musculo-skeletal conditions that limit physical activity, chronic lung diseases that limit physical activity, serum creatinin > 1.5 mg/dL, hemoglobin < 10 g/dL, fasting serum triglycerides > 400 mg/dL, at-rest blood pressure > 140/90 mg/Hg, or any other physical condition deemed likely to limit 5-year life expectancy or significantly interfere with individuals' ability to participate in a lifestyle intervention involving eating and physical activity changes. Presence of diabetes was not exclusionary if her fasting blood glucose was <125mg/dL at the screening assessment and if she received approval from her primary care provider. Individuals were excluded if they reported use of antipsychotic medications, monoamine oxidase inhibitors, systemic corticosteroids, human immunodeficiency virus or tuberculosis antibiotics, chemotherapeutics medications, or weight-loss medications. Individuals were also excluded if they reported a significant psychiatric disorder or excessive use of alcohol, were unable or unwilling to provide informed consent, were unable to read English at a fifth grade level, were currently participating in another research study, or were unwilling to be randomly assigned. Of the 559 women who responded to the study recruitment announcements, 261 were excluded. Among the 261 women who were not eligible for participation, 82 were excluded due to elevated blood pressure, 76 had abnormal lab values, 29 had contraindications based on medical history, 27 has some other abnormal result during screening, 17 had a BMI that was out of range, and 30 declined participation.

Procedures

Women in the current study were recruited through a variety of means, including mailings, newspaper study announcements, and in-person recruitment conducted at

churches, community centers, and community events. Interested women completed a telephone screening and if they were deemed eligible, were scheduled for an in-person screening visit. At the screening visit, women received a more detailed description of the study and were given the opportunity to provide informed consent. After providing informed consent, women were asked to complete detailed questionnaires that captured information about their demographics, diet, physical activity, medical history, medication use, quality of life, mental health status, and weight loss expectations and motivations. In addition, a blood sample was collected and height, weight, abdominal measurements, resting heart rate, and blood pressure were assessed. Women also completed a 6-minute walk test to assess their current level of physical fitness and mobility.

Women who were eligible following the screening visit returned for a follow-up screening visit within 2 weeks prior to their first group session. At the second screening visit women repeated the 6-minute walk test, and if they had gained greater than 4.5 kg since their first screening visit, a blood sample was collected to ensure that there had been no significant changes in their metabolic profile.

Measures

Body weight. Body weight was measured using a certified balance-beam scale and weight was recorded to the nearest tenth of a kilogram. Weight was measured at months 0, 6, and 18 by a study nurse masked to treatment condition, and by an interventionist at the beginning of each weekly group session during the initial phase of the study. Women were weighed in light clothing, without shoes, and with emptied pockets. Changes in weight during initial treatment and extended care were calculated by obtaining the difference in body weight between months 0 and 6 and between months 6 to 18, respectively.

Desired amount of weight loss. The Goals and Relative Weights Questionnaire (GRWQ) was used to assess women's desired amount of weight loss (Foster et al., 1997b). The GRWQ contains a section that assesses individuals' weight loss expectations and goals regarding a variety of treatment outcomes, which are classified as "dream," "happy," "acceptable," and "disappointed" weights. The GRWQ has excellent test-retest reliability for "happy," "acceptable," and "disappointed" weights ($r > 0.96$) and acceptable test-retest reliability for "dream" weight ($r = 0.64, p < .01$). For the current study, "happy weight" ("After completing the program, what weight would you be 'happy' with even though it is not your 'dream' weight?") was used in order to assess women's desired amount of weight loss. We then calculated "desired amount of weight loss" as a percentage of body weight (either at month 0 or month 6), then subtracted this value from 1.

Body image dissatisfaction. The Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ) was used to assess body image dissatisfaction (Brown, Cash, & Mikulka, 1990). The Appearance Evaluation subscale of the MBSRQ is comprised of seven items that assess individuals' overall evaluation and satisfaction with their physical appearance (Sarwer, Thompson, & Cash, 2005; Foster et al., 1997a). When using this subscale to assess body image dissatisfaction, lower scores are indicative of greater body image dissatisfaction. The Appearance Evaluation subscale has good test-retest reliability ($r = 0.81$) and internal consistency ($r = 0.77$) (Cash, 1994b).

Physical appearance self-ratings. Physical appearance self-ratings were also assessed using the Appearance Evaluation subscale of the MBSRQ. When using this

subscale to assess individuals' self-ratings of physical appearance, higher scores indicate greater satisfaction with physical appearance.

Statistical Analyses

To evaluate the first aim, a Pearson correlation was calculated between body image dissatisfaction and weight loss at month 0. If a significant association was found between pretreatment body image dissatisfaction and desired weight loss, a follow-up partial correlation was planned to determine the potential moderating effects of pretreatment BMI, with BMI entered as a continuous variable. Additionally, we examined the association between body image dissatisfaction and desired amount of weight loss for each class of BMI using a Pearson correlation. The classes of BMI are Class 1 = 30.0 - 34.9, Class 2 BMI = 35.0 - 39.9, and Class 3 BMI = 40.0 or greater (National Heart, Lung, and Blood Institute, 1998).

To evaluate the second aim of the study, a Pearson correlation was calculated between desired amount of weight loss from months 0 to 6 and weight regain from months 6 to 18. "Desired amount of weight loss" was calculated by dividing women's months 0 and 6 "happy weights" by their actual body weight at the respective time points. Change scores for desired amount of weight loss were then calculated by obtaining the difference between desired amounts of weight loss at months 0 and 6. Weight regain was calculated by obtaining the difference in body weight at months 6 and 18.

To examine the third aim of the study we focused our analyses on those individuals who were primarily motivated to lose weight in order to improve their physical appearance. We calculated a Pearson correlation between change in physical appearance self-ratings from months 0 to 6 and weight regain from months 6 to 18.

Since the second and third aims of the study examined factors that may be associated with weight regain during extended care, individuals were only included in the analyses if they completed initial treatment and lost $\geq 5\%$ of their body weight during initial treatment ($n = 196$). Completion of initial treatment was defined as (1) attendance at $\geq 50\%$ of group sessions, (2) attendance at ≥ 1 session in the final four weeks of initial treatment, and (3) completion of month 0 and month 6 assessments. Independent samples t -tests revealed that there were no significant differences between those individuals included and excluded from the analyses in terms of either pretreatment BMI or age, $t(296) = 1.70, p = .09$; $t(296) = -.67, p = .50$, respectively.

However, a one-way between-subjects ANOVA revealed a significant effect of extended care condition on amount of weight regain during follow-up, $F(2, 180) = 4.53, p < .01$. Post-hoc analyses revealed that individuals randomized to the Mail condition regained significantly more weight ($M = 3.9, SD = 6.5$) than individuals in the Telephone condition ($M = 1.1, SD = 6.5, p = .006$) and the Face-to-Face condition ($M = 0.8, SD = 6.0, p < .01$). Amount of weight regain during extended care was not significantly different between individuals randomized to the Telephone and Face-to-Face conditions, $p = .79$. For this reason, we will also examine weight regain separately for individuals randomized to the Mail condition ($n = 62$) and to the Telephone and Face-to-Face conditions ($n = 121$).

CHAPTER 3 RESULTS

Pretreatment Body Image Dissatisfaction and Desired Weight Loss

At pretreatment, the current study population reported a mean desired weight loss of approximately 26% of body weight, which is similar to the mean desired weight loss reported by other researchers using similar methods of assessment (Foster et al., 1997b). Regarding self-reported levels of body image dissatisfaction, based on the Appearance Evaluation subscale of the MBSRQ, women in our study population reported mean pretreatment scores of 2.3 ($SD = .7$). Other researchers have reported similar mean pretreatment body image dissatisfaction scores of 2.2 ($SD = 0.6$) (Foster et al., 1997a).

Examination of the pretreatment association between body image dissatisfaction and desired amount of weight loss revealed a significant positive association between these two variables ($r = .29, p < .01$). These results suggest that women who report greater body image dissatisfaction also express a desire to lose larger amounts of weight.

In order to better understand the potential role that degree of obesity may play in the observed association between body image dissatisfaction and desired amount of weight loss, we conducted a follow-up partial correlation that included pretreatment BMI as a continuous covariate. Results from the analysis revealed that the association remained significant even after controlling for pretreatment BMI ($r = .27, p < .01$). These results suggest that even when accounting for differences in degree of obesity, the observed relation between body image dissatisfaction and how much weight women wish to lose remains statistically significant.

In further efforts to elucidate the potential influence of BMI on the association between body image dissatisfaction and desired amount of weight loss, we also examined the association for each class of obesity. As can be seen from the results in Table 3-1, among women with BMIs in either Class 1 or Class 2 (i.e., BMIs ranging from 30.00 through 39.99), there were significant associations between desired amount of weight loss and body image dissatisfaction ($r = .27, p = .01, n = 91$; $r = .33, p = .01, n = 61$, respectively). However, among women with BMIs in Class 3 (i.e., BMI of 40 or higher), the same association was not significant ($r = .18, p = .24, n = 46$).

In order to investigate the potential effect of race on desired amounts of weight loss and body image dissatisfaction, as well as the relation between these variables, we conducted independent samples *t*-tests between African-American and Caucasian participants in each BMI class, as well as for the overall study population. We also conducted Pearson correlations to assess the relation between desired amounts of weight loss and body image dissatisfaction among African-American and Caucasian women. Results revealed that African American women reported less body image dissatisfaction than Caucasian women, and that this difference was statistically significant for the entire study population ($p < .01$), as well as separately among each BMI Class ($p < .01$). Furthermore, while there was a non-significant difference in desired amounts of weight loss between African-American and Caucasian women for the overall study population, there was a significant between-group difference among women with BMIs in Class 3 ($p < .05$). Results are presented in Table 3-1.

These results suggest that the overall association between desired weight loss and body image dissatisfaction that was observed for the entire study population is

accounted for by those women in the lower BMI classes. Furthermore, among women with BMIs in Class 3, the significant racial differences in desired amounts of weight loss and levels of body image dissatisfaction may account for the lack of an association between these variables that observed for this BMI class.

Changes in Desired Weight Loss and Long-term Weight Regain

From months 0 to 6, women in the current study decreased their desired amount of weight loss by a mean of 10.4% ($SD = 5.4$). In an effort to determine the extent to which the decrease in desired amount of weight loss was accounted for by decreases in actual body weight or decreases in weight loss expectations, we examined changes in these variables from months 0 to 6. Results revealed that over this time period, women decreased their body weight by a mean of 11.4 kg ($SD = 4.4$) and decreased their weight loss expectations (i.e., “happy weight”) by a mean of 0.2 kg ($SD = 4.6$). A paired-samples t -test revealed a non-significant effect of time on weight loss expectations, $t(195) = -.74$, $p = .46$. This is important because it reveals that an examination of changes in desired amount of weight loss will more truly be an examination of changes in body weight.

A Pearson correlation revealed that there was no relation between change in desired amount of weight loss during initial treatment and weight regain during extended care ($r = .06$, $p = .41$). There was also no association when we examined the relation separately for individuals randomized to the Face-to-Face/Telephone conditions ($r = .13$, $p = .16$) and the Mail condition ($r = -.03$, $p = .85$).

These results appear to suggest that becoming more realistic about the desired amount of weight loss is not related to the ability to maintain weight loss over the longer term. However, as mentioned above, almost all of the observed “change in amount of

desired weight loss” was attributable to changes in body weight, and not to changes in weight loss expectations. For this reason, a Pearson correlation was also conducted between changes in weight loss expectations (i.e., “happy weight”) from months 0 to 6 and changes in body weight from months 6 to 18. Results revealed that there was no detectable association between these factors ($r = .00$, $p = .98$). Results are presented in Table 2.

Changes in Physical Appearance Self-ratings and Long-term Weight Regain

From months 0 to 6, individuals increased their self-ratings of physical appearance by a mean of .54 ($SD = .56$) and experienced a mean increase in weight of 2.2 kg ($SD = 6.4$) from months 6 to 18. This mean improvement in self-ratings of physical appearance is notably less than the mean change of 1.2 ($SD = .8$) reported by Foster et al. (1997a). A paired-samples t -test revealed a main effect of time on physical appearance self-ratings from month 0 to 6, $t(67) = -8.02$, $p < .01$. However, given that scores for items that comprise the Appearance Evaluation subscale range from “0” to “5,” this relatively small change in self-ratings may represent a restriction of range and make it difficult to detect an existing association between changes in physical appearance self-ratings and weight regain. When the Pearson correlation was calculated, no significant association was found between changes in physical appearance self-ratings during initial treatment and weight regain during extended care ($r = -.14$, $p = .30$, $n = 60$).

When we examined the women separately based on extended care condition, we found that those randomized to the Face-to-Face/Telephone conditions experienced a mean improvement in physical appearance self-ratings of .51 ($SD = .53$) from months 0 to 6 and a mean increase in weight of 1.5 kg ($SD = 6.4$) from months 6 to 18.

Additionally, there was no association observed between improvement in physical appearance self-ratings and weight regain for individuals in these conditions ($r = .08$, $p = .66$, $n = 34$). However, women randomized to the Mail condition reported a mean improvement in physical appearance self-ratings of $.59$ ($SD = .60$) from months 0 to 6 and a mean increase in weight of 3.2 kg ($SD = 6.4$) from months 6 to 18. Among these women, the association between physical appearance self-ratings and weight regain approached significance ($r = -.38$, $p = .06$, $n = 26$). Results are presented in Table 3.

Table 3-1. Desired Weight Loss and Body Image Dissatisfaction at Pretreatment by Obesity Class and Race

Degree of Obesity	Desired Weight Loss (M ± SD) ^a	Body Image Dissatisfaction (M ± SD) ^b	<i>n</i>	<i>r</i>	<i>p</i>
Class 1 (BMI= 30.0-34.9)	19.6 ± 5.5	2.4 ± .7	91	.27	.01
African-American	17.3 ± 5.0	2.9 ± .8 ^c	17	.67	< .01
Caucasian	19.2 ± 5.0	2.3 ± .6	70	.08	.49
Class 2 (BMI= 35.0-39.9)	27.4 ± 6.2	2.2 ± .7	61	.33	.01
African-American	25.1 ± 7.4	3.1 ± 1.2 ^c	6	.76	.08
Caucasian	28.8 ± 5.6	2.1 ± .5	50	.12	.40
Class 3 (BMI= 40.0+)	33.9 ± 7.6	2.2 ± .7	46	.18	.24
African-American	29.0 ± 7.9 ^d	2.7 ± .6 ^c	13	.14	.65
Caucasian	33.9 ± 6.0	2.1 ± .7	33	.01	.95
All BMI Classes	25.5 ± 8.6	2.3 ± .7	198	.29	< .01
African-American	22.8 ± 8.4	2.7 ± .8 ^c	36	.42	.01
Caucasian	25.5 ± 8.1	2.2 ± .6	153	.19	.02

^aData presented percentage of pretreatment body weight

^bData represent composite score where "0" indicates high levels of body image dissatisfaction and "5" indicates low levels of body image dissatisfaction

^cSignificant between-group difference (*p* < .01)

^dSignificant between-group difference (*p* < .05)

Table 3-2. Changes in Desired Weight Loss and Weight Regain by Treatment Condition

Extended Care Condition	Change in Desired Weight Loss ^a (Month 0-6)	Change in Body Weight ^a (Month 6-18)	<i>n</i>	<i>r</i>	<i>p</i>
Face-to-Face/Telephone	.4 ± 5.0	1.0 ± 6.2	121	.03	.77
Mail	.1 ± 4.1	3.9 ± 6.5	62	-.08	.53
Entire sample	.2 ± 4.6	2.0 ± 6.5	183	.00	.98

^aData presented in kg as M ± SD

Table 3-3. Improvements in Appearance Self-ratings and Weight Regain by Treatment Condition

Extended Care Condition	Change in Appearance Self- ratings, Months 0-6 ^{a,b}	Change in Body Weight (kg), Months 6-18 ^b	<i>n</i>	<i>r</i>	<i>p</i>
Face-to- face/Telephone	.51 ± .53	1.5 ± 6.4	34	.08	.66
Mail	.59 ± 6.0	3.2 ± 6.4	26	-.38	.06
Entire sample	.54 ± .56	2.2 ± 6.4	60	-.14	.30

^aData represent composite score where "0" indicates low satisfaction with physical appearance and "5" indicates high satisfaction with physical appearance

^bData presented as M ± SD

CHAPTER 4 DISCUSSION

The overall objective of the current study was to examine how appearance-related motivations for weight loss are related to weight loss maintenance. Specifically, the current study examined the association between pretreatment body image dissatisfaction and how much weight women desired to lose. The study also examined how women's changes in expectations about how much weight they would lose during treatment, as well as changes in self-ratings of physical appearance, may be related to success with weight loss maintenance.

There were three major findings from the current study. One of the main findings was that women who expressed greater body image dissatisfaction also desired to lose greater amounts of weight. It was further revealed that this relation was significant for individuals with BMIs in Classes 1 and 2, but not those with BMIs in Class 3. It was also found that African-American women reported significantly lower levels of body image dissatisfaction compared to Caucasian women, and that among women with BMIs in Class 3, African-American women also reported significantly smaller amounts of desired weight loss.

The current study also found that individuals becoming more realistic about how much weight they desired to lose did not predict the amount of weight regain they experienced during the extended care period. Similarly, it was found that improvements in individuals' self-ratings of physical appearance generally did not predict the amount of weight regain experienced during extended care. However, this association approached significance for individuals randomized to the Mail condition in the extended care phase.

Researchers have previously asserted that obese treatment-seeking individuals have unrealistically high expectations about the amount of weight they wish to lose during treatment (Foster et al., 2001), as well as primary motives for desiring to lose such large amounts of weight (Cooper & Fairburn, 2001). Individuals also enter treatment with a high degree of body image dissatisfaction (Sarwer et al., 1998; Adami et al., 1998), which may explain why a desire to improve physical appearance is often the main motive for weight loss among women (Clarke, 2002).

Results from our examination are largely in alignment with those reported by other researchers suggesting that obese individuals enter treatment with unrealistically high expectations about how much weight they wish to lose, as well as high levels of body image dissatisfaction. While the current literature is somewhat divided as to whether a relation exists between degree of obesity and degree of body image dissatisfaction, results from the current study are in agreement with the greater part of the literature that suggests a positive association between these factors (Hill & Williams, 1998). These findings can be best understood in light of the pervasiveness of the “thin ideal” (Greenberg et al., 2003) and the prevalence of weight-related biases and discriminatory practices towards individuals who fall well short of meeting this standard (Puhl & Brownell, 2001; Puhl & Latner, 2008).

These results hold implications for both treatment and research. Treatment professionals may reasonably expect that individuals entering treatment will express high levels of body image dissatisfaction, wish to lose unrealistically large amounts of weight, and that individuals with higher BMIs will express a desire to achieve larger weight losses. Furthermore, they can expect that Caucasian women may express

higher levels of body image dissatisfaction than African-American women, and that among the more obese women (i.e., those with BMIs in Class 3), Caucasian women will likely express a desire to lose larger amounts of weight. Additional research should explore how treatment professionals' reactions to lofty weight loss expectations (e.g., encouragement, discouragement, or neutral responses) may be related to such factors as rapport-building, treatment adherence, and treatment attrition. Future research should also further investigate racial differences in expectations of weight loss treatment and what constitutes a satisfactory outcome.

Results from the current study also suggest that becoming more realistic about the desired amount of weight loss generally does not predict the amount of weight regain experienced during extended care. This finding is in alignment with two studies that have examined this question and similarly found no association between these factors (Ames et al., 2005; Gorin et al., 2007). However, results from the current study are in disagreement with those reported by Linde et al. (2004), who found that less realistic weight loss expectations were associated with better long-term weight maintenance. While these researchers also utilized the GRWQ to assess weight loss expectations, they used individuals' self-reported "dream weight" instead of their "happy weight." This discrepancy in study findings may be better understood in light of the fact that "dream weight" exhibits poorer test-retest reliability than "happy weight." This would suggest that "dream weight" actually measures some other distinct aspect of individuals' weight loss expectations. Furthermore, these researchers examined the association between pretreatment weight loss expectations and weight loss maintenance, and did

not assess how changes in weight loss expectations may be related to long-term outcomes.

While results from the current study would appear to suggest that changes in desired weight loss are unrelated to weight loss maintenance, it is important to reiterate that weight loss expectations (i.e., “happy weight”) in the current study only increased by a mean of 0.2 kg ($SD = 4.6$) from months 0 to 6. This small change in mean weight loss expectations makes it highly difficult to detect any association that may exist. However, this finding holds meaning in its own right. In the current study, adjustment of weight loss expectations was not a target of treatment. This would provide some evidence to suggest that weight loss expectations are highly stable over short periods of time. Future research should attempt to manipulate individuals’ weight loss expectations and examine effects on long-term weight loss outcomes.

Another key finding from this study was that, among individuals for whom improvement in physical appearance was the primary motive for weight loss, improvements in physical appearance self-ratings generally did not predict weight regain during extended care. These findings are largely in agreement with results reported by other researchers that have similarly found no association between these factors (Ames et al., 2005; Gorin et al., 2007).

However, there are three important considerations when assessing the significance of these results. Using the Appearance Evaluation subscale of the MBSRQ, individuals provided composite self-ratings of physical appearance using a “0” to “5” scale, where “0” indicates low levels of satisfaction with physical appearance and “5” indicates high levels of satisfaction with physical appearance. From months 0 to 6,

women reported a mean increase in self-ratings of physical appearance of only .54 ($SD = .56$). This may represent a restriction of range in change scores, which may make it difficult to detect any existing association between changes in physical appearance self-ratings and weight loss maintenance.

Additionally, it is important to note the differences in weight regain between the Face-to-Face/Telephone and the Mail extended care conditions. Individuals randomized to the Face-to-Face/Telephone conditions experienced a mean weight regain of only 1.0 kg ($SD = 6.2$) from months 6 to 18. In contrast to this, individuals randomized to the Mail condition experienced a mean weight regain of 3.9 kg ($SD = 6.5$) over the same time period. Given this sizeable difference in the amount of weight regain, it is notable that the association approached significance among individuals in the Mail condition. It is possible that the greater amount of weight regain in this group allowed for greater sensitivity to detect an association between these two factors.

Furthermore, given the many criteria for inclusion in the analysis of the third study aim, the resulting sample sizes were small for both the Face-to-Face/Telephone ($n = 34$) and Mail ($n = 26$) conditions. These small sample sizes may make it even more difficult to detect any existing association.

Evidence for the Appearance Motivation Hypothesis of Weight Loss Maintenance

Taken together, the three main findings from the current study do not appear to provide support for the appearance motivation hypothesis of weight regain that has been asserted by some researchers (Cooper & Fairburn, 2001). While individuals in this study experienced significant initial decreases in body weight, they adjusted their weight loss expectations by a mean of only 0.2 kg. Regardless, neither of these factors were significantly associated with weight maintenance during the extended care phase.

However, as discussed previously, it is notable that the relation between desired amount of weight loss and weight regain during the extended care phase approached significance among individuals randomized to the Mail condition. A weak argument could be made that individuals did not make significant enough progress towards achieving their desired amount of weight loss (either through decreases in body weight or adjustment of weight loss expectations) and that they subsequently became discouraged about their lack of satisfactory progress towards their goals. The argument would follow that this led to erosion in motivation to maintain the healthy behavior changes and subsequent weight regain. This line of reasoning would likely also hold that, while the same initial phenomenon occurred with individuals randomized to all three extended care conditions, the continued support provided in the Face-to-Face/Telephone conditions was sufficient to enable individuals to continue with the healthy behavior changes.

These findings hold several important implications for treatment and research. The current evidence largely suggests that aiding women in developing more realistic expectations about amounts of weight loss and improvements in physical appearance will not necessarily lead to better long-term weight loss outcomes. However, a body of literature has emerged suggesting that improvements in physical self-appraisal and body image can occur both in accordance with (Foster et al., 1997a), and independent from, changes in body weight. A study conducted by Rosen et al. (1995) aimed to improve body image among a group of obese women using a cognitive behavioral intervention. Despite a lack of weight loss, women were found to have significantly improved their body image at the conclusion of treatment.

Another study conducted by Bacon et al. (2002) randomly assigned obese individuals to either a wellness intervention or a standard behavioral treatment for weight loss. The wellness intervention focused on improving individuals' body image and detaching individuals' sense of self-worth from body weight, without specifically targeting weight loss. At 1-year follow-up, while only the standard behavioral treatment group had experienced significant weight loss, individuals in both conditions experienced significant improvements in body image satisfaction. These studies highlight how changes in body image can occur independent of weight loss. It is therefore recommended that weight loss interventions include a component that addresses development of a healthier body image, as well as detachment of body image and self-acceptance from body weight.

Limitations and Strengths

In considering the results and implications of the current study, it is important to take into account the limitations of the study. The current study utilized a questionnaire that contained several measures of how much weight individuals desired to lose (i.e., "dream," "happy," and "acceptable" weights). "Desired amount of weight loss" was constructed using women's self-reported "happy weight." It is possible that one of these other measures of "desired amount of weight loss" is a more accurate reflection of this variable.

A second limitation relates to the use of the Appearance Evaluation subscale of the MBSRQ to assess body image dissatisfaction and self-perceived physical appearance. While the instrument has been used in numerous research studies, and while the Appearance Evaluation subscale has good test-retest reliability ($r = 0.81$) and internal consistency ($r = 0.77$) (Cash, 1994b; Brown et al., 1990), it is still possible that

it may represent too global a construct and not be sufficiently sensitive to weight-related changes. The seven items that comprise the subscale are as follows: (1) “My body is sexually appealing,” (2) “I like my looks just the way they are,” (3) “Most people would consider me good-looking,” (4) “I like the way I look without my clothes on,” (5) “I like the way my clothes fit me,” (6) “I dislike my physique,” and (7) “I am physically unattractive.”

It is possible that an item may be interpreted in terms of non-weight-related aspects of physical appearance that are more salient. For example, women responding to the item “I like my looks just the way they are” may strongly disagree with this statement because of dissatisfaction with their smile, skin, hair, or some other non-weight-related aspect of physical appearance. As a result, women’s ratings of this item would be unlikely to change over the course of treatment despite weight loss. Future research may benefit from assessing multiple domains of “Appearance Evaluation,” including both weight-related and non-weight-related aspects.

A third limitation of this study is that a primary motive to improve physical appearance may actually be a proxy for some other underlying primary motive. For example, individuals may wish to improve their appearance as a means of attracting a romantic partner, attaining greater success in the workplace, or improving self-confidence.

Lastly, the current study was conducted with a population of older women from rural communities. It is possible that there are differences between younger and older women in terms of weight-related versus non-related sources of body image dissatisfaction, amount of desired weight loss, and effects of weight loss on perceived changes in physical appearance. It is also possible that there are differences between

women in urban, suburban, and rural areas in terms of availability and affordability of healthy foods and proximity to exercise facilities.

The current study also has several important strengths. Many weight loss studies draw largely from urban and suburban populations. However, the current study was conducted with women exclusively from rural counties. This unique characteristic of the study population allows for examination of a substantial, yet relatively understudied, segment of the U.S. population.

Another key strength of the current study is that individuals were randomized to one of three extended care conditions, i.e., Face-to-Face or Telephone counseling (i.e., continued intervention) conditions or a Mail (i.e., education control) condition. This design allowed for comparison of potential differences in weight maintenance between continued intervention and an education control group.

Summary

In summary, many obese individuals experience high levels of body image dissatisfaction, a desire to lose large amounts of weight, and are motivated to lose such large amounts of weight in order to achieve other motives. Results from the current study revealed that, among individuals in BMI Classes 1 and 2, those who desired to lose larger amounts of weight also reported greater body image dissatisfaction. It was also found that African-American women expressed significantly less body image dissatisfaction compared to Caucasian women. However, it was revealed that an individual moving closer to their desired amount of weight loss during initial treatment was generally unrelated to weight regain during extended care. Similarly, it was found that an individual's improvements in self-ratings of physical appearance during initial treatment were unrelated to weight regain during extended care. However, it is possible

that the lack of change in individuals' weight loss expectations and self-ratings of physical appearance during initial treatment made is highly difficult to detect an existing association.

Overall, the findings from the current study do not appear to support the appearance motivation hypothesis of weight regain. However, given the restriction of range of change scores for two of the study aims, the findings should be interpreted with care. Future research should focus on manipulating these variables (i.e., weight loss expectations and satisfaction with physical appearance) in order to stimulate greater variability in these variables. Despite these limitations, treatment professionals may reasonably expect individuals to present with a desire to lose large amounts of weight and make major improvements to their physical appearance. Even though these domains appear to be unrelated to long-term weight outcomes, the fostering of more realistic weight loss and physical appearance expectations may have a significant impact on other less tangible treatment outcomes that may have a positive impact on individuals' body image acceptance, self-confidence, and treatment satisfaction.

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BIOGRAPHICAL SKETCH

Valerie Joy Hoover was born in 1982 in Lancaster County, Pennsylvania. She graduated from Lancaster Mennonite High School in 2000. Valerie then attended Temple University and graduated magna cum laude in 2004 with a Bachelor of Arts in Psychology. Following graduation, Valerie worked as a research assistant at the University of Pennsylvania from 2004-2006, where she assisted in the development of a set of evidence-based substance abuse treatment resources for use by novice clinicians. In pursuit of her interest in obesity treatment research, in 2006, Valerie accepted a position as a clinical research coordinator at the Washington Center for Clinical Research in Washington, D.C. In this capacity, Valerie oversaw the implementation of several studies assessing the utility of plant-based dietary interventions for weight loss and management of type 2 diabetes. In fall 2008, Valerie entered the Clinical and Health Psychology doctoral program at the University of Florida in Gainesville, Florida. Valerie is currently pursuing her research interests in the areas of obesity and binge eating disorder.