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INVESTIGATING THE EFFECTS OF OBESITY PREVENTION CAMPAIGNS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University.

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Abstract

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2015

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Public health campaigns might not be universally helpful and could have detrimental consequences. The current investigation explored the effects of obesity prevention campaigns. Their impact was assessed using an experiment in which participants were randomized to view either weight focused obesity prevention campaigns or obesity prevention campaigns that did not use weight related terms. Results demonstrated that compared with campaigns without weight related terminology, weight focused campaigns increased negative perceptions of obesity and decreased self-efficacy for health behavior change. No differences in body satisfaction, thin-ideal internalization, state anxiety, or frequency of positive health behaviors were found based on the type of campaign viewed. Finally, exposure to both types of campaigns increased internalization of the thin-ideal. This study demonstrates that weight focused prevention messages pose serious

public health consequences. Obesity prevention campaigns should refrain from using weight-related terminology and instead emphasize the positive health consequences of a healthy diet and physical activity.

Investigating the Effects of Obesity Prevention Campaigns

Public health campaigns are frequently used to disseminate information regarding wellness and to promote positive health behavior change. In recent years, the rising prevalence of obesity has received considerable attention (Caballero, 2007). In response, numerous organizations have created public service announcements and educational materials to improve nutrition and increase physical activity. Although obesity prevention is an admirable goal, some scholars have suggested that health promotion messages can have unintended, harmful consequences (O'Dea, 2005; Wolburg, 2004; Witte & Allen, 2000). Specifically, in the case of obesity prevention, it is feared that overzealous efforts might inadvertently promote disordered eating behaviors and attitudes (Haines & Neumark-Sztainer, 2006; O'Dea, 2005). However, little research has examined the direct impact of obesity prevention campaigns on disordered eating attitudes and symptoms.

One reason for concern about obesity prevention campaigns is that these multimedia messages often employ fear-based appeals to highlight the detrimental consequences of excessive weight (Rutter, Abraham, & Kok, 2001). Extensive research has investigated the efficacy of fear appeals, and although under certain circumstances they are a successful means of promoting behavioral change, data and theory suggest they must be used cautiously (Witte & Allen, 2000).

Unfortunately, many obesity prevention campaigns do not reflect awareness of the research on fear-based appeals. Thus, a concern is that these public health messages might create considerable anxiety for overweight individuals without offering a feasible method of protective action (Witte, 1992; Kleinot & Rogers, 1982). To manage the apprehension brought on by anti-

obesity messages, individuals might engage in risky health behaviors, including extreme weight loss efforts (Wolburg, 2004; Fishbein, Hall-Jamieson, Zimmer, von Haefen, & Nabi, 2002).

Furthermore, obesity prevention campaigns frequently imply personal responsibility and blame for excess weight (Puhl, Luedicke, & Peterson, 2013; Puhl, Peterson, & Luedicke, 2012).

Evidence demonstrates that individuals who feel shamed about their body weight are more likely to avoid exercise and to engage in unhealthy eating behaviors (O'Dea, 2005). Therefore, fear-based public health campaigns that communicate stigmatizing messages might unintentionally facilitate, rather than reduce, risky behavior (Fishbein et al., 2002).

Moreover, the use of fear-based appeals in obesity prevention campaigns might trigger anxiety and distress not only in overweight individuals, but also in individuals of normal weight (Dooly, Deshpande, Adair, 2010). In particular, campaigns focusing on weight-related terms to prevent obesity might induce apprehension surrounding body weight and instill body dissatisfaction in average weight individuals. This is concerning, as body image disturbance is one of the strongest known risk factors for the development of an eating disorder (Stice, 2002). Furthermore, these messages could trigger unhealthy weight control behaviors, which often precede the development of threshold eating disorders (Watson, 2011; Neumark-Stzainer et al., 2007). It is therefore critical to assess the influence of obesity prevention campaigns on these established risk factors for eating and weight related disorders.

Thus, the purpose of the current study was to examine the potential consequences of obesity prevention campaigns. The effects of these campaigns were assessed using an experiment, in which half of the participants viewed public health promotion messages that used weight related terms, and the other half viewed public health promotion messages that did not

use weight related terms. This study evaluated the effects of these different campaigns on eating disorder-related attitudes and behaviors and motivation to make positive health changes.

Definition, Prevalence, and Correlates of Obesity and Eating Disorders

Obesity. Obesity is a medical condition characterized by an amount of body fat that adversely affects health (World Health Organization, 2000). Body mass index (BMI) is the most widely used measure of obesity, defined as weight in kilograms divided by height in meters squared. The classification of unhealthy body fat in adults is based on the BMI categories of underweight (BMI less than 18.5), normal weight (BMI between 18.5 and 25), overweight (BMI more than 25, but less than 30), and obesity (BMI greater than 30). The obesity cutoff represents the level at which excess body weight is expected to impair health (WHO, 2000).

The prevalence of obesity has increased dramatically over the last two decades. In 2013, the Centers for Disease Control and Prevention reported that 35.7% of adults and 17% of children and adolescents were obese. Increases in obesity rates have occurred in all ages and racial/ethnic groups, and in both genders (Ogden, Carroll, Kit, & Flegal, 2014; Wang & Beydoun, 2007; National Institutes of Health, 1998). The escalating prevalence of obesity is worrisome given its associated comorbidities.

Numerous physical health consequences frequently co-occur with obesity, including cardiovascular disease, hypertension, stroke, diabetes, gallbladder disease, and certain cancers (WHO, 2000). Further, there are several non-fatal but debilitating physical consequences related to obesity, including osteoarthritis, respiratory difficulties, chronic musculoskeletal problems, skin problems, and infertility (WHO, 2000). The myriad health repercussions of obesity increase risk of premature death in individuals with the condition. A systematic review of the mortality

risks accompanying individuals of varying weights demonstrated that obesity was associated with significantly higher all-cause mortality (Flegal, Kit, Orpana, & Graubard, 2013).

In addition to physical and medical complications, obesity is also associated with poor psychological well-being. Specifically, individuals with obesity are more likely than their peers to report poor perceived health, low self-esteem, impaired social functioning, body dissatisfaction, and depression. A recent meta-analysis found that individuals with obesity had a 55% greater risk of developing depression compared with normal-weight individuals (Luppino et al., 2010). Another cross-sectional study found a positive linear relation between negative affect and BMI (Pasco, Williams, Jacka, Brennan, & Berk, 2013). Furthermore, many individuals with obesity experience weight stigmatization. Negative attitudes towards obese individuals translate into discrimination in educational, employment, and health care contexts, and the experience of weight stigma exacerbates the risk of depression, low self-esteem, and body dissatisfaction (Gatineau & Dent, 2011). Thus, the physical and psychological health consequences of obesity hinder an individual's quality of life and represent a major public health issue.

Eating disorders. Eating disorders are mental illnesses that involve disturbances in emotions, attitudes, and behaviors surrounding food and weight. The most prevalent eating disorders identified in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), are anorexia nervosa, binge eating disorder, and bulimia nervosa (APA, 2013).

Anorexia nervosa (AN) is distinguished by self-induced starvation that leads to a body weight significantly lower than that considered normal for an individual's developmental stage (APA, 2013). Even though they are underweight, individuals with this condition harbor an extreme fear of gaining weight or becoming fat. Furthermore, an individual with AN experiences a disturbance in self-perceived body weight and size (APA, 2013).

Binge eating disorder (BED) is characterized by recurrent episodes of binge eating, defined as consuming a large quantity of food in a discrete period of time, usually to the point of discomfort and regardless of actual hunger (APA, 2013). Binges must be accompanied by a sense of lack of control over eating and cause significant distress. To meet criteria for BED, the binge episodes must occur at least once a week for three months (APA, 2013).

Bulimia nervosa (BN) involves frequent episodes of binge eating followed by maladaptive compensatory behaviors to prevent weight gain (APA, 2013). These compensatory behaviors include self-induced vomiting, excessive exercise, fasting, and the misuse of laxatives, enemas, or diuretics. Additionally, the self-evaluation of an individual with BN is inordinately influenced by body shape and weight. To meet BN diagnostic criteria, binge eating and compensatory behaviors must occur at least once a week for three months (APA, 2013).

The incidence of eating disorders increased significantly in the past few decades, particularly for BN and BED (Hudson, Hiripi, Pope, & Kessler, 2007; Hoek & van Hoeken, 2003). Eating disorders are also becoming more widespread in ethnically and racially diverse individuals from a range of socioeconomic groups (Shaw, Ramirez, Trost, Randall, & Stice, 2004). Furthermore, although rates of eating disorders are generally 1.75-3 times higher in females, research has identified an increase in bulimic and binge eating behaviors among males (Hudson et al., 2007). In the National Comorbidity Survey Replication, lifetime prevalence estimates of AN, BN, and BED were .9%, 1.5%, and 3.5% for females, and .3%, .5%, and 3.0% for males (Hudson et al., 2007). The growing prevalence of eating disorders is troubling, especially given the extensive medical and psychological comorbidities associated with these conditions.

Specifically, eating disorders are associated with serious and often lethal consequences, including the most extensive medical complications of any psychiatric disorder (Klump, Bulik, Kaye, Treasure, & Tyson, 2009). The physical complications of eating disorders can include cardiac arrhythmia, loss of brain mass, osteoporosis, diabetes, infertility, asthma, bowel paralysis, electrolyte imbalance, gastric rupture, anemia, liver failure, kidney dysfunction, and heart failure. Hospitalization for the medical problems instigated by eating disorders is not uncommon, and in the past decade these hospitalizations increased by 18% (Zhao & Encinosa, 2009). The mortality rate for individuals with eating disorders is higher than that of individuals with any other mental disorder, and the suicide mortality rate among individuals with eating disorders is also greater than that of individuals with any other psychiatric condition (Keel & Herzog, 2004). Roughly 20% of individuals suffering from an eating disorder will die from their condition, with 20-30% of these deaths the result of suicide (Keel, Doer, Eddy, Franko, Charatan, & Herzog, 2003).

In addition to these medical complications, psychiatric comorbidities are common among individuals with eating disorders. In the National Comorbidity Survey replication, 56.2% of individuals with AN, 95.5% with BN, and 78.9% with BED met criteria for at least one additional *DSM-IV* disorder (Hudson et al., 2007; APA, 2000). Specifically, eating disorders were associated with mood, anxiety, impulse-control, and substance use disorders. Furthermore, eating disorders are attendant with body dissatisfaction, low self-esteem, and poor social functioning. The adverse emotional consequences of eating disorders impede daily functioning; 53.1%-78.0% of individuals with these conditions report at least some role impairment in their home, work, personal, or social lives (Hudson et al., 2007). Therefore, the repercussions of

eating disorders are detrimental to an individual's quality of life and are a serious public health concern.

Unhealthy weight control behaviors. Unhealthy weight control behaviors are extreme dietary practices that are dangerous from a physical and psychological perspective. Examples include fasting, self-induced vomiting, excessive exercise, chronic dieting, and misuse of diet pills, laxatives, or diuretics (Neumark-Sztainer, Wall, Guo, Story, Haines, & Eisenberg, 2006). Unhealthy weight control behaviors can be considered subthreshold disordered eating symptoms. These symptoms do not meet full eating disorder criteria due to their lower frequency, duration and/or severity compared with that required for clinical diagnoses (Chamay-Weber, Narring, & Michaud, 2005; Mintz & Betz, 1988).

The use of unhealthy behaviors to control weight is common (Vander Wal, 2011; Croll, Neumark-Sztainer, Story, & Ireland, 2002). In a population-based study of 81,247 9th and 12th graders, approximately 55% of females and 30% of males engaged in these behaviors (Croll et al., 2002). Moreover, harmful attempts to modify weight were evident across gender, ethnicity, socioeconomic, and age groups (Vander Wal, 2011; Boutelle, Neumark-Sztainer, Story, & Resnick, 2002; Neumark-Sztainer, Story, Hannan, Perry, & Irving, 2002; Peters, Amos, Hoerr, Koszewski, Huang, & Betts, 1996). Research investigating the longitudinal predictors of disordered eating in young adults indicates that adolescents continue to engage in unhealthy weight control behaviors into young adulthood, and these behaviors become more frequent over time (Liechty & Lee, 2013). The fact that unhealthy weight modification behaviors are highly prevalent is concerning, as these behaviors can have serious consequences (Mintz & Betz, 1988).

A multitude of health compromising behaviors are attendant with extreme weight control practices (Neumark-Sztainer, Story, Dixon, & Murray, 1998). Crow, Eisenberg, Story, and

Neumark-Sztainer (2006) investigated the correlates of eating and weight-related behaviors in adolescent males and females and found that individuals who dieted were significantly more likely than non-dieting individuals to engage in extreme weight control behaviors and to use alcohol, marijuana, and tobacco. Dieters were also more likely to report low self-esteem, body dissatisfaction, and depressive symptoms (Crow et al., 2006). Moreover, the relation between unhealthy weight control behaviors and adverse health outcomes was similar for overweight and non-overweight youth, highlighting the significance of these behaviors across the BMI spectrum. Additional research supports and extends these findings, demonstrating that extreme weight control practices are associated with delinquency, suicidal ideation and attempts, unprotected sexual activity, and depression and anxiety (Neumark-Sztainer et al., 1998; Patton, Carlin, Hibbert, Rosier, Selzer, & Bowes, 1997; Neumark-Sztainer, Story, & French, 1996). Overall, research suggests that subthreshold disordered eating behaviors are associated with increased risk for health compromising behaviors and poor emotional adjustment, and these links are independent of weight status (Crow et al., 2006; Neumark-Sztainer et al., 1998; Patton et al., 1997; Neumark-Sztainer, Story, & French, 1996).

The number of youth participating in unhealthy weight control practices is also troublesome given the long-term health consequences of these behaviors. In a 10-year longitudinal study examining predictors of overweight and obesity, the frequency of unhealthy weight control behaviors and dieting in adolescence was positively associated with weight gain at follow-up in both males and females (Quick, Wall, Larson, Haines, & Neumark-Sztainer, 2013). Furthermore, females who increased their engagement in extreme weight control behaviors over the course of the study were twice as likely to be overweight at follow-up. Other research further supports this outcome, suggesting unhealthy weight management practices are

linked with overeating or binge eating, resulting in weight gain over time (Stice, 2001). Moreover, such behaviors increase eating disorder risk (Neumark-Sztainer et al., 2006). Thus, although extreme weight control behaviors are not uncommon, their consequences can be dangerous and they represent a public health challenge.

Spectrum of Weight-Related Disorders

Over the past few decades, the prevalence of obesity, eating disorders, and unhealthy weight control behaviors have increased simultaneously. Eating disorders and obesity have historically been regarded as disparate problems, with separate etiologies, trajectories, and methods of treatment and prevention (Irving & Neumark-Sztainer, 2002). However, there is evidence to support that obesity, eating disorders, and unhealthy weight control behaviors are strongly related.

Specifically, research indicates that obesity and eating disorders frequently co-occur (Neumark-Sztainer et al., 2002). In the National Comorbidity Survey replication, approximately 30% of individuals with a lifetime diagnosis of BN, and 40% of individuals with a lifetime diagnosis of BED, were obese (Hudson et al., 2007). Furthermore, there is a positive relation between overweight status and binge eating (Wilson, 1994).

Darby, Hay, Mond, Quirk, Buttner, & Kennedy (2009) conducted a cross-sectional study assessing the co-occurrence of obesity and eating disorder behaviors in South Australia. Participants were interviewed in 1995 and 2005, and results indicated that the prevalence of comorbid obesity and eating disorder behaviors increased from 1 to 3.5%. The co-occurrence of the conditions increased more than either obesity or eating disorders alone, and it was estimated that one in every five obese individuals engaged in eating disordered behaviors (Darby et al., 2009).

Another large population-based study examining adolescents' eating patterns, Project EAT (Eating Among Teens), found that 76% of obese females and 55.4% of obese males engaged in unhealthy weight control behaviors (e.g., fasting, eating little food, using a food substitute like powder or a special drink, skipping meals, smoking more cigarettes). Additionally, 17.9% of females and 6.3% of males engaged in extreme weight control behaviors (using diet pills, laxatives, diuretics, or vomiting; Neumark-Sztainer et al., 2002). Furthermore, 21% of obese females and 11.9% of obese males reported binge eating. Overall, compared with non-overweight youth, overweight adolescents were much more likely to engage in inappropriate weight control practices and binge eating (Neumark-Sztainer et al., 2002). Other research has yielded similar results (Darby, Hay, Mond, Rodgers, & Own, 2007; Haines & Neumark-Sztainer, 2006; Boutelle et al., 2002; Neumark-Sztainer et al., 1998).

Unhealthy weight control behaviors have detrimental effects for normal weight and underweight individuals as well. Numerous studies illustrate that dieting is not an effective weight loss method; rather, it is associated with weight gain over time (Neumark-Sztainer et al., 2006; Field et al., 2003; Stice, Cameron, Killen, Hayward, & Taylor, 1999). In one longitudinal study, females engaging in both unhealthy weight control behaviors and "healthy" dieting were three times more likely to be overweight compared with females who did not use any weight modification practices (Neumark-Sztainer et al., 2006). Furthermore, at 5-year follow-up, none of the weight control behaviors were associated with decreases in BMI or overweight status. The strongest predictor of eating disordered behavior was dieting, and it was counterproductive to weight loss. Additionally, in a prospective study of 8,203 girls and 6,769 boys, Field and colleagues (2003) found that males and females who dieted frequently were at seven and 12 times the risk, respectively, for binge eating compared with individuals who did not diet.

Adolescents who reported dieting at baseline had gained more weight than non-dieters at the 3-year follow-up. This research is consistent with other studies indicating that individuals who frequently diet and use unhealthy weight control practices are more likely to gain weight over time and have a higher risk of overweight and obesity (Neumark-Sztainer et al., 2006; Field et al., 2003; Stice et al., 1999).

Given the established overlap among obesity, eating disorders, and unhealthy weight control behaviors, Neumark-Sztainer (2003) proposes viewing weight-related disorders on a spectrum, with obesity on one end of the spectrum, AN and BN on the other end, and the range of unhealthy weight behaviors in the middle. This spectrum approach has limitations, as AN is not the opposite of obesity and individuals using unhealthy weight control behaviors are not necessarily of average weight. However, conceptualizing these behaviors as occurring on a spectrum is helpful in reminding the general public of the serious and detrimental consequences of all of the weight-related conditions, each of which generally involves using food for non-nutritive purposes (Neumark-Sztainer, 2003).

Predictors of Weight-Related Disorders

Obesity, eating disorders, and unhealthy weight control behaviors are influenced by several of the same risk and protective factors. In Project EAT, data were collected at two time points to identify shared risk and protective factors for weight-related problems from socio-environmental, personal, and behavioral domains (Neumark-Sztainer, Wall, Haines, Story, Sherwood, & van den Berg, 2007). In this sample of 2,516 adolescents, weight-related problems were identified in 44% of females and 29% of males. Risk factors for weight-related problems included weight teasing by family, personal weight and body concerns, dieting, and unhealthy weight control behaviors. For females, family meal frequency, a positive family meal

atmosphere, and lunch frequency protected against the development of weight-related problems. No protective factors were found for males. The authors conclude that obesity, eating disorders, and extreme weight control behaviors comprise a spectrum of weight-related problems (Neumark-Sztainer et al., 2007).

Irving and Neumark-Sztainer (2002) proposed a model of factors that contribute to the onset of weight-related disorders. Their model was grounded in social cognitive theory, which posits that behavior change is the result of alteration in both the socio-environmental and personal domains (Bandura, 1977). Constructs included in the model are discussed in the following paragraphs.

Sociocultural factors. Obesity, eating disorders, and unhealthy weight control behaviors are considered products of an increasingly “toxic” food and weight environment (Battle & Brownell, 1996). The current cultural context delivers mixed messages by glorifying thinness, stigmatizing fatness, promoting the consumption of high fat foods, and promising easy weight loss solutions (Battle & Brownell, 1996). The media are assumed to contribute to the development of weight-related behaviors in multiple ways. On average, adolescents spend 6.5 hours a day engaging with media by watching television, playing video games, using computers, and listening to music (Rideout, Roberts, & Foehr, 2005). Time spent in these activities reduces time available to engage in physical activity (Robinson, 1999). Furthermore, the media models and reinforces the intake of energy-dense foods through constant advertisements for fast foods, soda, sugared cereals, candy, and other “junk” foods (Robinson, 1999).

In addition to encouraging consumption of energy-dense foods, the media promotes the thin beauty ideal (Irving & Neumark-Sztainer, 2002). Mainstream media images reflect and shape the public’s perceptions and standards of beauty, enhancing the desirability of thinness

(Thompson et al., 1999). Individuals might go to extreme measures to emulate the thin ideal. In a meta-analysis of 25 studies examining the effects of experimental manipulation of the thin ideal, body image satisfaction significantly decreased after exposure to thin media images (Groesz, Levine, & Murnen, 2002). Furthermore, weight loss advertisements are widespread, communicating the message that people are not okay the way they are. This societal pressure to be thin is believed to be an important contributor to high levels of body dissatisfaction and eating disturbance, particularly for women (Stice, 2002).

In addition to the media, relationships with family and peers play a major role in how individuals relate to food and physical activity (Irving & Neumark-Sztainer, 2002). Specifically, weight teasing and stigmatization can trigger unhealthy weight-control behaviors (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006; Neumark-Sztainer, Falkner, Story, Perry, Hannan, & Mulert, 2002). Longitudinal research from Project EAT examined the relation between weight-related teasing and disordered eating behaviors in a large sample of adolescents (Haines et al., 2006). In both men and women, weight teasing predicted binge eating with loss of control at 5-year follow-up. Additionally, among female adolescents, weight teasing predicted frequent dieting (Haines et al., 2006). Furthermore, in a cross-sectional population-based study of adolescents, both overweight and underweight individuals recounted higher levels of teasing than individuals of average weight. Experiences of weight ridicule were significantly associated with unhealthy weight control behaviors. Adolescents with a history of teasing were twice as likely to engage in binge eating than adolescents without a history of teasing, placing them at an increased risk for weight gain (Neumark-Sztainer et al., 2002). Moreover, research investigating risk factors for binge eating indicates weight stigmatization significantly contributes to this eating behavior (Almeida, Savoy, & Boxer, 2011). Another cross-sectional study of adolescent

girls investigated the impact of weight-related teasing by family members (Keery, Boutelle, van den Berg, & Thompson, 2005). Girls who experienced familial ridicule concerning their weight displayed higher levels of restrictive and bulimic eating behaviors, as well as greater body dissatisfaction, depressive symptoms, and lower self-esteem (Kerry et al., 2005). Overall, research suggests the experience of weight-related teasing and parental weight-related concerns in adolescence are strongly associated with the incidence of overweight in young adulthood (Quick et al., 2013).

Personal factors. Negative body image and weight/shape preoccupation are well-established predictors of eating disorders and unhealthy weight control behaviors (Stice, 2002; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Button, Songua-Barke, Davies, & Thompson, 1996). Body dissatisfaction is described as “negative subjective evaluations of one’s physical body, such as figure, weight, stomach, and hips” (Stice & Shaw, 2002, pg. 985). This body image discontent often prompts individuals to engage in weight modification practices to lose weight; these practices can include extreme and ineffective measures (Stice, 2002). Indeed, body dissatisfaction is the strongest and most consistent predictor of eating disorder symptoms (Thompson et al., 1999; Button et al., 1996).

Although the influence of body image on disordered eating is rarely contested, its relation to obesity is less clear. Heinberg, Thompson, and Matzon (2001) posit that some amount of body dissatisfaction might be motivating for individuals of higher weights and could lead them to engage in healthy weight control behaviors. However, recent research challenges this theory. Specifically, a 5-year population-based longitudinal study examining body satisfaction and weight related behaviors found that adolescents with low body satisfaction did not experience beneficial outcomes in terms of healthy weight control behaviors (Neumark-Sztainer, Paxton,

Hannan, Haines, & Story, 2006). Rather, low body satisfaction predicted more health-compromising behaviors and fewer health-promoting behaviors. Furthermore, in the same sample, body dissatisfaction was associated with greater weight gain over time (van den Berg & Neumark-Sztainer, 2007). Quick and colleagues (2013) infer that individuals with low body satisfaction might engage in unhealthy weight control behaviors in an attempt to manage their weight, however these behaviors have the opposite effect, triggering overeating and resulting weight gain (van den Berg & Neumark-Sztainer, 2007).

Gender is another important risk factor for eating disorders, as a considerable amount of research demonstrates that women are at a higher risk for weight related disorders and are more likely to be diagnosed with an eating disorder (Ferreiro, Seoane, & Senra, 2011; Hudson et al., 2007; Acho, Arija, Asorey, & Canals, 2007; Kjelsas, Bloronstorm, & Gotestam, 2004; Hoek & Van Hoeken, 2003). In the National Comorbidity Survey Replication, the lifetime prevalence of eating disorders was 1.75 to 3 times higher for women than men (Hudson et al., 2007). Moreover, in a comprehensive literature review exploring the prevalence and incidence of eating disorders, findings indicated that while eating disorders are rare in the general population, they are relatively common among adolescent girls and young women (Hoek & Van Hoeken, 2003). Specifically, women ages 15-24 years old are most likely to display eating psychopathology (Hoek & Van Hoeken, 2003).

Furthermore, women are more likely than males to engage in unhealthy and extreme weight control behaviors (Neumark-Sztainer et al., 2002; Neumark-Sztainer et al., 2002; Boutelle et al., 2002). In large population based study investigating the risk and protective factors of unhealthy weight control behaviors by gender, 55% of women reported engaging in unhealthy weight control behaviors including fasting, smoking cigarettes, using diet pills, vomiting, and taking laxatives compared with 30% of men (Croll et al., 2002). This finding is

comparable to other research suggesting that more than half of women and approximately one third of men engage in unhealthy weight-control behaviors (Sim, Lebow, & Billings, 2013; Neumark-Sztainer et al., 2006). Certainly, gender appears to play an important role in risk for weight-related disorders.

Negative affect and anxiety are additional individual factors that appear to influence disordered eating behavior. In a meta-analysis of prospective and experimental studies investigating risk factors for eating pathology, negative affect emerged as a significant risk factor for eating pathology and a maintenance factor for binge eating (Stice, 2002). Furthermore, anxiety disorders occur more frequently in individuals with eating disorders than in the general population (Swinbourne & Touyz, 2007). Research demonstrates that in most instances, anxiety precedes eating disorders, indicating that early onset anxiety might be a predictor for the development of an eating disorder (Swinbourne & Touyz, 2007; Bulik, 2003)

Moreover, Goossens, Braet, Van Vlierberghe, and Mels (2008) found that overweight adolescents who were highly anxious were more likely than their less anxious peers to lose control over their eating behavior. According to the affect regulation model, individuals engage in binge eating behavior in an attempt to seek comfort and distraction from painful negative emotions (Hawkins & Clement, 1984). Therefore, compensatory behaviors such as self-induced vomiting, laxative abuse, and excessive exercise might be used to reduce anxiety surrounding impending weight gain after overeating.

Obesity Prevention in the Media

Exposure to media images of obese individuals appears to enhance internalization of the thin ideal (Dooley, Deshpande, & Adiar, 2010; Thompson et al., 1999). For example, in a study examining the effects of obesity prevention messages, participants were assigned to view public service announcements that either portrayed an ideal body type, illustrated the health benefits of

physical activity and/or healthy eating, emphasized the fun aspects of physical activity, or focused on health behaviors other than physical activity or healthy eating (Dooley, Deshpande, & Adiar, 2010). Results indicated that campaigns depicting overweight individuals significantly increased participants' anxiety. Given the hypothesized link between negative affect and thin ideal internalization, the authors concluded that exposure to overweight and media images might lead to internalization of the thin ideal (Haines & Neumark-Sztainer, 2006; Dooley, Deshpande, & Adiar, 2010). Further, they suggest that viewing overweight images might potentially (and inadvertently) trigger the development of disordered eating (Dooley, Deshpande, & Adiar, 2010).

Given the rising prevalence of the spectrum of weight related disorders, their detrimental psychological and physical health consequences, and the fact that they are difficult to treat, prevention is essential. Currently, however, public health prevention campaigns focus specifically on obesity and emphasize weight loss. These anti-obesity campaigns are becoming widespread (Puhl, Peterson, & Luedicke, 2012).

Multimedia obesity prevention campaigns often stress the adverse health consequences of excessive weight. These campaigns create a threat of impending harm, highlight the detrimental effects of obesity on well-being, and recommend protective action (Rutter, Abraham, & Kok, 2001). For example, the New York City Department of Health and Mental Hygiene (2012) created a series of advertisements depicting obese adults and the consequences of excess weight. One of the billboards displayed an overweight woman in a motorized wheelchair with the text: "portions have grown; so has obesity, which can lead to many health problems." This mode of communication, known as a fear appeal, is frequently used in public health campaigns. A fear appeal is defined as "persuasive communication attempting to arouse fear in order to promote precautionary motivation and self-protective action" (Rutter, Abraham, & Kok, 2001, pg. 614).

The fundamental goal of a fear appeal is to scare individuals into doing what the message advises (Witte, 1992). Fear appeals might stimulate change, however they do not always function as planned (Eppright, Hunt, Tanner, & Franke, 2002). The circumstances considered necessary for fear appeals to motivate change are discussed in the following section.

Theoretical Models of Fear Appeals

The three primary theories of fear appeals include the fear-as-acquired drive model, the parallel process model, and the protection motivation theory. Additionally, the extended parallel process model was developed most recently and integrates the three perspectives into one theory. The following sections review each of these theories.

Fear-as-acquired drive model. The fear-as-acquired drive model was one of the earliest theories proposed to explain responses to fear appeals. Fear arousal is understood to act as a motivational process, or drive, that initiates action (Witte & Allen, 2000). This theory presents a curvilinear model, suggesting an inverted U shape relation between fear arousal and message acceptance (Janis, 1967). It proposes that moderate levels of fear arousal will facilitate attitude and behavior change, but excessive arousal will not. Janis (1967) claimed that low to moderate levels of fear arousal encourage an individual to become more aware of the health recommendations included in a message, and motivate precautionary action. However, moderate to high levels of fear arousal trigger defensive processing and interfere with message acceptance (Janis & Feshbach, 1953). This elevated emotional tension leads to maladaptive methods of fear reduction, and potentially intensified risk behavior (Janis, 1967).

Empirical support for the fear-as-acquired drive model is weak. In a meta-analysis of the effectiveness of fear appeals, Witte and Allen (2000) found no support for the curvilinear model. Furthermore, data suggest that high fear appeals are more persuasive and lead to greater attitude

change than low fear appeals (Witte & Allen, 2000). Once Janis' model was uncorroborated, research began to examine the cognitive aspects of reactions to fear inducing messages, as described in the following sections (Witte & Allen, 2000).

Parallel process model. The parallel process model proposes that fear appeals generate two different coping responses, a fear control process and a danger control process. Each of these processes independently affects behavior (Leventhal, 1970). The fear control process is an emotional attempt to control an individual's fear about the threat. It occurs when the threat is perceived as difficult to eradicate, and creates reassurance by denying or discrediting the message. This coping method is maladaptive, as the risk behavior is not reduced and the perceived harm is not prevented (Leventhal, 1970). On the other hand, the danger control process is a cognitive effort to control the threat. It happens when an individual perceives the threat as easy to eliminate and develops strategies to avert it. This coping method is adaptive, as it generates protective action and decreases the problem behavior (Leventhal, 1970). Thus, whether a fear appeal induces defensive processing or behavior change is presumed to depend on an individual's perception of his/her ability to achieve the recommended response (Witte & Allen, 2000; Leventhal, 1970).

Witte and Allen's (2000) meta-analysis of the efficacy of fear appeals found that fear control responses were inversely correlated with danger control responses. Specifically, the more an individual engages in defensive processing to avoid a threat, the less likely s/he is to make adaptive changes to reduce problem behavior. This supports the parallel process model's assertion that fear appeals prompt two separate and independent coping responses (Witte & Allen, 2000).

Protection motivation theory. The protection motivation theory focuses on the cognitive mediational processes elicited by the message components of fear appeals to explain danger control actions (Rippetoe & Rogers, 1987; Rogers, 1983). The message of a fear appeal is said to initiate two appraisal processes, a threat appraisal and a coping appraisal. The threat appraisal process evaluates the perceived severity of the threat and the perceived probability of its occurrence. The outcome of this appraisal determines the likelihood of a maladaptive response. If the intrinsic and extrinsic rewards of continuing to engaging in the maladaptive behavior are greater than the perceived severity of the threat and the perceived probability of the threat's occurrence, then an individual is not motivated to change his/her behavior. However, if the perceived severity and probability outweigh the rewards, an individual is motivated to take protective action (Rogers, 1983).

The coping appraisal process evaluates the perceived effectiveness of the recommended protective response and the individual's self-efficacy to perform it (Rogers, 1983). The outcome of this appraisal determines the likelihood of an adaptive response. If the costs of engaging in the advocated behavior are seen as too great, the probability of behavior change is unlikely. On the other hand, if an individual perceives the adaptive behavior as effective and believes s/he is able to perform the recommended response, then s/he is more motivated to take protective action (Rogers, 1983).

Overall, the protection motivation theory hypothesizes that when all four cognitive mediation processes (perceived severity of threat, probability of threat's occurrence, efficacy of advocated response, and self-efficacy to perform the response) are high, individuals are encouraged to take protective action and control the perceived danger (Rogers, 1983). The assumption that fear appeals require high efficacy messages to produce adaptive responses is

supported by numerous studies (Wolburg, 2001; Witte & Allen, 2000; Rippetoe & Rogers, 1987). The protection motivation theory, however, is limited in that it focuses exclusively on the cognitive danger control processes (Witte, 1992). This model does not take into account the emotional fear control processes, which might interfere with an individual's effort to control danger and modify behavior (Witte, 1992).

Extended parallel process model. The extended parallel process model (EPPM) is a more recent fear appeal theory that is grounded in the earlier models. The EPPM uses the framework of the parallel process model and extends the protection motivation theory by accounting for fear control processes (Witte, 1992). According to this theory, a fear appeal prompts two appraisals of the message (a threat appraisal and an efficacy appraisal) and results in one of three outcomes (ignoring the fear appeal, taking protective action, or defensively coping through maladaptive responses; Witte & Allen, 2000; Witte, 1992). First, individuals engage in a threat appraisal to evaluate the level of perceived threat. If the threat is perceived as low or irrelevant, there is no motivation to continue processing the message and the fear appeal is ignored (Witte, 1992).

Conversely, if an individual perceives the threat level as moderate to high, fear is elicited and this emotion motivates action (Witte, 1992). This leads individuals to engage in the second appraisal, evaluating the efficacy of the behavior promoted in the message. If an individual thinks the advocated behavior is an effective method of change and believes s/he is capable of implementing it, s/he will be motivated to take protective action. Thus, cognitive danger control processes allow an individual to think of strategies to prevent harm and help him/her make adaptive changes (Witte, 1992).

On the other hand, if an individual perceives the advocated protective response as impractical and doubts his/her ability to perform it, s/he is more likely to engage in fear control processes. Feeling vulnerable and unable to prevent the threat, an individual's fear is intensified. This can lead people to engage in the opposite of the recommended response (Witte, 1992). For example, in an experiment examining the effectiveness of alcohol prevention programs, Kleinot and Rogers (1982) discovered that in the absence of a feasible coping response, high perceived threat resulted in a "boomerang" effect. Specifically, these researchers exposed college students who reported drinking at least once a week to messages detailing the harmful effects of alcohol on the body. When the prevention information lacked an effective preventive practice, the messages prompted drinkers to report intentions to increase their alcohol consumption (Kleinot & Rogers, 1982). The boomerang effect is documented elsewhere in prevention literature, demonstrating similar results in anti-smoking and anti-drug campaigns (Wolburg, 2004; Fishbein et al., 2002; Rogers & Mewborn, 1976). Thus, prevention messages might actually increase the health risk behaviors they are trying to reduce. The fear control processes elicited by high threat and low efficacy appeals appear to provoke individuals to cope defensively with their fear through maladaptive responses and detrimental changes (Witte, 1992).

In sum, EPPM postulates that the level of perceived threat regulates the strength of response to a fear appeal, while the level of perceived efficacy regulates the nature of the response (Witte, 1992). Overall, fear appeals seem to incur the intended response when they portray a relevant threat while outlining a feasible and effective protective action (Witte & Allen, 2000). Fear appeals might be beneficial for motivating attitude, intention, and behavior changes; however they must be used cautiously as they can backfire in individuals with low self-efficacy (Witte & Allen, 2000; Wolburg, 2001).

Obesity Prevention Campaigns

In general, research demonstrates that fear appeals are effective in promoting behavioral change if they include practical and successful recommendations for alternative action. However, the prescribed behavioral change strategies in many obesity-related campaigns are often simplistic (Lewis, Thomas, Hyde, Castle, Blood, & Komesaroff, 2010). For example, the United States Department of Agriculture (2012) advertised the message: “enjoy your food, but eat less.” The recommended response to this campaign is to limit food intake. In a qualitative study examining obese individuals’ perceptions of these public health campaigns, participants thought the messages lacked realistic solutions (Lewis et al., 2010). They described these campaigns as proposing that weight loss is straightforward, and that by simply practicing self-control, an individual should lose weight. However, participants recounted personal weight-loss attempts and noted that this is an oversimplified and ineffective solution (Lewis et al., 2010). Research supports the perception that losing weight is difficult (Neumark-Sztainer et al., 2006; Boutelle et al., 2002). Considering the theories underlying fear appeals, it seems that if obesity prevention campaigns do not offer feasible and plausible strategies for behavioral change, perceived response efficacy will be low (Witte & Allen, 2000). Therefore, these public health campaigns are unlikely to have the desired effect on obesity.

Furthermore, obesity prevention campaigns that use fear appeals often do not include information regarding appropriate responses. For example, the Children’s Healthcare of Atlanta (2011) produced a series of advertisements featuring overweight children with serious facial expressions and a red warning label. The images were accompanied by a variety of messages, such as “warning: chubby kids may not outlive their parents.” This message communicates the threat of obesity on long-term health; however, no practical guidance is offered to address weight

loss or obesity prevention. In the absence of feasible strategies for change, Witte & Allen (2000) posit that individuals will depend on prior experiences to ascertain perceived efficacy.

The majority of obese individuals are aware of their weight and care about controlling it. Moreover, most have previous (unsuccessful) experience with weight management to consider when viewing a fear appeal (Lawson & Wardle, 2013; Neumark-Stzainer, 2002). For example, in a study investigating the influence of visual images in weight-related health promotion campaigns, all participants were actively involved in managing their weight, yet none of them believed they were doing so successfully (Lawson & Wardle, 2013). Participants with obesity in Lewis and colleagues' (2010) qualitative study also expressed difficulties associated with weight loss, suggesting overweight individuals feel low self-efficacy to accomplish this goal. If obesity prevention campaigns lack a recommended response, or promote an impractical response, theory asserts that such campaigns will elicit low levels of efficacy (Witte & Allen, 2000; Rippetoe & Rogers, 1987). Thus, anti-obesity messages might drive individuals to respond to the danger by employing maladaptive coping responses that increase risk and vulnerability (Hastings, Stead, & Webb, 2004).

By highlighting the negative health consequences of a behavior and implying personal responsibility to make changes, fear appeals could also create blame and promote stigma towards obese individuals (Puhl & Heuer, 2010). Stigmatizing attitudes create social disparities, impede the intended effects of health messages, and might increase the risky behavior they are designed to combat (Puhl & Heuer, 2010; Guttman & Salmon, 2004). The potential for stigma to result from fear-inducing public health campaigns is well documented in the literature on HIV/AIDS prevention (Slavin, Batrouney, & Murphey, 2007; Guttman & Salmon, 2004; Valdiserri, 2002).

To investigate whether obesity-related health campaigns prompted similar negative

attitudes, Puhl, Peterson, and Luedicke (2012) recruited a sample of 1,014 adults to view a selection of these messages and rate whether they were motivating or stigmatizing. Participants perceived messages that implied personal responsibility, used pejorative language, and instilled blame to be stigmatizing, ineffective, and the least motivating. In contrast, messages rated as positive and motivating did not mention the term “obesity” at all (Puhl, Peterson, & Luedicke, 2012). In a similar study, Puhl, Luedicke, and Peterson (2013) again assessed the public’s perceptions of obesity-related campaigns, this time including visual content and evaluating the extent to which each message promoted self-efficacy for the advocated behavior. Results provided more evidence that obesity prevention campaigns promote stigmatizing attitudes. Furthermore, the messages rated as stigmatizing were perceived to elicit lower levels of self-efficacy when compared with neutral campaigns. In another study, when overweight women were primed to think about weight-related stereotypes, their self-efficacy for exercise and dietary control significantly decreased (Seacat & Mickelson, 2009). Given that weight stigma is a predictor of weight-related disorders, and that low perceived self-efficacy is associated with defensive coping mechanisms, it is likely that maladaptive reactions to obesity prevention campaigns are pervasive (Quick et al., 2013; Witte, 1992).

Unintended Consequences

Research on obesity prevention campaigns demonstrates their potential to unintentionally do more harm than good (O’Dea, 2005). By overemphasizing weight and BMI as the physical parameters of health, anti-obesity messages might inadvertently create maladaptive reactions including weight concern, body dissatisfaction, and disordered eating behaviors (Watson, 2011; O’Dea, 2005). Furthermore, these adverse consequences occur not only for overweight

individuals, but also for individuals of normal weight (Major, Hunger, Bunyan, & Miller, 2013; Dooly, Deshpande, & Adair, 2010; O’Dea, 2005).

These effects were demonstrated in an experiment investigating the effects of weight-stigmatizing messages in which women were assigned to read either a news article describing stigmatizing attitudes towards overweight individuals, or a control article (Major et al., 2013). After reading the article, women were presented with bowls of Skittles, M&M’s, and Goldfish Crackers. For both overweight women, and women who perceived themselves to be overweight, exposure to the stigmatizing messages significantly increased the number of calories they consumed and reduced their feelings of self-efficacy to control their diet. Notably, significant effects were associated with individuals’ *perception* that they were overweight, rather than their actual weight (Major et al., 2013). The authors concluded that perceived weight was more important than objective weight in determining of susceptibility to adverse outcomes of weight stigmatization (Major et al., 2013). Therefore, if obesity prevention campaigns are stigmatizing and an individual perceives the message to be personally relevant, regardless of his/her actual weight status, s/he might be vulnerable to defensive coping and maladaptive responses (O’Dea, 2005; Witte, 2000).

Weight concern is pervasive in Western society, as many individuals, particularly women, are worried about becoming overweight, even if they are currently within a normal weight range (LaRose, Gorin, Clarke, & Wing, 2011). Exposure to fearful messages regarding excessive weight might exacerbate or initiate this weight preoccupation and encourage negative appearance evaluations (O’Dea, 2005). Indeed, health promotion messages focusing on weight are likely to cultivate and reinforce weight concern, as public service announcements implying that an ideal body shape exists are thought to stimulate anxiety and encourage individuals to

conform to the thin standard of beauty (Dooly, Deshpande, & Adair, 2010). Obese images accompanying these messages might cause individuals of all sizes to feel pressure to be thin (Dooly, Deshpande, & Adair, 2010; Stice & Bearman, 2001).

Overall, campaigns focusing on weight-related terms and images to prevent obesity might induce apprehension surrounding body weight, promote internalization of the thin ideal, and instill feelings of body dissatisfaction in individuals of all sizes. This is concerning as a negative body image is the most consistent and robust predictor for the development of an eating disorder (Stice, 2002; Thompson et al., 1999; Songua-Barke, Davies, & Thompson, 1996). Catling and Malson (2012) interviewed women with a history of an eating disorder to examine their perception of obesity prevention campaigns. In light of their past struggles with weight, participants viewed the anti-obesity messages as highly problematic. Specifically, they viewed the campaigns as endorsing an obsession with food and weight, promoting problematic ideas about food, and encouraging disordered eating and unhealthy weight loss (Catling & Malson, 2012). There is no existing empirical evidence to corroborate the claim that obesity prevention campaigns cause eating disorders, however some experts in the field suggest a causal link is plausible (Sanches-Carracedo, Neumark-Stzainer, & Lopez-Guimera, 2012; Watson, 2011; Haines & Neumark-Stzainer, 2006; O’Dea, 2005). Indeed, a lack of consideration for eating disorders is recognized as the “blind spot” in obesity prevention (Austin, 2011). By inducing fearful attitudes towards obesity and failing to include feasible recommendations for protective action, an individual’s maladaptive response to anti-obesity messages might very well be unhealthy weight control behaviors and disordered eating. However, limited empirical data are available addressing this hypothesis. Thus, it is essential to evaluate the impact of obesity prevention campaigns and assess their effects (Dooly, Deshpande, & Adair, 2010; O’Dea, 2005).

Summary & Purpose of the Current Study

Obesity, eating disorders, and unhealthy weight control behaviors are serious conditions that result in adverse physical and psychological consequences. They are typically regarded as discrete problems, however research indicates they are not mutually exclusive and share many risk and protective factors. Given the established overlap among these conditions, Neumark-Sztainer (2003) proposes conceptualizing weight-related disorders as occurring on a continuum.

Due to their high prevalence, obesity, eating disorders, and unhealthy weight control behaviors have become major health concerns in the United States. However, current public health prevention campaigns focus nearly exclusively on obesity. These prevention messages frequently use fear appeals to highlight the detrimental effects of obesity and recommend protective action. Extensive research has investigated the efficacy of fear appeals, and theory indicates that to promote behavioral change, they must outline a feasible and effective protective action plan (Witte & Allen, 2000). If realistic, effective response strategies are not provided within the message, an individual's fear can be intensified and defensive coping mechanisms employed.

Current obesity prevention campaigns often lack an advocated response or prescribe an overly simplistic approach to change. Therefore, maladaptive responses might be especially likely to result from these messages. Furthermore, these messages might increase risk for other eating and weight related problems. Potentially negative outcomes of prevention campaigns need to be investigated (O'Dea, 2005).

Thus, the purpose of the current study was to examine the effects of obesity prevention campaigns. It extends the current literature by assessing the influence of obesity-related video messages on established risk factors for weight-related disorders. This study had two aims: (1)

investigate the outcomes of different types of obesity prevention public health campaigns (i.e., those that emphasize weight loss vs. those that emphasize healthy nutrition and exercise) on body dissatisfaction, thin-ideal internalization, anxiety, eating and exercise behaviors, self-efficacy for health behavior change, and attitudes about obesity; and (2) investigate whether individual characteristics at pretesting (body dissatisfaction, thin-ideal internalization, anxiety, BMI) were associated with responses to the obesity prevention campaigns.

Method

Campaign Identification

Obesity-related public health campaigns were identified predominantly through Internet search engines (i.e., Google) using the following keywords: ‘obesity,’ ‘childhood obesity,’ ‘overweight,’ ‘prevention,’ ‘public health campaign,’ ‘public service announcement,’ ‘public health advertisement,’ ‘public health communication,’ and ‘health promotion.’ Additionally, messages were found through previous research on obesity prevention campaigns (Puhl, Luedicke, & Peterson, 2013; Puhl, Peterson, & Luedicke, 2012). Campaigns were selected if they used a short video clip to convey their message. Furthermore, campaigns in the current study were local, regional, or national efforts in the United States, publically funded, and active within the last two years. Seven distinct organizations were identified, and a total of 10 messages were included in the study (Appendix A). Campaigns were selected to represent individuals of different ages, genders, and race/ethnicities. Messages were categorized into two groups: campaigns that use obesity-specific language ($n = 5$) and campaigns without weight-related terms ($n = 5$).

Participants

Participants were Virginia Commonwealth University (VCU) students recruited from the Psychology Department Subject Pool. They received a total of two and a half hours of course credit for their study involvement. To be eligible for the study, participants needed to be at least 18 years of age and a VCU student.

Phase 1 of the study yielded 644 participants; phase 2 yielded 547 participants, and 510 participants completed all three phases. After eliminating data from participants who incorrectly answered one or more of the validation questions (see Appendix B and description in the Measures section), the final sample included 372 participants, 75.2% ($n = 279$) female and 24.8% ($n = 92$) male. The following ethnicities were represented in the final sample: 52.7% ($n = 196$) White, 25.8% ($n = 96$) Black, 7.0% ($n = 26$) Hispanic, 16.1% ($n = 60$) Asian, 4.3% ($n = 16$) “Other.” Participants' mean age at baseline was 19.12 ($SD = 3.18$). Their mean BMI was 24.02 ($SD = 5.04$) with a range from underweight (BMI = 16.35) to severely obese (BMI = 46.87). With respect to year in school, 67.7% ($n = 252$) were first-year students, 14.2% ($n = 53$) sophomores, 10.8% ($n = 40$) juniors, and 7.3% ($n = 27$) seniors.

Measures

Demographics. The demographics questionnaire asked participants their age, gender, year in school, and race/ethnicity (Appendix C). Participants were also asked their current height and weight so that BMI could be calculated.

Block Food Screener (BFS). Dietary intake was assessed using the BFS (Appendix D; Block, Gillespie, Rosenbaum, & Jenson, 2000). The BFS is a 27-item self-report questionnaire that surveys the leading sources of fat, fiber, fruits, and vegetables in the diets of North Americans. Individuals are asked how often they consume each type of food on a six-point rating

scale (ranging from 0 = *less than once a week* to 5 = *2 or more times a day*; Block et al., 2000). The BFS estimates an individual's fiber and fat intake.

The BFS was developed as a shorter alternative to the well-validated Block Food Frequency Questionnaire (FFQ; Block, Woods, Potosky, & Clifford, 1990). The BFS was validated against the “gold standard” 100-item Block FFQ and provides estimates similar to those obtained from the full-length nutrition questionnaire. Correlations between the BFS and the FFQ were .71 for total servings of fruits and vegetables per day and .69 for total servings of fat per day (Block et al., 2000). Cronbach's alphas in the current study were .85 for fat intake and .79 for fiber intake.

Eating Disorder Examination Questionnaire with Instruction (EDE-Q-I). Disordered eating behaviors were assessed with the EDE-Q-I (Appendix E; Fairburn & Beglin, 1994). The EDE-Q-I is a 36-item self-report questionnaire adapted from the Eating Disorders Examination, and includes written instructions with definitions and examples of binge eating (EDE; Cooper & Fairburn, 1987; Goldfein, Delvin, and Kamenetz, 2005). The addition of instructions enhances the ability of the EDE-Q to evaluate objective binge episodes in patients with binge eating disorder (Goldfein, Delvin, & Kamenetz, 2005). This measure includes four subscales: eating concern, shape concern, weight concern, and dietary restraint. The EDE-Q-I assesses the occurrence of these symptoms in the past 28 days, and responses are quantified on a 7-point rating scale (ranging from 0 = *no days/not at all* to 6 = *every day/markedly*). Examples of items from the EDE-Q-I include: “How often have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?” and “How dissatisfied have you felt about your weight?”

Peterson and colleagues (2007) reported Cronbach's alpha for the EDE-Q total score was .90. For the EDE-Q subscales, they report alpha levels of .70 (restraint), .73 (eating concern), .83 (shape concern), and .90 (weight concern). Luce and Crowther (1997) provided evidence for the test-retest reliability of the EDE-Q, ranging from .81-.92, over a two week time period for all subscales. Mond, Hay, Rodgers, Owen, and Beumont (2004) reported strong positive correlations between the EDE-Q and EDE subscales, demonstrating good convergent and criterion validity. Cronbach's alphas in the current study were as follows: .83 (restraint), .82 (eating concern), .92 (shape concern), and .85 (weight concern).

Sociocultural Attitudes Towards Appearance Questionnaire - 3 (SATAQ-3). The influence of society on body image, appearance standards, and eating behaviors was assessed with the SATAQ (Appendix F; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). The SATAQ is a 30-item self-report questionnaire consisting of four subscales: internalization-general (influence of the media on perceived body ideals), internalization-athlete (influence of athletic ideals presented in the media), information (influence of the media as a source for determining ideal body), and pressure (perceived pressure from the media to achieve specific body ideals) (Thompson et al., 2004). Only the internalization-general, information, and pressure subscales were used in this study. Responses are measured on a 5-point rating scale (ranging from 1 = *definitely disagree* to 5 = *definitely agree*). Examples of items from the SATAQ include: "I compare my body to the bodies of people who are on TV" and "I've felt pressure from TV or magazines to change my appearance" (Thompson et al., 2004).

Thompson and colleagues (2004) evaluated the validity of the SATAQ and compared the scores of eating disturbed individuals with those of a control sample. The SATAQ manifested strong convergent validity with other measures of body image and eating disturbances, and

individuals with disordered eating behaviors had higher scores on the SATAQ subscales than controls. Furthermore, Warren, Gleaves, and Rakhkovskaya (2013) investigated the reliability of the SATAQ in a sample of female college students from the four largest ethnic groups in the United States. Cronbach's alpha for the SATAQ total score was .97 for each group. Alpha levels were above .95 for the information, pressure, and internalization-general subscales (Warren, Gleaves, & Rakhkovskaya, 2013).

A slightly modified version of the SATAQ-3 was used to assess the influence of society on body image, appearance standards, and eating behaviors in males (Appendix G; Karazsia & Crowther, 2008; Smolak, Levine, & Thompson, 2001). Items that focus on "looking pretty" and "being thin" were changed to focus on muscularity. For example, "I've felt pressure from TV and magazines to be thin," was changed to "I've felt pressure from TV and magazines to be muscular." Karazsia and Crowther (2008) examined the factor structure of the revised version of the SATAQ-3 in a sample of undergraduate males. Alpha levels were above .92 for the information, pressure, and internalization-general subscales (Karazsia & Crowther, 2008). Furthermore, the factors demonstrated excellent concurrent and discriminant validity compared with other measures relevant to body image, behavioral, and psychological constructs. Results support the use of the slightly altered version of the SATAQ-3 in males (Karazsia & Crowther, 2008). Cronbach's alphas in the current study were as follows: .93 (general internalization), .91 (information), and .93 (pressure).

State-Trait Anxiety Inventory (STAI). Current and characteristic anxiety was assessed with the STAI (Appendix H; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI is a 40-item self-report questionnaire consisting of 20 items measuring trait anxiety and 20 items measuring state anxiety. Responses are quantified on a 4-point rating scale (ranging from 1 = *not*

at all/almost never to 4 = *very much so/almost always*), with higher scores indicating greater anxiety. Examples of items from the state anxiety subscale include: “I am tense” and “I feel calm.” Examples of items from the trait anxiety subscale include: “I worry too much over something that really doesn’t matter” and “I am content” (Spielberger, 1983).

Spielberger and colleagues (1983) report that the STAI yields internally consistent scores, with Cronbach’s alpha between .86 and .95. The test-retest reliability after a two-month interval ranged from .65 to .75. Numerous studies also indicate the STAI yields valid scores, including investigations that have included college students (Mazzeo, Trace, Mitchell, & Gow, 2007; Thome & Espelage, 2004; Spielberger, 1983). In the current study, internally consistent scores were observed for the state anxiety items (Cronbach’s alpha = .93) and the trait anxiety items (Cronbach’s alpha = .94).

Change of Stages of Exercise – University of Rhode Island Change Assessment, the third generation (URICA-E2). Motivation to engage in exercise behavior was assessed using the URICA-E2 (Appendix I; Reed, 1994; Marcus, Selby, Niaura, & Rossi, 1992). The URICA-E2 is a 24-item self-report questionnaire that measures the stages of change related to exercise behavior. Readiness to change is categorized into six stages: precontemplation non-believers in exercise, precontemplation believers in exercise, contemplation, preparation, action, and maintenance. Individuals are provided with a definition of regular exercise to consider when completing the questionnaire, and instructed to indicate how strongly they agree or disagree with each statement. Responses are quantified on a 5-point rating scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*). Examples of items from the URICA-E2 include: “I have been thinking that I might want to start exercising regularly,” and “I am satisfied with being a sedentary person.”

Reed (1994) conducted a principal components analysis and a confirmatory factor analysis, demonstrating that the URICA-E2 captures six discrete and unique stages of change. For each stage, Reed (1994) reports alpha levels of .81 (precontemplation non-believers), .91 (precontemplation believers), .91 (contemplation), .88 (preparation), .92 (action), and .94 (maintenance). The URICA-E2 was validated against three other measures of the Transtheoretical Model of Behavior change (Reed, 1994). Cronbach's alphas in the current study were as follows: .80 (precontemplation non-believers), .88 (precontemplation believers), .86 (contemplation), .79 (preparation), .88 (action), and .93 (maintenance).

Reaction to messages. Participants answered questions assessing their reaction to each obesity prevention campaign (Appendix J; Puhl, Peterson, & Luedicke, 2012; Uhrig, Bann, Wasserman, Guenther-Grey, & Eroglu, 2010). This 11-item measure includes two subscales: favorable reactions and negative reactions. Items assess participants' perceptions of each campaign's relevance, helpfulness, likeability, whether it evoked motivation to engage in healthy behaviors, and whether it appeared to stigmatize obese individuals (Puhl, Peterson, & Luedicke, 2012). Responses were measured on a 5-point rating scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*). Examples of items include: "This message makes me concerned about my body weight" and "This message would increase blame towards people for being overweight." Puhl, Peterson, and Luedicke (2012) found that this measure yielded internally consistent scores; Cronbach's alphas ranged from .82 to .93 for the favorable reaction subscale and from .71 to .84 for the negative reaction subscale. Cronbach's alpha for the current study ranged from .70 to .79 for the favorable reaction subscale and from .69 to .73 for the negative reaction subscale.

Self-efficacy. Participants were asked a series of questions concerning whether they feel capable of making the health behavior changes promoted in each campaign (Appendix K; Puhl,

Luedicke, & Peterson, 2013). These four questions evaluated the efficacy of each obesity prevention campaign presented. Responses were measured on a 5-point rating scale (ranging from 1 = *strongly disagree* to 5 = *strongly agree*). An example item includes: “This campaign provides a clear action or behavior for people to engage in to improve their health.” Puhl, Luedicke, and Peterson (2013) report good reliability, ranging from .95-.98. Cronbach’s alpha in the current study ranged from .75 to .83.

Validation questions. Each obesity prevention campaign was followed by a simple, factual question concerning the content of the video clip (Appendix A). This item evaluated whether participants attended to each message.

Procedure

The study included three phases, all of which were completed online via REDCap. In the first phase, all participants completed the demographics questionnaire, BFS, EDE-Q-I, SATAQ, STAI, and URICA-E2. Between completion of baseline measures and the beginning of phase two, participants were randomly assigned (using a randomization table created using the RAND function in SAS 9.2) to either the experimental or control condition. Phase two occurred approximately one week after phase one. In phase two, participants in the experimental condition watched five obesity prevention public health videos that emphasized weight-related terms. Participants in the control condition watched five obesity prevention public health videos without weight-related terms. Videos were presented in random order as determined by the random number generator in Excel. Upon viewing each campaign, participants were asked a general factual question regarding the content of the video clip, questions concerning their reactions to the campaign, and questions about their self-efficacy to engage in the behaviors promoted in the message. After watching all five campaigns, participants completed the BFS, EDE-Q-I, SATAQ,

URICA-E2, and the state anxiety subscale of the STAI. Phase three occurred approximately one week after phase two. In this final phase, all participants again completed the BFS, EDE-Q-I, SATAQ, URICA-E2, and the state anxiety subscale of the STAI.

Data Preparation

REDCap 6.3.0 was used for data entry and SPSS 21.0 was used for analyses. Data were cleaned and descriptive statistics, including means, standard deviations, and frequencies were calculated to verify that the data met the assumptions of the planned analyses. Prior to analyses, answers to the validation questions were evaluated. Examination of the validation questions revealed that one of the questions was potentially confusing. Specifically, for the weight-related campaign illustrating that obesity happens one pound at a time, the validation question asked, “What is the main point of this video?” The correct answer was “extra weight on the body can make a big difference in how the body moves,” however 33.6% of participants selected, “extra weight on the body can lead to serious health problems.” Reviewing the campaign verified that both answers were acceptable. Therefore, data for participants who selected the alternate response were retained (N = 64). Participants who answered any other validation questions incorrectly were excluded from analyses. The final sample included 372 participants.

Data Analyses

Aim I. The first aim of the study was to investigate the effects of two types of obesity prevention public health campaigns on measures of body dissatisfaction, thin-ideal internalization, anxiety, and health behavior change. It was hypothesized that:

(1) viewing obesity prevention campaigns with a specific focus on weight would negatively impact body satisfaction, as measured by the EDE-Q-I subscales of shape concern and weight concern;

(2) viewing obesity prevention campaigns with a specific focus on weight would increase internalization of the thin ideal, as measured by the SATAQ subscales of internalization-general, pressure, and information;

(3) viewing obesity prevention campaigns focusing on healthy eating and physical exercise would increase participants' motivation to make positive health behavior changes (specifically, decrease fat intake, increase fiber intake, and increase exercise frequency), as measured by the BFS and the URICA-E2, compared with obesity prevention campaigns that emphasize weight;

(4) viewing obesity prevention campaigns with a specific focus on weight would increase anxiety, as measured by the STAI state anxiety subscale;

(5) viewing obesity prevention campaigns with a specific focus on weight and limited practical guidance would prompt lower levels of self-efficacy, as measured by the Self-Efficacy questionnaire; and

(6) viewing obesity prevention campaigns with a specific focus on weight would increase negative perceptions of obesity, as measured by the Reaction to Messages questionnaire.

(7) It was further hypothesized that women would be more sensitive to obesity prevention campaigns with a specific focus on weight, and thus experience lower body satisfaction, higher internalization of the thin ideal, higher anxiety, and more motivation to make positive health behavior changes compared with men.

Hypotheses 1-3 were assessed using separate repeated measures Multivariate Analysis of Variance (MANOVA), a statistical technique that examines differences between groups on multiple outcome variables. This multivariate approach minimizes the risk of Type 1 error that might be expected when conducting multiple mixed ANOVAs. Using a repeated measures framework, scores on the dependent variables were assessed pre-intervention, post-intervention,

and one week follow-up. Time of assessment and experimental condition (campaigns with weight-related terms or campaigns without weight-related terms) were entered as independent variables. The purpose of the MANOVA was to determine if the dependent variables changed significantly after exposure to specific obesity prevention campaigns. To evaluate gender differences postulated in hypothesis 7, each MANOVA was run a second time with gender included as a between-subjects variable.

Hypothesis 4 was evaluated using a repeated measures Analysis of Variance (ANOVA), a statistical technique that examined differences between groups on a single outcome variable. Using a repeated measures framework, scores on the dependent variable were assessed pre-intervention, post-intervention, and one week follow-up. Time of assessment and experimental condition were entered as independent variables. The purpose of the ANOVA was to investigate if state anxiety changed significantly after viewing different types of obesity prevention campaigns. To examine the proposed gender differences in anxiety, another ANOVA was conducted with gender added as a between-subjects factor.

Hypotheses 5 and 6 were assessed using a Multivariate Analysis of Variance (MANOVA), a statistical technique that investigates differences between groups on multiple outcome variables. This multivariate approach took into account the relations between the dependent variables and minimized the risk of Type 1 error that might be expected when conducting multiple mixed ANOVAs. Scores on the dependent variables were assessed post-intervention and experimental condition was entered as the independent variable. The purpose of the MANOVA was to determine if viewing different types of obesity prevention campaigns influenced the dependent variables.

Aim II. The second aim of the study was to investigate whether individual characteristics at pretesting (body dissatisfaction, thin-ideal internalization, anxiety, BMI) were associated with responses to obesity prevention campaigns. It was hypothesized that females, as well as individuals with low body satisfaction, high thin-ideal internalization, high anxiety, and high BMIs at baseline would be more likely to experience the unintended negative effects of obesity prevention campaigns that emphasize weight-related terms. Hierarchical regressions assessed these potential moderators at baseline on post-intervention outcomes including: eating concern, weight concern, shape concern, dietary restraint, internalization-general, and state anxiety. Regressions were conducted separately for each dependent variable with baseline scores entered in the first step to control for pre-existing individual differences. The hypothesized moderators were centered, and product terms created for each moderating variable (Holmbeck, 1997; Baron & Kenny, 1986). Main effects were entered in the second step of the regression and the product term was entered in the third. The intention of the hierarchical regression analysis was to discover if these specific individual characteristics enhance vulnerability to obesity prevention campaigns that emphasize weight-related terms.

Results

Data Cleaning

The initial data set included 372 participants. Before testing the hypotheses, descriptive statistics for each measure (and relevant subscales) were reviewed to ensure that the data met the assumptions of the analyses (see Table 1 for baseline, post, and follow-up means by group). A review of each subscale's skewness and kurtosis indicated that all had adequate variance. Skewness and kurtosis values of most scores were close to or below an absolute value of 1, indicating that they were approximately normally distributed. Eating concern had a skewness

value of 1.43 and a kurtosis value of 1.76; this was expected, as disordered eating behaviors are not equally distributed throughout the population. All subscales were thus included in the analyses. Furthermore, the assumptions of independence, normality, outliers, and homogeneity of variance were checked and sufficiently met.

Body Satisfaction

A repeated measures MANOVA examined whether shape concern and weight concern significantly changed after exposure to different types of obesity prevention campaigns. The independent variables were time of assessment and experimental condition, and the dependent variables were shape concern and weight concern at pre-intervention, post-intervention, and follow-up. Results demonstrated a significant multivariate effect over time for shape concern and weight concern combined, Pillai's Trace = .18, $F(4, 326) = 17.45$, $p < .001$, $\eta^2 = .176$ (see Table 2 for baseline, post, and follow-up means over time). However, there was no difference over time between the intervention and control groups on the dependent variables, Pillai's Trace = .00, $F(4, 326) = .25$, $p = .910$, $\eta^2 = .003$ (see Table 1 for baseline, post, and follow-up means by group).

Within group univariate analyses demonstrated that both shape concern, $F(2, 658) = 29.27$, $p < .001$, $\eta^2 = .082$, and weight concern, $F(2, 658) = 30.42$, $p < .01$, $\eta^2 = .085$, were significantly affected by time (see Table 2 for baseline, post, and follow-up means over time). Post hoc comparisons using the LSD test indicated that both shape concern and weight concern significantly decreased from baseline to follow-up ($ps < .001$). There were no changes in these variables related to experimental condition.

Gender differences. Another repeated measures MANOVA explored whether body dissatisfaction differed between men and women after viewing different obesity prevention

campaigns. The same variables were entered as before, with gender included as a between-subjects factor. Results indicated a significant multivariate effect of gender for shape and weight concern combined, Pillai's Trace = .08, $F(2, 325) = 14.81$, $p < .001$, $\eta^2 = .084$ (see Table 3 for means by gender). However, there was no interaction between gender and experimental condition, Pillai's Trace = .01, $F(2, 325) = 1.89$, $p = .153$, $\eta^2 = .011$. Furthermore, results showed no difference over time between men and women, Pillai's Trace = .03, $F(2, 323) = 2.14$, $p = .075$, $\eta^2 = .026$, and no interaction effect over time between gender and experimental condition, Pillai's Trace = .01, $F(2, 323) = 1.07$, $p = .374$, $\eta^2 = .013$.

Table 1.

Means and Standard Deviations on Baseline, Post, and Follow-up Measures by Group

	No Weight Related Terms			Weight Related Terms		
	Baseline mean (SD)	Post mean (SD)	Follow-up mean (SD)	Baseline mean (SD)	Post mean (SD)	Follow-up mean (SD)
EDE-Q-I Weight Concern	2.01 (1.73)	2.03 (1.70)	1.75 (1.71)	2.17 (1.73)	2.15 (1.59)	1.85 (1.50)
EDE-Q-I Shape Concern	2.51 (1.78)	2.34 (1.76)	2.14 (1.80)	2.54 (1.72)	2.42 (1.67)	2.16 (1.61)
SATAQ Internalization	25.52 (9.78)	26.52 (10.50)	26.15 (10.90)	25.61 (9.07)	26.67 (9.18)	26.49 (9.25)
SATAQ Pressure	19.98 (8.23)	20.13 (8.39)	19.90 (9.05)	18.78 (7.50)	20.14 (8.01)	19.75 (8.24)
SATAQ Information	23.82 (9.08)	25.00 (10.69)	24.45 (10.55)	23.93 (8.60)	25.39 (9.44)	24.51 (9.42)
BFS Fat Intake	98.33 (24.00)	95.20 (23.61)	92.05 (22.90)	96.17 (23.26)	92.75 (22.65)	92.30 (22.94)
BFS Fiber Intake	14.53 (5.32)	14.28 (5.56)	13.83 (5.10)	14.31 (6.00)	14.29 (6.04)	14.01 (6.24)
URICA-E2 Exercise Frequency	74.06 (14.29)	74.63 (13.46)	74.13 (15.12)	75.64 (15.41)	75.55 (15.56)	74.32 (15.78)
STAI State Anxiety	38.68 (11.90)	37.41 (13.18)	38.07 (13.08)	39.06 (11.17)	39.62 (12.19)	39.29 (11.35)

Note. EDE-Q-I = Eating Disorder Examination Questionnaire with Instructions; SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire – 3; BFS = Block Food Screener; URICA-E2 = Changes of Stages of Exercise – University of Rhode Island Change Assessment, the third generation; STAI = State Trait Anxiety Inventory.

Thin Ideal Internalization

A repeated measures MANOVA investigated whether internalization of the thin ideal significantly changed after exposure to different types of campaigns. The independent variables were time of assessment and experimental condition, and the dependent variables were measures of general internalization, pressure, and information at pre-intervention, post-intervention, and follow-up. Results revealed a significant multivariate effect over time for general internalization, pressure, and information combined, Pillai's Trace = .08, $F(6, 274) = 3.82$, $p = .001$, $\eta^2 = .077$. There were no differences between conditions over time for the dependent variables, Pillai's Trace = .01, $F(6, 274) = .28$, $p = .946$, $\eta^2 = .006$ (see Table 1 for baseline, post, and follow-up means by group).

Within-group univariate analyses demonstrated that general internalization, $F(2, 588) = 3.71$, $p = .025$, $\eta^2 = .013$, information, $F(2, 588) = 6.47$, $p = .002$, $\eta^2 = .023$, and pressure, $F(2, 588) = 9.98$, $p < .001$, $\eta^2 = .035$, were significantly affected by time (see Table 2 for baseline, post, and follow-up means over time). Post hoc comparisons using the LSD test indicated that general internalization significantly increased from baseline to post, $p = .016$, and did not significantly change from post to follow up, $p = .262$. Post hoc comparisons also revealed that pressure significantly increased from baseline to post, $p < .001$, and did not significantly change from post to follow up, $p = .214$. Furthermore, information increased significantly from baseline to post, $p = .001$, but this change failed to persist to follow up, $p = .017$. This illustrates that all aspects of internalization of the thin ideal significantly changed after exposure to obesity prevention campaigns, however this change was not associated with the specific type of campaign viewed. Furthermore, this increase was sustained over time only for general internalization and pressure.

Gender differences. Another repeated measures MANOVA explored whether internalization of the thin ideal varied between men and women after they viewed different obesity prevention campaigns. The same variables were entered as before, with gender included as a between-subjects factor. Results revealed a significant multivariate effect of gender for general internalization, pressure, and information combined, Pillai's Trace = .05, $F(3, 275) = 5.09$, $p = .002$, $\eta^2 = .053$ (see Table 3 for means by gender). However, there was no interaction effect between gender and experimental condition, Pillai's Trace = .01, $F(2, 275) = .63$, $p = .598$, $\eta^2 = .007$. Furthermore, there was a significant difference over time between men and women on measures of thin ideal internalization, Pillai's Trace = .05, $F(6, 272) = 2.18$, $p = .046$, $\eta^2 = .046$. However, there was no interaction effect over time between gender and experimental condition, Pillai's Trace = .02, $F(6, 272) = .90$, $p = .493$, $\eta^2 = .020$.

Between group univariate analyses indicated that general internalization of the thin ideal, $F(1, 277) = 4.09$, $p = .044$, $\eta^2 = .015$, and pressure, $F(1, 277) = 11.84$, $p = .001$, $\eta^2 = .041$, varied significantly between men and women. Specifically, women showed higher levels of general internalization, $p = .044$, and pressure, $p = .001$. Information, $F(1, 277) = .73$, $p = .393$, $\eta^2 = .003$, did not significantly differ between men and women. Within group univariate analyses revealed that general internalization, $F(2, 554) = 2.63$, $p = .073$, $\eta^2 = .009$, information, $F(2, 554) = .33$, $p = .720$, $\eta^2 = .001$, and pressure, $F(2, 554) = .20$, $p = .818$, $\eta^2 = .001$, did not significantly vary between men and women over time. Findings suggest that women experienced greater changes in thin ideal internalization as a result of viewing obesity prevention campaigns, and these differences were irrespective of experimental condition.

Table 2.

Means and Standard Deviations on Baseline, Post, and Follow-up Measures by Time

	Baseline mean (SD)	Post mean (SD)	Follow-up mean (SD)
EDE-Q-I Weight Concern	2.13 (.09)	2.09 (.09)	1.80 (.09) ^b
EDE-Q-I Shape Concern	2.53 (.10)	2.38 (.10) ^a	2.15 (.09) ^b
SATAQ Internalization	25.72 (.57)	26.56 (.59) ^a	26.32 (.60)
SATAQ Pressure	18.89 (.47)	20.14 (.49) ^a	19.83 (.52)
SATAQ Information	23.88 (.53)	25.19 (.60) ^a	24.48 (.56) ^b
BFS Fat Intake	97.25 (1.60)	93.98 (1.56) ^a	92.17 (1.56)
BFS Fiber Intake	14.42 (.38)	14.28 (.40)	13.92 (.39)
URICA-E2 Exercise Frequency	75.35 (1.01)	75.09 (1.00)	74.23 (1.05)
STAI State Anxiety	38.87 (.65)	38.51 (.72)	38.68 (.69)

Note. ^a Indicates significant changes from baseline to post-video.

^b Indicate significant changes from post-video to follow-up.

Health Behaviors

A repeated measures MANOVA examined whether fat intake, fiber intake, and exercise frequency significantly changed after viewing different types of obesity prevention campaigns. The independent variables were time of assessment and experimental condition, and the dependent variables were fat intake, fiber intake, and exercise frequency at pre-intervention, post-intervention, and follow-up. There was a significant multivariate effect over time for fat intake, fiber intake, and exercise frequency combined, Pillai's Trace = .10, $F(2, 219) = 4.24$, $p < .001$, $\eta^2 = .104$. There were no differences between conditions over time for the dependent variables, Pillai's Trace = .01, $F(6, 219) = .49$, $p = .817$, $\eta^2 = .013$ (see Table 1 for baseline, post, and follow-up means by group). Within-group univariate analyses demonstrated that fat intake, $F(2, 448) = 11.67$, $p < .001$, $\eta^2 = .050$, was significantly affected by time (see Table 2 for baseline, post, and follow-up means over time). Post hoc comparisons using the LSD test

indicated that fat intake significantly decreased from baseline to follow-up, $p < .001$. Univariate analyses also revealed that fiber intake, $F(2, 448) = 2.17, p = .115, \eta^2 = .010$, and exercise frequency, $F(2, 448) = 2.00, p = .137, \eta^2 = .009$, were not significantly affected by time. This suggests that fat intake was significantly reduced after viewing obesity prevention campaigns; however this decline was unrelated to experimental condition. Moreover, fiber intake and exercise frequency did not change after exposure to obesity prevention campaigns.

Gender differences. Another repeated measures MANOVA examined whether health behaviors differed between men and women after exposure to different prevention campaigns. The same variables were entered as before, with gender included as a between-subjects factor. Results indicated significant multivariate effects of gender for fat intake, fiber intake, and exercise frequency combined, Pillai's Trace = .25, $F(3, 220) = 24.07, p < .001, \eta^2 = .247$ (see Table 3 for means by gender). However, there was no interaction between gender and experimental condition, Pillai's Trace = .02, $F(3, 220) = 1.08, p = .359, \eta^2 = .015$. Furthermore, results showed no difference over time between men and women, Pillai's Trace = .04, $F(6, 217) = 1.42, p = .208, \eta^2 = .038$, and no interaction effect over time between gender and experimental condition, Pillai's Trace = .03, $F(6, 217) = 1.03, p = .404, \eta^2 = .028$.

Between group univariate analyses revealed that fiber intake, $F(1, 222) = 69.45, p < .001, \eta^2 = .238$, varied significantly between men and women. Specifically, men consumed more fiber than women, $p < .001$, regardless of their experimental condition. In contrast, fat intake, $F(1, 222) = 1.44, p = .232, \eta^2 = .006$, and exercise frequency, $F(1, 222) = 1.18, p = .278, \eta^2 = .005$, were not significantly different between men and women.

Table 3.

Means and Standard Errors on Measures by Gender

	Men	Women
EDE-Q-I Weight Concern	1.19 (.17)	2.26 (.10)*
EDE-Q-I Shape Concern	1.55 (.18)	2.60 (.10)*
SATAQ Internalization	24.15 (1.16)	26.81 (.63)*
SATAQ Pressure	16.71 (.96)	20.46 (.52)*
SATAQ Information	23.67 (1.13)	24.77 (.61)
BFS Fat Intake	91.46 (2.98)	95.53 (1.64)
BFS Fiber Intake	19.00 (.66)	12.73 (.36)*
URICA-E2 Exercise Frequency	76.76 (2.00)	74.23 (1.10)
STAI State Anxiety	36.45 (1.26)	39.30 (.69)*

Note. *Indicates significant difference between genders.

Anxiety

A repeated measures ANOVA explored whether state anxiety changed after exposure to different types of campaigns. The independent variables were time of assessment and experimental condition, and the dependent variable was state anxiety at pre-intervention, post-intervention, and follow-up. Results did not indicate a significant main effect of time, $F(2, 632) = .21, p = .809, \eta^2 = .001$. Furthermore, there was no significant interaction between experimental condition and time, $F(2, 632) = 1.36, p = .258, \eta^2 = .004$. (see Table 1 for baseline, post, and follow-up means by group). Findings indicated that viewing specific types of obesity prevention campaigns did not influence state anxiety.

Gender differences. Another repeated measures ANOVA investigated whether state anxiety varied between men and women after exposure to different categories of obesity prevention campaigns. The same variables were entered as before with gender included as a between-subjects factor. Results demonstrated a significant main effect of gender, $F(1, 313) = 3.91, p = .049, \eta^2 = .012$ (see Table 3 for means by gender). Post hoc comparisons using the LSD

test revealed that women experienced higher state anxiety. However, there was no significant interaction between gender and experimental condition, $F(2, 313) = .11, p = .745, \eta^2 = .000$. Furthermore, results showed no difference over time between men and women, $F(2, 626) = .05, p = .954, \eta^2 = .000$, and no interaction effect over time between gender and experimental condition, $F(2, 626) = .60, p = .55, \eta^2 = .002$. Therefore, while women experience higher levels of anxiety overall, this finding was inconsistent over time and occurred irrespective of experimental condition.

Campaign Reactions

A MANOVA investigated whether viewing obesity prevention campaigns with a specific focus on weight generated lower self-efficacy and more negative perceptions of obesity. The independent variable was experimental condition, and the dependent variables were self-efficacy and negative reaction. Results identified a significant multivariate effect of experimental condition, Pillai's Trace = .22, $F(2, 332) = 46.80, p < .001, \eta^2 = .220$. Between group univariate tests revealed that experimental condition significantly influenced self-efficacy, $F(1, 333) = 19.91, p < .001, \eta^2 = .056$, and negative reaction, $F(1, 333) = 91.79, p < .001, \eta^2 = .216$. Post hoc comparisons using the LSD test indicated that individuals who viewed obesity prevention campaigns with weight-related terms ($M = 3.56, SD = .59$) reported lower self-efficacy at post-testing compared with individuals who viewed obesity prevention campaigns with non-weight related terms ($M = 3.84, SD = .54; p < .001$). Furthermore, exposure to campaigns with a specific focus on weight ($M = 2.65, SD = .55$) was associated with more negative perceptions of obesity than campaigns without a specific focus on weight ($M = 2.04, SD = .61; p < .001$).

Table 4.

Means and Standard Deviations for Campaign Reactions by Group

	No Weight Related Terms	Weight Related Terms
Self-efficacy	3.84 (.54)	3.56 (.59)*
Negative Reaction	2.04 (.61)	2.65 (.55)*

Note. *Indicates significant difference between groups.

Moderation Analyses

Hierarchical regression analysis evaluated the influence of gender on the relation between campaign type and post intervention measures of eating concern, weight concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety. Gender did not significantly moderate the relation between campaign type and eating concern, $\beta = .13$, $\Delta R^2 = .001$, $\Delta F(1, 357) = .51$, $p = .477$, weight concern, $\beta = .26$, $\Delta R^2 = .006$, $\Delta F(1, 366) = 2.22$, $p = .137$, shape concern, $\beta = .20$, $\Delta R^2 = .003$, $\Delta F(1, 361) = 1.28$, $p = .259$, dietary restraint, $\beta = .27$, $\Delta R^2 = .010$, $\Delta F(1, 366) = 2.23$, $p = .136$, thin ideal internalization, $\beta = .00$, $\Delta R^2 = .000$, $\Delta F(1, 354) = .00$, $p = .985$, or state anxiety, $\beta = .07$, $\Delta R^2 = .000$, $\Delta F(1, 354) = .13$, $p = .718$.

Analyses also evaluated the influence of BMI on the relation between different types of campaigns and post intervention measures of eating concern, weight concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety. BMI did not moderate the relation between category of obesity prevention campaign and eating concern, $\beta = .13$, $\Delta R^2 = .001$, $\Delta F(1, 355) = .54$, $p = .462$, weight concern, $\beta = .03$, $\Delta R^2 = .000$, $\Delta F(1, 364) = .04$, $p = .842$, shape concern, $\beta = .03$, $\Delta R^2 = .054$, $\Delta F(1, 359) = .92$, $p = .876$, dietary restraint, $\beta = .28$, $\Delta R^2 = .007$, $\Delta F(1, 364) = 2.55$, $p = .111$, general internalization, $\beta = -.11$, $\Delta R^2 = .001$, $\Delta F(1, 352) = .38$, $p = .539$, or state anxiety, $\beta = -.01$, $\Delta R^2 = .000$, $\Delta F(1, 352) = .00$, $p = .957$.

Next, the impact of baseline weight concern on the relation between experimental condition and post intervention measures of eating concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety was investigated. Baseline weight concern did not moderate the relation between type of prevention campaign and eating concern, $\beta = .19$, $\Delta R^2 = .003$, $\Delta F(1, 354) = 2.09$, $p = .149$, shape concern, $\beta = .08$, $\Delta R^2 = .001$, $\Delta F(1, 358) = .71$, $p = .401$, dietary restraint, $\beta = .16$, $\Delta R^2 = .002$, $\Delta F(1, 363) = 1.27$, $p = .261$, general internalization, $\beta = -.15$, $\Delta R^2 = .021$, $\Delta F(1, 351) = .95$, $p = .330$, or state anxiety, $\beta = .21$, $\Delta R^2 = .004$, $\Delta F(1, 352) = 1.56$, $p = .207$.

Hierarchical regression analysis also evaluated the influence of baseline shape concern on the relation between different types of prevention campaigns and post intervention measures of eating concern, weight concern, dietary restraint, internalization of the thin ideal, and state anxiety. Baseline shape concern did not moderate the relation between experimental condition and eating concern, $\beta = .12$, $\Delta R^2 = .001$, $\Delta F(1, 356) = .87$, $p = .353$, weight concern, $\beta = -.06$, $\Delta R^2 = .000$, $\Delta F(1, 365) = .37$, $p = .543$, dietary restraint, $\beta = .08$, $\Delta R^2 = .001$, $\Delta F(1, 365) = .33$, $p = .565$, general internalization, $\beta = -.23$, $\Delta R^2 = .005$, $\Delta F(1, 353) = 2.21$, $p = .138$, or state anxiety, $\beta = .14$, $\Delta R^2 = .002$, $\Delta F(1, 353) = .69$, $p = .407$.

In addition, the influence of baseline thin ideal internalization on the relation between experimental condition and post measures of eating concern, weight concern, shape concern, dietary restraint, and state anxiety was assessed. Baseline thin ideal internalization did not moderate the relation between type of campaign and eating concern, $\beta = .16$, $\Delta R^2 = .003$, $\Delta F(1, 343) = 1.00$, $p = .319$, weight concern, $\beta = -.063$, $\Delta R^2 = .000$, $\Delta F(1, 351) = .18$, $p = .676$, shape concern, $\beta = .01$, $\Delta R^2 = .000$, $\Delta F(1, 347) = .01$, $p = .94$, dietary restraint, $\beta = -.09$, $\Delta R^2 = .001$, $\Delta F(1, 351) = .31$, $p = .581$, or state anxiety, $\beta = .19$, $\Delta R^2 = .003$, $\Delta F(1, 341) = 1.26$, $p = .262$.

Finally, hierarchical regression investigated the influence of trait anxiety on the relation between experimental condition and post intervention measures of eating concern, weight concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety. Trait anxiety did not moderate the link between type of campaign and eating concern, $\beta = -.19$, $\Delta R^2 = .003$, $\Delta F(1, 342) = 1.33$, $p = .250$, weight concern, $\beta = -.21$, $\Delta R^2 = .004$, $\Delta F(1, 351) = 1.85$, $p = .175$, shape concern, $\beta = -.19$, $\Delta R^2 = .003$, $\Delta F(1, 346) = 1.56$, $p = .212$, dietary restraint, $\beta = -.32$, $\Delta R^2 = .010$, $\Delta F(1, 351) = 3.65$, $p = .057$, thin ideal internalization, $\beta = -.09$, $\Delta R^2 = .001$, $\Delta F(1, 339) = .28$, $p = .600$, or state anxiety, $\beta = .10$, $\Delta R^2 = .001$, $\Delta F(1, 341) = .47$, $p = .496$.

Female subsample. Hierarchical regression analysis evaluated the influence of BMI on the relation between types of prevention campaigns and post measures of eating concern, weight concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety in the female subsample. BMI did not moderate the relation between type of campaign and eating concern, $\beta = .01$, $\Delta R^2 = .000$, $\Delta F(1, 266) = .01$, $p = .945$, weight concern, $\beta = .01$, $\Delta R^2 = .000$, $\Delta F(1, 272) = .00$, $p = .980$, shape concern, $\beta = .01$, $\Delta R^2 = .000$, $\Delta F(1, 269) = .00$, $p = .969$, dietary restraint, $\beta = .30$, $\Delta R^2 = .008$, $\Delta F(1, 273) = 2.27$, $p = .133$, general internalization, $\beta = -.15$, $\Delta R^2 = .002$, $\Delta F(1, 263) = .53$, $p = .468$, or state anxiety, $\beta = -.13$, $\Delta R^2 = .002$, $\Delta F(1, 264) = .43$, $p = .513$.

Analyses also investigated the impact of baseline weight concern on the relation between experimental condition and post measures of eating concern, shape concern, dietary restraint, internalization of the thin ideal, and state anxiety in the female subsample. Baseline weight concern did not moderate the relation between type of obesity prevention campaign and eating concern, $\beta = .17$, $\Delta R^2 = .003$, $\Delta F(1, 266) = 1.26$, $p = .264$, shape concern, $\beta = .08$, $\Delta R^2 = .001$, $\Delta F(1, 269) = .58$, $p = .446$, dietary restraint, $\beta = .11$, $\Delta R^2 = .001$, $\Delta F(1, 273) = .54$, $p = .462$,

general internalization, $\beta = -.15$, $\Delta R^2 = .002$, $\Delta F(1, 263) = .77$, $p = .380$, or state anxiety, $\beta = .30$, $\Delta R^2 = .008$, $\Delta F(1, 265) = 2.53$, $p = .113$.

Next, the influence of baseline shape concern on the relation between type of campaigns and post intervention measures of eating concern, weight concern, dietary restraint, internalization of the thin ideal, and state anxiety in the female subsample was examined.

Baseline shape concern did not moderate the relation between experimental condition and eating concern, $\beta = .09$, $\Delta R^2 = .001$, $\Delta F(1, 271) = .40$, $p = .527$, weight concern, $\beta = -.02$, $\Delta R^2 = .000$, $\Delta F(1, 273) = .10$, $p = .749$, dietary restraint, $\beta = .01$, $\Delta R^2 = .000$, $\Delta F(1, 272) = .00$, $p = .955$, general internalization, $\beta = -.20$, $\Delta R^2 = .004$, $\Delta F(1, 264) = 1.32$, $p = .252$, or state anxiety, $\beta = .23$, $\Delta R^2 = .005$, $\Delta F(1, 265) = 1.56$, $p = .214$.

In addition, the influence of baseline thin ideal internalization on the relation between experimental condition and post intervention measures of eating concern, weight concern, shape concern, dietary restraint, and state anxiety in the female subsample was investigated. Baseline thin ideal internalization did not moderate the relation between category of obesity prevention campaign and eating concern, $\beta = .17$, $\Delta R^2 = .003$, $\Delta F(1, 258) = .82$, $p = .365$, weight concern, $\beta = -.07$, $\Delta R^2 = .001$, $\Delta F(1, 263) = .17$, $p = .681$, shape concern, $\beta = .05$, $\Delta R^2 = .000$, $\Delta F(1, 261) = .08$, $p = .780$, dietary restraint, $\beta = -.01$, $\Delta R^2 = .000$, $\Delta F(1, 264) = .00$, $p = .966$, or state anxiety, $\beta = .27$, $\Delta R^2 = .007$, $\Delta F(1, 257) = 2.05$, $p = .153$.

Finally, hierarchical regression analysis investigated the influence of trait anxiety on the relation between experimental condition and post intervention measures of eating concern, weight concern, shape concern, dietary restraint, thin ideal internalization, and state anxiety in the female subsample. Trait anxiety did not moderate the relation between type of campaign and eating concern, $\beta = -.26$, $\Delta R^2 = .006$, $\Delta F(1, 257) = 1.88$, $p = .171$, weight concern, $\beta = -.32$, $\Delta R^2 =$

.009, $\Delta F(1, 263) = 3.33$, $p = .069$, shape concern, $\beta = -.27$, $\Delta R^2 = .007$, $\Delta F(1, 260) = 2.49$, $p = .116$, dietary restraint, $\beta = -.31$, $\Delta R^2 = .009$, $\Delta F(1, 264) = 2.55$, $p = .112$, thin ideal internalization, $\beta = -.12$, $\Delta R^2 = .001$, $\Delta F(1, 254) = .36$, $p = .550$, or state anxiety, $\beta = .13$, $\Delta R^2 = .002$, $\Delta F(1, 257) = .59$, $p = .444$.

Discussion

The prevalence of public service announcements and educational materials aimed at reducing obesity has increased in recent years. Although obesity prevention is essential, research demonstrates that health promotion messages might result in unintended, harmful consequences (O’Dea, 2005; Wolburg, 2004; Witte & Allen, 2000). Multimedia obesity prevention campaigns often employ fear-based appeals to highlight the undesirable consequences of excessive weight. These campaigns might unintentionally facilitate unhealthy weight control behaviors (Watson, 2011; Neumark-Stzainer et al., 2007; Rutter, Abraham, & Kok, 2001). Therefore, the purpose of the current study was to examine the potential effects of obesity prevention campaigns on both established risk factors for weight-related disorders, and motivation to make positive health behavior change. Specifically, weight-focused obesity prevention campaigns using fear-based appeals were compared with obesity prevention campaigns with an emphasis on healthy eating and physical exercise.

Differences Between Campaigns

Exposure to different types of obesity prevention campaigns was not associated with any differences in body satisfaction, thin-ideal internalization, state anxiety, or frequency of positive health behaviors. Thus, weight-focused campaigns did not appear to negatively influence body satisfaction, thin-ideal internalization, or state anxiety. Further, campaigns focusing on healthy eating and physical exercise did not increase the frequency of positive health behaviors. One possible explanation for this finding regarding health behaviors is that campaigns with weight-

related terms did not actually induce fear in the participants. Therefore, individuals did not encounter the threat of impending harm and experience apprehension regarding their body weight or motivation to take protective action (Rutter, Abraham, & Kok, 2001). Additionally, the campaigns might have instilled fear, but participants evaluated the perceived threat as low or irrelevant. This appraisal might have decreased the incentive to continue processing the message, and the fear appeal was disregarded (Witte, 1992). On the other hand, participants might have perceived the threat level as high and engaged in maladaptive responses not measured in the current study (e.g., alcohol intake, drug abuse, cigarette smoking; Witte, 1992).

Individuals who viewed weight-focused prevention messages had greater negative perceptions of obesity compared with individuals who viewed campaigns without weight-related terms. Thus, weight-focused campaigns heightened unfavorable attitudes towards obesity. This finding corroborates previous research demonstrating that stigmatizing obesity related health messages resulted in negative reactions from the public, and that messages perceived as more positive made no mention of “obesity” at all (Puhl, Luedicke, & Peterson, 2013; Puhl, Peterson, & Luedicke, 2012). Moreover, the current study extends prior work by indicating that weight-related terms are particularly pernicious components of obesity prevention campaigns, as they appeared to induce these detrimental attitudes. Use of these terms implies personal responsibility and blame for excessive weight (Piggin & Lee, 2011). Therefore, individuals (of all body sizes) might respond to weight-related messages by forming (or strengthening) negative opinions towards obese or overweight individuals. This is worrisome, as negative attitudes towards obesity are associated with numerous detrimental psychological and physical consequences (Puhl & Heuer, 2010). On the other hand, obesity prevention campaigns that refrain from using weight-related terms advocate positive health changes by emphasizing healthy eating and exercise. Instead of framing obesity as a problem and viewing weight as a marker of health,

changes are recommended for people of all body sizes to increase overall health. These campaigns recommend actions in which everyone can engage, and do not suggest that these behaviors are only appropriate for individuals with obesity.

Weight-focused obesity prevention campaigns were also associated with decreased self-efficacy for health behavior change compared with campaigns that did not include these terms. This finding is consistent with past research showing that negatively rated obesity health campaigns induced less self-efficacy than more positively rated campaigns (Puhl, Luedicke, & Peterson, 2013). Moreover, it advances previous literature by identifying weight-related terms as a specific element of obesity prevention campaigns that negatively affects health behavior self-efficacy. Campaigns that include weight-related terminology emphasize the detrimental consequences associated with high BMIs, yet typically lack corresponding behavioral recommendations. If campaigns do include information regarding an appropriate protective response, the prescribed behavioral changes are frequently unrealistic (Lewis et al., 2010). Without feasible recommendations, individuals are made aware of the harmful effects of their weight status but are not provided with a method to eradicate their condition. Therefore, such campaigns are unlikely to have the desired effect on obesity (Witte & Allen, 2000). On the other hand, campaigns without weight-related terms focus on recommending feasible mechanisms of behavioral change. These messages do not emphasize weight, and instead advocate small behavior changes (e.g., changing portion sizes, increasing fruit and veggie intake). By offering an effective method of change, this type of campaign appears to result in higher self-efficacy, and thus is more likely to produce the desired effect (Witte, 1992).

Overall Effects of Campaigns

Fat intake decreased as a result of exposure to both types of obesity prevention campaigns. This suggests that exposure to the campaigns influenced the amount fat an individual

consumes. The observed decrease in fat consumption might be due to the emphasis on high-fat foods as a cause of obesity in the campaigns. On the other hand, this finding might be an indication of participants' transition to college, as a majority of the sample was college freshman. Upon starting college, individuals are often making meal choices on their own for the first time. Initially, college students might select the more appealing foods that are higher in fat and widespread throughout the university cafeterias. As time goes on, however, new students might become more cognizant of their food choices and decrease consumption of high-fat foods.

Interestingly, although fat consumption decreased from baseline to follow-up, fiber intake and exercise frequency remained unchanged. One interpretation of this finding is that college students did not perceive themselves as at risk for obesity. Research demonstrates that people need to feel personally at risk in order to engage in protective action. Therefore, if an individual does not perceive personal risk, s/he is unlikely to make positive health behavior changes (Rosenstock, 1974). Moreover, participants might have perceived personal risk, yet felt no motivation to change. Previous literature shows that risk perception as a result of health campaigns increases intention for protective behavior in older adults, but typically does not affect younger adults' behavioral intentions (Schwarzer & Renner, 2000). Furthermore, the campaigns used in this study included vivid images of high-risk individuals, potentially creating risk stereotypes that are perceived as dissimilar to the viewer. Participants might have underestimated their personal risk and discounted the message as irrelevant (Renner & Schwarzer, 2003; Weinstein & Klien, 1995). Finally, individuals often believe they are less likely than others to experience health problems in the future (Weinstein, 1980). It is probable that the college students in this study displayed unrealistic optimism, a bias that hinders the adoption of preventive behaviors (Radcliffe & Klien, 2002; Schwarzer, 1994).

An unexpected finding was the significant decrease in weight concern and shape concern, regardless of experimental condition. This discovery contradicted the hypothesis that obesity prevention campaigns unintentionally create body dissatisfaction (Watson, 2011; O’Dea, 2005). Instead, current results suggest that obesity prevention campaigns might actually reduce negative appearance self-evaluations. One possible interpretation of this finding is that body image was improved as a result of viewing body shapes that participants perceived to be “worse off.” Viewed through the lens of social comparison theory, participants likely made downward comparisons with ideals contrary to societal expectations (e.g., obese or overweight individuals) resulting in higher body satisfaction (Festinger, 1954). Downward comparisons with perceived inferior targets maintain a positive self-image to counterbalance the prevalence of thin ideals in the media (O’Brien, Hunter, Halberstadt, & Anderson, 2007).

Exposure to both types of campaigns influenced internalization of the thin-ideal. Specifically, all elements of thin-ideal internalization (i.e., general internalization, pressure, and information) increased after viewing the campaigns. Moreover, changes in general internalization and pressure were sustained over time. This illustrates that the extent to which an individual considers media an important source of information about appearance was intensified after watching obesity prevention campaigns. Furthermore, the campaigns heightened the extent to which an individual “buys into” the standards of beauty promoted in the media and the perceived feelings of pressure to conform to the societal standards of beauty, and these increases remained significant over time (Thompson et al., 2004). Taken together, these findings indicate that obesity prevention campaigns imply that an ideal body shape exists and encourage individuals to conform to this standard (Dooley, Deshpande, & Adair, 2010). Moreover, the influence of these campaigns appears to persist. This finding confirms and extends previous

research, demonstrating that viewing obese images indeed encourages the thin-ideal, and this influence is long-lasting (Dooley, Deshpande, & Adair, 2010; Thompson et al., 1999).

Gender Differences

Exploration of gender differences illustrated that compared with men, women experienced greater changes in thin-ideal internalization as a result of exposure to obesity prevention campaigns. This suggests that women are more susceptible to the societal standards of beauty presented in the media, regardless of the body size of the individuals presented. This could be due to the fact that appearance norms presented in the media for women are more frequent and explicit than they are for men (Strahan, Wilson, Cressman, & Buote, 2006). Additionally, beauty and appearance ideals are more central to the feminine (vs. masculine) gender role (Grogan, 1999; Halliwell & Dittmar, 2003). Results extend previous research by illustrating that women are more vulnerable to the influence of obese images on thin-ideal internalization.

Public Health Implications

Weight-focused obesity prevention campaigns pose serious public health consequences. These campaigns posit that body weight is a marker of health and appear to encourage negative attitudes towards obesity. These messages imply personal responsibility to make behavioral changes, creating blame and promoting stigma towards individuals with obesity (Puhl & Heuer, 2010). Stigmatizing attitudes towards obesity are concerning, as these beliefs create social disparities, threaten the psychological and physical health of individuals with obesity, and impede the intended effects of health messages (Puhl & Heuer, 2010; Guttman & Salmon, 2007). Weight stigma leads to prejudice and discrimination in the workplace, health care facilities, educational institutions, the mass media, and interpersonal relationships (Puhl & Heuer, 2009). As a result of this stigma, individuals with obesity experience psychological distress, lower

quality of life, substandard health care, and decreased health care utilization (Puhl & Heuer, 2010).

Weight stigma is also a predictor of weight-related disorders. Individuals who experience weight-based stigmatization are at greater risk than their peers of engaging in unhealthy eating behaviors and lower levels of physical activity (Puhl & Brownell, 2006; Puhl, Moss-Racusin, & Schwartz, 2007). Notably, the effects of stigmatizing messages are more strongly associated with individual's perception that s/he is overweight, rather than her/his actual weight status (Major et al., 2013). Thus, these messages could be detrimental to many individuals within a normal weight range (LaRose, Gorin, Clarke, & Wing, 2011). Given the detrimental consequences of stigma, the use of weight-focused obesity prevention campaigns should be particularly discouraged. The current study demonstrates that prevention campaigns with weight-related terms do not increase motivation to make positive health behavior changes more than those without weight-related terms. This result counters the perception that stigmatizing messages instill motivation to engage in healthier eating and exercise behaviors (Puhl & Heuer, 2010).

Furthermore, weight-focused obesity prevention campaigns emphasize the adverse health consequences of excessive weight but do not include a feasible recommended protective action. Individuals are confronted with harm, yet not provided with a practical way to prevent it. Thus, viewers doubt their ability to avoid harm and experience low self-efficacy for behavior change. Research demonstrates the importance of including advice for regulating behavior when presenting a health threat, as self-efficacy is crucial in handling difficult or novel situations (Bandura, 1997). Individuals' perceptions of self-efficacy shape the goals they set, the course of action they pursue, how much effort they invest, and how long they persevere (Bandura, 1997). Without the belief they are able to change, individuals might engage in maladaptive coping responses (Witte, 1992). Specifically, exposure to stigmatizing obesity prevention campaigns

results in reduced self-efficacy for exercise and dietary control (Major et al., 2013; Seacat & Mickelson, 2009). Therefore, obesity prevention campaigns might hinder the behaviors they are designed to promote. Effective obesity prevention campaigns should communicate a feasible protective action in addition to providing information about health risks.

Exposure to obesity prevention campaigns increased internalization of the thin ideal. Individuals appeared to experience lasting feelings of pressure to conform to the societal standards of beauty exhibited in the media. These campaigns imply that an ideal body shape exists, and encourage individuals to conform this thin beauty standard. By (even inadvertently) enhancing the desirability of thinness, these messages might pressure individuals to take extreme measure to emulate the thin ideal. The societal pressure to be thin is an important contributor to body dissatisfaction, the most consistent and robust predictor for the development of disordered eating (Watson, 2011; Neumark-Stzainer et al., 2007; Stice, 2002; Thompson et al., 1999; Songua-Barke, Davies, & Thompson, 1996). This is particularly true for women, who were more susceptible to changes in thin-ideal internalization as a result of obesity prevention campaigns. Given that women are disproportionately affected by eating disorders and unhealthy weight control behaviors, and that thin-ideal internalization is a risk factor for weight-related conditions, obesity prevention campaigns might produce undesirable consequences (Groesz, Levine, & Mrnen, 2002). A causal link between obesity prevention campaigns and eating disorders is plausible, although this link cannot be established with the current data (Sanches-Carracedo, Neumark-Stzainer, & Lopez-Guimera, 2012; Watson, 2011; Haines & Neumark-Stzainer, 2006; O'Dea, 2005).

Overall, obesity prevention campaigns with weight-related terms did not yield positive health behavior change, especially when compared with campaigns without weight-related terms. Indeed, exposure to weight-focused prevention campaigns was associated with consequences

that might actually hinder positive health behavior change in the long term. Therefore, it is recommended that these campaigns focus less on weight and more on healthy eating and increasing physical activity.

Neither campaign, however, had much effect on health behavior change. Considering the observed negative effects (e.g., increased thin-ideal internalization), the use of mass media obesity prevention campaigns is highly questionable. Instead, perhaps obesity risk messages should be tailored to specific subsets of the population (e.g., adolescents, college students, young adults) to increase viewers' perception of their personal relevance. Moreover, campaigns should include information about the risk faced by an average peer and depict individuals with varying levels of risk, limiting the development of risk stereotypes that are perceived as dissimilar. That way, perception of personal risk might increase and individuals might feel more inclined to take protective action. Finally, perhaps limited public health resources might be better used to support other types of obesity prevention efforts, such as improving the environment in which we live (i.e., increasing access to fresh fruits and vegetables, improving access to gyms, creating more outdoor parks).

Strengths and Limitations

This project extends the current literature in a number of novel ways. It is the first study to evaluate the effects of obesity prevention public health video campaigns, rather than written or print messages. This is important because large blocks of text are becoming less appealing to consumers, and information is increasingly presented in video format (Danaher, Jazdzewski, McKay, & Hudson, 2005; Liu, 2005). Moreover, it investigated the influence of different types of obesity prevention campaigns, comparing messages that use weight-related terms with those that focus on living a healthy lifestyle. Additionally, this study examined the direct impact of obesity prevention campaigns on elements of disordered eating and motivation to make positive

health behavioral changes. Furthermore, by collecting follow-up data, it investigated behavior outcomes over time and assessed whether different obesity-related messages produced lasting results. The project's emphasis on the varying components of obesity prevention campaigns provides important implications for framing messages to address the issue.

Limitations of the study include the convenience sampling method. Participants were all VCU undergraduate students enrolled in a Psychology course who independently chose to enroll in the study. These individuals were predominantly young, educated, and middle class. Moreover, they might differ from those who chose not to participate, creating a selection bias. Another limitation is the use of self-report measures. Response to the questionnaires might reflect social desirability rather than true attitudes and behaviors. Furthermore, measures were completed online. The research environment was not controlled, and participants might become distracted or influenced by situational factors. The inclusion of validation items attempted to mitigate this concern.

Future Directions

Future research is needed to further investigate the ramifications of using weight-related terms in obesity prevention messages. Specifically, research should explore other potential harmful responses (e.g., alcohol intake, drug abuse, cigarette smoking) that might result from exposure to weight-focused campaigns.

Further, research is required to tease apart the specific components of obesity prevention campaigns (e.g., poignant visuals, key phrases) that might be associated with a decrease in fat intake but not an increase in fiber intake or exercise frequency. Awareness of these elements is needed to create beneficial (and not detrimental) messages and maximize campaign effectiveness. Additionally, future research should focus on replicating the current study in a more diverse sample, particularly with respect to age, stage of life, and weight status. This could

yield information regarding the message components that are effective for particular subsets of the population (e.g., college students, young adults, middle-age adults). Results can inform the development of campaigns tailored to specific individuals to increase risk perception and personal relevance.

Finally, future work should include open-ended questions or conduct in-depth focus groups to gather qualitative responses to obesity prevention campaigns. Qualitative data would provide greater detail regarding the specific elements of the campaigns to which individuals attend and react. Further, investigators could assess whether perceptions of health messages vary according to whether participants apply the messages to themselves or others.

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List of References

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Appendix A

Obesity-Related Public Health Campaigns

Campaigns with Weight-Related Terms

1. Hawaii State Department of Health: Start Living Healthy Hawaii
 - a. [Rethink Your Drink #1](#)
2. New York City Department of Health and Mental Hygiene: Pouring on the Pounds
 - a. [Pouring On the Pounds - Adults](#)
3. Children's Healthcare of Atlanta: Strong4Life
 - a. [Why Am I Fat?](#)
4. Children's Healthcare of Atlanta: Strong4Life
 - a. [Rewind the Future](#)
5. National Heart, Lung, and Blood Institute
 - a. [Obesity Happens One Pound at a Time](#)

No Weight-Related Terms

1. Eat Smart, Move More North Carolina
 - a. [Eat More Fruits and Veggies](#)
 - b. [Right Size Your Portions](#)
2. National Heart, Lung, and Blood Institute & Department of Health and Human Services:
I Can, You Can, We Can!
 - a. [Dunk](#)
3. National Heart, Lung, and Blood Institute: All In Together
 - a. [All In Together](#)
4. U.S. Government: Let's Move!
 - a. [Remember Play](#)

Appendix B

Validation Questions

Questions for Campaigns with Weight-Related Terms

1. Rethink Your Drink: According to this campaign, how many pounds fatter a year does drinking one can of soda a day make you?
 - b. 5 pounds
 - c. 10 pounds**
 - d. 20 pounds
 - e. 25 pounds

2. Pouring on the Pounds: According to this campaign, besides obesity, drinking a lot of sugar can bring on:
 - a. Liver disease
 - b. Stroke
 - c. Diabetes**
 - d. Cancer

3. Why Am I Fat: According to this campaign, what percentage of Georgia parents of overweight kids doesn't recognize the problem?
 - a. 25%
 - b. 40%
 - c. 60%
 - d. 75%**

4. Rewind the Future: What type of food does the mother in this campaign feed her child when he is a baby and sitting in his high chair?
 - a. French fries**
 - b. Chocolate pudding
 - c. Carrots
 - d. Gummy bears

5. Obesity Happens One Pound at a Time: What is the main message in this video campaign?
 - a. Extra weight on the body can lead to heart attack
 - b. Extra weight on the body can make a big difference in how the body moves**
 - c. Extra weight on the body can lead to an inability to exercise
 - d. Extra weight on the body can lead to serious health problems

Questions for Campaigns with No Weight-Related Terms

6. Eat More Fruits and Veggies: In this campaign, the mother is serving veggies to and eating veggies with her:
 - a. Close girlfriends
 - b. Coworkers

- c. Grandparents
 - d. **Family**
7. Right Size Your Portions: According to this campaign, _____ will help you lose weight.
- a. **Using a smaller plate**
 - b. Cooking with less butter
 - c. Eating more fruits and veggies
 - d. Eating more fish
8. Dunk: In this video campaign, the mother
- a. Is a star basketball player
 - b. Makes all of her attempts to score a basket
 - c. **Misses all of her attempts to score a basket except her last one**
 - d. Is teaching her children how to do a slam dunk
9. All In Together: What is the main message of this video campaign?
- a. Eating less fast food can make you healthier
 - b. Increasing the amount of fruits and veggies you eat can make you healthier
 - c. Engaging in vigorous physical activity every day can make you healthier
 - d. **Just moving a little and eating better every day can make you healthier**
10. Remember Play: According to this video, it is important for children to play for _____ a day to stay healthy and strong.
- a. **60 minutes**
 - b. 40 minutes
 - c. 30 minutes
 - d. 25 minutes

Appendix C

Demographic Questionnaire

1. Age: _____
2. Year in school:
 Freshman (first-year)
 Sophomore
 Junior
 Senior
 Graduate
3. Race/ethnicity (check all that apply):
 White/Caucasian
 Black/African-American
 Hispanic/Latino
 Asian/Asian-American
 Other
4. Sex:
 Male
 Female
5. Current height: _____
6. Current weight: _____
7. Highest weight (excluding pregnancy) at your current height: _____
8. Lowest weight at your current height: _____

Appendix D

Block Food Screener

Think about your eating habits over the past year or so. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Check one box for each food.

Meats and Snacks	1/MONTH or less	2-3 times a MONTH	1-2 times a WEEK	3-4 times a WEEK	5+ times a WEEK
Hamburgers, ground beef, meat burritos, tacos					
Beef or pork, such as steaks, roasts, ribs, or in sandwiches					
Fried chicken					
Hot dogs, or Polish or Italian sausage					
Cold cuts, lunch meats, ham (not low-fat)					
Bacon or breakfast sausage					
Salad dressings (not low-fat)					
Margarine, butter or mayo on bread or potatoes					
Margarine, butter or oil in cooking					
Eggs (not Egg Beaters or just egg whites)					
Pizza					
Cheese, cheese spread (not low-fat)					
Whole milk					
French fries, fried potatoes					
Corn chips, potato chips, popcorn, crackers					
Doughnuts, pastries, cake, cookies (not low-fat)					
Ice cream (not sherbet)					

or non-fat)					
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Think about your eating habits over the past year or so. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Check one box for each food.

Fruits, Vegetables, and Grains	Less than 1/WEEK	Once a WEEK	2-3 times a WEEK	4-6 times a WEEK	Once a DAY	2+ a DAY
Fruit juice, like orange, apple, grape, fresh, frozen or canned. (Not sodas or other drinks)						
How often do you eat any fruit, fresh or canned (not counting juice?)						
Vegetable juice, like tomato juice, V-8, carrot						
Green salad						
Potatoes, any kind, including baked, mashed or french fried						
Vegetable soup, or stew with vegetables						
Any other vegetables, including string beans, peas, corn, broccoli or any other kind						
Fiber cereals like Raisin Bran, Shredded Wheat or Fruit-n-Fiber						
Beans such as baked beans, pinto, kidney, or lentils (not green beans)						
Dark bread such as whole wheat or rye						

Appendix E

Eating Disorder Examination Questionnaire with Instruction

Some questions ask about (1) eating what most people would regard as an unusually large amount of food and (2) feeling a sense of having lost control while eating.

1. An unusually large amount of food is something that *most* people would feel is more than a large meal.
2. A sense of having lost control while eating might be experienced as feeling driven or compelled to eat; not being able to stop eating once you have started; not being able to keep yourself from eating large amounts of certain kinds of foods in the first place; or giving up on even trying to control your eating because you know that, no matter what, you are going to overeat.

Here are some examples:

After work one evening, Diana ate two pieces of chicken, a 16-ounce package of frozen vegetables, three cups of rice, three fourths of a coffee cake, and a piece of fruit. This is an unusually large amount of food. While she ate Diana felt completely out of control, ate more quickly than usual, and ate until she felt uncomfortable full. Afterwards, Diana was very upset about how much she had eaten, and said she felt depressed, guilty, and hated herself for giving in to the urge to binge.

Several times a week JoAnne ate lunch at McDonald's with two coworkers. Her usual order was a Big Mac, a fish fillet sandwich, two large orders of fries, and a large chocolate shake. This is an unusually large amount of food. Although she ate somewhat more than her friends did and knew she was eating a lot of high-fat food, she did not feel out of control while eating or feel upset afterwards about how much she had eaten.

For lunch one day, Joseph had a ham and cheese sandwich with mayonnaise on a roll, a small bag of potato chips, a candy bar, and a diet coke. Although this was a large meal, it was not unusually large. However, Joseph felt out of control because he had planned to have turkey on whole wheat with lettuce and tomato plus a piece of fruit for dessert, but changed his mind at the last minute while ordering his sandwich.

Carol ate two donuts someone brought to the office one morning. She had started a diet that day and planned to skip breakfast. Carol initially refused the donuts, but after everyone else had gone to a meeting she snuck into the break room and very quickly ate the donuts so no one would see her eating. She felt very guilty and ashamed afterwards and hated feeling so out of control of her eating, resolving to start dieting again the next day. Although Carol felt bad about eating the donuts, this was not an unusually large amount of food.

Diana and JoAnne ate an unusually large amount of food, but Joseph and Carol did not. Diana, Joseph, and Carol felt a loss of control while eating, but JoAnne did not. Of the four, Diana is the only one who actually had a binge episode, which includes both (1) eating

an unusually large amount of food and (2) feeling a sense of having lost control while eating.

Instructions

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days). Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS.....	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
--	---------	----------	-----------	------------	------------	------------	-----------

1. Have you been deliberating <u>trying</u> to limit the amount of food you eat to influence your shape or weight?	0	1	2	3	4	5	6
--	---	---	---	---	---	---	---

2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
---	---	---	---	---	---	---	---

3. Have you <u>tried</u> to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
---	---	---	---	---	---	---	---

4. Have you tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
--	---	---	---	---	---	---	---

5. Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
--	---	---	---	---	---	---	---

6. Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation? 0 1 2 3 4 5 6

7. Have you been afraid of losing control over eating? 0 1 2 3 4 5 6

8. Have you had episodes of binge eating? 0 1 2 3 4 5 6

9. Have you eaten in secret? (Do not count binges.) 0 1 2 3 4 5 6

10. Have you definitely wanted your stomach to be flat? 0 1 2 3 4 5 6

11. Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example read, watch TV, or follow a conversation? 0 1 2 3 4 5 6

12. Have you had a definite fear that you might gain weight or become fat? 0 1 2 3 4 5 6

13. Have you felt fat? 0 1 2 3 4 5 6

14. Have you had a strong desire to lose weight? 0 1 2 3 4 5 6

OVER THE PAST FOUR WEEKS (28 DAYS)

15. On what proportion of time that you have eaten have you felt guilty because the effect on your shape or weight? (Do not count binges.) (Circle the number which applies.)

- 0 – None of the times
- 1 – A few of the times
- 2 – Less than half the times
- 3 – Half of the times
- 4 – More than half the times
- 5 – Most of the times
- 6 – Every time

16. Over the past four weeks (28 days), have there been any times when you have felt you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please put appropriate number in box).

- 0 – No
- 1 – Yes []

17. How many episodes have you had over the past four weeks?

[] [] []

18. During how many of these episodes of overeating did you have a sense of having lost control over your eating?

[] [] []

19. Have you had other episodes of eating in which you have had a sense of having lost control and eating too much, but have not eaten an unusually large amount of food given the circumstances?

- 0 – No
- 1 – Yes []

20. How many such episodes have you had over the past four weeks?

[] [] []

21. Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?

- 0 – No
- 1 – Yes []

22. How many times have you done this over the past four weeks?

[] [] []

23. Have you taken laxatives as a means of controlling your shape or weight?

0 – No

1 – Yes []

24. How many times have you done this over the past four weeks?

[] [] []

25. Have you take diuretics (water tablets) as a means of controlling your shape or weight?

0 – No

1 – Yes []

26. How many times have you done this over the past four weeks?

[] [] []

27. Have you exercised hard as a means of controlling your shape or weight?

0 – No

1 – Yes []

28. How many times have you done this over the past four weeks?

[] [] []

OVER THE PAST FOUR WEEKS (28 DAYS) (Please circle the number which best describes your behavior.)	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
29. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
30. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
31. How much would it upset you if you had to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6

33. How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6
34. How concerned have you been about other people seeing you eat?	0	1	2	3	4	5	6
35. How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?	0	1	2	3	4	5	6
36. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?	0	1	2	3	4	5	6

Appendix F

Sociocultural Attitudes Towards Appearance Questionnaire – 3

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree
1	2	3	4	5

1. TV programs are an important source of information about fashion and “being attractive.” _____
2. I’ve felt pressure from TV or magazines to lose weight. _____
3. I do not care if my body looks like the body of people who are on TV. _____
4. I compare my body to the bodies of people who are on TV. _____
5. TV commercials are an important source of information about fashion and “being attractive.” _____
6. I do not feel pressure from TV or magazines to look pretty. _____
7. I would like my body to look like the models who appear in magazines. _____
8. I compare my appearance to the appearance of TV and movie stars. _____
9. Music videos on TV are not an important source of information about fashion and “being attractive.” _____
10. I’ve felt pressure from TV and magazines to “be thin.” _____
11. I would like my body to look like the people who are in movies. _____
12. I do not compare my body to the bodies of people who appear in magazines. _____
13. Magazine articles are not an important source of information about fashion and “being attractive.” _____
14. I’ve felt pressure from TV or magazines to have a perfect body. _____
15. I wish I looked like the models in music videos. _____
16. I compare my appearance to the appearance of people in magazines. _____
17. Magazines advertisements are an important source of information about fashion and “being attractive.” _____
18. I’ve felt pressure from TV or magazines to diet. _____
19. Pictures in magazines are important source of information about fashion and “being _____

attractive.”

20. I've felt pressure from TV or magazines to exercise. _____

21. Movies are an important source of information about fashion and “being attractive.” _____

22. I've felt pressure from TV or magazines to change my appearance. _____

23. I do not try to look like the people on TV. _____

24. Movie stars are not an important source of information about fashion and “being attractive.” _____

25. Famous people are an important source of information about fashion and “being attractive.” _____

Appendix G

Sociocultural Attitudes Towards Appearance Questionnaire – 3 – Male Version

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree **Mostly Disagree** **Neither Agree Nor Disagree** **Mostly Agree** **Definitely Agree**
1 **2** **3** **4** **5**

1. TV programs are an important source of information about fashion and “being attractive.” _____
2. I’ve felt pressure from TV or magazines to lose weight. _____
3. I do not care if my body looks like the body of people who are on TV. _____
4. I compare my body to the bodies of people who are on TV. _____
5. TV commercials are an important source of information about fashion and “being attractive.” _____
6. I do not feel pressure from TV or magazines to look muscular. _____
7. I would like my body to look like the models who appear in magazines. _____
8. I compare my appearance to the appearance of TV and movie stars. _____
9. Music videos on TV are not an important source of information about fashion and “being attractive.” _____
10. I’ve felt pressure from TV and magazines to be muscular. _____
11. I would like my body to look like the people who are in movies. _____
12. I do not compare my body to the bodies of people who appear in magazines. _____
13. Magazine articles are not an important source of information about fashion and “being attractive.” _____
14. I’ve felt pressure from TV or magazines to have a perfect body. _____
15. I wish I looked like the models in music videos. _____
16. I compare my appearance to the appearance of people in magazines. _____
17. Magazines advertisements are an important source of information about fashion and “being attractive.” _____
18. I’ve felt pressure form TV or magazines to diet. _____
19. Pictures in magazines are important source of information about fashion and “being _____

attractive.”

20. I've felt pressure from TV or magazines to exercise. _____

21. Movies are an important source of information about fashion and “being attractive.” _____

22. I've felt pressure from TV or magazines to change my appearance. _____

23. I do not try to look like the people on TV. _____

24. Movie stars are not an important source of information about fashion and “being attractive.” _____

25. Famous people are an important source of information about fashion and “being attractive.” _____

Appendix H

State-Trait Anxiety Inventory

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then enter your response to the left of the number of each statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

- | 1 | 2 | 3 | 4 |
|-------------------|-----------------|----------------------|---------------------|
| Not At All | Somewhat | Moderately So | Very Much So |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
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| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |
| _____ | | | |

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then enter your response to the left of the number of each statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend

too much time on any one statement but give the answer which seems to describe how you generally feel.

1
Almost Never

2
Sometimes

3
Often

4
Almost Always

- _____ 21. I feel pleasant.
- _____ 22. I feel nervous and restless.
- _____ 23. I feel satisfied with myself.
- _____ 24. I wish I could be as happy as others seem to be.
- _____ 25. I feel like a failure.
- _____ 26. I feel rested.
- _____ 27. I am “calm, cool, and collected.”
- _____ 28. I feel that difficulties are piling up so that I cannot overcome them.
- _____ 29. I worry too much over something that really doesn’t matter.
- _____ 30. I am happy.
- _____ 31. I have disturbing thoughts.
- _____ 32. I lack self-confidence.
- _____ 33. I feel secure.
- _____ 34. I make decisions easily.
- _____ 35. I feel inadequate.
- _____ 36. I am content.
- _____ 37. Some unimportant thoughts run through my mind and bother me.
- _____ 38. I take disappointments so keenly that I can’t put them out of my mind.
- _____ 39. I am a steady person.
- _____ 40. I get in a state of tension or turmoil as I think over my recent concerns and interests.

Appendix I

Changes of Stage of Exercise

Please use the following definition of exercise when answering these questions:

Regular Exercise is any planned physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 times per week for 20-60 minutes per session. Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

Please indicate how strongly you agree or disagree with the following statements.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1. As far as I'm concerned, I don't need to exercise regularly. _____
2. I have been exercising regularly for a long time and I plan to continue. _____
3. I don't exercise and right now I don't care. _____
4. I am finally exercising regularly. _____
5. I have been successful at exercising regularly and I plan to continue. _____
6. I am satisfied with being a sedentary person. _____
7. I have been thinking that I might want to start exercising regularly. _____
8. I have started exercising regularly within the last 6 months. _____
9. I could exercise regularly, but I don't plan to. _____
10. Recently, I have started to exercise regularly. _____
11. I don't have the time or energy to exercise regularly right now. _____
12. I have started to exercise regularly, and I plan to continue. _____
13. I have been thinking about whether I will be able to exercise regularly. _____
14. I have set up a day and time to start exercising regularly within the next few weeks. _____

15. I have managed to keep exercising regularly through the last 6 months. _____
16. I have been thinking that I may want to begin exercising regularly. _____
17. I have lined up with a friend to start exercising regularly within the next few weeks. _____
18. I have completed 6 months of regular exercise. _____
19. I know that regular exercise is worthwhile, but I don't have time for it in the near future. _____
20. I have been calling friends to find someone to start exercising with in the next few weeks. _____
21. I think regular exercise is good, but I can't figure it into my schedule right now. _____
22. I really think I should work on getting with a regular exercise program in the next 6 months. _____
23. I am preparing to start a regular exercise group in the next few weeks. _____
24. I am aware of the importance of regular exercise but I can't do it right now. _____

Appendix J

Reaction to Messages

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree
1	2	3	4	5

1. This message would motivate a person to eat healthier. _____
2. This message promotes a behavior that is difficult for me to do. _____
3. This message would motivate a person to lose weight. _____
4. This message promotes a negative attitude about overweight/obese persons. _____
5. This message would be helpful for people who want to improve their health. _____
6. This message would increase blame towards people for being overweight. _____
7. This message would motivate a person to exercise more. _____
8. This message makes obesity seem like a much simpler issue than it really is. _____
9. This message makes weight loss seem attainable. _____
10. This message makes me concerned about my body weight. _____
11. I do not like this message. _____

Appendix K

Self-Efficacy

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree
1	2	3	4	5

1. This campaign provides a clear action or behavior for people to engage in to improve their health. _____

2. This message offers strategies for achieving the intended action or behavior. _____

3. I feel like I would have the ability to engage in the behavior promoted in this campaign if I put my mind to it. _____

4. I am likely to change my behavior based on this message. _____

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