

EFFECTS OF ACUTE AEROBIC EXERCISE FOR THE NEGATIVE MOOD STATES  
ELICITED BY THE MEDIA'S PORTRAYAL OF THE "IDEAL" FEMALE BODY

By

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by

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To my father, who lovingly instilled in me everything I needed to be triumphant: an inquisitive and logical mind, and tenacious perseverance.

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Abstract of Dissertation Presented to the Graduate School  
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Women's body-image disturbance has increased threefold over the past three decades. Because body-image disturbance is the primary symptom of eating disorders, and eating disorders are chronic conditions that result in one of the highest mortality and morbidity rates of all mental disorders, there is need for cost effective prevention and treatment strategies such as exercise for body-image disturbance. Recently, exercise has been proposed as a treatment for body-image disturbance. Therefore, the purpose of this dissertation was to examine the effects of an acute bout of exercise on the negative mood states elicited by the media's portrayal of the "ideal" female body. Caucasian undergraduates reporting high levels of drive for thinness and internalization of the media ideal were randomly assigned to watch a picture show containing either neutral pictures or "ideal" female body pictures after engaging in 30 minutes of moderate intensity acute aerobic exercise or 30 minutes of quiet rest. Results showed that compared to neutral pictures, the media pictures significantly increased depression ( $p = .001$ ) and body

dissatisfaction ( $p < .001$ ). Acute aerobic exercise, however, was not effective in preventing or treating the negative mood states elicited by these media images ( $p = .68$ ). Future research should continue to investigate the role of exercise in the treatment and prevention of body-image disturbances by using theoretically driven cognitive behavioral treatments containing chronic exercise programs.

## CHAPTER 1 INTRODUCTION

Many social benefits are afforded to physically attractive people. More specifically, attractive people are perceived as more popular, outgoing (Langlios et al., 2000; Martin, Sinden, & Fleming, 2000), and successful (Eagly, Ashmore, Makhijani, & Longo, 1991; Hatfield & Sprecher, 1986). They also receive higher academic grades (Felson, 1980), are given greater employment opportunities (Cash, Gillen, & Burns, 1977), and earn higher starting salaries than less attractive people (Jackson, 1983). With regard to romantic life, overweight men and women are about 15% less likely to marry, compared to their nonoverweight counterparts (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993). It is plausible that the many social benefits associated with physical attractiveness combined with the difficulty of altering one's physique have led to significant increases in body-image disturbance over the past three decades (Berschied, Walster, & Bohrnstedt, 1973; Cash, Winstead, & Janda, 1986; Garner, 1997).

While it is generally understood that a lean physique is desirable for both men and women (Pope, Phillips, & Olivardia, 2000; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), this "ideal" body is becoming exceedingly thin for women (Silverstein, Perdue, Peterson, Vogel, & Fantini, 1986; Wiseman, Gray, Mosimann, & Ahrens, 1992) and exceedingly muscular for men (Leit, Pope, & Gray, 2001; Pope, Olivardia, Gruber, & Borowiecki, 1999). This has been evidenced by changes in the body shape and structure of men and women shown in the mass media. Specifically, Wiseman et al. showed that

60% of *Miss America Pageant* contestants and 69% of *Playboy* centerfolds from 1979 to 1988 were 15% below their expected weights based on their heights. Similarly, for men, an investigation of *Playgirl* centerfolds from 1973 to 1997 indicated that the ideal male body has become increasingly lean and muscular (Leit et al.). Specifically, over the last 25 years, the average male centerfold has lost 12 pounds of fat and gained 27 pounds of muscle (Pope, Phillips, & Olivardia).

As the discrepancy between the sizes and proportions of the ideal body and the average body increases (USDHHS, 2000), people are spending extreme amounts of money to alter their appearance. For example, annual estimates show that Americans spend about \$21.5 billion on gym memberships and exercise equipment (Canadian Fitness and Lifestyle Research Institute, 1996), \$16.8 billion on dietary supplements (i.e., weight-loss aids, fat burners; National Nutritional Foods Association, 2002), \$2 billion on commercial weight-loss programs (i.e., Weight Watchers; Farzan, 1997), and \$6.9 billion on cosmetic surgery (American Society of Plastic Surgeons, 2002). More vital is the cost associated with counseling and psychiatric treatment of psychological illnesses that result from body-image disturbance such as eating disorders and body dysmorphic disorder. While no prevalence and mortality statistics are available for body dysmorphic disorder, about 3.5 - 4.0% of the population suffers from anorexia nervosa and bulimia nervosa. Furthermore, eating disorders are chronic conditions that result in one of the highest mortality and morbidity rates of all mental disorders (American Psychological Association [APA], 1994).

Because of the large increase and the high costs associated with the treatment of body-image disturbance, there is need for practical cost efficient prevention and treatment

strategies for body-image disturbance. Recently, exercise has been proposed as a practical treatment for body-image disturbance (Fisher & Thompson, 1994; Koff & Bauman, 1997).

Therefore, the purpose of this dissertation is to examine the effects of an acute bout of aerobic exercise on the negative mood states (i.e., anxiety, anger, depression, body dissatisfaction) elicited by pictures of the “ideal” female body. Specifically, I hypothesized that (a) women viewing media images of the ideal body would report more anxiety, anger, depression, and body dissatisfaction compared to those viewing neutral pictures (Cusumano & Thompson, 1997; Hausenblas, Janelle, Gardner, & Hagan, 2003; Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999); and (b) after viewing media images of the ideal female body, participants in the exercise condition would report less anxiety, anger, depression, and body-image dissatisfaction compared to participants in the quiet rest condition (Arent, Landers, & Etnier, 2000; Focht & Koltyn, 1999; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991).

## CHAPTER 2 LITERATURE REVIEW

Contemporary society exerts pressure on individuals to achieve the aesthetic standard of a lean and fit body for women and a lean and muscular body for men (Leit, Pope, & Gray, 2001; Pope, Phillips, & Olivardia, 2000; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). The pressure to attain this ideal body, the rewards for appearing attractive, and the health benefits of a normal weight have resulted in people's attempts to alter their body size and shape (Bane & McAuley, 1998; Garner, 1997). Changing one's physique, however, is difficult and people's efforts are often unsuccessful (Brownell, 1991). The inability to obtain the "perfect body" has led to an increased prevalence of body-image disturbance for men and women over the last three decades (Berscheid, Walster, & Bohrnstedt, 1973; Cash, Winstead, & Janda, 1986; Garner).

Because of the large increase in body-image disturbance over the past three decades, there is need for practical cost-efficient prevention and treatment strategies. Exercise has been proposed as a practical cost-effective treatment for body-image disturbance (Fisher & Thompson, 1994; Koff & Bauman, 1997). While a recent meta-analysis confirms that exercise has a positive effect on body image (Hausenblas & Fallon, 2001), the effect is small, and there are several limitations in this area of research that must be addressed.

The purposes of this literature review are to present the prominent body image theories and methodological limitations within the literature. Research examining the role

of media in body-image disturbance will also be reviewed. Finally, the effects of acute and chronic exercise on body image will be discussed, with specific consideration for moderator variables such as age, sex, ethnicity, and exercise program characteristics.

### **Body-image Theories**

Several theories have been proposed to explain body-image disturbance such as the Social Comparison Theory, Self-ideal Discrepancy Theory, Self-schema Theory, Self-presentation Theory, and the Sociocultural Theory (Heinberg, 1996). Most research, however, fails to study body image within a theoretical framework. Furthermore, no theory proposes to explain all of the causes of body-image disturbance (Heinberg; Thompson et al., 1999). Thus I will review the following two body-image theories with the most empirical support: the Self-presentation Theory and the Sociocultural Theory (Thompson et al., 1999).

#### **Self-presentation Theory**

Self-presentation theory proposes that individuals selectively present or omit aspects of themselves to generate a desirable social impression and avoid an undesirable impression (Leary, 1992a, 1992b, Leary & Kowalski, 1990). Social anxiety results when a person is unable to generate a desirable impression (Leary, 1992b). Because physical appearance is an important component of physical self-esteem (Cash, 1990) and global self-esteem (Fox & Corbin, 1989), social physique anxiety may result in environments where evaluation of one's physique is salient (i.e., gym, beach, pool). Thus, *social physique anxiety* is defined as the anxiety experienced by individuals who perceive that their physique will be negatively evaluated by others (Hart, Leary, & Rejeski, 1989).

The primary advantage of the self-presentation theory is that, unlike other theories, it uses a theoretically derived measure of body-image disturbance. Specifically, the

Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rejeski; Martin, Rejeski, Leary, McAuley, & Bane, 1997) has excellent psychometric properties (Martin et al.), and has been used successfully in examining body-image disturbance within various contexts (Bane & McAuley, 1998; Focht & Hausenblas, 2003; McAuley, Marquez, & Jerome, 2002). Furthermore, researchers using the SPAS have shown that engaging in chronic exercise lowers social physique anxiety (Bane & McAuley, 1998; McAuley, Bane, & Mihalko, 1995; McAuley, Bane, Rudolph, & Lox, 1995). It is important to note, however, that decreases in social physique anxiety associated with chronic exercise may be mediated by the simultaneous changes in weight and body fat composition. More specifically, because the populations used in these studies were sedentary and significantly overweight (i.e., body fat of 29.37% and 35.97% for men and women, respectively; McAuley, Bane, & Mihalko) prior to the intervention, the exercise led to physical changes (i.e., body fat of 27.13% and 34.54% for men and women, respectively) that more closely resembled the ideal body. This suggests that social physique anxiety is not a stable trait, and it may decrease as people's body shape approaches that of the ideal male or female physique.

Although social physique anxiety is associated with increases in exercise behavior, there is also evidence that it is associated with decreases in exercise behavior. Specifically, if a person experiences high social physique anxiety in an exercise environment (i.e., gym, pool, or track), their motivation to exercise may be overwhelmed by their social physique anxiety, resulting in a low active or sedentary lifestyle (Lantz, Hardy, & Ainsworth, 1997; Randsell, Wells, Manore, Swan, & Corbin, 1998).

Research indicates that the relationship between exercise and social physique anxiety has moderating variables such as age and sex, such that young women are more

likely to experience social physique anxiety compared to men and older women. In a more recent study, Hausenblas and Martin (1999) showed that experienced aerobic exercise leaders experienced social physique anxiety regardless of body fat composition or weight. Furthermore, their results indicate that a person's motives for exercise are mediated by social physique anxiety, such that those who exercised for appearance-oriented reasons had higher social physique anxiety compared to those who reported either affective or leadership motives for exercising.

In conclusion, although the social physique anxiety construct is beneficial to the body-image literature because it is theoretically driven, there are several factors that may moderate (i.e., sex and age) or mediate (i.e., body composition, weight, motivations to exercise) social physique anxiety. Therefore, past research must be interpreted with caution, and future research should continue to investigate the role of mediators of social physique anxiety and the degree to which these mediators affect social physique anxiety.

### **Sociocultural Theory**

Researchers agree that the strongest influences on the development of body-image disturbance in Western societies are sociocultural factors (Fallon, 1990; Heinberg, Thompson, & Stormer, 1995). These factors are the result of an interaction of social structure and culture. Specifically, *social structure* is defined as “a persisting and bounded pattern of social relationships among the units in a social system” (House, 1981, p. 542), and *culture* is defined as “a set of cognitive and evaluative beliefs – beliefs about what is or what ought to be – that are shared by the members of a social system and transmitted to new members” (House, p. 542). Because various cognitive and behavioral patterns are encompassed by these definitions, the sociocultural theory uses several perspectives (i.e., feminist perspective, gender-role orientation, and the influence of mass

media) to examine the influence of common social ideals, expectations, and experiences on the etiology and maintenance of body-image disturbance (Heinberg, 1996). Generally, the sociocultural theory suggests that society overemphasizes the importance of thinness; and because many people find this a difficult standard of beauty to achieve, body-image disturbance may develop (Tiggeman & Pickering, 1996).

**Feminist perspective.** According to the feminist perspective, the etiology and maintenance of body-image disturbance is the result of women's tendency to equate physical attractiveness with self-esteem (Franks, 1986; Nagel & Jones, 1992). More specifically, society teaches women that physical attractiveness is a priority equal to or higher than education, spirituality, or personal independence. Thus, women who find it difficult to conform to the prevailing norms for thinness and attractiveness are at greater risk for developing low self-esteem and body-image disturbances (Bergner, Remer, & Whetsell, 1985; Striegel-Moore & Marcus, 1995).

**Gender-role orientation.** Similar to the feminist perspective, gender-role orientation assumes that society is the driving force behind the development of cognitive and behavioral patterns. Unlike the feminist perspective, the gender-role orientation proposes that men and women are susceptible to socialization, thus forming rigid gender-roles for each of the sexes. Specifically for women, femininity and physical beauty are of high importance (Spence & Helmreich, 1978; Timko, Striegel-Moore, Silberstein, & Rodin; 1987). Therefore, women holding traditional gender-role beliefs place higher importance on appearance and experience greater levels of body-image dissatisfaction compared to their more masculine or androgynous peers (Jackson, Sullivan, & Rostker, 1988; van Strien, 1989).

**Influence of mass media.** Most relevant to this dissertation is a perspective that focuses on the influence of mass media on women's body-image dissatisfaction. In the following pages, I will provide evidence of a socially endorsed thin ideal, followed by a review of the correlational and experimental research examining the influence of the mass media on body-image disturbance.

Research has shown that 60% of Miss America Pageant contestants and 69% of *Playboy* centerfolds from 1979 to 1988 were 15% below their expected weights based on their heights (Wiseman, Gray, Mosimann, & Ahrens, 1992). This trend has also been documented in fashion magazines (i.e., *Vogue*, *Cosmopolitan*) predominantly read by women, such that the ideal female body portrayed in the magazines is becoming progressively thinner over time (Anderson & DiDomenico, 1992; Leit, Pope, & Gray, 2001; Pope, Phillips, & Olivardia, 2000; Wiseman, Gray, Mosimann, & Ahrens, 1992). Furthermore, the articles accompanying these thin images are oriented towards dieting, exercise, and plastic surgery (Malkin, Wornian, & Chrisler, 1999; Silverstein, Perdue, Peterson, & Vogel, 1986; Nemeroff, Stein, Diehl, & Smilack, 1994).

While the data reported in these descriptive studies indicate the presence of a socially endorsed thin ideal, it is not sufficient support for the influence of mass media on body-image disturbance. More notably, researchers rely on the correlational and experimental data showing that exposure to the mass media's portrayal of the thin ideal results in decreased mood (Hausenblas, Janelle, Gardner, & Hagan, 2003), affect (Hausenblas, Janelle, Gardner, & Focht, in press; Kalodner, 1997), self-esteem (Cusumano & Thompson, 1997), body satisfaction (Cusumano & Thompson), and an

increase of eating disorder symptoms (Harrison & Cantor, 1997; Stice, Schupak-Neuberg, Shaw, & Stein, 1994).

For example, in a correlational design, 238 undergraduate women were asked to complete self-report measures for media exposure, body dissatisfaction, and eating disorder symptoms (Stice et al.). Results indicated a positive relationship between media exposure and eating disorder symptoms. Furthermore, a path analysis indicated that eating disorder symptoms were mediated by internalizing the ideal-body stereotype and body dissatisfaction. More specifically, media exposure increased body dissatisfaction and internalization of the media ideal, and in turn, body dissatisfaction and internalization increased eating disorder symptoms. A limitation to the study, however, is that the measures used to assess ideal-body stereotype internalization were not adequately validated.

Therefore, Cusumano and Thompson (1997) improved on the research of Stice and colleagues (1994) by including the Sociocultural Attitudes Towards Appearance Questionnaire and the Rosenberg Self-esteem Inventory along with the Eating Disorder Inventory to examine the effects of media exposure, awareness, and internalization of the media ideal on body-image disturbance. Their results revealed no correlation between media exposure and body-image disturbance, but found that between 12.8% and 28.7% of the variance in body-image disturbance and eating disorder symptoms was accounted for by awareness and internalization of the media ideal. Therefore, media's influence on body-image disturbance may not be a result of mere exposure to the media, but a result of the cognitive processes (i.e., awareness and internalization) present while viewing the media images. The importance of awareness and internalization processes has been

further substantiated by more recent research (Harrison, 1997; Hermes & Keel, 2003; Sands & Wardle, 2003; Thomsen, Weber, & Brown, 2002).

Because correlational studies have been inconclusive, experimental approaches have been used to indicate a link between media exposure and body-image disturbance. For example, Kalodner (1997) asked women to view 12 pictures depicting either the media's ideal female body, men exercising, or older men, women, and children playing. Results indicated that the women viewing the media ideal had higher private body consciousness and higher anxiety compared to women looking at slides of men or people playing (Kalodner). Furthermore, research has shown that exposure to pictures of fashion models can increase anger, hostility, and depression compared to viewing control pictures (Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999).

The relationship between media exposure and body image has been further established by research examining the media's effect on populations with eating disorder symptoms. For example, Waller, Hamilton, and Shaw (1992) compared changes in body-size estimation between women with diagnosed eating disorders and women with no history of eating disorders. Results indicated a decrease in body satisfaction for the eating disordered women viewing slides of fashion models, such that women with eating disorders significantly overestimated their own body size after viewing fashion models compared to eating disordered women who viewed control slides, and noneating disordered women viewing the models or control pictures.

In a more recent study, women scoring high and low for drive for thinness viewed pictures of a female model, pictures of themselves, and nonphysique control pictures (Hausenblas, Janelle, Gardner, & Focht, 2004). Using the Positive and Negative Affect

Scale, results indicated that women scoring high for drive for thinness had increased negative affect immediately after viewing slides of themselves. The women continued to report negative affect one and two hours after viewing the slides. Furthermore, positive affect was significantly lower 1-hour post-test for women scoring high for drive for thinness.

This relationship between media and body image has also been documented in adolescents (Harrison, 2001). Specifically, 366 adolescents in the 6<sup>th</sup>, 9<sup>th</sup>, and 12<sup>th</sup> grades were randomly assigned to watch a 15-minute video showing a girl being socially rewarded for thinness, socially punished for fatness, or a control video showing a girl camping with her family. Results indicated that the adolescents watching the video showing a girl being socially punished for fatness reported decreased mood compared to the other videos, indicating that exposure to a “fat is bad” mentality may be related to eating disorder symptoms.

The positive relationship between media exposure to an ideal body type and body-image disturbance is well-established. Until recently, however, researchers have struggled to identify an underlying mechanism to explain why this relationship exists. Heinberg and Thompson (1995) were among the first to propose that women internalize the media images as representative of how their own body should look. More specifically, correlational and experimental evidence shows that women are not only aware of the ideal body being presented in mass media, but they believe they are expected to conform to that ideal (Cusumano & Thompson, 1997; Hausenblas, Janelle, Gardner, & Focht, 2004). It is this internalization of media images that researchers

believe has led to the increase in body-image disturbance over time (Cattarin, Thompson, Thomas, & Williams, 2000; Heinberg, & Thompson, 1995; Irving & Berel, 2001).

Similar to the research investigating women's internalization of the media ideal, researchers have recently indicated that men are also internalizing the advertisements displayed in popular magazines and clothing catalogs (Hausenblas, Janelle, Gardner, & Hagan, 2003; Leit, Gray, & Pope, 2002). Specifically, Leit et al. found that after being exposed to 30 slides showing ideal male physiques, men reported greater discrepancies between their estimation of their current muscle mass and their ideal muscle mass.

In a similar study, male participants scoring high and low for body-image disturbance were asked to view nonphysique control slides, and physique slides (i.e., pictures of themselves, and pictures of a male model; Hausenblas et al., 2003). All participants, regardless of level of body-image disturbance, reported increased depression, anger, anxiety, and body dissatisfaction after viewing slides of themselves. Additionally, all men reported increased body dissatisfaction after viewing the model slides. Furthermore, results indicated that body-image disturbance might moderate this response such that men with greater body-image disturbance reported greater mood disturbance (i.e., more anger, depression, anxiety, and body dissatisfaction) after viewing slides of themselves compared to control slides.

Although most research has been conducted with women in early adulthood, it is important to note that recent investigations of youth have also indicated a positive relationship between the mass media and body-image disturbance. Specifically, results show that children begin to internalize the mass media ideal before puberty (Hermes &

Keel, 2003). Furthermore, research has indicated that internalization explains 28% of the variance of body-image disturbance among 9 to 12-year olds (Sands & Wardle, 2003).

In conclusion, the mass media (i.e., television and magazines) are depicting increasingly leaner men and women as the societal ideal. Additionally, adults and adolescents are internalizing these images as representative of how their own bodies should look. Furthermore, because technology affords greater opportunity for exposure to this mass media ideal, it is important to continue to explore the relationship between the media and body image. There are, however, several methodological limitations within the body-image literature that must be addressed.

### **Methodological Considerations in Body-image Research**

As previously mentioned, a lack of research conducted within a theoretical framework is a major limitation of the body-image literature. There are also several other methodological and design limitations in the body-image research that will be discussed. First, the operational definition and terminology of body image has varied, and it is often not explicitly explained within individual research studies (Bane & McAuley, 1998). *Body image* is an umbrella term for the “internal representations of one’s outer appearance” (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and it consists of perceptions, cognitions, affect, behaviors, and subjective evaluations. The affective dimension encompasses distress or anxiety regarding one’s appearance. An example of this dimension is social physique anxiety, which is caused by fear of negative social evaluation of one’s body (Hart et al., 1989). The cognitive component includes how body-image schema affects the input, storage, and retrieval processing of information. For example, body-related thoughts may dominate the cognitions of individuals with body-image disturbance resulting in distorted processing of their physique. The

behavioral aspect encompasses avoidance of situations or environments that evoke body-image scrutiny (e.g., public beaches and pools), and engaging in behaviors related to weight change or maintenance (e.g., dieting and exercise). The perceptual component is the accuracy in estimating the size of body sites or the whole body. A body-site perceptual task involves a comparison between an estimation of the size of body parts (i.e., chest, waist, hips, thighs) compared to the actual width of the body parts, such that larger differences between the actual and perceived measurement indicates greater body-image disturbance. Finally, subjective evaluation is the most global measure of body image because it uses a person's subjective evaluation of their physique and is associated with affective, cognitive, and behavioral features (Thompson et al.). Examples of subjective evaluation include the degree of dissatisfaction with the size of body parts (e.g., hips, thighs) or the whole body. Because of the variety of body-image dimensions available, and their disparate operational definitions, it is important for researchers to clarify which dimension they are assessing. Additionally, several body-image dimensions should be used in future studies so researchers are better able to detect body-image disturbance and gain a more complete understanding of body image within their sample.

Similar to the limitations associated with the numerous operational definitions of body image, there have been a wide variety of body-image measures used to assess body-image concerns. These instruments differ in their psychometric properties, feasibility, and frequency of use (Bane & McAuley, 1998; Thompson et al., 1999); and therefore, comparing individual studies investigating the exercise-body image relationship is difficult. According to Thompson (2004), researchers should carefully consider the population they are examining and include multiple pertinent measures of body image.

Potential body-image measures should be investigated for validity, reliability, instructional protocol (Thompson, 2004), and scale type (e.g., Likert or visual analogue; Bartoshuk, 2000a, 2000b; Carpenter, 2000). Researchers should also determine whether a state or trait measure of body image is most appropriate for their research (Thompson, 2004). Furthermore, if no existing body-image measure is satisfactory for the population of interest, authors should seek to adapt an existing measure and avoid creating new measures (Thompson, 2004).

More specifically, several studies located by Hausenblas and Fallon (2001) for the exercise and body-image meta-analysis used author-developed measures of body image that were not adequately tested for validity and reliability. Similarly, body-image measures that have been validated for women (e.g., Eating Disorder Inventory) may not be appropriate for measuring body-image disturbance for men. Therefore, any results obtained from studies using such measures should be cautiously evaluated.

Regarding scale type, some researchers have recently suggested that traditional measures of body image that use Likert scales anchored with adjectives such as “weak,” “moderate,” and “strong” may be flawed because the intensity of those adjectives depends on the range of their experiences (Bartoshuk, 2000a, 2000b; Carpenter, 2000). Therefore, visual analogue scales with universally adjective-labeled scales (i.e., no depression at all to most depression possible) are suggested for use in psychology (Bartoshuk, 2000a, 2000b; Carpenter, 2000) because individuals have different ranges of experiences to draw from and visual analogue scales provide a greater range of responses for participants.

Finally, although there has been extensive literature investigating the relationship between media exposure and body satisfaction, and there is an overall effect size of  $-.30$ , indicating that exposure to media ideals results in decreases in body satisfaction (Groesz, Levine, Murnen, 2002). The direction of the cause-effect relationship, however, is unclear. More specifically, research has not been able to determine whether media exposure causes greater body-image disturbance, or if greater body-image disturbance causes people to seek out information (via the mass media) on how they should appear.

In conclusion, the body-image literature has several limitations that must be addressed by future research. These limitations include nontheoretically driven studies, unclear terminology, diverse and somewhat inadequate assessment techniques, and the inability to establish a clear cause-effect relationship between body-disturbance and media exposure.

### **The Exercise-Body Image Relationship**

Researchers have also not clearly established the cause-effect relationship between exercise and body image (Hausenblas & Fallon, 2001). Although many researchers presume that increased physical activity leads to increased body image, it is possible that people with better body image are more likely to exercise. Recently, Hausenblas and Fallon (2001) undertook a meta-analysis of the research investigating the exercise-body image relationship. Although a meta-analysis is not able to determine the direction of the exercise-body image relationship, the meta-analysis was able to provide a statistical review of the research, which indicated a positive relationship between exercise and body image. The results and future directions provided by this meta-analysis are discussed below.

### **Chronic effects of exercise for body image**

A total of 111 studies were included in the meta-analysis by Hausenblas and Fallon (2001) investigating the relationship between chronic physical activity and body image. Effect sizes (ES) were calculated for correlational, repeated-measures, and experimental versus control group designs. Sixty-three studies containing 252 effect sizes were included in the correlational category. Results revealed a significant but small effect size ( $ES = .32$ ) indicating that exercisers had a better body image than nonexercisers.

Repeated measures studies compared body image scores of experimental and nonexercising control groups before and after an exercise intervention. Forty studies with 232 effect sizes were included in this category. Results indicated that exercisers had more positive body image after the exercise intervention compared to before the intervention. In comparison, the control group's body image did not change from pre to post assessment. Additionally, the exercisers had significantly better body image compared to the controls after the intervention.

Finally, for experimental versus control studies, only studies using randomization procedures were included in this category. As a result, 33 studies containing 143 effect sizes were used. A small effect ( $ES = .27$ ) was found indicating that exercisers had greater body-image satisfaction after exercise compared to the controls.

In conclusion, the meta-analysis indicated that chronic exercise has a small positive effect on body image, but there were conflicting results for gender and age. More specifically, there were greater effects for men compared to women for correlational studies, but not for the experimental versus control or gains studies. With regard to age, each of the categories resulted in a different outcome, with correlational studies indicating greater effects for those over 30, gains indicating greater effects for those

between 20 and 30, and experimental versus control indicating no difference between age groups.

Research investigating the role of chronic exercise participation for clinically diagnosed eating disorders also indicates that exercise and body-image satisfaction have a positive relationship. Specifically, in a study examining the effects of an exercise intervention in the treatment of obese women with binge eating disorder, 77 women were randomized to either a 6-month treatment program or a delayed treatment control condition (Levine, Marcus, & Moulton, 1996). At post-treatment, the women in the treatment group reported significant increases in their weekly exercise frequency compared to the control group. Furthermore, 81% of those in the treatment group reported that they were no longer engaging in binge eating episodes.

Similarly, in a study examining the addition of exercise to the typical cognitive behavioral treatment for binge eating disorder, 84 women were randomly assigned to a cognitive behavioral treatment, a cognitive behavioral treatment with exercise, or a cognitive behavioral treatment with exercise and a maintenance program (Pendleton, Goodrick, Poston, Reeves, & Foreyt, 2002). At the end of 16 months, results indicated that adding the cognitive behavioral treatment with exercise significantly increased the rate of abstinence from binge eating compared to the cognitive behavioral treatment alone.

### **Acute effects of exercise for body image**

Although the effects of chronic exercise have been well documented, only one study (McInnman & Berger, 1993) was located that investigated changes in body image after an acute bout exercise. McInnman and Berger asked 75 female exercisers to answer the Self-Description Questionnaire III before and after an acute bout of exercise.

Compared to the control group, who were tested before and after a classroom lecture, the exercisers reported significant increases on the Physical Ability and Physical Appearance subscales following exercise (McInnman & Berger).

While McInnman and Berger (1993) found that an acute bout of exercise has the potential to increase body-image satisfaction, there are several limitations within their study that should be addressed by future research. First, only one measure of body image was used in this study. Future researchers should attain a more complete understanding of the treatment effects of their experiments by using several measures of body image that test the cognitive, affective, and perceptual components of body-image. Second, the Self-Description Questionnaire III is not a state measure of body image; and therefore, the validity of the measure is questionable when testing the effects of acute exercise on body image. Third, their sample consisted of experienced aerobics participants (i.e., 50% with more than one year of aerobic dance experience), and the increases in body image after a single bout of exercise cannot be extrapolated to inactive populations or populations unfamiliar with aerobics.

### **Acute Effects of Exercise for Mood**

As stated earlier, the research examining the effects of acute exercise on body image is scarce (McInnman & Berger, 1993). Therefore, because researchers have associated negative mood with negative body image (Hausenblas, Janelle, Gardner, & Hagan, 2003; Cusumano & Thompson, 1997) and eating disorder symptoms (Carter, Bulik, Lawson, Sullivan, & Wilson, 1996; Stice & Shaw, 1994), it is beneficial to discuss the research examining exercise's effect on mood and mood related concepts (i.e., affect and emotion). Specifically, the similarities and differences between the terms (i.e., mood, affect, and emotion) are addressed. Subsequently, a summary of the research examining

the effects of an acute bout of exercise on emotion and mood, and the methodological implications for this dissertation are presented.

Although the Diagnostic and Statistical Manual of Mental Disorders (APA; 2000) includes specific definitions for affect and mood, these terms have been used interchangeably. According to Ekkekakis and Petruzzello (2000), these terms have important distinctions, and therefore must be differentiated within empirical research. Specifically, *Emotions* are elicited by a specific recognized stimulus and are characterized by strenuous intensity, short duration cognitions (Ekkekakis & Petruzzello, 2000). *Affect* is defined as “a pattern of observable behaviors that is the expression of a subjectively experienced feeling state (emotion)” (APA, 2000). Sadness, elation, and anger are all examples of affect. *Moods* are defined as “a pervasive and sustained emotion that colors the perception of the world” (APA, 2000). Examples of mood include depression, elation, anger, and anxiety. Researchers have elaborated on the definition of mood stating that moods are the result of cognitions elicited by the environment, but are typically considered low intensity, and longer in duration compared to emotions (Smith & Crabbe, 2000). Furthermore, moods are thought to be the result of prolonged exposure to a stimulus and influence cognitive processes, which in turn, can further effect mood (Hausenblas, Janelle, Gardner, & Hagan, 2003; Kalodner, 1997).

Because past research has used the terms affect, emotion, and mood interchangeably, it is difficult to determine the effects of acute exercise on mood. However, a brief discussion of research investigating mood and emotion is necessary to help formulate appropriate methodology and hypotheses for this dissertation.

Early studies examining acute exercise and emotion focused on aggressiveness and anger (Cantor, Zillman, & Bryant, 1975; Caprara, Renzi, D'Imperio, Rielli, & Travaglia, 1986; Zillman, & Bryant, 1974). Specifically, they used confederates to provoke participants in a laboratory setting. For example, in a study investigating aggressiveness, participants were brought into a waiting room with a confederate who acted obnoxiously by being noisy and intentionally interrupting conversations. After exposure to the confederate, participants cycled at strenuous intensity or sat quietly for one minute. Results indicated that participants in the exercise condition were more aroused (i.e., higher heart rate, higher blood pressure; Cantor, Zillman, & Bryant, 1975), and gave greater intensity shocks to the obnoxious confederate compared to those in the quiet rest condition (Caprara, Renzi, D'Imperio, Rielli, & Travaglia, 1986; Zillman, & Bryant, 1974). Thus, researchers concluded that the exercise bout increased aggressive behavior.

In a similar study, after exposure to an anger-provoking confederate, participants cycled at strenuous intensities for 1.5 minutes (Zillman, Johnson, & Day, 1974). Subsequently, half of the participants were given the opportunity to shock the confederate immediately after exercise, while the other half of the participants were given an 8-minute recovery period. Because the participants who were able to give the shock immediately after exercise gave greater shocks compared to those who had a recovery period, Zillman and colleagues again concluded that the acute bout of exercise increased aggressive behavior.

More recently, Ahmend and Mapletoft (1989) compared an exercise condition to a frustration condition on subsequent aggressive behavior. Their results contradicted previous research (Ahmend & Mapletoft, 1989; Caprara, Renzi, D'Imperio, Rielli, &

Travaglia, 1986; Zillman, Johnson, & Day, 1974) such that participants in the frustration condition were more aggressive compared to those in the exercise condition. This result supports the ideal that exercise does not enhance aggression, but may reduce it.

In their qualitative literature review examining emotion and exercise, Smith and Crabbe (2000) suggested that these early experiments should be interpreted with caution because they used behavioral measures of aggression. Because these aggressive responses are indirect measures of the emotions underlying the behavioral response, more research is needed.

Research examining the positive effect of exercise on mood, however, has been supported by research using the State-Trait Anxiety Scale (Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991; Spielberger, Gorsuch, & Lushene, 1970) and the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1981). With regard to anxiety, a meta-analysis containing 104 studies ( $N = 3,048$  men and women) indicated that acute ( $ES = .23$ ) and chronic ( $ES = .25$ ) exercise behavior is associated with a reduction in state anxiety (Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). Specifically for acute exercise, the greatest effects emerged for exercise lasting between 21 and 30 minutes ( $ES = .41$ ). Since this meta-analysis, research has continued to report that exercise reduces state (Focht & Koltyn, 1999) and trait anxiety (Steptoe, Kearsley, & Walters, 1993).

Similar to the anxiety and exercise research, most studies using the POMS to investigate changes in mood before and after an acute bout of exercise has also indicated improved positive (i.e. vigor) and decreased negative (i.e., tension, depression, anger, fatigue, and confusion) mood states from pre- to post- exercise (Berger & Motl, 2000). Furthermore, the positive effect of exercise on mood has been enduring across various

exercise modes (i.e., jogging, weight training, taekwondo, and rockclimbing), and intensities (i.e., mild, moderate, and strenuous; Berger & Motl).

Most important to this study is the recommendations for exercise duration, mode, and intensity provided by the POMS research. More specifically, some research has indicated positive mood changes are associated with bouts of exercise as short as 5 to 10 minutes (Thayer, 1987, 1996). Little research, however, has replicated this effect (Berger & Motl, 2000). At the opposite extreme, exercising for an extended period of time (i.e., more than 1 hour) has been associated with no mood changes (Berger, Grove, Prapavessis, & Butki, 1997; Hooper, Mackinnon, & Hanrahan, 1997) or adverse mood reactions (O'Connor, Morgan, & Raglin, 1991; Morgan, Costill, Flynn, Raglin, & O'Connor, 1988). Therefore, a guideline has been proposed for experimentation purposes of 20 to 30 minutes of exercise (Berger & Motl, 2000).

For mode of exercise, greater mood alterations have been observed when using an exercise prescription that has: (a) deep and rhythmic breathing, (b) lack of competition, (c) closed or predictable activities, and (d) repetitive and rhythmical movements (Berger, 1996; Berger & Owen, 1988). Therefore, activities such as walking, jogging, stair stepping, and cycling are recommended activities for exercise and mood research (Berger & Motl, 2000).

For exercise intensity, it appears that mild intensity exercise (i.e., walking) is associated with positive mood states (Thayer, 1987; 1989; 1996), but the research using mild exercise is limited. Research examining the effect of moderate intensity exercise on mood is more salient and consistently shows a positive association between moderate exercise and mood (Motl, Berger, & Wilson, 1996; Steptoe, Kearsley, & Walters, 1993).

Strenuous exercise, however, has been associated with negative changes in mood (Motl, Berger, & Wilson, 1996; O'Connor, 1997). Therefore, researchers recommend the use of moderate intensity exercise to study the effects of exercise on mood (Berger & Motl, 2000).

Finally, researchers have noted that participants report greater positive mood changes when they perceive the exercise duration, intensity, and mode as enjoyable (Berger & Motl, 2000). Therefore, researchers should be cautious when prescribing specific exercise intensities and modes during experimental research. Specifically, the population parameters such as age, exercise history, health status, and gender should be considered prior to exercise prescription.

### **Moderator Variables of the Exercise-Body Image Relationship**

There are several moderator variables that may affect the exercise-body image relationship. Specifically, the effects of age, sex, ethnicity, and exercise program characteristics are discussed.

#### **Age**

Although research indicates that the mean age of onset for eating disorders is 17 (APA, 2000), research investigating nonpathological populations has been inconclusive in determining the effects of age for body-image disturbance. Several studies have indicated that body-image disturbance increases with age (Demarest & Allen, 2000), while others have reported that age has little effect (Cash & Henry, 1995).

When age was incorporated as a moderator variable in the exercise-body image meta-analysis by Hausenblas and Fallon (2001), the gains studies indicated that exercise participation had the largest effect for those between 20 and 30 ( $ES = .58$ ), followed by participants less than 20 years ( $ES = .15$ ), and those older than 30 years ( $ES = .08$ ).

Therefore, the population at greatest risk for body-image disturbance, and the most likely to benefit from exercise participation is those in early adulthood (i.e., 18-22 years).

### **Sex**

Recent research has indicated that body-image disturbance is increasing among men and newly recognized body-image disorders, such as Muscle Dysmorphia, are more likely to occur in men than women (Pope, Gruber, Choi, Olivardia, & Phillips, 1997). Despite the reported increases in male body-image disturbance, however, women continue to report greater body-image disturbance compared to men (APA, 1994). Furthermore, women are more likely than men to suffer from eating disorders (i.e., anorexia nervosa), which can result in mortality (APA, 2000). Therefore, most research investigating body image has focused on women.

With regard to the effects of exercise for body image, Hausenblas and Fallon (2001) meta-analytically investigated the moderating role of sex. While correlational research indicated a significantly greater relationship for physical activity and positive body image for men ( $ES = .59$ ) compared to women ( $ES = .33$ ), the magnitude of the effect for physically active men compared to inactive men ( $ES = .30$ ) was not significantly different from the magnitude of the effect for physically active women compared to inactive women ( $ES = .36$ ). Likewise, the gains studies showed no difference between the effect sizes for men ( $ES = .21$ ) compared to women ( $ES = .27$ ). Therefore, because women have traditionally reported greater body-image disturbance compared to men, and because the moderating role of sex in the exercise-body image relationship is equivocal, this study used a female sample.

**Ethnicity**

Research investigating ethnicity differences and body-image disturbance has been equivocal. While several studies have revealed no differences for body-image disturbance among Caucasian, Hispanic, and African-Americans (Schreiber, Robins, Stiegel-Moore, Obarzanek, Morrison, & Wright, 1996; Stiegel-Moore, Wilfley, Caldwell, Needham, & Brownell, 1996), others have indicated that Caucasian females report greater body-image disturbance than African-American females (Cash & Henry, 1995; Rosen, Srebnik, Saltzberg, & Wendt, 1991). A recent meta-analysis using 35 studies containing 104 effect sizes confirmed that Caucasians report more eating disturbance than non-Caucasians (Wildes & Emery, 2001). The greatest effect sizes were obtained from college samples on measures of subclinical eating pathology (i.e., dietary restraint, ideal body shape, and body dissatisfaction). It is important to note, however, that the results obtained by Wildes and Emery are relevant only for Caucasians and African-Americans. At the time, research investigating other ethnicities (i.e., Asian and Hispanic) was limited and therefore they were unable to determine the role of ethnicity for these populations.

With regard to ethnicity's role in the exercise-body image relationship, it has been reported that more Caucasians engage in physical activity with greater frequency compared to African-Americans (USDHHS, 2000). How ethnicity moderates the exercise-body image relationship, however, is unknown because Hausenblas and Fallon (2001) were not able to calculate an overall effect size for ethnicity due to low numbers of studies incorporating ethnicity as a factor. Therefore, because Caucasians have reported more body-image disturbance compared to African-Americans (Wildes & Emery, 2001), and because the moderating role of race/ethnicity for the exercise-body

image relationship is unknown (Hausenblas & Fallon, 2001), this dissertation used a Caucasian sample.

### **Exercise program characteristics**

Although extensive research exists investigating the exercise-body image relationship, little is known regarding the mediating effects of exercise program characteristics (i.e., mode, intensity, frequency, and duration). With respect to mode of exercise (i.e., aerobic, anaerobic, both aerobic and anaerobic), the meta-analysis by Hausenblas and Fallon (2001) indicated no significant differences for mode of exercise for the experimental versus control group or gains designs. A trend emerged for mode for the correlational studies such that the effect was larger for people who participated in both aerobic and anaerobic exercise ( $ES = .38$ ), followed by anaerobic only ( $ES = .19$ ) and aerobic only ( $ES = .06$ ). Although this effect was noted only for the correlational studies, it is important for future research to investigate mode as a moderator variable in the relationship between physical activity and body image. Additionally, due to the general aspirations of men to be muscular and women to be thin, the interaction between sex and mode on body disturbance should also be investigated.

The physical activity and body image meta-analysis revealed no effect for intensity, frequency, or duration of exercise for correlational, experimental versus control, or gains categories (Hausenblas, & Fallon, 2001). It is important to note, however, that many studies failed to incorporate validated subjective measures of exercise behavior (i.e., Leisure-Time Exercise Questionnaire) or objective physiological measures of intensity (i.e., heart rate), frequency and duration (i.e., pedometers, or accelerometers). To determine the effects of these variables, future researchers must incorporate validated

subjective measures and objective measures of exercise behavior, or control the exercise characteristics within the experimental intervention.

In conclusion, because of the increasing prevalence of body-image disturbance, and the substantial costs associated with the treatment of body-image disorders, future research is needed to investigate exercise as a practical treatment strategy for the reduction of body-image disturbance. Future research, however, must use validated subjective and objective measures of exercise behavior and body image. Additionally, researchers must consider the roles of moderator variables such as sex, ethnicity, age, and exercise program characteristics.

Therefore, the purpose of this dissertation was to investigate the effects of an acute bout of exercise for the negative mood states elicited by exposure to media images of the “ideal” female body for female university students. Specific hypotheses were: (a) women viewing media images of the ideal body would report more anxiety, anger, depression, and body dissatisfaction compared to those viewing neutral pictures (Cusumano & Thompson, 1997; Hausenblas, Janelle, Gardner, & Hagan, 2003; Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999), and (b) after viewing media images of the ideal female body, participants in the exercise condition would report less anxiety, anger, depression, and body-image dissatisfaction compared to participants in the quiet rest condition (Arent, Landers, & Etnier, 2000; Focht & Kolytn, 1999; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991).

## CHAPTER 3 METHOD

### **Participants**

Sixty-three Caucasian female undergraduate students recruited from courses in the College of Health and Human Performance participated in this experiment. Women were chosen because they report greater body-image disturbance compared to men (Cash, Winstead, & Janda, 1986; Garner, 1997; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and because they are more likely to report negative mood states (Verbrugge, 1985). Fifteen participants in each experimental condition were needed for adequate statistical power. Sample size was determined using Tran's (1997) power analysis tables for repeated measures designs. Sample size was calculated at an alpha level of .05, using an average correlation value between adjacent repeated measures of .60, and an effect size of .70.

### **Measures**

**Demographic data.** Demographic data including participant age, height, weight, and ethnicity was collected via a pre-screening questionnaire.

**Leisure-Time Exercise Questionnaire (LTEQ).** The LTEQ (see Appendix A; Godin, Jobin, & Bouillon, 1986) is a self-report instrument that assesses the frequency of mild, moderate, and strenuous exercise done for 20 min or longer during a typical week. The weekly frequency of mild, moderate, and strenuous exercise are converted into a measure of energy expenditure called metabolic equivalents (METs)

using the following formula:  $3(\text{mild}) + 5(\text{moderate}) + 9(\text{strenuous})$ . This measure has adequate validity and test-retest reliability (Jacobs, Ainsworth, Hartman, & Leon, 1993).

**Drive for Thinness.** The Drive for Thinness subscale of the Eating Disorder Inventory-2 (see Appendix B; Garner, 1991) assesses body-image disturbance. For each item, individuals respond on a six-point Likert scale ranging from 1 (never) to 6 (always), with a higher score indicating greater drive for thinness. A sample item is “I feel extremely guilty after overeating”. Previous research has supported the validity and reliability of the Drive for Thinness subscale (Garner).

**Sociocultural Attitudes Towards Appearance Questionnaire - Revised.** The Sociocultural Attitudes Towards Appearance Questionnaire – Revised (see Appendix C; Cusumano & Thompson, 1997; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) uses two subscales (i.e., Awareness and Internalization) to assess a person’s awareness and internalization of body stereotypes in popular media (i.e., television & magazines). For each of the 21 items, individuals respond on a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). A sample item for the internalization subscale is “I would like my body to look like the women who appear in TV shows and movies”. A sample item for the awareness subscale is “People find individuals who are in shape more attractive than individuals who are not in shape”. Higher scores indicate increased awareness and internalization of media awareness. Previous research has shown this scale to be psychometrically valid and is a significant predictor of body-image disturbance, eating disturbance, and self-esteem (Cusumano & Thompson).

**Pre-Participation Questionnaire (PPQ).** The PPQ (see Appendix D) is a self-report measure used to identify medical concerns that would place a participant at increased risk for complications during exercise. Significant medical conditions and the risk factors for heart disease, as determined by the American College of Sports Medicine (ACSM), are formulated in questions in the PPQ (ACSM, 2000). Participants who indicated “yes” to any question were asked to elaborate on their condition. If the condition did not put the individual at risk, the subject was allowed to participate in the study.

**Visual analogue scales.** Visual analogue scales (see Appendix E) were used to assess the eating disorder symptoms of anxiety, depression, anger, and body dissatisfaction. The scales use a 10 cm horizontal line with anchors from No Anxiety/ Depression/ Anger/ Body Dissatisfaction to Worst Possible Anxiety/ Depression/ Anger/ Body Dissatisfaction. The participant is asked to place a vertical line at the point that “best describes how you feel right now.” These scales have adequate psychometric properties, and they have been frequently used in research investigating media effects on mood and body image (e.g., Heinberg & Thompson, 1995; Lavin & Cash, 2000).

**Heart rate.** Heart rate was measured using a Polar Favor heart rate monitor (Polar CIC Inc., New York) that was strapped around the participant’s chest during exercise. The ACSM (2000) states that there is a linear relationship between heart rate and  $VO_2$  max and that heart rate is a valid method to estimate exercise intensity. Additionally, heart rate monitors are an accurate and reliable measure of exercise intensity (ACSM).

**Rating of Perceived Exertion (RPE).** Rating of perceived exertion was determined by the Borg scale (see Appendix F; Borg & Noble, 1974). The Borg scale is

an interval scale ranging from 6 (very light) to 20 (maximal exertion) and mimics the amount of exertion the heart is experiencing. The larger the number, the higher the heart rate and thus, more physical exertion is being experienced during the task. RPE is a reliable measure to indicate an individual's perceived exertion (ACSM, 2000), and it has demonstrated adequate psychometric properties (Borg & Noble).

**Waist-to-hip ratio.** Waist-to-hip ratio was calculated by dividing each participant's waist measurement (cm) by her hip measurement (cm). Waist is measured at the narrowest part of the torso (above the umbilicus and below the xiphoid process), while the hip is measured at the maximal circumference of the hips or buttocks region, whichever is larger (above the gluteal fold). The ratio created by this calculation is a good indicator of body fat pattern (Bray & Gray, 1988), and health risk, such that health risk is very high for young women with a waist-to-hip ratio  $> .82$  (ACSM, 2000).

**Enjoyability of exercise.** Enjoyability of the exercise session was assessed by participant ratings on four components of exercise (i.e., speed, incline, intensity level, and overall exercise experience). A 10-point Likert scale ranging from 1 (not at all enjoyable) to 10 (completely enjoyable) was used, with a higher score indicating greater enjoyment (see Appendix G).

**Body-image pictures.** Sixty pictures of women depicting the "ideal" female body were selected from popular magazines (i.e., *Vogue*, *Cosmopolitan*) and clothing catalogues (i.e., *Victoria's Secret*; DeBraganza, 2004). Selection criteria were based on the procedures of Cusumano and Thompson (1997) and Waller, Hamilton, and Shaw (1992). Specifically, photographs depicted a single woman, facing front (or within 45° of facing front), and showing at least three quarters of her body (i.e., head to lower thigh).

The women in the photographs could not contain overlaid type (i.e., advertisements), masked or obscured by clothing (i.e., no baggy clothing or dark clothing), and were not selected if they depicted adolescent females.

To choose the nine pictures that best represented the “ideal” female body, a content analysis was conducted by ten Caucasian women (DeBraganza, 2004). Specifically, each woman independently rated how closely each picture represented the media ideal by using a 10-point Likert scale ranging from 1 (not at all representative) to 10 (completely representative). Because previous research has indicated that between one and nine pictures produce the greatest experimental effect (Groesz, Levine, & Murnen, 2002), the 9 pictures with the highest scores were included in the picture show.

**Control pictures.** Nine pictures depicting neutral objects were selected from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1990). The pictures were included only if they did not depict human physique, food, or other item that might elicit negative mood changes in women with high body-image disturbance. Furthermore, each of these pictures has been tested for eliciting neutral levels of valence and low arousal (Lang, Bradley, & Cuthbert). Specifically, these pictures were of a trashcan, men’s dress shoes, hair dryer, hammer, dustpan, iron, bar stool, fan, and a wicker basket.

### **Procedure**

Approval from the University’s Institutional Review Board was obtained before beginning the study (see Appendix H). To recruit potential participants, a screening questionnaire including the LTEQ, Drive for Thinness, Internalization of Media Images Scale, and basic demographic information (i.e., age, ethnicity, height, and weight) was given to women enrolled in undergraduate courses in the College of Health and Human Performance. For a visual depiction of the study procedures see Figure 3-1.

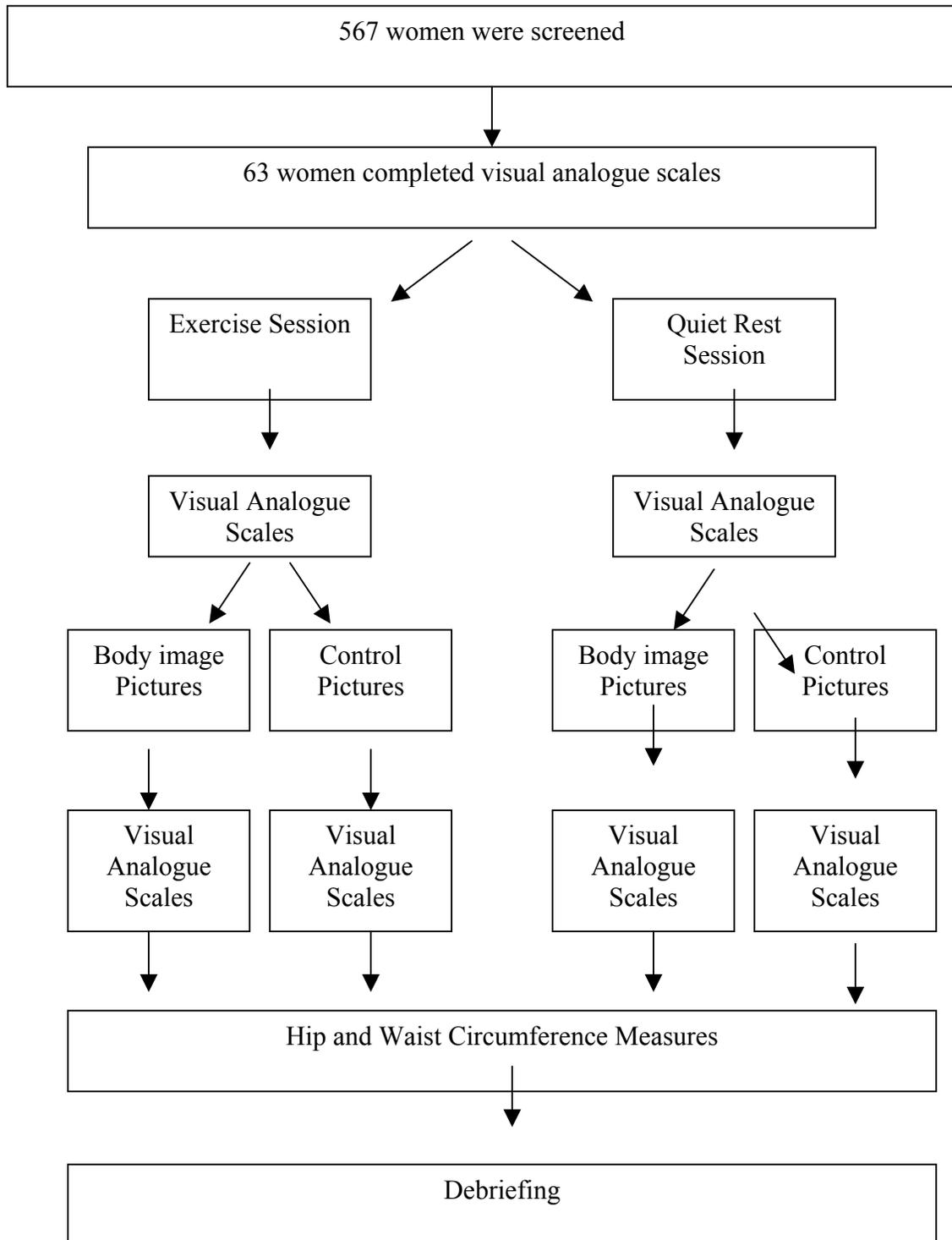


Figure 3-1. Dissertation Procedure

**Screening procedure.** Five hundred sixty-seven undergraduate women were screened for drive for thinness, internalization of the media ideal, and exercise behavior. Specifically, Caucasian women scoring in the top one-third of the sample for drive for thinness and internalization were contacted for participation in a study on “exercise and mood”. Drive for thinness scores were used to identify individuals most at risk for eating disorder symptoms. The Sociocultural Attitudes Towards Appearance Questionnaire – Revised was used to identify those most likely to internalize the body-image pictures used in this study. Women reporting no exercise were not included because the exercise condition (i.e., moderate intensity) may be unpleasant, thus increasing negative mood instead of decreasing negative mood (Berger & Motl, 2002). If they agreed to participate, they were told they would have an equal chance of being in the exercise or quiet rest groups, and following the exercise/quiet rest they would watch a 2-minute picture show.

If they agreed to participate, an appointment was scheduled and I gave them a reminder call the night before the appointment. To avoid any expectancy effects, participants were not told whether they would be exercising or in quiet rest. They were reminded to come to the lab prepared to either exercise (i.e., exercise clothes, water bottle, towel) or to bring reading materials (i.e., textbooks, class notes). Additionally, they were instructed not to exercise on the day of the experiment to avoid any exercise induced mood changes not elicited by the study.

When participants arrived at the laboratory, they were taken to a private room to complete the informed consent (see Appendix H) and the first set of visual analogue scales. Subsequently, they were informed whether they were in the exercise or quiet rest

group. Subsequently, participants were told whether they were randomized into an exercise or quiet rest group.

**Exercise group.** The exercise group was asked to complete the PPQ before exercising. If the participant was at risk (e.g., diagnosed heart condition, dizziness, or fainting), she was not allowed to participate further. She was then debriefed, and awarded extra course credit for attending her appointment.

If the participant was at no risk for exercise, she was asked to complete the visual analogue scales, and then fitted with a heart rate monitor. Instructions were given regarding safety procedures and the proper use of the treadmill. Each subject was then instructed to warm up at a mild intensity for the first 5 minutes of exercise. Subsequently, to make the exercise as enjoyable as possible (Berger & Motl, 2000) participants were allowed to self-select a speed on the treadmill that would create a “moderate intensity” exercise bout. After selecting her intensity, heart rate and rating of perceived exertion was assessed every 5 minutes during the 20-minute workout. If the participant indicated a rating of perceived exertion between 12 and 16 (ACSM, 1998), they were allowed to continue with no experimenter comments. If the participant reported a rating of perceived exertion below 12 or above 16, however, they were reminded to maintain a “moderate intensity level”. Specifically, if the participant reported a number below 12, she was reminded that the number she reported corresponded to “light” and she needed to increase her intensity to meet the goal of “moderate intensity”. Likewise, if the participant reported a number above 16, she was reminded that the number she reported corresponded to “very hard”, and she needed to decrease her intensity to meet the goal of “moderate intensity”. After 20 minutes of moderate intensity exercise, the participants

were asked to slow to a mild walking pace for a 5-minute cool down to allow their heart rates to return to normal. Total exercise time was 30 minutes. Following the exercise bout, the participants completed the visual analogue scales.

**Quiet rest group.** After signing the informed consent, the quiet rest group was asked to complete the visual analogue scales. Subsequently, their reading materials were checked to confirm that they were not reading materials did not discuss diet, exercise, or pictorially depicted an ideal body type (i.e., popular magazines). After I approved the participant's reading materials, they were allowed to read or sit quietly for 30 minutes. Because the exercise session required that I stay with the exercise participants throughout the session and assess RPE and heart rate every 5 minutes, I continued this procedure for the quiet rest participants as well.

**Post-manipulation.** After either the exercise/quiet rest session, I left the room and the participants completed the visual analogue scales for a second time. Subsequently, participants were led to a second room and left alone to view the picture show. Specifically, they were seated 1.5 feet (.46 m) from a 16-inch (.40 m) color computer monitor displaying the picture show. Each picture was shown for 10 seconds, with a 3 second blank screen between each picture. Therefore, participants were exposed to a 1 minute 57 second picture presentation. After the presentation, participants completed the visual analogue scales for a third time. Finally, body fat composition measurements were taken for each participant.

All participants were debriefed regarding the true purpose of the study. After debriefing, they were asked to read and sign a waiver (see Appendix I) that gave them the option to let me use their data, or withdraw it from the study by taking their visual

analogue scale data with them. Additionally, all participants were given contact information for the University of Florida Internal Review Board, and pamphlets provided by the University of Florida Student Infirmary regarding proper nutrition, body image, and contact information of campus counselors and nutritionists.

### **Statistical Analyses**

First, internal consistency scores (i.e., Chronbach's alpha) were calculated and interpreted for the Drive for Thinness subscale and the Sociocultural Attitudes Towards Appearance Questionnaire. Second, means and standard deviations were calculated for the sample population, participants, and nonparticipants and the data were checked for skewness and kurtosis to assure that the data met the statistical assumptions for normality. Third, to verify that the exercise session was adequately enjoyable for the participants, descriptive statistics were calculated using the enjoyability of exercise ratings. Fourth, preliminary comparisons for the four experimental conditions were conducted to verify the effectiveness of the randomization. Finally, to investigate the effects of exercise/quiet rest on the negative mood states elicited by media/neutral images a 2 (Experimental Group: exercise vs. quiet rest) X 2 (Picture Type: body image vs. neutral) X 3 (Time: pre-test; post-test 1, and post-test 2) repeated measures Multiple Analysis of Variance (MANOVA) for Time was conducted for the four visual analogue scales. An alpha level of .05 was used for all statistical analyses and Tukey's post hoc was conducted for significant results for Time. Finally, omega squared was conducted to determine the meaningfulness of the results ( $\omega^2$ ; Tolson, 1980).

## CHAPTER 4 RESULTS

### **Internal consistency**

Internal consistency scores (i.e., Chronbach's alpha) for the Drive for Thinness subscale and the Sociocultural Attitudes Towards Appearance Questionnaire (i.e., Awareness and Internalization subscales) were calculated (Nunnally, 1978). Because the alpha value increases with the number of variables, there is no consensus regarding the interpretation of internal consistency scores. I used the rules for the interpretation of alpha values described by George and Mallery (2001; see Table 4-1). Chronbach's Alpha for the Drive for Thinness ( $\alpha = .89$ ) and Internalization ( $\alpha = .89$ ) subscales were good, and the reliability of the Awareness subscale ( $\alpha = .78$ ) was acceptable.

Table 4-1. Interpretations of Internal Consistency Scores (George & Mallery, 2001).

Alpha Value	Interpretation
> .9	Excellent
> .8	Good
> .7	Acceptable
> .6	Questionable
> .5	Poor
< .5	Unacceptable

### **Sample characteristics**

#### **Prescreened Sample**

Descriptive statistics for the 567 women prescreened for study participation are presented in Table 4-2. To verify that the prescreen data met the assumptions for

normality, the data were examined for skewness and kurtosis. Although, a value of zero indicates a normal distribution, values between  $-2$  and  $+2$  are acceptable criterion for meeting the assumptions of normality (George & Mallery, 2001). Thus, the sample screened for this experiment ( $N = 567$ ) met the criterion for normality for the Drive for Thinness subscale, the Awareness and Internalization subscales of the Sociocultural Attitudes Towards Appearance Questionnaire, BMI, height, and strenuous exercise. The data, however, were positively skewed for age, mild, and

Table 4-2. Descriptive Statistics

	Prescreened Sample ( $n = 567$ ) $M$ ( $SD$ )	Nonparticipants ( $n = 79$ ) $M$ ( $SD$ )	Participants ( $n = 63$ ) $M$ ( $SD$ )
Age	19.86 (1.84)	19.76 (1.17)	19.75 (1.14)
Height (m)	1.63 (.06)	1.63 (.06)	1.63 (.06)
Weight (kg)	60.61 (9.12)	61.00 (9.44)	61.83 (9.59)
BMI	22.78 (3.12)	23.06 (3.16)	23.15 (3.14)
Drive for Thinness	5.01 (5.33)	12.08 (4.25)	11.62 (4.29)
SATAQ			
Awareness	39.23 (5.01)	42.49 (3.73)	43.13 (3.30)
Internalization	38.25 (7.22)	45.80 (3.85)	45.68 (4.08)
LTEQ (METs)			
Strenuous	25.32 (18.23)	28.15 (15.10)	30.66 (21.99)
Moderate	15.97 (11.53)	15.53 (9.43)	16.86 (10.54)
Mild	13.17 (10.39)	13.18 (8.67)	12.25 (8.85)

Note. SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire.  
LTEQ = Leisure-time Exercise Questionnaire

moderate exercise. This skewness may be expected, however, because the sample was taken from undergraduate courses offered in the College of Health and Human Performance, which strongly promotes regular exercise.

### **Nonparticipants**

Inclusion criteria for this study were scoring in the top one-third percentile for the Drive for Thinness (score  $\geq 6$ ) and Internalization subscales (score  $\geq 41$ ). Mean scores and standard deviations for the study variables are presented in Table 4-2. Of the 142 women who met the inclusion criteria, 2 were unable to participate due to medical conditions preventing exercise (i.e. broken/sprained limb, illness), 3 did not wish to participate, 51 did not return phone calls, and 17 women who agreed to participate failed to attend their scheduled session and did not reschedule. Therefore, 63 women participated in the laboratory portion of the study (see Table 4-2).

### **Participants**

Descriptive statistics for the 63 participants are presented in Table 4-2. To verify that the data met the assumptions for normality, the data were examined for skewness and kurtosis according to criterion established by George and Mallery (2001). Thus, the participants' ( $n = 63$ ) data met the criterion for normality for all of the study variables including the Drive for Thinness subscale, the Awareness and Internalization subscales of the Sociocultural Attitudes Towards Appearance Questionnaire, BMI, height, weight, hip-to-waist ratio, mild, moderate, and strenuous exercise, and initial mood scores (i.e., depression, anger, anxiety, and depression).

### **Preliminary analyses**

Several preliminary analyses were conducted to examine differences between those who participated in the study and those who were selected but chose not to

participate. Specifically, I investigated whether the groups were statistically different for BMI, Drive for Thinness, the Awareness and Internalization subscales of the Sociocultural Attitudes Towards Appearance Questionnaire, as well as mild, moderate, and strenuous exercise behavior. The means and standard deviations for these variables are listed in Table 4-2.

A one-way Analysis of Variance (ANOVA) for BMI revealed no group differences for those who participated and those who did not participate [ $F(1, 137) = .02, p = .88$ ]. Similarly, a one-way ANOVA for drive for thinness showed no group differences for those who participated compared to those who chose not to participate [ $F(1, 140) = .40, p = .53$ ]. Separate one-way MANOVAs were undertaken to determine group differences for the Sociocultural Attitudes Toward Appearance Questionnaire (i.e., awareness and internalization subscales) and the Leisure-time Exercise Questionnaire (i.e., mild, moderate, and strenuous exercise). Results revealed no significant group differences for the awareness [Wilks' Lambda = .99,  $F(1, 140) = 1.12, p = .29, \eta^2 = .008$ ] or internalization [Wilks' Lambda = .99,  $F(1, 140) = .03, p = .86, \eta^2 < .001$ ] subscales for those who participated compared to those who chose not to participate. Likewise, no significant group differences for mild [Wilks' Lambda = .99,  $F(1, 126) = .10, p = .75, \eta^2 = .001$ ], moderate [Wilks' Lambda = .99,  $F(1, 126) = .58, p = .45, \eta^2 = .005$ ], or strenuous [Wilks' Lambda = .99,  $F(1, 126) = .29, p = .59, \eta^2 = .002$ ] exercise were evidenced.

### **Primary analyses**

Based on the mean responses to the enjoyability of exercise questionnaire, I was able to verify that the exercise session was a moderately to highly enjoyable experience for the participants. For speed, participants' ratings ranged from 4 to 10

( $M = 7.56$ ). For intensity, the ratings ranged from 1 to 10 ( $M = 7.31$ ). Ratings of intensity and overall enjoyability ranged from 5 to 10 with means of 7.75 and 8.06, respectively.

To verify that the randomized assignment was effective, separate 2 (experimental group: exercise vs. quiet rest) X 2 (Picture Type: body image vs. neutral) ANOVAs were conducted for the Drive for Thinness subscale, weight, BMI, and waist-to-hip ratio. Separate 2 (Experimental Group: exercise vs. quiet rest) X 2 (Picture Type: body image vs. neutral) MANOVAs were conducted for the Sociocultural Attitudes Toward Appearance Questionnaire (i.e. awareness and internalization) exercise behavior (i.e., mild, moderate, strenuous), and initial mood scores (i.e., anxiety, anger, depression, and body dissatisfaction). See Table 4-3 for the means and standard deviations for these study variables. Results of these analyses indicated no significant group differences for Drive for Thinness [ $F(1, 59) = 2.51, p = .13$ ], weight [ $F(1, 57) = 2.41, p = .13$ ], waist-to-hip ratio [ $F(1, 57) = .43, p = .52$ ], exercise behavior [Wilks' Lambda = .97,  $F(3, 49) = .57, p = .64, \eta^2 = .03$ ], or Sociocultural Attitudes Toward Appearance [Wilks' Lambda = .93,  $F(2, 58) = 2.19, p = .12, \eta^2 = .07$ ]. Results did indicate, however, a significant main effect for picture type [Wilks' Lambda = .83,  $F(4, 56) = 2.82, p = .03, \eta^2 = .17$ ] at the initial mood assessment, such that women scheduled to view the media images had higher body dissatisfaction at the beginning of the experiment compared to those scheduled to view the neutral images [ $F(1, 59) = 6.06, p = .02$ ]. No group differences were evidenced for anxiety [ $F(1, 59) = .16, p = .69$ ], anger [ $F(1, 59) = .27, p = .61$ ], or depression [ $F(1, 59) = .07, p = .78$ ].

Table 4-3. Descriptive Statistics for the Four Experimental Groups.

	Exercise		Quiet Rest	
	Media ( <i>n</i> = 17)	Neutral ( <i>n</i> = 15)	Media ( <i>n</i> = 15)	Neutral ( <i>n</i> = 16)
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )
Age	19.75 (1.14)	19.47 (1.13)	20.13 (1.13)	19.69 (1.08)
Height (m)	1.62 (.07)	1.66 (.05)	1.62 (.05)	1.62 (.05)
Weight (kg)	64.15 (10.41)	64.10 (9.23)	69.12 (12.60)	61.11 (7.37)
BMI	24.47 (3.63)	22.80 (2.32)	25.85 (3.90)	23.25 (2.68)
Waist-to-hip Ratio	.77 (.05)	.77 (.05)	.77 (.05)	.76 (.04)
Drive for Thinness	11.12 (4.78)	10.87 (3.70)	12.80 (5.05)	11.75 (3.57)
SATAQ				
Awareness	42.94 (3.90)	43.20 (2.62)	43.40 (3.38)	43.19 (3.31)
Internalization	45.77 (3.96)	43.80 (3.32)	45.53 (4.56)	47.31 (4.22)
Leisure-time Exercise (METs)				
Strenuous	19.69 (14.41)	38.40 (18.78)	31.15 (17.47)	36.00 (30.62)
Moderate	16.25 (9.22)	17.00 (9.96)	18.57 (12.16)	15.36 (11.84)
Mild	14.25 (6.15)	12.80 (8.52)	11.14 (9.00)	10.15 (11.91)
Initial Mood States				
Anxiety	2.91 (1.94)	3.45 (2.49)	1.97 (1.56)	2.10 (2.01)
Anger	1.26 (1.52)	.74 (.74)	.96 (1.62)	.81 (1.44)
Depression	2.04 (1.55)	1.95 (1.86)	1.64 (1.90)	1.81 (2.54)
BD	5.00 (1.68)	3.63 (1.91)	4.44 (1.15)	3.81 (1.63)

Note. SATAQ = Sociocultural Attitudes Towards Exercise Questionnaire. METs = Metabolic Equivalent. BD = Body Dissatisfaction.

Finally, to investigate the effects of exercise/quiet rest on the negative mood states elicited by media/neutral images a 2 (Experimental Group: exercise vs. quiet rest) X 2 (Picture Type: body image vs. neutral) X 3 (Time: pre-test; post-test 1, and post-test 2) repeated measures MANOVA for Time was performed (Heinberg & Thompson, 1995). Means and standard deviations for each group across time are presented in Tables 4-4 and 4-5. Results revealed a significant main effect of Picture Type [Wilks' Lambda = .74,  $F(4, 56) = 4.85, p = .002, \eta^2 = .26$ ], a significant main effect of Time [Wilks' Lambda = .42,  $F(8, 52) = 8.94, p < .001, \eta^2 = .58$ ], and a significant Picture Type by Time interaction [Wilks' Lambda = .64,  $F(8, 52) = 3.59, p = .002, \eta^2 = .36$ ]. Follow-up ANOVAs revealed significant Picture Type by Time interactions for anxiety [ $F(2, 118) = 3.66, p = .03, \omega^2 = .08$ ], depression [ $F(2, 118) = 7.53, p = .001, \omega^2 = .17$ ], and body dissatisfaction [ $F(2, 118) = 12.69, p < .001, \omega^2 = .26$ ]. Tukey's post hoc analyses revealed that participants viewing the media pictures reported significant increases in depression ( $p = .001$ ; see Figure 4-1) and body dissatisfaction ( $p < .001$ ; see Figure 4-2) compared to those viewing the neutral pictures. No significant difference emerged, however, for anxiety ( $p = .18$ ).

Furthermore, results revealed no significant main effect of Experimental Group [Wilks' Lambda = .95,  $F(4, 56) = .80, p = .53$ ]. Likewise, no significant interaction was evidenced for Experimental Group by Picture Type [Wilks' Lambda = .98,  $F(4, 56) = .28, p = .89$ ], Experimental Group by Time [Wilks' Lambda = .87,  $F(8, 52) = .92, p = .51$ ], or Experimental Group by Picture Type by Time [Wilks' Lambda = .90,  $F(8, 52) = .71, p = .68$ ].

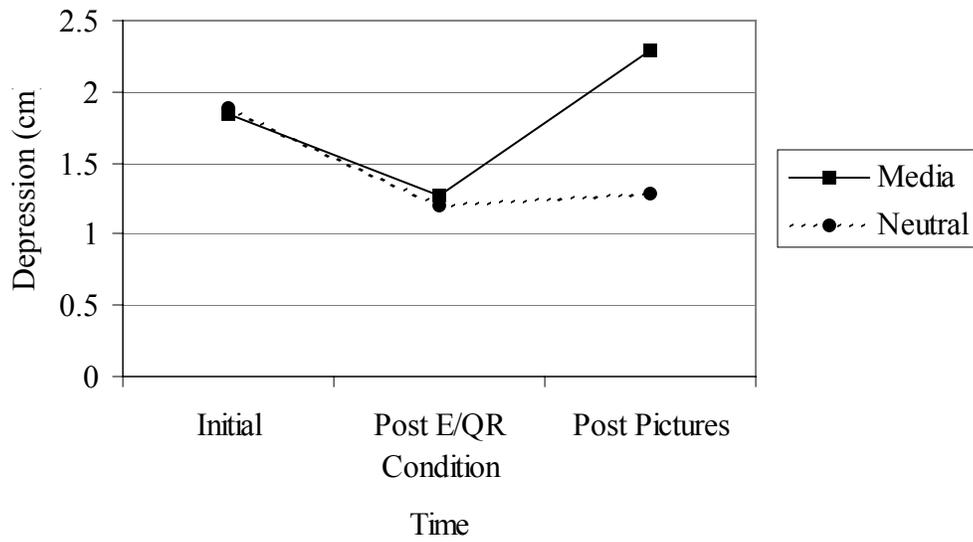


Figure 4-1. Picture Type by Time Interaction For Depression.

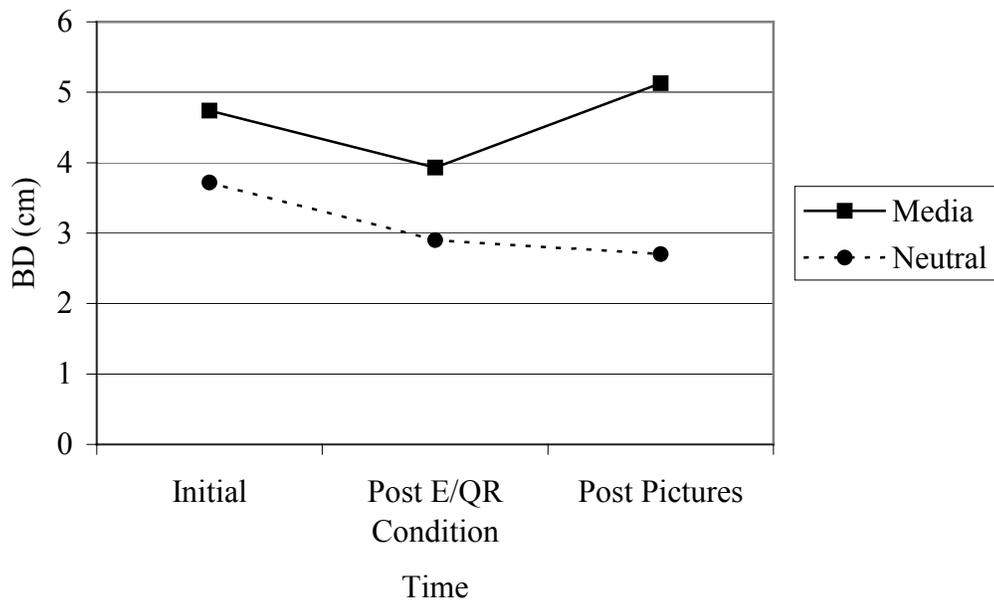


Figure 4-2. Picture Type by Time Interaction For Body Dissatisfaction.

Table 4-4. Means and Standard Deviations for the Exercise Condition.

Mood State	Media Pictures ( <i>n</i> = 17)			Neutral Pictures ( <i>n</i> = 15)		
	Initial	Post Exercise	Post Pictures	Initial	Post Exercise	Post Pictures
Anxiety	2.92 (1.94)	2.06 (2.06)	2.29 (2.02)	3.45 (2.49)	1.87 (2.04)	1.54 (1.60)
Anger	1.26 (1.52)	.98 (1.04)	1.42 (1.78)	.74 (.74)	.64 (.78)	.46 (.37)
Depression	2.03 (1.55)	1.45 (1.17)	2.39 (1.92)	1.95 (1.86)	1.02 (1.26)	.99 (.87)
Body Dissatisfaction	5.01 (1.68)	3.95 (1.57)	5.11 (2.42)	3.63 (1.91)	3.09 (1.65)	2.45 (1.19)

Table 4-5. Means and Standard Deviations for the Quiet Rest Condition.

Mood State	Media Pictures ( <i>n</i> = 15)			Neutral Pictures ( <i>n</i> = 16)		
	Initial	Post Quiet Rest	Post Pictures	Initial	Post Quiet Rest	Post Pictures
Anxiety	1.98 (1.56)	1.50 (1.56)	1.78 (1.75)	2.10 (2.01)	1.40 (2.37)	1.58 (2.70)
Anger	.96 (1.62)	.70 (.93)	1.12 (1.29)	.81 (1.44)	.73 (1.56)	.88 (1.32)
Depression	1.64 (1.90)	1.07 (1.35)	2.17 (1.70)	1.81 (2.54)	1.37 (2.24)	1.56 (1.90)
Body Dissatisfaction	4.44 (1.15)	3.91 (1.55)	5.16 (1.62)	3.81 (1.63)	2.72 (1.49)	2.92 (1.43)

## CHAPTER 5 DISCUSSION

Women's body-image disturbance has increased threefold over the past three decades (Berschied, Walster, & Bohrnstedt, 1973; Cash, Winstead, & Janda, 1986; Garner, 1997). To change their appearance, Americans are spending more than \$47 billion annually on exercise equipment, dietary supplements, and surgeries (i.e., rhinoplasty, breast augmentation, liposuction; American Society of Plastic Surgeons, 2002; Canadian Fitness and Lifestyle Research Institute, 1996; Farzan, 1997; National Nutritional Foods Association, 2002). Changing one's appearance, however, is difficult and for those who develop body-image disturbances (i.e., eating disorders, body dysmorphic disorder), the cost of psychological and psychiatric treatment is substantial. Thus, there is need for practical cost efficient prevention and treatment strategies for body-image disturbance. Although exercise has recently been proposed as a treatment for body-image disturbance (Fisher & Thompson, 1994; Koff & Bauman, 1997), experimental research examining the effect of exercise for body-image disturbance is limited. Therefore, the purpose of this dissertation was to investigate the influence of an acute bout of aerobic exercise on the negative mood states elicited by exposure to pictures of the "ideal" female physique portrayed by the media.

Preliminary analyses indicated that the women screened for participation in this study reported drive for thinness scores similar to the norms established by Garner (1991) for college women. Similarly, their scores for awareness and internalization were similar to those reported in previous research (Heinberg & Thompson, 1995; Heinberg,

Thompson, & Stormer, 1995). Furthermore, there were no significant differences between the women who chose to participate and those who chose not to participate for any of the study variables. Despite random assignment, preliminary analyses indicated that the women scheduled to view the media pictures had higher body dissatisfaction at the beginning of the experiment compared to those scheduled to view the neutral pictures. It is important to note, however, that the women did not know the content of the slide show prior to participation in this experiment. More importantly, there were no significant group differences for body dissatisfaction after the exercise/quiet rest treatment.

Consistent with my hypotheses the results of this study indicated that the women viewing media pictures of the “ideal” body reported more anxiety, depression, and body dissatisfaction compared to those viewing neutral pictures. No group differences, however, were evident for anger.

Contrary to my hypothesis, participants who performed an acute bout of aerobic exercise did not report less anxiety, anger, depression, and body-image dissatisfaction after viewing the media pictures compared to those participants in the quiet rest condition. Therefore, this study indicates that acute bouts of exercise may not be an effective strategy for the prevention and treatment of body-image disturbance elicited by media pictures. This result, however, may be due to a floor effect for mood scores, such that the women were reporting low levels of anxiety, anger, and depression at baseline. Furthermore, high levels of weekly physical activity may have caused the floor effect. Specifically, the women reported expending an average of 60.12 METs per week during exercise. If a person were to exercise for 30 minutes at a moderate intensity level 5 days

per week, they would expend about 25 METs per week. Thus, it is possible that physically active women, such as those in this study, may already be experiencing the positive effects of exercise for mood and therefore may not experience noticeable psychological benefits from a single 30-minute acute bout of moderate intensity exercise. Therefore, future research should test sedentary or low-active populations to examine the effects of acute exercise on mood and body-image disturbance.

Several other limitations exist within this experiment that must also be considered when interpreting the results. First, women in the top one-third for drive for thinness and internalization of the media ideal were selected for participation in this study. Because of their relatively high levels of body dissatisfaction and eating disorder symptoms, it is possible that an acute bout of exercise is not enough to produce meaningful changes in anxiety, anger, depression, and body dissatisfaction. Significant changes may be evident in a population that experiences lower levels of body disturbance. The results of this study indicate, however, that those in greatest need of prevention and treatment strategies for body-image disturbance may not benefit psychologically from an acute bout of aerobic exercise.

Second, measurement errors often result from self-report information (Sallis & Owen, 1998). Participants may unconsciously misrepresent their retrospective information (i.e., frequency, intensity, and duration of weekly exercise behavior). Additionally, women who do not wish to be suspected of severe body-image disturbance or eating disorders may be motivated to give more socially acceptable answers for the Drive for Thinness and Sociocultural Attitudes Towards Appearance Questionnaire. The variability introduced by self-report questionnaires (i.e., Leisure-time Exercise

Questionnaire, Drive for Thinness, and Sociocultural Attitudes Towards Appearance Questionnaire) can be reduced in future research by directly measuring exercise behavior (i.e., accelerometers), holding clinical interviews, or using a clinically diagnosed population of eating disordered patients.

Third, because research has indicated that the effects of exercise for mood are greatest when the exercise is enjoyable (Berger & Motl, 2000), I allowed participants to self-select their exercise intensity only stipulating that they needed to maintain a “moderate intensity”. Based on the women’s ratings for the enjoyability of exercise measure, this created an exercise session that was moderately to highly enjoyable. Rating of perceived exertion (Borg & Noble, 1974), however was the only method used to monitor the intensity of exercise. As long as the women reported a rating of perceived exertion of 12-16, they were allowed to continue their self-selected exercise intensity. It is possible, however, that participants were misreporting their exercise intensity such that they may have reported a moderate intensity but actually maintained a mild exercise intensity that was not sufficient to produce positive mood effects. Equally likely is that participants were exercising strenuously thereby preventing positive mood effects. Future research should reduce the variance in the participants’ exercise intensity by asking them to adhere to a moderate exercise intensity determined by calculating their age predicted maximum heart rate or conducting VO<sub>2</sub> max tests. Furthermore, recent research suggests that enjoyability and psychological benefits of an exercise session can be optimized, while still controlling for differences in intensity level, by giving participants a choice of exercise type (i.e., cycle ergometer, treadmill rowing stair climbing or ski simulator; Daley & Maynard, 2003).

As stated previously, most research examining body image is not theoretically driven. This study improved upon this limitation by using the Sociocultural Theory to examine the influence of media on body-image disturbances. Results from this study substantiate previous research showing that women experience increases in negative mood states after viewing media's portrayal of the "ideal" female physique (Hausenblas, Janelle, Gardner, & Focht, 2004; Kalodner, 1997; Waller, Hamilton, & Shaw, 1992). Future research, however, will benefit from examining body-image disturbance via other theories. Recently, Bandura (2001) has described how Social Cognitive Theory may be useful in explaining how the media is used to influence thoughts and change behavior. Specifically, he proposes a series of personal, behavioral, and environmental determinants that lead to the imitation of the television world. Specifically, Bandura points out that the fashion and beauty industry relies almost exclusively on the social prompting power of modeling by creating a world where women are rewarded for wearing a certain brand of clothing or using a certain type of beauty product. Repeated exposure to these images leads to a belief that the commercials represent reality. Therefore, if they use the product being advertised they will win the admiration of beautiful people, promotions and raises at work, invite social recognition from total strangers, and arouse affections from their romantic partner. With this cognitive reasoning, and the potential incentives for conforming to the commercials, they adopt the behaviors they see on television and ultimately diffuse these new behaviors into their social networks where other women are prompted to adopt the new behaviors.

In conclusion, an acute bout of aerobic exercise was not able to significantly reduce anxiety, anger, depression, or body dissatisfaction for a sample of young, Caucasian

women reporting high levels of drive for thinness and internalization of the media ideal. Furthermore, an acute bout of aerobic exercise was not able to reduce or prevent the negative mood states elicited by pictures of the “ideal” female body portrayed by the mass media compared to quiet rest. Thus, the mass media’s portrayal of the “ideal” female physique remains a powerful influence on the mood and body dissatisfaction of young women despite overtly engaging in healthy behaviors (i.e., exercise) that might promote positive changes in health and body composition. Furthermore, future research should continue to investigate the cognitive and behavioral processes underlying the development and maintenance of body-image disturbances via theory driven research.

APPENDIX A  
LEISURE-TIME EXERCISE QUESTIONNAIRE

**Instructions.** This scale measures your leisure-time exercise (i.e., exercise that was done during your free time such as intramural sports—NOT your physical education class).

Considering a typical week, please indicate how often (on average) you have engaged in strenuous, moderate, and mild exercise more than 20 minutes during your free time.

**1. Strenuous exercise:** heart beats rapidly (e.g., running, basketball, jogging, hockey, squash, judo, roller skating, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, heavy weight training). How many times per typical week do you perform strenuous exercise for 20 minutes or longer? \_\_\_\_\_

**2. Moderate exercise:** not exhausting, light sweating (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, popular and folk dancing). How many times per typical week do you perform moderate exercise for 20 minutes or longer?  
\_\_\_\_\_

**3. Mild exercise:** minimal effort, no sweating (e.g., easy walking, yoga, archery, fishing, bowling, lawn bowling, shuffleboard, horseshoes, golf). How many times per typical week do you perform mild exercise for 20 minutes or longer? \_\_\_\_\_

APPENDIX B  
DRIVE FOR THINNESS SUBSCALE – EDI-2

**Instructions:** using the scale provided below, please complete the following questions as honestly as possible. For each item, decide if the item is true about you never (1), rarely (2), sometimes (3), often (4), usually (5), or always (6).

1	2	3	4	5	6
never	rarely	sometimes	often	usually	always

- \_\_\_\_\_ 1. I eat sweets and carbohydrates without feeling nervous.
- \_\_\_\_\_ 2. I think about dieting.
- \_\_\_\_\_ 3. I feel extremely guilty after overeating.
- \_\_\_\_\_ 4. I am terrified about gaining weight.
- \_\_\_\_\_ 5. I exaggerate or magnify the importance of weight.
- \_\_\_\_\_ 6. I am preoccupied with the desire to be thinner.
- \_\_\_\_\_ 7. If I gain a pound, I worry that I will keep gaining.

APPENDIX C  
SOCIOCULTURAL ATTITUDES TOWARDS APPEARANCE QUESTIONNAIRE –  
REVISED FEMALE VERSION

Read each of the following items, and circle the number that best reflects your agreement with the statement.

1	2	3	4	5
Completely Disagree		Neither agree nor disagree		Completely Agree

- \_\_\_ 1. I would like my body to look like the women who appear in TV shows and movies.
- \_\_\_ 2. I believe that clothes look better on women that are in good physical shape.
- \_\_\_ 3. Music videos that show women who are in good physical shape make me wish that I were in better physical shape.
- \_\_\_ 4. I do not wish to look like the female models who appear in magazines.
- \_\_\_ 5. I tend to compare my body to TV and movie stars.
- \_\_\_ 6. In our society, fat people are regarded as attractive.
- \_\_\_ 7. Photographs of physically fit women make me wish that I had better muscle tone.
- \_\_\_ 8. Attractiveness is very important if you want to get ahead in our culture.
- \_\_\_ 9. It's important for people to look attractive if they want to succeed in today's culture.
- \_\_\_ 10. Most people believe that a toned and physically fit body improves how you look.
- \_\_\_ 11. People think that the more attractive you are, the better you look in clothes.

- \_\_\_ 12. In today's society, it's not important to always look attractive.
- \_\_\_ 13. I wish I looked like the women pictured in magazines who model underwear.
- \_\_\_ 14. I often read magazines and compare my appearance to the female models.
- \_\_\_ 15. People with well-proportioned bodies look better in clothes.
- \_\_\_ 16. A physically fit woman is admired for her looks more than someone who is not fit and toned.
- \_\_\_ 17. How I look does not affect my mood in social situations.
- \_\_\_ 18. People find individuals who are in shape more attractive than individuals who are not in shape.
- \_\_\_ 19. In our culture, someone with a well-built body has a better chance of obtaining success.
- \_\_\_ 20. I often find myself comparing my physique to that of athletes pictured in magazines.
- \_\_\_ 21. I do not compare my appearance to people I consider very attractive.

APPENDIX D  
PRE-PARTICIPATION QUESTIONNAIRE

1. Has a doctor ever said that you have a heart condition AND that you should only do physical activity recommended by a doctor? Y or N
2. Do you feel pain in your chest when you do physical activity? Y or N
3. Do you lose your balance because of dizziness? Do you ever lose consciousness?  
Y or N
4. Do you have a bone or joint problem that could be made worse by a change in your physical activity? Y or N
5. Is your doctor currently prescribing drugs (i.e., water pills) for your blood pressure or heart condition? Y or N
6. Have you been diagnosed with asthma or exercise induced asthma? Y or N
7. Have you been diagnosed with Diabetes I or II? Y or N
8. Do you know of any other medical reason that you should not do physical activity?  
Y or N

If you answered YES to any of the above questions please take the time to thoroughly explain your illness/injury. Include the following information: when the injury happened or when the illness was diagnosed, any medications that you are taking, any specific considerations we should take to ensure your safety while involved in this study.

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The information that I have provided on this form is true and complete to the best of my knowledge.

Print name: \_\_\_\_\_

Signed: \_\_\_\_\_

date: \_\_\_\_\_

---

Experimenter Only:

Current Blood Pressure: \_\_\_\_/\_\_\_\_

date: \_\_\_\_

initials: \_\_\_\_\_

APPENDIX E  
MOOD VISUAL ANALOGUE SCALES

**Instructions.** Please draw a vertical line perpendicularly across the horizontal line at the location that best describes how you **feel right now** for each of the 4 questions below.

1.

No Anxiety

Worst Anxiety Possible



2.

No Depression

Worst Depression Possible



3.

No Anger

Worst Anger Possible



4.

No Body Dissatisfaction

Worst Body Dissatisfaction



APPENDIX F  
RATING OF PERCEIVED EXERTION

6	
7	Very, very light
8	
9	Very light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard

APPENDIX G  
ENJOYABILITY OF EXERCISE QUESTIONNAIRE

**Instructions:** Using the following scale, indicate how enjoyable of each component of the exercise session was for you.

1	2	3	4	5	6	7	8	9	10
not at all enjoyable								completely enjoyable	

Speed \_\_\_\_\_

Incline \_\_\_\_\_

Intensity Level \_\_\_\_\_

Overall exercise experience \_\_\_\_\_

APPENDIX H  
UNIVERSITY OF FLORIDA INSTITUTIONAL REVIEW BOARD

1. TITLE OF PROJECT:

Effects of Acute Exercise on Mood and Body Dissatisfaction

2. PRINCIPAL INVESTIGATOR(S):

Elizabeth A. Fallon, M.S.E.S.S., graduate student, Department of Exercise and Sport

Sciences, Phone: (352) 392-0580 x 1389, Email: FallonEA@hhp.ufl.edu

3. SUPERVISOR:

Heather A. Hausenblas, Ph.D., Assistant Professor of Exercise and Sport Sciences,

110 Florida Gym, Phone: (352) 392-0584, Email: heatherh@hhp.ufl.edu

4. DATES OF PROPOSED PROJECT: From: 10/03 To: 10/04

5. SOURCE OF FUNDING FOR THE PROJECT: No funding is provided.

6. SCIENTIFIC PURPOSE OF THE INVESTIGATION:

The purpose of this study is to investigate the effect of an acute bout of aerobic exercise on the negative mood states and body dissatisfaction elicited by media images of the ideal female body.

7. DESCRIBE THE RESEARCH METHODOLOGY IN NON-TECHNICAL

LANGUAGE:

Female participants will be recruited from undergraduate courses. Specifically, they will be identified through a screening questionnaire, and will be called for participation if they

report high levels of body disturbance, high levels of media internalization, and low levels of exercise.

Participants meeting the screening criteria are called for a study on “exercise and mood”.

If they agree to participate, they are randomly assigned to an exercise or quiet rest condition. When they arrive at the laboratory, they are taken to a private room and are asked to read and sign the informed consent. If they agree to participate, they complete the mood questionnaire (see attached) for the first time.

Quiet Rest Condition: Participants are asked to study materials from the university course of their choice for 30 minutes.

Exercise Condition: Participants are given a pre-exercise participation questionnaire (see attached) that identifies any health reasons the individual may have that would keep them from engaging in moderate intensity exercise. If the participant answers “yes” to any of the questions, they are told they can not participate, debriefed regarding the purpose of the study, and given their extra credit/phone card. If the participant answers “No” to all of the questions, they are given instructions on how to use the treadmill, including safety precautions for treadmill use. Subsequently, they are asked to self-select a speed on the treadmill that would satisfy a “mild warm-up speed”. After 5 minutes of warm-up, the participant is asked to select a “moderate exercise speed” for 20 minutes. At the end of the 20-minute moderate intensity exercise session, the participant is asked to select a “cool down speed” for 5 minutes. For the entire 30 minutes, heart rate and rating of perceived exertion is recorded every 3 minutes. If the individual exceeds 85% of their age predicted maximum or 17 on the RPE (see attached), they are asked to reduce their exercise intensity, and heart rate and RPE are monitored each minute until they are below

85% of age predicted max and 17 RPE. These safety precautions are in accordance with exercise testing instructions provided by the American College of Sports Medicine, 2000. After the exercise/quiet rest condition, the participants complete the mood questionnaire for a second time. Subsequently, they watch a 2-minute picture show on a computer screen in a private room. There are 9 pictures of either women in the media that depict the “ideal female body” or of neutral control slides. The media pictures were obtained from popular women’s magazines (i.e., Vogue, Cosmo) and common clothing catalogues (Victoria’s Secret). The neutral slides are taken from the IAPS photos (Lang et al) and are of neutral objects (i.e., trash can, electrical socket). After viewing the pictures, and completing the mood questionnaire for a 3<sup>rd</sup> time, participants are debriefed regarding the true purpose of the study, and asked to sign whether they are still willing to let us use their data (see attached). If they choose not to let us use their data, they are asked to take their questionnaires with them when they leave.

#### 8. POTENTIAL BENEFITS AND ANTICIPATED RISK:

The risks associated with this experiment are minimal to moderate. Specifically, the risks are less than or equal to that of engaging in aerobic exercise on a treadmill at any health club or gym. Furthermore, precautions are taken to reduce the risks are associated with treadmill exercise. A par-q is required before participation (see attached), specific instructions regarding proper use and safety features of the treadmill are given, and the experimenter is giving one-on-one supervision for the entirety of the exercise session, including heart rate and rating of perceived exertion assessments.

All participants will receive either extra course credit or a 60-minute phone card for their participation. Additionally, because all of the participants scored highly on the drive for

thinness and media internalization scales, they will be given a packet including IRB contact information, and pamphlets discussing nutrition, eating disorders, and contact information of campus counselors obtained at the University of Florida Infirmery.

9. DESCRIBE HOW SUBJECTS WILL BE RECRUITED, THE NUMBER AND AGE OF THE SUBJECT, AND THE PROPOSED MONETARY COMPENSATION:

Approximately 300 females enrolled in various undergraduate classes at the University of Florida will be given a screening questionnaire (see attached). Based on answers to the screening questionnaire, 100 women between the ages of 18 and 25 will be called to participate in the study.

While there is NO monetary compensation, the participant can choose between extra course credit or a 60-minute phone card for participation.

10. DESCRIBE THE INFORMED CONSENT PROCESS. INCLUDE A COPY OF THE INFORMED CONSENT DOCUMENT:

See the attached informed consent forms.

Principal Investigator' Signature:

Supervisor's Signature:

\_\_\_\_\_

\_\_\_\_\_

Elizabeth A. Fallon

Dr. Heather A. Hausenblas

I approve this protocol for submission to the UFIRB:

Dept. Chair Signature:

\_\_\_\_\_

\_\_\_\_\_

Dr. Dodd

Date

APPENDIX I  
INFORMED CONSENT

**Project Title:** Exercise and Mood

**Principal Investigators:** Elizabeth A. Fallon M.S., Graduate Student, Department of Exercise and Sport Sciences

**Supervisor:** Heather A. Hausenblas PhD, Assistant Professor, Department of Exercise and Sport Sciences

**Purpose and Testing Procedure:** The purpose of this study is to investigate the effects of 1 bout of aerobic exercise or quiet rest on mood. Specifically, you will be asked to complete a pre-test questionnaire, engage in exercise or a quiet rest condition for 30 minutes, and complete the questionnaire for a second time. Subsequently, you will view 9 pictures on a computer screen and complete the questionnaire for a final time. The experiment will take about 1 hour.

**Risk and Confidentiality:** Minimal risk is associated with this experiment. Specifically, a person may become injured while participating in exercise on the treadmill, but the risk is no greater than that of exercising at a gym or fitness center. Additionally, a person may become more aware of their mood states via answering questionnaires.

Participants will receive either extra course credit, or a 60-minute phone card for their participation.

Any information that is collected is confidential; names are not linked to the data in any way, because a participant number codes all data. Furthermore, all data is kept

locked inside the Exercise Psychology Laboratory and can only be accessed by the experimenters directly involved with this study.

Participation in this study is strictly voluntary. If at any time you want to withdraw from the study for any reason, you will not be penalized and you will receive your extra course credit/phone card.

**Additional Questions or Information:** If at any time you have any questions or concerns about the study, please direct them to the supervising professor of this study, Dr. Heather Hausenblas 392-0584. If you have any questions or concerns regarding participants' rights, please contact the UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250, 392-0433.

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I have read the policies and procedures described in this informed consent and I voluntarily agree to participate in this study.

Participant's signature: \_\_\_\_\_ date: \_\_\_\_\_

APPENDIX J  
DEBRIEFING SIGNATURE FORM

Originally, you were told that the title of this study was “exercise & mood”. This is true, but the study also investigated the effects of exercise on body dissatisfaction. This information was intentionally kept from you so you would be more likely to respond freely to the questions.

Because we kept the full purpose of the study from you, we would like to confirm that we have your permission to use your data. If so, you may sign the “YES” line. If you do not wish us to use your data, you may sign the “NO” line and take your data sheets with you when you leave the laboratory. No matter which line you sign, you will be given your extra course credit or phone card.

I understand that the purpose of this study was to better understand the effects of acute exercise/quiet rest on mood (i.e., anger, depression, and anxiety) as well as body dissatisfaction.

Additionally, I know that I have the choice to agree to allow the researchers to use my data or take it with me when I leave. Whichever choice I make, I will still receive my extra course credit or 60-minute phone card.

YES, I will allow the researchers to use my data.                      Date: \_\_\_\_\_

Signature: \_\_\_\_\_

NO, I will not allow the researchers to use my data. (Please take data sheets with you.)

Signature: \_\_\_\_\_

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## BIOGRAPHICAL SKETCH

In 1976, Elizabeth Anne Fallon was born in Hartford, Connecticut. Raised in Birmingham, Alabama, she graduated in 1994 with an advanced high school degree from Pelham High School, Pelham Alabama. In 1998, she graduated with a Bachelor of Science degree specializing in psychology from the College of Liberal Arts and Sciences at the University of Florida, Gainesville. Subsequently, she began her master's and PhD program in the College of Health and Human Performance specializing in sport and exercise psychology with a minor in social and health psychology.