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Effects of exercise on body image in college women at risk for an eating disorder

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EFFECTS OF EXERCISE ON BODY IMAGE IN COLLEGE WOMEN AT RISK FOR
AN EATING DISORDER

Thesis

Submitted to

The Graduate School of the
UNIVERSITY OF DAYTON

In Partial Fulfillment of the Requirements for

The Degree

Master of Arts in Psychology

by


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ABSTRACT

EFFECTS OF EXERCISE ON BODY IMAGE IN COLLEGE WOMEN AT RISK FOR AN EATING DISORDER

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The present study examined body image in female undergraduates with a range of eating disorder symptoms following exposure to exercise. Body image has been found to be related to the development and maintenance of eating disorders. While exercise has been found to increase body image in women without eating disorder symptoms, women at risk for an eating disorder may respond differently to exercise. In the literature two factors found to be related to body image include social physique anxiety and exercise motivation. In addition, eating disorder symptom level has been found to be related to body image, exercise motivation, and social physique anxiety. Participants ($N=21$) were regular exercisers recruited from the University of Dayton. Participants completed a measure of eating disorder symptoms and had a range of symptoms from none, to levels placing them at risk for an eating disorder. Participants were then asked to complete a demographics questionnaire and a measure of body image. Two weeks after the initial assessment of body image, participants engaged in their regular exercise regimen at the RecPlex. Immediately following exercise, all participants completed post-test measures of social physique anxiety, body image, and reasons for exercise. Consistent with the

literature, several correlations among study variables reached significance. Individuals with higher levels of eating disorder symptoms had lower body image scores at baseline and higher levels of social physique anxiety. Individuals with higher levels of social physique anxiety had lower body image scores. As a preliminary analysis, multiple regression analyses were conducted to determine if eating disorder symptom level accounted for unique variance in post-exercise body image when controlling for baseline body image. Preliminary multiple regression analyses were also conducted to determine if social physique anxiety and exercise motivation accounted for unique variance in body image following exercise. Eating disorder symptom level did not account for significant unique variance in post-exercise body image. Similarly, social physique anxiety and exercise motivation did not predict post-exercise body image beyond participant's baseline body image and eating disorder symptom level. Future research is needed to examine these relationships in a larger sample.

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CHAPTER 1

INTRODUCTION

In the United States, an estimated 10 million females and 1 million males are diagnosed with an eating disorder (Shisslak, Crago, & Estes, 1995). The problem is most pronounced in college students, with at least 25% of college women at risk for developing an eating disorder (Drewnowski, Yee, Kurth, & Krahn, 1994; Schwitzer, Rodriguez, Thomas, & Salimi, 2001). These years of emerging adulthood appear to be a time of vulnerability with one-third of women who develop eating disorders doing so during their college years (Woodside & Garfinkel, 1992). These figures may be under-representative due to under-reporting and a lack of methodologically sound epidemiological studies of eating disorders (Machado, Machado, Goncalves, & Hoek, 2007).

Disordered eating is associated with a multitude of other physical and mental health risks. Physical complications associated with eating disorders include serious heart conditions and kidney failure, both of which can be fatal (Herzog & Copeland, 1985; Lock, Reisel, & Steiner, 2001; Wilson, Heffernan, & Black, 1996). Psychological disturbances associated with eating disorders include depression, anxiety, and substance abuse (Lock et al., 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000). Because of the severity of these problems, it is important to understand the etiological factors surrounding the development and maintenance of eating disorders.

In the following thesis, the literature review will begin with a description of clinical eating disorders. The concept of an eating disorder continuum will be presented and within this section, body image and its relationship to the development and maintenance of eating disorders will be discussed. Next, variables that may impact body image will be described. The last part of the introduction will discuss the purpose and hypotheses of the current study.

Brief Overview of Clinical Definition for Eating Disorders

The Diagnostic and Statistical Manual of Mental Disorders Text Revision (DSM-IV-TR) (American Psychological Association, 2000) describes eating disorders as severe disturbances in eating behavior. There are three primary types of eating disorders as defined by the DSM-IV-TR: anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified (EDNOS). More specifically, anorexia nervosa is the refusal to maintain a minimally normal body weight while bulimia nervosa is characterized by repeated episodes of binge eating followed by inappropriate compensatory behaviors such as self-induced vomiting. A diagnosis of EDNOS is applied to individuals with significant eating disorder symptoms that do not meet full criteria for anorexia or bulimia. Disturbances in body image concerning shape and weight are also an essential feature of anorexia nervosa and bulimia nervosa (American Psychological Association, 2000). A more comprehensive report of these types of eating disorders follows.

Anorexia is characterized by an intense fear of gaining weight or of becoming overweight even though the individual's current weight is less than 85% of their objective ideal weight based on height and gender. Approximately .5% of the United States population meets criteria for anorexia nervosa (Patton, 1992). In addition to

failure to maintain a healthy weight, postmenarcheal females experience amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. Individuals with this disorder have a distorted view of their body weight and shape, place enormous emphasis on weight or shape, and/or are in denial of the seriousness of their low body weight (American Psychological Association, 2000). Individuals with anorexia can be described as the restricting type, with the primary presentation of solely calorie restriction or as the binge-eating/purging type with engagement of bingeing or purging behaviors in addition to the restricting behaviors (American Psychological Association, 2000).

A second subtype of eating disorders, bulimia, is characterized by binge eating and inappropriate compensatory behaviors to prevent weight gain (American Psychological Association, 2000). Approximately 1% to 3% of the United States population meets criteria for bulimia nervosa (Fairburn & Beglin, 1990; Kendler et al., 1991). For an individual with bulimia, evaluation of one's self worth is heavily influenced by one's body weight or shape. The binge eating and compensatory purging must occur, on average, at least twice a week for three months. A binge is described as eating more than most individuals would eat in a certain amount of time. During the binge, there is a feeling of lack of control (e.g., one cannot stop eating). The compensatory purging behavior can consist of one or more of the following: self-induced vomiting, fasting, excessive exercise, and/or misuse of laxatives, diuretics, enemas, or other medications (American Psychological Association, 2000).

An additional eating disorder diagnosis of Eating Disorder Not Otherwise Specified (EDNOS) exists as well (American Psychological Association, 2000). The prevalence rates for EDNOS are much greater than for anorexia or bulimia at 25-40% for women in the U.S (Tsai, Hoerr, & Song, 1998). This diagnosis applies to individuals with severe eating disorder symptoms who do not meet specific criteria for anorexia or bulimia. For example, women who meet all criteria for anorexia except that they have regular menses or women who meet criteria for bulimia nervosa but the binge eating/compensatory mechanism cycle occurs less frequently than needed for diagnosis (American Psychological Association, 2000). Binge-Eating Disorder is an example of EDNOS. Binge-Eating Disorder is characterized by recurrent episodes of binge eating that are associated with three or more of the following: eating much more rapidly than normal, eating until feeling uncomfortably full, eating large amounts of food when not feeling physically hungry, eating alone because of being embarrassed by how much one is eating, and feeling disgusted with oneself, depressed, or very guilty after overeating (American Psychological Association, 2000). The binge eating occurs, on average, at least twice a week for six months and is characterized by marked distress. Of note, Binge-Eating Disorder is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, excessive exercise) and does not occur exclusively during the course of Anorexia or Bulimia (American Psychological Association, 2000). Thus, the DSM-IV-TR recognizes eating behavior may be problematic without meeting clinical diagnoses of anorexia or bulimia. Because of the severity and prevalence of EDNOS, it is important that women with this disorder seek treatment (Shisslak et al., 1995).

The Eating Disorder Continuum

Eating disorder symptomatology has been conceptualized as being on a continuum, with eating disorder pathology ranging from few eating disorder symptoms to clinical eating disorders (Killen & Barr, 1996) such as those noted above. Although bulimia and anorexia occur with some regularity on campuses, it is much more common to see less severe problems centering on weight concern and body image dissatisfaction (Killen & Barr, 1996). Of particular concern to the current project, are those individuals that fall in the middle of this continuum whereby they exhibit some eating disorder symptoms without meeting DSM-IV-TR criteria for an eating disorder. Partial-syndrome anorexia nervosa is characterized by the presence of at least two of the four criteria for anorexia nervosa. Partial-syndrome bulimia nervosa is characterized by a presence of at least criteria A, B, and D (i.e., recurrent episodes of binge eating, recurrent purging, and self evaluation unduly influenced by body weight and shape) for bulimia nervosa (Moorhead, Stashwick, Reinherz, Giaconia, Striefel-Moore, & Paradis, 2003).

Individuals falling into midway points along the continuum of eating disordered behavior have an increased chance of becoming restricted dieters, fasters, purgers, and developing clinical eating disorders (Scarano & Kalodner-Martin, 1994). In addition, women suffering from partial-syndrome eating disorders have been shown to experience significantly higher levels of depression than controls (Beck, Steer, & Brown, 1996).

Research has shown that many women who suffer from partial-syndrome eating disorders may progress to full symptomatic eating disorders over time (Shisslak et al., 1995; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). Herzog, Hopkins, & Burns (1993) conducted a follow-up study with college women with partial-syndrome eating disorders. The women were re-interviewed via phone 25-52 months after seeking treatment for maladaptive eating behaviors. These women were assessed for anorexia and bulimia using DSM-III criteria. Although none of the participants had clinical eating disorders at onset, 82% of participants developed full criteria for an eating disorder at least once over the course of the two and a half year study (Herzog et al., 1993). At follow-up, of the 33 women who initially presented with partial-syndrome eating disorders, 4 participants met diagnosis for a clinical eating disorder, 22 met diagnosis for partial-syndrome eating disorders, 6 female participants recovered, and one participant had a previously undiagnosed medical condition resulting in weight loss. This study demonstrated the risk of developing an eating disorder in women with subdiagnostic eating problems.

There is some evidence to suggest that early eating problems in childhood are predictive of later eating pathology. Marchi & Cohen (1990) interviewed 326 girls and 333 boys and their mothers over a ten year interval. The children were between 1 and 10 years old when they were first interviewed. They found that eating pathology in early childhood was predictive of symptoms of anorexia and bulimia in adolescence. The results further emphasize the need to understand risk factors for the development of eating pathology.

Risk Factors for Eating Pathology

Although partial-syndrome eating disorders are well-defined with specific criteria (Moorhead et al., 2003), the status of being at “risk” for an eating disorder has not been as well-defined (Zabinski et al., 2001). Therefore, specific risk factors can be analyzed to better evaluate this population. Described below are those risk factors that have considerable support in the eating disorder literature. Research suggests that the more of these risk factors that are present, the more severe the risk is for eating pathology. Since risk factors for an eating disorder are cumulative, some researchers recommend targeting individuals with these risk factors instead of studying the eating disorder population at large (Taylor & Altman, 1997).

There are several risk factors for the development and maintenance of eating disorders. Although not exhaustive of the literature, the risk factors of body image, sociocultural pressure for thinness, internalization of the thin-ideal, depression, lack of social support, low self-esteem, family environment, and excessive exercise are covered in this review.

Body image dissatisfaction is one of the most consistent and robust risk and maintenance factors for eating pathology as determined by a meta-analysis of risk and maintenance factors for eating pathology (Stice, 2003). Body image dissatisfaction may promote dieting and negative affect which may increase the risk for eating pathology (Gleaves & Eberenz, 1995; Killen et al., 1994). Killen and colleagues (1994) found that self-reported weight and shape concerns were related to the later development of eating disorder symptoms in adolescent girls. Further reduction of weight concerns and body image disturbances are posited to improve body image, and reduce eating disorder

symptoms in a high risk population, such as college-aged women (Killen et al., 1994; Taylor & Altman, 1997).

To examine the role of body image on the development of eating disorder symptoms, Cooley & Toray (2001) examined 225 female undergraduates in a longitudinal study. Body image and eating disorder symptoms were assessed initially, seven months later, and three years after the initial assessment. Body image dissatisfaction was the most salient predictive factor for eating pathology across all three time intervals. Women entering college with higher levels of body image dissatisfaction were likely to show worsening patterns of eating pathology across the college years (Cooley & Toray, 2001). These results coincide with one of the most consistent findings that individuals with body image dissatisfaction are at risk for developing eating pathology (Cooley & Toray, 2001; Gleaves & Eberenz, 1995; Killen et al., 1996; Stice, 2003).

The eating disorder literature has examined the considerable effect that poor body image has on the development and maintenance of eating disorder symptoms. Body image has been demonstrated to have such potent effects on bulimia nervosa that some conceptualize it as a completely separate dimension of the disorder. Gleaves & Eberenz, (1995) propose that it may be that the eating disturbance of bulimia may be secondary to initial body image dissatisfaction. Their study examined women seeking treatment for bulimia nervosa and established four dimensions of the disorder. One of the dimensions was body image. Body image proved to be an important separate factor of bulimia nervosa. This further emphasizes the important role that body image plays in the development and maintenance of eating disorders.

A second, but related factor that may place an individual at an increased risk for developing an eating disorder is the sociocultural pressure to be thin (Stice, Nemeroff, & Shaw, 1996; Streigel-Moore et al., 1986). This theory posits that external social pressure for thinness creates an internalization of the thin-ideal and body image dissatisfaction which can place individuals at risk for eating pathology (Stice, 2002; Streigel-Moore, Silberstein, & Rodin, 1986). This pressure to be thin places an emphasis on the importance of appearance which can lead to body image dissatisfaction. Repeated sociocultural messages that one is not thin enough can cause dissatisfaction with one's body (Stice, 2002).

Tylka and Subich (2004) proposed that this pressure for thinness directly influences women's tendencies to experience higher levels of internalization of the thin-ideal and body image dissatisfaction. The media promotes an unrealistic standard of thinness that most women cannot achieve, thus more women may feel negatively towards their bodies and they subsequently feel greater pressure to be thin (Stice et al., 1996). Thin-ideal internalization and emphasis on appearance may contribute to body image dissatisfaction because of the difficulty in achieving this ideal (Fairburn, 1997; Stice, 2003; Stice & Shaw, 2002). This becomes a vicious cycle because the more pressure there is to be thin, the more women may experience a disturbed body image (Stice et al., 1996; Stice & Shaw, 2002; Tylka & Subich, 2004).

Sociocultural pressure for thinness has been found to have an effect on women's motivation for exercise. Because of the social pressure of thinness and a subsequent desire to change their physique, women's motivation for exercise tends to be focused more on their appearance (Strelan, Mehaffey, & Tiggemann, 2003) as opposed to health-based reasons.

A third risk factor for the development of an eating disorder is the internalization of the thin-ideal and an emphasis on the importance of appearance which promotes body image dissatisfaction, which in turn can contribute to dieting, negative affect, and eating pathology (Stice, 2003). Internalization of the thin ideal may occur when individuals believe messages from media and society that promote the concept that thinness equates feminine beauty. Internalization of the thin-ideal may lead to a drive for thinness because the individual expects reinforcement from an attainment of the thin-ideal. Internalizing the thin-ideal may lead to dieting and disturbed eating, and it has been found that thin-ideal internalization mediates the effect of sociocultural pressure on eating disorder symptoms (Stice et al., 1996). Hausenblas, Janelle, & Gardner (2004) sampled female undergraduates and exposed them to slides featuring a thin model, slides featuring themselves, and slides featuring neutral stimuli. Women high in drive for thinness experienced negative affect after viewing slides of the thin model which persisted for two hours. It may be that frequent exposure to the thin-ideal physique may make a significant contribution to long-term body image dissatisfaction (Hausenblas et al., 2004).

Eating disorders tend to be highly co-morbid with other psychological disorders. Individuals with anorexia nervosa who are seriously underweight tend to experience symptoms of depression such as depressed mood, social withdrawal, and irritability (American Psychological Association, 2000). Similarly, there is an increased frequency of depressive symptoms in individuals with bulimia nervosa (American Psychological Association, 2000).

Other related factors that may increase vulnerability to developing an eating disorder include a lack of social support. A lack of social support from family and friends may contribute to negative attitudes towards one's physique (Presnell, Bearman, & Stice, 2004). Poor social support may also lead to negative affect and low self-esteem (Tylka & Subich, 2004). Low self-esteem may be related to sociocultural pressure for thinness and body image dissatisfaction. Specifically, low self-esteem may predispose young women and girls to internalizing the sociocultural ideal thin physique and lead to decreased satisfaction with one's own appearance (Dohnt & Tiggemann, 2006).

Another related factor that may contribute to the development and maintenance of eating disorders is the family environment. For instance, certain family dynamics such as general dysfunction, a low level of cohesion, low levels of expressiveness, and high levels of conflict have been linked with eating disorders (Okon, Greene, & Smith, 2003). Family emphasis on body weight and shape, specifically, being teased about one's weight, can also effect body image and contribute to the development of eating disorders (Okon et al., 2003; Stice & Shaw, 2002). Negative maternal modeling, such as bingeing and being criticized for what one eats, have also been found to be correlated with eating disorder symptoms (Annus, Smith, Fischer, Hendricks, & Williams, 2005).

Finally, excessive exercise has been studied in conjunction with individuals with eating disorder symptomatology and some researchers have found that it can be problematic and even may help maintain eating disorder symptomatology (Hausenblas & Fallon, 2006). Although exercise typically has positive effects on body image in healthy individuals (Fox, 2004; Tiggemann et al., 2000; Williams & Cash, 2001), high levels of exercise may be problematic for individuals “at risk” for an eating disorder. Individuals with bulimia may use excessive exercise in efforts to compensate for binge eating, for example. Exercise is considered excessive when it significantly interferes with daily life, occurs at inappropriate times or inappropriate settings, and/or an individual exercises despite physical injury or medical condition (American Psychological Association, 2000).

Effects of Exercise on Body Image

Given the prevalence of body image disturbance among individuals with eating disorder symptomatology, it is important to determine factors contributing to decreased body image. Exercise can be a protective factor for eating disorders in healthy individuals (Fox, 2004; Scully et al., 1998). Hausenblas & Fallon (2006) conducted a meta-analysis of 121 studies that examined the impact of exercise on body image. They found that exercise was associated with a more positive body image. Participants in exercise interventions generally had better body image at the conclusion of the intervention than the non-exercisers. In particular, correlational studies indicated that individuals who engaged in aerobic exercise had even higher levels of body image. This relationship has been hypothesized to exist because aerobic exercise is ideal for losing weight or maintaining weight, thus giving aerobic exercisers a physique that most

resembles the ideal body (Hausenblas & Fallon, 2006). The authors did caution however, of the effect of exercise on individuals with eating pathology. They stressed the need to first determine the exercise motivation of this population prior to recommending an exercise intervention (Hausenblas & Fallon, 2006). For instance, there are particular sports in which there is an emphasis on thinness for aesthetic purposes such as cheerleading, dance, figure-skating, and gymnastics. Participation in these sports has been found to promote poor body image and is associated with eating disorders (Zucker, Womble, Williamson, & Perrin, 1999). In addition, research has shown that girls as young as 5 show disturbances in body image related to aesthetic-focused sport participation (Davidson, Earnest, & Birch, 2002).

Russell and Cox (2003) proposed that although exercise tends to enhance a women's perceived body image, her idealized body image begins to shift towards a thinner more "fit" standard with continued dissatisfaction regardless of objective improvement. They sampled 168 college females to assess if inaccurate weight assessment (judging one's weight to be higher than it is objectively) would be predictive of body image, social physique anxiety (i.e., feeling anxious about one's physique), and self-esteem. They found that inaccurate weight assessment was predictive of body image dissatisfaction in both Caucasian and African-American participants. Additionally, Caucasian female's inaccurate weight assessment was the only significant predictor for both social physique anxiety and body image dissatisfaction. Regardless of exercise frequency and type, body image dissatisfaction was predictive of social physique anxiety in females. Thus, dissatisfaction with one's body may be an underlying reason for higher social physique anxiety (Russell & Cox, 2003). However, the relationship between

higher social physique anxiety and resulting exercise habits and eating disorder symptomatology is just beginning to be examined.

Social Physique Anxiety and Exercise

Social physique anxiety (SPA) is defined as the anxiety that arises when an individual is motivated to make positive physical impressions on others, but lacks the confidence in their abilities to do so. SPA is derived from self-presentation and social anxiety frameworks (Hart et al., 1989). Self-presentation is an individual's preoccupation with attempting to control how they are perceived by others. Because of the emphasis on the ideal physique in Western society, women often utilize self-presentation strategies. Therefore, the level of an individual's SPA is determined by how they think others perceive their bodies and their attempts to control these perceptions (Sabiston, Crocker, & Munroe-Chandler, 2005).

Social physique anxiety has been studied in conjunction with body image, exercise, and sports settings. Krane, Waldron, Stiles-Shiple, and Michalenok (2001) examined body image, symptoms of bulimia, drive for thinness, SPA, and perfectionism in female college aerobic exercisers and female college athletes. This study is unique because it is comparing actual athletes and individuals who exercise instead of having participants view videos of other individuals exercising. The athletes were divided into groups based on the visibility of their body shape in their uniforms (i.e., baggy, revealing, and mixed uniforms). Exercisers and athletes in various uniforms did not differ in body image, drive for thinness, symptoms of bulimia, or SPA at the beginning of the study. After viewing the video tapes they found that body image and drive for thinness were the

greatest predictors of SPA in exercisers and athletes. One limitation of the study was that it did not address whether body image was effected by exercise.

SPA is reported to be an influential component of body image (Bane & McAuley, 1998) in that it makes an individual more aware of their physical appearance and contributes to negative feelings associated with ones physique. Females who exercise primarily to improve their appearance (e.g., for attractiveness, weight loss, and body tone) tend to have high levels of SPA (Eklund & Crawford, 1994; Bane & McAuley, 1998). In one study, Sabiston et al. (2005) examined significant predictors of social physique anxiety. They sampled 300 female undergraduate students that exercised at least one time per week. As expected, they found that disturbances in body image and exercise motives (i.e., appearance-based, health-based) significantly predicted levels of social physique anxiety during exercise. This study suggests that body image does affect levels of social physique anxiety in a female undergraduate sample.

In another study, Eklund and Crawford (1994) sampled 94 college-aged females to examine the effects of exercise on SPA. SPA and reasons for exercise were assessed pre-intervention. Each participant viewed two videos of different aerobics classes. The two videotapes were identical in all regards except for what the women in the class were wearing while exercising. In one video, the aerobics participants were wearing form-fitting clothing that emphasized physique. In the second video, the clothing was loose-fitting and de-emphasized physique. A negative relationship was found between SPA and exercising for health. Individuals who exercised for health reasons (e.g. cardiovascular health) generally did not have anxiety about the way other's perceived their physique. There was also a significant positive relationship between

appearance-based exercise motivation and SPA. Individuals who exercised for appearance-based reasons (weight loss, improved muscle tone) had more anxiety concerning other's perceptions of their physique. This study provides further support for a relationship between SPA and exercise motivation (Eklund & Crawford, 1994; Sabiston et al., 2005) and that exercising for appearance-based reasons is related to high SPA (Eklund & Crawford, 1994).

Exercise Motivation

Exercise motivation has been shown to be related to levels of social physique anxiety as well as body image dissatisfaction (Bane & McAuley, 1998; Eklund & Crawford, 1994; Krane et al., 2001; Leary, 1992; Sabiston et al., 2005). Exercise motivation refers to the reasons why individuals are motivated to participate in physical activity (Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Dissatisfaction with one's physique can be a strong predictor of exercise motivation (Leary, 1992). In particular, appearance-focused motivation for exercise tends to promote body image dissatisfaction and eating disturbance (Eklund & Crawford, 1994; McDonald & Thompson, 1992;). McDonald and Thompson (1992) examined body image and exercise motivation in healthy exercising adults ages 17-35. Their sample included several undergraduate students. They found that exercising for weight and tone concerns was positively correlated with disturbed eating behavior and body image dissatisfaction. Conversely, exercising for mood, health, and enjoyment reasons was not related to disturbance in eating or body image dissatisfaction and was positively related to self-esteem (McDonald & Thompson, 1992). It may be that individuals with greater discrepancies between their current and perceived ideal body shapes (i.e., body image dissatisfaction) identify more

appearance-focused or self presentational motives for engaging in exercise. Consequently, these individuals may be more likely to engage in physical exercise in attempts to change their physique (Sabiston et al., 2005) and be more dissatisfied with results.

Silberstein and colleagues (1988) examined the relationships between body image, self-esteem, dieting, and exercise in 92 male and female undergraduates. Exercising for weight control reasons was found to be related to disordered eating and those that exercised for appearance rather than for health reasons may be at a higher risk for the development of a clinical eating disorder (Silberstein et al., 1988). The findings from this study confirm the view that for some individuals, dieting and weight concerns are considered "normative discontent" and that exercise is part of the complex of behaviors and attitudes that comprise normative discontent (Silberstein et al., 1988) and place them at-risk for maladaptive eating patterns.

Women may be more impacted by these findings because there have been identified gender differences in motivation for exercise. McDonald & Thompson (1992) found that women exercise more for weight concerns than men. Women tend to exercise for weight loss while men desire body shape change (McDonald & Thompson, 1992; Silberstein et al., 1988). Furnham et al. (2002) propose this is because of different male and female ideals. For example, the male ideal is V-shaped with an emphasis on large biceps, chest, and shoulders; whereas the female ideal is to be very thin with the emphasis placed on slim hips, buttocks, and thighs. Because of these differences, women tend to view themselves as overweight while men tend to view themselves as underweight compared to their peers (Furnham & Calnan, 1998). Women, therefore,

may tend to exercise primarily to lose weight. It may be that women find that exercise may not yield their desired thinness which may contribute to further decreased body image (Hausenblas & Fallon, 2006).

The literature has strongly supported a relationship between body image and eating disorder symptoms (e.g. Gleaves & Eberenz, 1995; Stice, 2003). In addition, past research has demonstrated that social physique anxiety and exercise motivation may have an effect on body image (Sabiston et al., 2005; Silberstein et al., 1988). However, the literature has not examined the possible effects social physique anxiety and exercise motivation have on body image after exercising in college women with varying degrees of eating disorder symptomatology.

Present Investigation

The primary goal of the present investigation was to investigate the relationships between eating disorder symptom level, body image, social physique anxiety, and exercise motivation. It was hypothesized that eating disorder symptoms will be positively correlated with social physique anxiety and appearance-based exercise motivation. In contrast, it was hypothesized that eating disorder symptoms would be negatively correlated with body image.

The secondary goal of this study was to conduct a preliminary investigation of the role of exercise on body image in college women ranging from healthy to at risk for an eating disorder. An additional preliminary investigation goal was to examine two variables that might account for changes in body image following exercise: exercise motivation and social physique anxiety. It was predicted that appearance-based exercise motivation (e.g., weight loss) and higher levels of social physique anxiety would be

related to decreases in body image following exercise above and beyond eating disorder symptom level and baseline body image.

Many studies have demonstrated the established relationship between body image and disordered eating. The construct of body image is strongly related to eating disorder symptoms and is predictive of the development of an eating disorder (Stice et al, 1994). Although the research on eating disorders is extensive, there are some areas in need of additional investigation. One area in which research is limited is the examination of the effects of exercise on women with subclinical levels of eating disturbances. The current study is a preliminary investigation aimed to determine the role of exercise on body image in college women with various levels of eating disorder symptoms.

Research Questions

The proposed study will seek to examine the relationship between eating disorder symptom level, social physique anxiety, motivation for exercise, and body image before and after exercising. A secondary purpose of this study is to conduct preliminary analyses to investigate the role of exercise on body image in college women ranging from healthy to at risk for eating disorders and how exercise motivation and social physique anxiety may mediate this relationship.

Primary Study Hypotheses:

The major study hypotheses were that eating disorder symptoms would be positively correlated with social physique anxiety and exercise motivation. It was also hypothesized that eating disorder symptoms would be negatively correlated with body image.

Hypothesis 1: It is hypothesized that eating disorder symptoms will be positively correlated with social physique anxiety. That is, women who experience higher levels of eating disorder symptoms will also have higher social physique anxiety.

Hypothesis 2: It is hypothesized that eating disorder symptoms will be positively correlated with appearance-based exercise motivation. Therefore, women with higher levels of eating disorder symptoms will be more likely to be motivated to exercise in order to change their weight and appearance.

Hypothesis 3: It is hypothesized that eating disorder symptoms will be negatively correlated with body image. That is, women with more eating disorder symptoms will have lower body image.

Preliminary Study Hypotheses

As a secondary purpose, preliminary multiple regression analyses were conducted to determine the relationship between eating disorder symptom level and body image before and after exercise. Exercise motivation and social physique anxiety were tested as mediators of this relationship.

Hypothesis 4: Controlling for baseline body image disturbance, it is hypothesized that women with higher levels of reported eating disorder symptoms will demonstrate decreased body image following exercise. Further, it is hypothesized that social physique anxiety and exercise motivation will mediate the relationship between eating disorder symptom level and body image following exercise.

CHAPTER II

METHOD

Participants

Participants were screened for the study as part of the routine mass testing of students enrolled in Psychology 101 at the University of Dayton. Undergraduate women who qualified (i.e., utilize the RecPlex at least two times per week for 45 minutes per session and did not reach cut-off score of 2 standard deviations above the mean on the EDE-Q) were invited to participate in the study via e-mail. Eighty-one (34%) of the women in mass testing met eligibility criteria and were approached for study participation. Eleven (14%) of women scored at least two standard deviations above the mean on the EDE-Q and were excluded from the study and provided written referral information to the UD counseling center. Thirty percent of qualified women participated in the study.

Reasons for non-participation included a lack of response to study e-mails inviting them to participate in the study, scheduling conflicts, or not needing additional Psychology 101 credits. Lastly, the study had two components and some women who met established criteria stated that they did not want to participate in a lengthy study. Resulting participants included 21 (30% of women who qualified) female undergraduate students that regularly utilize the recreation-complex (RecPlex) at the University of Dayton. Nineteen percent of study participants scored at least one standard deviation

above the overall EDE-Q mean, suggesting that they may be considered “at-risk” for an eating disorder. An independent t-test was performed to see if there was a difference in EDE-Q scores between study participants and recruited individuals who chose not to participate. There was no significant difference of EDE-Q scores between groups, $t(79) = -.17, p = .86$. The mean EDE-Q scores for study participants ($M=1.94, SD=.78$) did not differ significantly from recruited individuals who did not participate ($M=1.97, SD=.69$).

As shown in Table 1, ages of the resulting participants ranged from 18 to 22 ($M = 19.43, SD = .97$) and the majority of the sample was Caucasian (90.5%). The participants’ family’s average yearly household income was reported to be over \$100,000 (47.6%). Freshmen undergraduates comprised the majority of the sample (66.7%), with 19% Sophomores, 9.5% Juniors, and 4.8% Seniors. The participants’ average total minutes of reported exercise per week was 201.43 minutes ($SD = 113$). Approximately one quarter of study participants reported exercising at least 240 minutes per week at the RecPlex.

Table 1
Demographic Characteristics of Participants

Demographic Variable	Range	N	%	M	SD
Age	18-22			19.43	.978
Race					
African-American		0	0		
Asian-American		0	0		
Caucasian		19	90.5		
Hispanic		1	4.8		
Native American		0	0		
Other		1	4.8		
Yearly Family Household Income					
\$25,000-\$35,000		0	0		
\$35,000-\$50,000		2	9.5		
\$50,000-\$75,000		4	19		
\$75,000-\$100,000		5	23.8		
Over \$100,000		10	47.6		
UD Status					
Freshmen		14	66.7		
Sophomore		4	19		
Junior		2	9.5		
Senior		1	4.8		
Frequency of Exercise					
Once per week		1	4.8		
Twice per week		6	28.6		
Three times per week		6	28.6		
More than three times per week		8	38.1		
Duration of Exercise Per Session					
30 minutes		1	4.8		
45 minutes		4	19		
1 hour		12	57.1		
1.5 hours		2	9.5		
2 hours		2	9.5		
Total Minutes Exercised Per Week	60-480			201.43	113

Materials

Demographics Questionnaire. Participants completed a brief questionnaire that included questions on age, race, income, and educational status. In addition, there were questions regarding frequency of exercise, type of exercise, and duration of exercise (See Appendix A). This information was used to describe the study sample.

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is a self-report measure modified from a semi-structured interview (EDE; Cooper & Fairburn, 1987) designed to measure eating disorder symptoms. The EDE-Q consists of 30 self report items, requires 15-20 minutes to complete, and assesses eating behavior in the past 28 days. Results from the EDE and the EDE-Q have found to be strongly correlated with correlations ranging from .63-.69 (Grilo, Masheb, & Wilson, 2001). Test-retest reliability was acceptable at .7 or more for all subscales and interrater reliability was consistent with correlations above .9 (Rizvi, Peterson, Crow, & Agras, 2000). The EDE-Q has good concurrent validity ranging from .68 to .84 (Mond, Hay, Rodgers, Owen, & Beumont, 2004). (See Appendix A)

The Multidimensional Body Self Relations Questionnaire-Appearance Scales (MBSRQ-AS; Cash, 1990). The MBSRQ-AS is a 34 item self-report version of the MBSRQ consisting of the following subscales: Appearance Evaluation (i.e., feelings of physical attractiveness or unattractiveness), Appearance Orientation (i.e., extent of investment in one's appearance), Overweight Preoccupation (i.e., weight anxiety, dieting, and restrictive eating), Self-Classified Weight (i.e., one's perception and label of their weight), and the Body Areas Satisfaction (i.e., satisfaction with separate aspects of one's appearance). Participants respond to items based on a 5-point Likert-type scale from 1

“definitely disagree” to 5 “definitely agree”. Higher scores on Appearance Evaluation and Body Areas Satisfaction indicate higher body image while higher scores on Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight indicate lower body image. There is no overall score for the MBSRQ-AS, so in the present study, the Appearance Evaluation subscale was utilized because the items most appropriately captured body image dissatisfaction and the scale had an adequate number of items. Acceptable internal reliabilities for the subscales ranged from .70 to .91. One month test-retest reliabilities ranged from .74 to .91 (Cash, 2000) Concurrent validity with other measures of body image including the Figure Rating Scale ranged from .29 to .81 (Brown, Cash, & Mikulka, 1990). (See Appendix B)

The Social Physique Anxiety Scale (SPAS; Martin et al., 1997). The SPAS is a 12-item self report measure assessing social physique anxiety as a function of body image. Participants are asked to indicate on a Likert-type scale the degree to which certain statements about social anxiety surrounding their physical appearance are characteristic of them. The scale ranges from 1 “not at all” to 5 “extremely”. Scores range from 0-45, with higher scores indicative of an individual who fears being judged and observed by others. Confirmatory factor analysis research suggests that it is a two factor multidimensional scale composed of five items in factor 1, representing feelings about comfort of presenting one's physique, and seven items in factor 2, representing expectations of negative evaluation of one's physique by others (Eklund, Much, & Hart, 1996). Internal consistency is .76 and .90 for factors 1 and 2 respectively. High concurrent validities were demonstrated for both factors as well. (See Appendix C)

The Reasons for Exercise Inventory (REI; Silberstein et al., 1988). The REI is a 24- item, self-report inventory assessing motivation for engaging in exercise activities. The seven subscales include exercising for weight control, fitness, health, body tone, overall physical attractiveness, mood enhancement, and enjoyment. Participants will rate the importance of each exercise motivation from 1 “not at all important” to 7 “extremely important”, with higher scores identifying increased motivation for a specific reason to exercise. The present study examined the effect of the appearance-based exercise motivation subscale on body image because of the demonstrated relationship in the literature (McDonald & Thompson, 1992). Acceptable internal consistency of .67 and above has been demonstrated for each of the seven subscales (Silberstein et al, 1988). More recent studies have demonstrated four factors comprising the REI; Fitness/health, Weight/Appearance, Stress/Emotion, and Socializing (Cash et al., 1994; Sabiston et al., 2005). Acceptable internal consistency was established for the four factors ranging from .77 to .88 (Sabiston et al., 2005).

(See Appendix D)

Procedure

Screening. Participants were 21 students recruited from the Psychology 101 courses at the University of Dayton. Participants were screened for significant eating disorder symptoms via the EDE-Q through the Department of Psychology mass testing. Individuals scoring at least two standard deviations above the mean on the EDE-Q were excluded from the study as scoring in this range is indicative of significant eating pathology. All participants reported that they utilized the RecPlex at least twice per week for 45 minutes to be considered for the study.

Pre-test. Eighty-one participants that qualified in the initial screening were randomly selected and contacted to participate in the study. Twenty-one participants consented to participate and were scheduled in groups of 10 for the pre-test which consisted of a one-hour battery of measures, including the informed consent form, a demographics questionnaire, and the MBSRQ-AS with the later two given in random order. All participants received research credit which satisfied a Psychology 101 course requirement.

Exercise/Post- Test Measurements. Upon completion of pre-test, participants were provided with a sign-up sheet listing "open hours" to utilize the RecPlex at the University of Dayton. Participants signed up for times to complete exercise and post-test measures two weeks following the pre-test measures. For example, participants were asked to exercise for a 45 minute period during the hours of 4-7 on Monday, Wednesday, and Thursday. The participants were asked to sign in with the researcher at a discrete and pre-determined location at the RecPlex. Next, participants engaged in their regular exercise at the RecPlex. Prior to exiting the facility, the participant completed the post-test measures. The post-test consisted of the SPAS, the MBSRQ-AS, and the Reasons for Exercise Inventory given in random order. The post test took approximately 20 minutes to complete. At the conclusion of the study, all participants were debriefed and given contact information and list of services of the UD Counseling Center prior to exiting the RecPlex. Participants received research credit toward fulfillment of their research experience requirement in Psychology 101 course.

CHAPTER III

RESULTS

The results section will be presented as follows. First, descriptive statistics for all major study variables will be presented. Correlations computed between demographic variables and major study variables will be explained. Next, major study questions regarding the relationships between eating disorder symptoms, body image, reasons for exercise (mood/stress, weight/appearance, socializing, and fitness/health), and social physique anxiety will be presented. Lastly, the preliminary multiple regression analysis between level of eating disorder symptoms, pre-exercise body image, and post-exercise body image will be examined. Social physique anxiety and exercise motivation as mediators of the relationship between level of eating disorder symptom level and body image following exercise exposure will be explained as part of this exploratory analysis.

Descriptive Statistics

The means, standard deviations, and ranges of continuous variables analyzed in the current study are presented in Table 2. Of interest were the participant's Global EDE-Q scores ($M=2.01$, $SD=1.44$) which were greater than the adult norms ($M=1.55$, $SD=1.21$) as reported by Fairburn & Beglin (1994). Consistent with the literature, exercising for fitness and health was reported to be the most common motivation for exercise ($M=5.23$, $SD=.91$). Exercising for weight/appearance was the second most common motivation for exercise ($M=4.54$, $SD=.76$).

Relationships between demographic variables and major study variables

Correlations were computed between demographic variables (i.e., age, frequency of exercise, length of workout, and total minutes of exercise per week) and major study variables (i.e., eating disorder symptoms, social physique anxiety, appearance evaluation, body areas satisfaction, overweight preoccupation, self-classified weight) and are summarized in Table 3. Several self-reported exercise variables were correlated with major study variables. Participants' reported frequency of exercise was positively correlated with eating disorder symptoms ($r = .48, p < .05$), social physique anxiety ($r = .43, p < .05$), pre-exercise overweight preoccupation ($r = .51, p < .05$), and post-exercise overweight preoccupation ($r = .44, p < .05$). Frequency of exercise was negatively correlated with pre-exercise appearance evaluation ($r = -.47, p < .05$) and pre-exercise body areas satisfaction ($r = -.51, p < .05$). Length of exercise was positively correlated with social physique anxiety ($r = .46, p < .05$). Total minutes of exercise per week was positively correlated with social physique anxiety ($r = .58, p < .05$), pre-exercise overweight preoccupation ($r = .56, p < .01$) and post-exercise weight preoccupation ($r = .48, p < .05$). Age was positively correlated with pre-exercise self-classified weight ($r = .56, p < .01$) and post-exercise self-classified weight ($r = .52, p < .05$).

Major Study Questions

Correlations between major study variables were computed. As shown in Table 4, there were several significant correlations between major study variables.

Hypothesis 1. It was hypothesized that eating disorder symptoms would be positively correlated with social physique anxiety. Global EDE-Q score (i.e., weight concerns, restraint, shape concerns, eating concerns) was positively correlated with SPA ($r = .72, p < .01$). SPA was negatively correlated with both pre-exercise appearance evaluation subscale of the body image measure ($r = -.62, p < .01$) and post-exercise appearance evaluation ($r = -.56, p < .01$).

Hypothesis 2. It was hypothesized that appearance-based exercise motivation would be positively correlated with eating disorder symptom level. Appearance-based exercise motivation was not significantly correlated with EDE-Q score ($r = .33, p > .05$).

Hypothesis 3. It was hypothesized that eating disorder symptoms would be negatively correlated with body image. EDE-Q score was negatively correlated with the pre-exercise appearance evaluation subscale of the body image measure ($r = -.60, p < .01$). Surprisingly, EDE-Q score was not significantly correlated with the post-exercise appearance evaluation of the body image measure ($r = -.36, p > .05$). As expected, pre-exercise appearance evaluation and post-exercise appearance evaluation were positively correlated ($r = .77, p < .01$).

Table 2
Descriptive Statistics of Study Variables

Study Variable	<i>M (SD)</i>	Range
Eating Disorder Symptoms ^a		
Global	2.01 (1.44)	.13-4.93
Weight Concerns	2.30 (1.75)	0-5.80
Restraint	2.25 (1.59)	0-5.20
Shape Concerns	2.43 (1.51)	.50-5.13
Eating Concerns	1.06 (1.18)	0-4.40
Body Image ^b		
Pre-Appearance Evaluation	3.34 (.61)	2.29-4.57
Pre-Appearance Orientation	3.54 (.50)	2.50-4.83
Pre-Body Areas Satisfaction	3.41 (.44)	2.22-4.22
Pre-Overweight Preocc.	2.89 (1.00)	1.00-4.75
Pre-Self Classified Weight	3.19 (.72)	2.00-5.00
Post-Appearance Evaluation	3.41 (.70)	2.00-4.57
Post-Appearance Orientation	3.54 (.45)	2.92-4.58
Post-Body Areas Satisfaction	3.53 (.56)	2.56-4.56
Post-Overweight Preocc.	2.74 (1.04)	1.00-4.75
Post-Self Classified Weight	3.12 (.63)	2.00-4.00
Social Physique Anxiety ^c	1.61 (.44)	1.00-2.52
Exercise Motivation ^d		
Weight/Appearance	4.54 (.76)	3.13-6.25
Fitness/Health	5.23 (.91)	3.63-7.00
Stress/Mood	4.52 (1.23)	1.00-6.67
Socializing	4.21 (1.40)	2.00-7.00

Notes. a. The EDE-Q is a Likert-type scale ranging from 0-6 with higher numbers indicating higher levels of eating disorder symptoms. b. The MBSRQ-AS is a Likert-type scale ranging from 1-5 with higher scores on the Appearance Evaluation and Body Areas Satisfaction indicating higher body image while higher scores on Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight are an indication of lower body image. c. The SPAS is a Likert-type scale ranging from 1-5 with higher scores indicating higher levels of SPA. d. The REI is a Likert-type scale ranging from 1-7 with higher scores indicating a specific exercise motivation.

Table 3
Correlations Between Demographic Variables and Major Study Variables

	Age	Frequency of Exercise	Length of Exercise	Total Minutes Exercised
Variable				
EDE-Q Global	.12	.48*	.22	.43
SPAS	.12	.43*	.46*	.58*
REI Exercising Weight/ Appearance	.05	.25	.19	.17
Exercising Fitness/health	-.06	.08	.12	-.06
Exercising Stress/Mood	.04	.29	-.06	.05
Exercising Socializing	-.22	-.02	.04	-.06
MBSRQ-AS Pre-Appearance Evaluation	-.17	-.47*	-.05	-.39
Post-Appearance Evaluation	-.24	-.33	.05	-.24
Pre-Overweight Preoccupation	.01	.51*	.38	.56**
Post-Overweight Preoccupation	.19	.44*	.31	.48*

Note. * $p < .05$. ** $p < .01$.

Table 4

Correlations Between Eating Disorder Symptoms, Social Physique Anxiety, Body Image, and Reasons for Exercise Study Variables

	Global EDE-Q	SPA	Exercising for Weight/Appearance	Pre-Appearance Evaluation	Post-Appearance Evaluation
Global EDE-Q	---	.72**	.33	-.60**	-.36
SPA		---	.29	-.62**	-.56**
Exercising for Weight/Appearance			---	-.24	.10
Pre-Appearance Evaluation				---	.77**
Post-Appearance Evaluation					---

Note. ** $p < .01$.

Preliminary Multiple Regression Analyses

As an exploratory analysis into this dataset, multiple regression analyses were conducted to determine the relationship between eating disorder symptom level and body image after exercise exposure. Social physique anxiety and exercise motivation were tested as mediators in the relationship between eating disorder symptoms and body image following exercise exposure.

According to Baron and Kenny (1986) a variable operates as a mediator to the extent that it accounts for the relationship between a predictor variable and a criterion variable. Thus, a mediator explains the relationship between the predictor and the criterion variable. Baron and Kenny suggest that following conditions are necessary to evaluate mediation: 1. the predictor variable needs to be related to criterion variable, 2. the mediator needs to be related to the predictor variable, 3. the criterion variable needs to be related to the mediator when controlling for the predictor variable.

Before testing the mediator variables, analyses were conducted to determine whether the above preconditions were met. The first precondition was not met (i.e., does the predictor variable relate to the criterion variable). As a control variable, baseline body image was related to post-exercise body image ($r = .77, p < .01$) but the predictor variable of eating disorder symptom level was not related to post-exercise body image ($r = -.36, p > .05$). The second precondition was met (i.e., does the predictor variable relate to the mediator) in the case of social physique anxiety. Baseline body image and eating disorder symptom level were both related to social physique anxiety ($r = -.60, p < .01$; $r = .72, p < .01$) respectively. However, the second precondition was not met (i.e., does the predictor variable relate to the mediator) in the case of exercise motivation. Neither

baseline body image nor eating disorder symptom level were related to exercise motivation ($r = -.24, p > .05$; $r = .33, p > .05$). However, despite the lack of statistical significance, .30 is an acceptable medium effect size (Cohen, 1988) and therefore was retained in the multiple regression model. The third precondition (i.e., the criterion variable needs to be related to the mediator when controlling for the predictor variable) is also a preliminary study question. Thus, the results of these analyses are presented in the next section.

Hypothesis 4. As a secondary purpose, to set the stage for future research, preliminary multiple regression analyses were conducted in order to test the second hypothesis that eating disorder symptom level would predict post-exercise body image scores and that exercise motivation and social physique anxiety would mediate this relationship. EDE-Q scores did not predict post-exercise body image significantly over and above pre-exercise body image, $R^2 = .61, R^2 \text{ change} = .02, F(1, 18) = .75, p = .40$. The multiple regression results suggest that eating disorder symptom level does not account for significant variance in body image scores after exercise.

A hierarchical multiple regression analysis was conducted as part of a preliminary investigation in order to determine whether social physique anxiety predicted decreased body image following exercise beyond baseline body image and eating disorder symptom level. Specifically, the predictor variables of pre-exercise body image (appearance evaluation) and EDE-Q scores (eating disorder symptom level) were entered in the first step and social physique anxiety (SPA) in the second step. Post-exercise body image was the dependent variable. As shown in Table 5, social physique anxiety did not predict post-exercise body image, ($R^2 = .65, R^2 \text{ change} = .04, F(1, 17) = 1.97, p = .18$) beyond

eating disorder symptom level and baseline body image. Thus, social physique anxiety did not account for significant variance beyond baseline body image and eating disorder symptom level.

A hierarchical multiple regression analysis was conducted as part of a preliminary investigation to test whether appearance-based exercise motivation predicted decreased body image following exercise beyond baseline body image and eating disorder symptom level. The predictor variables of pre-exercise body image and EDE-Q scores were entered in step one and exercising for weight and appearance was entered in the second step. The dependent variable was post-exercise body image. As shown in Table 6, exercising for weight and appearance did not predict post-exercise body image ($R^2 = .68$, R^2 change = .07, $F(1, 17) = 3.82$, $p = .07$) beyond eating disorder symptom level and baseline body image. Therefore, preliminary findings suggest that exercising for weight and appearance may not account for significant variance beyond baseline body image and eating disorder symptom level. The regression analyses revealed that the only variable that significantly accounted for variance in post-exercise body image scores was pre-exercise body image accounting for 61% and 57% of the variance in the two above regression analyses respectively.

Table 5

Preliminary Hierarchical Multiple Regression Analyses (with Betas) Examining the Prediction of Post-Exercise Body Image by Baseline Body Image and Eating Disorder Symptom Level (Step 1) and Social Physique Anxiety (Step 2)

Post-Exercise Body Image					
Step	Variable	R ²	R ² Δ	F	β
1	Baseline Body Image	.61***	---	14.1	.87***
	Global EDE-Q	---	---	---	.16
2	Baseline Body Image	---	---	---	.78***
	Global EDE-Q	---	---	---	.33
	SPA	.65	.04	10.6	-.31

Note. *** $p < .001$.

Table 6

Preliminary Hierarchical Multiple Regression Analyses (with Betas) Examining the Prediction of Post-Exercise Body Image by Baseline Body Image and Eating Disorder Symptom Level (Step 1) and Appearance-Based Exercise Motivation (Step 2)

Post-Exercise Body Image					
Step	Variable	R ²	R ² Δ	F	β
1	Baseline Body Image	.61***	---	14.1	.87***
	Global EDE-Q	---	---	---	.16
2	Baseline Body Image	---	---	---	.88***
	Global EDE-Q	---	---	---	.08
	Appearance-Based Exercise Motivation	.68	.07	12.1	.28

Note. *** $p < .001$.

CHAPTER IV

DISCUSSION

The relationship between eating pathology and disturbed body image is well established in the literature (Cooley & Toray, 2001; Gleaves & Eberenz, 1995; Killen et al., 1994; Stice, 2004; Taylor & Altman, 1997). However, questions remain about the influences on body image in women who may be at risk for an eating disorder. Body image and exercise have been studied in conjunction with social physique anxiety. The relationship between social physique anxiety and resulting body image has been demonstrated in past research (Bane & McAuley, 1998; Eklund & Crawford, 1994; Krane et al., 2001). In sum, researchers have found that social physique anxiety is a significant predictor of body image in individuals who exercise (Krane et al., 2001). The relationships between various eating disorder symptom level, body image, and social physique anxiety before and after exposure to exercise have not been examined in the current literature.

The relationship between exercise motivation and body image has been established in the literature (McDonald & Thompson, 1992; Sabiston et al., 2005). Specifically, researchers have found a relationship between appearance-based motivation and poor body image (e.g., Leary, 1992). Individuals who exercise for appearance-based reasons tend to have higher levels of body image disturbance as compared with individuals who exercise for other reasons such as fitness and health (Bane & McAuley,

1998; Sabiston et al., 2005). The literature has not examined the possible relationship between exercise motivation and body image following exposure to exercise in college women exhibiting varying levels of eating disorder symptoms.

Relationships between Demographic Variables and Major Study Variables

Because of the existing literature regarding body image and eating disorder symptoms, it is important to examine factors related to body image. As predicted, body image was negatively correlated with social physique anxiety, with participants who reported lower body image reporting higher social physique anxiety. Consistent with this finding, the literature has demonstrated a relationship between body image and social physique anxiety (Bane & McAuley, 1998; Krane et al., 2001; Sabiston et al., 2005). Pre-exercise body image also correlated negatively with frequency of exercise, as was expected given previous research (Russell & Cox, 2003).

Researchers have found that exercise can have positive effects on body image in healthy individuals (Hausenblas & Fallon, 2006; Tiggemann et al., 2000). However, women with significant eating disorder symptoms may experience decreased body image as a result of exercise (Fox, 2004; Hausenblas & Fallon, 2006; Williams & Cash, 2001; Zucker et al., 1999). Eating disorder symptoms and body image were both related to self-reported frequency of exercise in this study. The total number of minutes exercised per week was related to body image scores such that the more frequent one exercised, the lower one's body image scores were. In addition, the total number of minutes exercised per week was related to higher levels of eating disorder symptoms. Although correlational data is limited by the inability to establish causality, this data suggests that exercise may play a role in eating pathology.

However, several significant correlations between major study variables were very strong. This may be due to content overlap between items on some of the study questionnaires such as the Social Physique Anxiety Scale and the Multidimensional Body Self Relations Questionnaire-Appearance Scales. For instance, item 4 on the MBSRQ-AS is "I constantly worry about being or becoming fat." Item 3 on the SPAS is "I wish I wasn't so worried about how my body looks during exercise." These items are both assessing worrying about one's physique. Well-controlled studies with larger sample sizes are needed to isolate the role of exercise exposure on body image in women with and without significant eating disorder symptoms.

Primary Study Questions: Correlational Relationships between EDE-Q, Social Physique Anxiety, Exercise Motivation, and Body Image

The primary purpose of this study was to determine the relationships between eating disorder symptom level, body image, exercise motivation, and social physique anxiety. It was hypothesized that individuals with higher levels of eating disorder symptoms would report higher levels of social physique anxiety, higher body image dissatisfaction and would be more likely to exercise for weight and appearance-based motivations.

EDE-Q and Social Physique Anxiety (Hypothesis 1). The Eating Disorder Examination Questionnaire, a measure of eating disorder symptoms, was significantly correlated with several study variables. Eating disorder symptoms and social physique anxiety were positively correlated. Individuals with higher levels of eating disorder symptoms were more likely to express concerns with anxiety about the way other's perceived their physical appearance as measured by SPA. Similarly, previous research

has found that eating disorder symptoms are positively correlated with social physique anxiety (Krane et al., 2001; Sabiston et al., 2005). In the current study, eating disorder symptoms also correlated positively with frequency of exercise. Individuals with eating disorders have been found to engage in excessive exercise in an attempt to control their weight (APA, 2000; Hausenblas & Fallon, 2002).

EDE-Q and Exercise Motivation (Hypothesis 2.) Although several relationships from the literature were replicated in current study, the relationship between appearance-based exercise motivation and eating disorder symptom level was not found. In addition, the relationship between exercise motivation and body image dissatisfaction was not found. Exercise motivation has been found to be directly related to body image and indirectly related to eating disorder symptoms (Leary, 1992; McDonald & Thompson, 1992; Eklund & Crawford, 1994; Sabiston et al., 2005), with appearance-based motivation related to more disturbed levels of body image and higher levels of eating disorder symptoms. It may be that the limited variability in exercise motivation contributed to the lack of significant correlations between eating disorder symptoms and exercise motivation. Sabiston et al. (2005) found that the fitness/health subscale of the Reasons for Exercise Motivation was the most frequently cited motivation for why women exercise. This finding was replicated in the current study. It may be that this response is more socially desirable and could contribute to why there was no significant relationship between appearance-based exercise motivation, body image after exercise, and eating disorder symptoms.

Previous research has found that exercising for fitness/health and socializing was not related to body image (McDonald & Thompson, 1992). In the present study, the exercise motivation involving socializing was not significantly related to body image, social physique anxiety, or eating disorder symptom level as expected. In addition, the fitness/health motivation for exercise was not related to social physique anxiety. Surprisingly, motivation to exercise for stress/mood was related to eating disorder symptom level. It may be that endorsing items related to exercising for stress/mood is more socially acceptable. Individuals with eating disorders, anorexia in particular, tend to deny and/or minimize the severity of their disorder (Couturier & Lock, 2006). Individuals may also experience more subjective distress and negative affect as a result of having higher levels of eating disorder symptoms and use exercise as a means of coping. It may be that individuals at risk for an eating disorder also have the tendency to minimize and/or deny their problem, including the use of exercise to compensate for binge eating or to lose weight.

EDE-Q and Body Image (Hypothesis 3.) As expected, participants reported eating disorder symptom level was negatively correlated with pre-exercise body image. That is, as eating disorder symptoms increased, reported body image scores decreased. Previous studies have demonstrated the relationship between eating disorder symptoms and poor body image (Gleaves & Eberenz, 1995; Killen et al., 1994; Stice et al., 1996; Stice, 2003; Taylor & Altman, 1997; Tylka & Subich, 2004) and study findings are consistent with this body of literature. Surprisingly, eating disorder symptom level and post-exercise body image were not significantly correlated. It may be that exercise actually improves body image in women at-risk for an eating disorder. There is literature

to support that exercise is associated with positive body image (Fox, 2004; Hausenblas & Fallon, 2006; Scully et al., 1998). Individuals with serious eating pathology were excluded from the study and it may be that associations between exercise and body image dissatisfaction are captured by this population and not by individuals at risk for an eating disorder. This finding may be a result of confounding variables in the exercise intervention due to the lack of standardization. It may be that because of variation in the exercise intensity, amount, and exposure (e.g., group exercise versus individual exercise), resulted in variations in participant body image. For instance, some participants exercised longer during their exercise intervention. In addition, it was not certain if individuals exercised on the day that baseline assessments of body image were taken. Individuals that did exercise on the day of baseline body image assessments likely had similar body image scores at post-test. This may contribute to the lack of significant correlation between EDE-Q scores and post-exercise body image.

In sum, correlations of study variables found that participants who reported higher levels of eating disorder symptoms also reported further concerns about pre-exercise body image, social physique anxiety, and increased exercise tendencies.

Secondary Study Questions: Preliminary Multiple Regression Analyses

Hypothesis 4. A secondary purpose of the present study was to examine the role of exercise on body image in college women with varying eating disorder symptom levels. Given the sample size in this study, these analyses are exploratory in nature. In order to test the hypothesis that eating disorder symptom level would predict post-exercise body image scores, a preliminary hierarchical multiple regression analysis was conducted. Eating disorder symptom level was not predictive of post-exercise body

image. This finding is consistent with correlation results which showed a significant negative correlation between EDE-Q scores and pre-exercise body image but did not show a significant correlation between EDE-Q scores and post-exercise body image.

It was also hypothesized that social physique anxiety would mediate the relationship between eating disorder symptoms and body image following exercise when controlling for baseline body image. In order to determine if social physique anxiety would mediate the relationship between eating disorder symptoms and body image following exercise beyond baseline body image, a preliminary hierarchical multiple regression analysis was proposed. It is important to note that mean social physique anxiety scores in the present study ($M = 1.61$, $SD = .44$) were lower than the adult norms ($M = 2.71$, $SD = .69$) (Hart et al., 1989). Social physique anxiety was not predictive of body image after exercise beyond eating disorder symptom level and baseline body image. Some of the variables did not meet the preconditions to test for mediation. However, the second precondition was met with eating disorder symptom level and baseline body image (predictor variables) both related to social physique anxiety (mediator). The first condition was partially met with baseline body image (predictor variable) related to post-exercise body image (criterion variable) but with eating disorder symptom level (predictor variable) not related to post-exercise body image. These results are surprising since the literature supports a relationship between social physique anxiety, exercise, and body image (Bane & McAuley, 1998; Sabiston et al., 2005).

Other studies have found that diligent exercise can have negative consequences, particularly among highly critical exercisers, e.g., exercisers high in social physique anxiety (Davis, 1997). There was a significant correlation in the present study between social physique anxiety and body image, consistent with the literature. If the sample size in the present study had been larger, it is possible that the regression analysis could have reached significance. Another factor that may have had implications for the results regarding social physique anxiety is that there may have been limited variability in the clothing that users of the University of Dayton recreational facility were wearing. The UD RecPlex has a dress code which requires patrons to wear more conservative dress including tee shirts and full back shirts. Given the conservative dress code at the RecPlex, participants may have experienced less social physique anxiety than if they were in an environment where patrons wore more revealing clothing.

It was also hypothesized that exercise motivation would mediate the relationship between eating disorder symptoms and body image following exercise beyond baseline body image. Exercise motivation did not account for significant unique variance beyond baseline body image and eating disorder symptom level. Previous studies have found that appearance based motivation may have a negative effect on body image (e.g., McDonald & Thompson, 1992). However, the participants in McDonald & Thompson's study were of a wider age range, 17-35, both male and female, and of a greater sample size. The present sample was limited to a small sample of female undergraduate students. Previous research has demonstrated the relationship between exercising for weight and appearance and body image dissatisfaction as well as the relationship between exercising

for fitness and health reasons and improved body image (Eklund & Crawford, 1994; McDonald & Thompson, 1992).

Exercising for fitness/health reasons was cited most commonly as women's motivation for exercise in the current study, with fewer participants endorsing appearance-based exercise motivation. Studies have shown that exercise motivation has a significant effect on individuals with significant eating pathology (e.g., Hausenblas & Fallon, 2006). It may be that since individuals with clinical eating disorders were excluded from the study, there were not enough remaining participants with significant eating pathology to see an effect of exercise motivation on body image. The largest amount of variance was accounted for by pre-exercise body image which is suggestive of some stability in body image scores.

Study Limitations

When interpreting the results of this study, several limitations should be considered. First, the small sample size is a major limitation of this study, and, greatly reduced the likelihood of finding significant results, should they be present. A power analysis was conducted, assuming a moderate effect size, at .57 power, which is well below the suggested level of .80 (Cohen, 1988). A follow-up study should be conducted with a larger sample size which would afford the study more power. Significant correlations between frequency of exercise and other major study variables such as eating disorder symptoms, SPA, and body image suggest that there were some relationships between the variables that may have been impeded by the low power in this study.

Another limitation to this study is that all participants utilized the same exercise facility, the University of Dayton RecPlex. Because many of the patrons at the RecPlex are college students, the environment might be very different from a community recreational center where people of all ages can join. Young college students may place more emphasis on their appearance when exercising with their peers, and in turn, there may be pressure to look a certain way. Conversely, conservative dress code policies at these facilities may have an effect on how much college students compare the way they look with their peers while exercising. The social milieu of different exercise facilities may differ greatly in this respect. For instance, college women exercising at a community exercise facility may not feel as much pressure to look attractive while exercising because they may not be surrounded by as many peers. Future research should examine characteristics of different exercise facilities and types of exercise (e.g. group fitness) to see the effect of exercise on body image.

The sole use of self-report measures for data collection is another study limitation. Although self-report measures are helpful in providing important insight into subjective perceptions of study participants, it is possible that demand characteristics effected participant responses. Given that some of the questions in the self-report questionnaires were very sensitive, the secretive nature of eating pathology, and the shame some individuals feel as a result of their eating and body-image concerns, participants who were "at risk" for an eating disorder may have been embarrassed to admit the extent of their symptoms and/or may have been motivated to present themselves in a more favorable manner. In the present investigation, candid responses were encouraged by keeping all questionnaires confidential and by using study identification numbers as

opposed to names on all questionnaires. Regardless, there may have been underreporting of social physique anxiety, body image, and eating disorder symptomatology, and overreporting of amount of exercise.

Another study limitation was that the exercise intervention was not completely standardized. For instance, participants had to exercise at least two days per week for at least 45 minutes. Since there were no upper limits to exercise frequency and duration, participants were diverse in this respect, with reports ranging from 60-480 minutes of exercise per week. Also, it was not certain whether baseline assessments of body image were completed on a day when participants had not been exercising. If participants had exercised recently prior to the pre-test, this may have confounded post-test body image results. Also, participants were asked to exercise for a minimum of 45 minutes but were given no limit. It is unknown precisely how long each participant exercised during the intervention, another limitation to the study. In addition, the type of exercise that participants engaged in varied. For instance, individuals engaging in aerobic exercise may differ greatly from individuals who lift weights or participate in a sport.

Suggestions for Future Research

Future research should use a larger, more diverse sample so that there would be increased variability in EDE-Q scores providing more participants in the “at-risk” range. In addition, because body image tends to be a fairly stable construct, longitudinal studies with multiple data points should be conducted so that they may be able to better detect changes in body image over time as a result of exercise exposure, exercise motivation, and social physique anxiety. Also, the use of the EDE (Eating Disorder Examination), the interview version of the EDE-Q may increase accuracy of reporting. Modification of

some items of the EDE-Q may also encourage more accurate endorsement, although no studies have demonstrated that asking questions in a different way can decrease minimization and denial (Couturier & Lock, 2006). Measuring the physiological symptoms (e.g., electrodermal activity, cortisol levels) of anxiety during exercise may make the assessment of social physique anxiety more objective subsequently decreasing demand characteristics.

Future research should attempt to standardize the exercise intervention. For instance, participants should exercise for the same amount of time each week. Also, it is important to ensure that pre-exercise body image is assessed at a time when participants have not been exercising to better determine baseline body image. In addition, using multiple data collection points is recommended. For example, assessing initial body image, and then assessing body image after exercising on more than one occasion would give a more comprehensive evaluation of individuals' body image. Finally, it is recommended that future research examines the differences in various exercise facilities, including demographics of the facilities, dress codes, and types of exercise.

In summary, eating disorder symptom level was found to be related to social physique anxiety and to pre-exercise body image. However, a relationship between eating disorder symptom level and exercise motivation was not found in the current study. In the preliminary analyses, eating disorder symptom level did not account for significant unique variance in post-exercise body image beyond baseline body image. In addition, preliminary multiple regression analyses suggested that social physique anxiety and exercise motivation did not account for significant unique variance in post-exercise body image when controlling for baseline body image and eating disorder symptom level.

Given the small sample size, the range of eating disorder symptom level was restricted as well.

Future research should examine social physique anxiety and exercise motivation as mediating variables on body image after exercise in eating disorder populations and “at risk” populations. In addition, comparing various exercise facilities and how the exercise environment effects body image and SPA should be determined. The correlational results as well as the near significant results of Table 4 allude to the possible mediating effects of SPA on eating disorder symptom level, exercise, and subsequent body image that warrant further research. College women with eating disorder symptoms may experience decreases in body image as a result of exercise exposure and social physique anxiety and exercise motivation may mediate this relationship, but a larger sample size is necessary to determine these relationships.

The relationship between body image and eating disorder symptoms is well replicated in the literature (Gleaves & Eberenz, 1995; Killen et al., 1994; Stice, 2003). With larger sample sizes and some adjustments to methodology, the present study may be built upon to better understand the relationship between exercise and body image in healthy women and women at-risk for an eating disorder. With a better understanding of the factors that effect body image, we can learn more about the relationship between body image and the etiology and maintenance of eating disorders. The current study addressed several important questions although, it was preliminary, and questions remain regarding the relationship between exercise and body image in individuals with various levels of eating pathology.

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Appendix A

Demographics Questionnaire

1. What is your date of birth? _____
2. What is your ethnicity?
 1. African-American
 2. Asian-American
 3. Caucasian
 4. Hispanic
 5. Native American
 6. Other _____ (Please specify)
3. What is your family's annual household income?
 1. Under \$25,000
 2. \$25,000-\$35,000
 3. \$35,000-\$50,000
 4. \$50,000-\$75,000
 5. \$75,000-\$100,000
 6. Over \$100,000
4. What is your status at UD?
 1. Freshmen
 2. Sophomore
 3. Junior
 4. Senior
5. How often do you go to the RecPlex to exercise?
 1. Never
 2. Once a month
 3. Once a week
 4. Twice a week
 5. Three times a week
 6. More than three times a week
6. When was the last time you were at the RecPlex?

7. How long do you typically exercise at the RecPlex? _____
8. In a typical week, what activities do you do while at the RecPlex? Note how many times per week you participate.

1. Group fitness classes _____
2. Weight training (other than group classes) _____
3. Cardiovascular training (other than group classes) _____
4. Swimming _____
5. Circuit training _____
6. Indoor sports _____
7. Indoor climbing _____

9. Do you play a sport?

1. Yes
2. No

10. If so what sport/sports do you play and how often do you play?

11. Do you participate in other exercise outside of the RecPlex?

1. Yes
2. No

12. If so what type of exercise do you engage in and how many times per week?

Appendix B

EDE-Q (Fairburn & Beglin, 1994)

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days). Please read each question carefully and circle the appropriate number. Please note that the scales may change.

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS...:

1. ...Have you been consciously trying to restrict the amount of food you eat to influence your shape or weight?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

2. ...Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

3. ...Have you attempted to avoid eating any foods which you like in order to influence your shape or weight?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

4. ...Have you attempted to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or, rules about what or when you should eat?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

5. ...Has thinking about food or its calorie content interfered with your ability to concentrate on things you are interested in: for example, read, watch TV or follow a conversation?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

6. ...Have you had a definite fear that you might not be able to either resist eating or stop eating?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

7. ...Have you experienced a sense of loss of control over eating?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

8. ...Have you had any episodes of binge-eating?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

9. ...Have you eaten in secret? (Do not count binges.)

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

10. ...Have you had a definite desire for your stomach to be flat?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

11. ...Have you had a definite desire for your stomach to feel empty?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

12. ...Has thinking about shape or weight interfered with your ability to concentrate on things you are interested in: for example, read, watch TV or follow a conversation?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

13. ...Have you had a definite fear that you might gain weight or become fat?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

14. ...Have you felt fat?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

15. ...Have you had a strong desire to lose weight?

No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	everyday
1	2	3	4	5	6	7

16. ...On what proportion of times that you have eaten have you felt guilty because of your shape or weight? (Do not count binges.)

Never	A few times	Less than half	Half	More than half	Most times	Always
1	2	3	4	5	6	7

17. Have there been times when you have eaten what most people would regard as an unusually large amount of food.

No Yes

1 2

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

1-2 episodes 3-4 episodes 5-6 episodes 7-8 episodes 9 or more episodes

1 2 3 4 5

19. During how many of these episodes of overeating did you have a sense of having lost control?

1-2 episodes 3-4 episodes 5-6 episodes 7-8 episodes 9 or more episodes

1 2 3 4 5

20. Have you had other episodes of eating in which you have had a sense of having lost control, but have not eaten an unusually large amount of food? (Please circle)

No Yes

1 2

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

1-5 episodes 6-10 episodes 11-15 episodes 16 or more episodes

1 2 3 4

22. Over the past four weeks, have you made yourself sick (vomit) as a means of controlling your weight, or to counteract the effects of eating?

No Yes

1 2

23. On how many days of the last 28 have you done this?

No days 1-5 days 6-12 days 13-15 days 16-22 days 23-27 days everyday

1 2 3 4 5 6 7

24. Over the past four weeks, have you taken laxatives as a means of controlling your shape or weight or to counteract the effects of eating? (Please circle)

No Yes

1 2

25. On how many days of the last 28 have you done this?

No days 1-5 days 6-12 days 13-15 days 16-22 days 23-27 days everyday

1 2 3 4 5 6 7

26. Over the past four weeks, have you taken diuretics (water tablets) as a means of controlling your shape or weight or to counteract the effects of eating? (Please circle)

No Yes

1 2

27. On how many days of the last 28 have you done this?

No days 1-5 days 6-12 days 13-15 days 16-22 days 23-27 days everyday

1 2 3 4 5 6 7

28. Over the past four weeks, have you vigorously exercised as a means of controlling your weight, altering your shape or your amount of fat, or burning off calories? (Please circle)

No Yes

1 2

29. On how many days of the last 28 have you done this?

No days 1-5 days 6-12 days 13-15 days 16-22 days 23-27 days everyday

1 2 3 4 5 6 7

OVER THE PAST FOUR WEEKS (28 DAYS)...

30. ...Has your weight influenced how you think about (judge) yourself as a person?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

31. ...Has your shape influenced how you think about (judge) yourself as a person?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

32. ...How much would it distress you if you had to weigh yourself once a week or more for the next four weeks?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

33. ...How dissatisfied have you felt about your weight?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

34. ...How dissatisfied have you felt about your shape?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

35. ...How thin have you wanted to be?

Not at all		Slightly		Moderately		Markedly
1	2	3	4	5	6	7

36. ...How concerned have you been about other people seeing you eat? (only mark 4, 5, or 6 if you have avoided some occasions.)

Not at all Slightly Moderately Markedly

1 2 3 4 5 6 7

37. ...How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower? (only mark 4, 5, or 6 if you have avoided some occasions.)

Not at all Slightly Moderately Markedly

1 2 3 4 5 6 7

38. ...Have the past four weeks been representative of the past year?

No Yes

1 2

Appendix C
The Multidimensional Body Self Relations Questionnaire-Appearance Scales
MBSRQ-AS (Cash, 1990)

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally. There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

- 1. Definitely Disagree**
- 2. Mostly Disagree**
- 3. Neither Agree nor Disagree**
- 4. Mostly Agree**
- 5. Definitely Agree**

- _____ 1. Before going out in public, I always notice how I look.
- _____ 2. I am careful to buy clothes that will make me look my best.
- _____ 3. My body is sexually appealing.
- _____ 4. I constantly worry about being or becoming fat.
- _____ 5. I like my looks just the way they are.
- _____ 6. I check my appearance in a mirror whenever I can.
- _____ 7. Before going out, I usually spend a lot of time getting ready.
- _____ 8. I am very conscious of even small changes in my weight.
- _____ 9. Most people would consider me good-looking.
- _____ 10. It is important that I always look good.
- _____ 11. I use very few grooming products.
- _____ 12. I like the way I look without my clothes on.
- _____ 13. I am self-conscious if my grooming isn't right.
- _____ 14. I usually wear whatever is handy without caring how it looks.
- _____ 15. I like the way my clothes fit me.
- _____ 16. I don't care what people think about my appearance.
- _____ 17. I take special care with my hair grooming.
- _____ 18. I dislike my physique.
- _____ 19. I am physically unattractive.
- _____ 20. I never think about my appearance.
- _____ 21. I am always trying to improve my physical appearance.
- _____ 22. I am on a weight-loss diet.

For the remainder of the items use the response scale given with the item, and enter your answer in the space beside the item.

_____ 23. I have tried to lose weight by fasting or going on crash diets.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very Often

_____ 24. I think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

_____ 25. From looking at me, most other people would think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

26-34. Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are with each of the following areas or aspects of your body:

- 1. Very Dissatisfied**
- 2. Mostly Dissatisfied**
- 3. Neither Satisfied Nor Dissatisfied**
- 4. Mostly Satisfied**
- 5. Very Satisfied**

_____ 26. Face (facial features, complexion)

_____ 27. Hair (color, thickness, texture)

_____ 28. Lower torso (buttocks, hips, thighs, legs)

_____ 29. Mid torso (waist, stomach)

_____ 30. Upper torso (chest or breasts, shoulders, arms)

_____ 31. Muscle tone

_____ 32. Weight

_____ 33. Height

_____ 34. Overall appearance

Appendix D
Social Physique Anxiety Scale
SPAS (Martin, Rejeski, Leary, McAuley, & Bane, 1997)

- 1. Not at all true of me**
- 2. Slightly true of me**
- 3. Moderately true of me**
- 4. Very true of me**
- 5. Extremely true of me**

1. I am comfortable with how my body looks during exercise.
2. I would never worry about wearing clothes that might make me look too thin or too Overweight while exercising.
3. I wish I wasn't so worried about how my body looks during exercise.
4. Sometimes I worry that other people don't like how my body looks during exercise.
5. When I look in the mirror while exercising, I feel good about my body.
6. I worry that there are parts of my body that people may not like while I exercise.
7. When I am with other people during my exercise session, I am nervous about my body.
8. I am comfortable with how healthy my body appears to other people while at the RecPlex.
9. It would make me uncomfortable to know that other people were judging my body at the RecPlex.
10. I am a shy person and I don't like other people looking at my body while exercising.
11. I usually feel relaxed when it is obvious that other people are looking at my body while exercising.
12. When I wear a bathing suit, I often feel nervous about the shape of my body.

Appendix E
The Reasons for Exercise Inventory
REI (Silberstein et al., 1988)

Please respond to the following items as honestly as possible. To what extent is each of the following an important reason that you have for exercising? Use the scale below, ranging from 1 to 7, in giving your answers.

1. 2. 3. 4. 5. 6. 7.

**Not at all
Important**

**Moderately
important**

**Extremely
important**

Weight Control

1. To be slim
2. To lose weight
3. To maintain my current weight

Fitness

4. To improve my muscle tone
5. To improve my strength
6. To improve my endurance
7. To improve my flexibility, coordination

Mood

8. To cope with sadness, depression
9. To cope with stress, anxiety
10. To increase my energy level
11. To improve my mood

Health

12. To improve my cardiovascular fitness
13. To improve my overall health
14. To increase my resistance to illness and disease
15. To maintain my physical well-being

Attractiveness

16. To improve my appearance
17. To be attractive to members of the opposite sex
18. To be sexually desirable

Enjoyment

19. To meet new people
20. To socialize with friends
21. To have fun

Tone

- 22. To redistribute my weight
- 23. To improve my overall body shape
- 24. To alter a specific area of my body

Appendix F
Informed Consent

Informed consent to participate in a research project

Project Title: Exercise and Eating Habits

Investigator(s): Claire M. Peterson, B.A.
Keri Brown Kirschman, Ph.D.

Description of Study: In the following study you will be asked to respond to questions about your eating habits, your body shape, and reasons why you participate in exercise. You will be asked to participate in your typical physical exercise at the University of Dayton RecPlex. Following exercise, you will be asked to answer some questions about your body shape and reasons why you participate in exercise.

Adverse Effects and Risks: There are no expected risks involved although when participating in physical activity there is always some chance for physical injury. Risks associated with physical activity include muscle aches, pulled muscles, sprains, dehydration, exhaustion, and even death.

Duration of Study: This study will take approximately 90 minutes for the pre-exercise and
and post-exercise and 45 minutes for the exercise component.

Confidentiality of Data: Only the researchers involved in the study will have access to the data and student numbers will be used to help preserve confidentiality. If you have questions about your rights as a participant or to report an ethical issue with this study please contact the Chair of the Research Review and Ethics Committee:

Dr. Greg Elvers
(937)229-2171
Greg.elvers@notes.udayton.edu

Contact person: Claire M. Peterson, B.A. (e-mail) peterscl@notes.udayton.edu
(phone) (859)803-1158

Keri Brown Kirschman, Ph.D. (e-mail) kirschke@notes.udayton.edu
(phone) (937)229-5404
(office) SJ301

**Consent to
Participate:**

I have voluntarily decided to participate in this study. The investigator named above has adequately answered any and all questions I have about this study, the procedures involved, and my participation. I understand that the investigator named above will be available to answer any questions about research procedures throughout this study. I also understand that I may voluntarily terminate my participation in this study at any time and still receive full credit. I also understand that the investigator named above may terminate my participation in this study if s/he feels this to be in my best interest. In addition, I certify that I am 18 (eighteen) years of age or older.

Signature of Student	Student's Name (printed)	Date
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Signature of Witness	Date
----------------------	------

Appendix G
Debriefing Form

Information about the Study: In this study, you were asked to fill out surveys about your eating habits, your feelings about your body image, and reasons why you exercise. You also participated in exercise at the University of Dayton RecPlex. We are interested in seeing if there is an effect of exercise on body image in college women. In this study, the hypothesis is that women with more disordered eating habits are more likely to have poor body image. In addition, it may be that their body image is even worse after exercising. Because of pressure to be thin, it may be that exercising can actually make one more conscious of their physical appearance, resulting in negative feelings about one's body. Women who are more aware of how others perceive their bodies may be especially prone to decreased body image after exercise. Also, it is hypothesized that exercise motivation may have an effect on body image. It may be that women who exercise to change the way they look have greater decreases in body image after exercise.

Assurance of Privacy: Only the researchers involved in the study will have access to all research materials. In addition, student numbers will be used to help preserve confidentiality. If you have questions about your rights as a participant or to report an ethical issue with this study please contact the Research Review and Ethics Committee:

Dr. Greg Elvers
(937)229-2171
Greg.elvers@notes.udayton.edu

Contact Information: If you have further questions about the study please contact:

Claire M. Peterson
(phone) (859)803-1158
(e-mail) cmpete2@yahoo.com

or **Keri Brown Kirschman, Ph.D.**
(phone) (937) 229-5404
(e-mail) kirschke@notes.udayton.edu
(office) SJ301

There may be some items asking about attitudes or behaviors that you endorsed that may warrant further attention. For example, the Multidimensional Body Self Relations Questionnaire addresses concerns with body image. Question four asks, "I constantly worry about being or becoming fat." Other items warranting further attention include, "I dislike my physique," "I am on a weight-loss diet," and "I am always trying to improve my physical appearance." Endorsing these items may indicate a preoccupation with weight or body image. Another example is "I have tried to lose weight by fasting or going on crash diets." This item may be indicative of poor eating habits. If many of the above items were endorsed it may be an indication of a problem with a preoccupation with weight and even disordered eating. If you have any concerns about any of the behaviors that we asked you about in the surveys, we encourage you to contact the Counseling Center.

**Gosiger Hall
300 College Park
Dayton, OH 45469
(937) 229-3141**

If you experienced any type of physical injury from this study please contact your physician or the University of Dayton Student Health Center:

**Gosiger Hall
300 College Park
Dayton, OH 45469
(937) 229-3131**

Thanks and Credit: Thank you very much for your participation in the study. It would not be possible to continue psychological research without the help of research volunteers. We expect the results to be analyzed at the end of the semester, so please feel free to contact us if you would like to know the results.

References: If you would like to learn more about the topic we are studying the following references might be helpful:

Eklund, R. C., & Crawford, S. (1994). Active women, social physique anxiety, and exercise. *Journal of Sport and Exercise Psychology*, 16, 431-448.

McDonald, K., & Thompson, J. K. (1992). Eating disturbance, body image dissatisfaction, and reasons for exercising: Gender differences and correlational findings. *International Journal of Eating Disorders*, 11, 3, 289-292.

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