Disordered eating among collegiate female athletes: the role of athletic seasonal status and self-objectification

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DISORDERED EATING AMONG COLLEGIATE FEMALE ATHLETES: THE ROLE OF ATHLETIC SEASONAL STATUS AND SELF-OBJECTIFICATION

By

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ABSTRACT

Over the past several decades there has been a significant increase in attention to the eating related beliefs and behaviors of female college athletes, particularly in determining whether certain subgroups of athletes are at greater risk than others. At seemingly greatest risk for eating disorders are athletes involved in sports where leanness is emphasized or a thin physique is required for performance or aesthetics. However, it remains unclear if differences exist between aesthetic lean and non-aesthetic lean sport athletes. It is possible that seasonal status is associated with the transience of eating disorder symptoms and the motivation to engage in eating disordered behaviors.

The purpose of this study is to examine the differences in eating disorder symptoms and diagnoses across three groups of athletes (i.e., aesthetic lean, non-aesthetic lean, and non-lean). Second, this study examined changes in eating disorder symptoms and diagnoses across athletic seasonal status. Finally, level of self-objectification was expected to mediate these between-sport relationships.

Participants were 282 female athletes from 14 American universities. Participants completed measures of eating disorder diagnoses, general and athlete-specific eating disorder symptoms, and self-objectification in and out of the athletic season. In the test of sport differences, results revealed that non-aesthetic lean sport athletes reported fewer athlete-specific eating disorder symptoms than the other two groups during the athletic season. Further, non-lean sport athletes reported more athlete-specific eating disorder symptoms at both time points. When examining the effect of seasonal status, athletes reported fewer eating disorder symptoms during the athletic season than in the off-season.
These results have important clinical implications. Because of the expectation that lean individuals are at greatest risk for the development of eating disorders, non-lean sport athletes may not be receiving the attention and treatment needed to improve their eating attitudes and behaviors. For lean-sport athletes, it is important for clinicians and coaching staff members to understand the drive and methods for obtaining and maintaining a low body weight. Finally, increases in disordered eating during the off-season could have significant ramifications, specifically that disordered eating behaviors and eating disorders may be overlooked due to the timing of the screening and coaching staff supervision.
Chapter I

Introduction

Eating disorders represent an important risk to the mental and physical health of college-aged women in the United States. Although epidemiological studies have found that anorexia affects .5% and bulimia affects 1-3% of the female population in general (American Psychiatric Association, 2000), rates among college students appear higher. In fact, prevalence rates of clinical eating disorders in college-age women range from 1.0% to 4.2% for anorexia and 1.0% to 6.5% for bulimia (Mintz, O’Halloran, Mulholland, & Schneider, 1997; Pope, Hudson, Yurgelun-Todd, & Hudson, 1984; Pyle, Halvorson, Neuman, Mitchell, 1986; Striegel-Moore et al., 2003). An even greater percentage (60%) of college women report engaging in disordered eating behaviors, such as chronic dieting and binge eating (Mintz & Bentz, 1988). In fact, in a sample of high school and college females, many participants reported skipping meals (59%), eating less than 1200 calories a day (37%), eliminating fats (30%) and carbohydrates (26.5%) from their diets, and fasting for more than 24 hours (26%) (Tylka & Subich, 2002). Although the majority of dieters will not develop an eating disorder, a study of first-year college women found that 15% of those identified as “at risk” in the fall semester moved into the probable bulimia category by the spring semester (Drewnowski, Yee, Kurth, & Krahn, 1994).

Over the past several decades there has been a significant increase in attention to the eating related beliefs and behaviors of female college athletes. Athletes represent a unique population with regards to disordered eating because they experience a greater need to maintain a healthy lifestyle due to the physical demands of their sport. However, many athletes engage in disordered eating behaviors, often in order to maintain a specific
weight. A number of studies have demonstrated that athletes are at an increased risk for the development of eating disorders, including anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (ED-NOS) (Smolak, Murnen & Ruble, 2000; Sundgot-Borgen & Larsen, 1993). Specifically, research examining the prevalence of eating disorders among female athletes has found the pervasiveness of anorexia and bulimia to be as high as 2.9% and 9.2%, respectively (Johnson, Powers, & Dick, 1999). In one of the most rigorous studies to date, Sundgot-Borgen (1993) surveyed 522 elite female athletes in the Norwegian Confederation of Sports using a combined self-report and interview format. Results indicated that a significantly higher number of athletes (18%) than non-athlete controls (5%) had suffered from an eating disorder.

Several studies indicate that athletes who do not meet criteria for a diagnosable eating disorder still tend to score higher on various measures of eating disorder symptomatology than non-athletes. For example, Sundgot-Borgen and Larsen (1993) examined the use of pathogenic weight-control methods among female elite athletes and non-athletic controls and found that significantly more athletes (11%) than controls (7%) used pathogenic weight-control methods (e.g., laxative use, diet pills, and dieting). Athletes also reported different reasons for dieting than the controls. While the controls reported dieting to improve their appearance, the athletes generally reported dieting to enhance performance. Further, dieting athletes were found to be more likely than dieting controls to use pathogenic weight-control methods. Similarly, Rosen, McKeag, Hough, and Curley (1986) examined 182 female collegiate athletes to determine the prevalence of pathogenic weight control methods, and found that 32% of participants practiced at least one pathogenic weight control behavior on a daily basis. More specifically, regular
use of diet pills occurred in 25% of the participants and 14% and 16% engaged in self-induced vomiting and laxative abuse, respectively.

Although a good deal of research supports the idea that athletes are at a greater risk than non-athletes for the development of an eating disorder, this research is not unequivocal. For example, Marten, DiBartolo, and Shaffer (2002) found that female athletes had fewer eating disorder symptoms and less body image disturbance than non-athletes, while Sanford-Martens, Davidson, Yakushko, and Martens (2005) found no differences between athletes and non-athletes in terms of likelihood of experiencing a clinical or “subclinical” eating disorder. Perhaps the most authoritative research on the topic comes from a meta-analysis of 92 studies comparing eating disorder symptoms between athletes and non-athletes (Hausenblas & Carron, 1999). Results of this study revealed significant, although small, effect sizes indicating that female athletes self-reported more bulimic ($g = .16$) and anorexic ($g = .12$) symptomatology than non-athletes. However, female athletes did not demonstrate a greater drive for thinness than non-athletes, a core component of eating disorders. Therefore, although female athletes in general are at greater risk than non-athletes for various eating disordered behaviors, the magnitude of the risk may be relatively small.

**Lean Versus Non-Lean Sports**

In addition to the issue of whether athletes are at higher risk for the development of eating disorders than non-athletes is the question of whether certain subgroups of athletes are at greater risk than others. At seemingly greatest risk for eating disorders are athletes involved in sports where leanness is emphasized or a thin physique is required for performance or aesthetics (Books-Gunn, Burrow, & Warren, 1988; Davidson,
Earnest, & Birch, 2002; Garner, Olmsted, Polivy, & Garfinkel, 1987). For example, Sundgot-Borgen and Larsen (1993) found that, overall, a similar proportion of female athletes and non-athletes were classified as being at risk of developing eating disorders. However, when examining only the athletes involved in sports in which leanness or a specific weight is considered important, a higher proportion of athletes than non-athletes were considered to be at risk of developing an eating disorder.

At least two meta-analyses have examined the specific differences in eating disordered behaviors among athletes participating in different types of sports. Hausenblas and Carron (1999) examined the differences between aesthetic (e.g., figure skating), endurance (e.g., running), and ball-game (e.g., soccer) sports and found that athletes in aesthetic sports reported greater drive for thinness ($g = 0.09$) than ball-game athletes and greater anorexic symptomatology ($g = 0.38$) than both endurance athletes ($g = -0.04$) and ball-game athletes ($g = -0.17$). However, the groups did not differ on measures of bulimic symptomatology. Smolak, Murnen, and Ruble (2000) also conducted a meta-analysis of 34 studies examining the relationship between female athletes and eating problems. When compared to non-athletes, elite athletes who participated in lean sports (i.e., sports where a low body weight is important for athletic success; e.g., gymnastics, running) were found to be at increased risk for the development of eating problems ($d = .52$). The authors concluded that athletes participating in lean sports, dancers, and athletes competing at an elite level were most at risk for the development of an eating disorder.

**Differences within Lean Sport Groups**

Although evidence exists to suggest that lean sport athletes may be at greater risk for the development eating disorders than non-lean sport athletes, it remains unclear if
differences exist between different types of lean sport athletes. Specifically, the eating beliefs and behaviors of athletes involved in lean sports in which low body weight is deemed central to performance for aesthetic purposes (aesthetic lean sports: e.g., figure skating) may differ in some fundamental ways from athletes involved in lean sports in which low body weight is deemed central for performance purposes (non-aesthetic lean sports: e.g., cross-country running). While athletes in both sport types are under pressure to maintain a low body weight, aesthetic lean sports have unique elements in that they tend to involve subjective judgment of others to determine athletic success and tend to require tight fitting, feminine attire. Current research that has examined these groups separately has resulted in inconsistent findings. Hulley and Hill (2001) surveyed elite female distance runners and found that runners were at increased risk for eating disorders when compared to national norms. However, Warren, Stanton, and Blessing (1990) examined competitive female athletes to identify risk of disordered eating patterns and found that competitive female cross-country runners were at slightly less risk for body dissatisfaction than the non-athletes, whereas competitive female gymnasts were at greater risk for weight preoccupation.

One factor that may lead to differences between these two groups of athletes is the level of internalization of messages related to low weight demands and body objectification. Fredrickson and Roberts (1997) proposed objectification theory to understand the consequences of being female in a society that sexually objectifies the female body. This theory posits that as a result of the pervasiveness of sexual objectification in our culture, women internalize these objectifying messages and, at some level, treat themselves as objects to be looked at and evaluated. This theory
maintains that as the internalization of objectifying messages increase, so too does one’s risk of developing depression, sexual dysfunction, and eating disorders.

Sexual objectification occurs when a woman’s body is separated from her identity as a person and reduced to the status of a mere instrument (Fredrickson & Roberts, 1997). Although objectification theory assumes that all women internalize this objectification of their bodies at some level, the extent to which women self-objectify is largely context dependent and some groups are at greater risk than others (Fredrickson & Roberts, 1997). Of particular interest to the current study is the difference in level of self-objectification in different groups of lean sport athletes. While non-aesthetic lean sport athletes tend to experience pressure to be thin to enhance objective performance (e.g., a higher strength to weight ratio increases speed in endurance runners), aesthetic lean sport athletes tend to experience pressure to be thin to gain the subjective approval of others (e.g., judges). According to self-objectification theory, aesthetic lean sport athletes likely have greater levels of self-objectification and may be at greater risk for engaging in disordered eating behaviors.

Seasonal Status

Another unanswered question regarding eating disordered behaviors and lean sport athletes is the effect of seasonal status (i.e., in- versus off-season). It is possible that seasonal status is associated with the transience of eating disorder symptoms and the motivation to engage in eating disordered behaviors. Johnson and Tobin (1991) discuss the importance of considering the context and pattern of behavior before determining whether the behavior is pathological. Among athletes the training demands associated with seasonal status may be an important contextual variable. Theoretically, those who
meet clinical diagnostic criteria for an eating disorder should not experience transient symptoms across seasonal status. In contrast, some athletes may engage in various eating disordered behaviors during their competitive season due to the environmental pressures associated with their sport, but such symptoms may dissipate during the off-season.

To date, minimal research has been done examining the influence of seasonal status on disordered eating behaviors of athletes. One study by Dale and Landers (1999) began to address this issue. They acknowledged the behavioral similarities between wrestlers and individuals suffering from bulimia and examined whether an increased risk of bulimia existed for wrestlers. The Eating Disorder Inventory (EDI) was administered to a group of junior high and high school wrestlers both in and out of the athletic season and to a group of non-wrestlers. Results indicated that there were no significant differences between the number of in-season wrestlers and non-wrestlers classified as at-risk for bulimia. However, significant differences did exist on the Drive for Thinness subscale between in-season wrestlers and non-wrestlers, and between in-season wrestlers and off-season wrestlers. Although a significant difference was demonstrated between in-season wrestlers and non-wrestlers, the same wrestlers tested off-season did not differ significantly from non-wrestlers. The authors concluded that the concerns of the wrestlers are transient, which is not characteristic of an eating disorder. Other related literature has demonstrated the relationship between seasonal status and health-related behaviors among intercollegiate athletes. For example, Martens, Dams-O’Connor, and Duffy-Paiement (2006) assessed for off- versus in-season differences in alcohol consumption among a sample of intercollegiate athletes and found that college athletes’ drinking and negative alcohol-related consequences decreased during their competitive season.
It is proposed that a significant increase in disordered eating behaviors during the athlete’s competitive season would not correlate with a significant increase in the formal diagnoses of eating disorders among all athletic sport types. This change of eating disorder symptoms with seasonal status would support the notion that these unhealthy eating behaviors are not indicative of an eating disorder, but rather are risks primarily to the athletes’ physical health. Understanding the risks associated with various sport types to physical and mental health has significant implications for prevention and treatment issues.

The Present Study

The main purpose of the present study is twofold. First, this study will examine the differences in eating disorder symptoms and diagnoses across three groups of athletes (i.e., aesthetic lean sport athletes, non-aesthetic lean sport athletes, and non-lean sport athletes). It is hypothesized that the proportion of aesthetic lean sport athletes who meet criteria for eating disorder diagnoses will be greater than non-aesthetic lean sport athletes or the comparison group. It is also hypothesized that eating disorder symptoms will be greater for both groups of lean sports than for the control group. Second, this study will examine changes in eating disorder symptoms and diagnoses across athletic seasonal status. It is hypothesized that the incidence of eating disorder diagnoses will remain stable regardless of seasonal status, but that eating disorder symptoms will increase in the athletic season. It is also hypothesized that increases in symptoms will be greater for non-aesthetic lean sport athletes and the comparison group than for aesthetic lean sport athletes. Level of self-objectification is expected to mediate these between-sport relationships.
Chapter II

Review of the Literature

In order to provide a background and context for the proposed study, this chapter will review the literature relevant to eating disorders and athletes. First, the prevalence and significance of eating disorders will be discussed, followed by a review of the literature examining female college athletes as a population at increased risk. Next, a brief review of the differences between various subgroups of athletes will be presented, with subsections focusing on lean vs. non-lean sport differences and differences within lean sports athletes. Differences between athletes groups will be explored in two ways. Existing literature on the effect of athletic seasonal status on changes in athlete health behaviors will be presented. Finally, objectification theory will be offered as a possible explanation for the proposed differences in eating disorder symptoms and diagnoses among athletes. Relevant empirical support will be presented.

Prevalence of Eating Disorders

Eating disorders, such as anorexia nervosa and bulimia, have been found to affect .5% and 1-3% of the female population, respectively, in the United States (American Psychiatric Association, 2000). The average age of onset for these disorders is approximately 18 years old, with women representing 90% of the diagnoses (American Psychiatric Association, 2000). Eating disorders are most common in college-educated women from middle- and upper-class families, and the prevalence has been found to be directly related to the degree of westernization of the country (Johnson & Tobin, 1991). This suggests that the disorders are highly affected by socio-cultural factors. College women may be particularly susceptible to the development of these disorders, given that
entrance into college is a time of adjustment to a new environment with less adult
guidance and higher academic demands (Kirk, Singh, & Getz, 2001).

Numerous studies have supported the notion that college-aged women may be at
increased risk for the development of eating disorders. Epidemiological investigations
reporting prevalence rates of clinical eating disorders in college-age women range from
1.0% to 4.2% for anorexia and 1.0% to 6.5% for bulimia (Mintz, O’Halloran,
Mulholland, & Schneider, 1997; Pope, Hudson, Yurgelun-Todd, & Hudson, 1984; Pyle,
Halvorson, Neuman, Mitchell, 1986; Striegel-Moore et al., 2003). A much higher
percentage of college women do not meet criteria for eating disorders, but report
engaging in disordered eating behaviors (e.g., 61%; Mintz & Bentz, 1988). Rates for
fasting, binge eating, purging, and use of diet pills, laxatives, and diuretics to lose weight
have been found to range from 1.4% for laxative use to 26% for fasting in college women

The relatively common use of disordered eating behaviors appears to represent a
somewhat normative discontent with body weight and shape in the female college
population (Thompson, 1990). That is, women’s dissatisfaction with their bodies is so
widespread that frequent dieting, drive for thinness, and fear of fat have become a
relatively typical response for adolescent and young adult women (Johnson & Tobin,
1991; Markey & Markey, 2005). Although the majority of dieters will not pass the
threshold to develop a clinical eating disorder, Drewnowski, Yee, Kurth, and Krahn
(1994) found that 15% of those college-aged women identified as “at-risk” in the fall
semester moved into the probable bulimia category by the spring semester. Although
female college students in general seem to be at risk for eating disorder symptoms,
research has shown that certain subgroups are at even greater risk. Specifically, it has been hypothesized that participation in athletics further increases the risk for the development of eating disorders.

**Eating Disorders in Athletes**

Female collegiate athletes represent a unique population with regards to disordered eating. Although they experience a greater need to maintain a healthy lifestyle due to the physical demands of their sport, athletes often feel significant pressure to strive for low body weight, putting them at greater risk for engaging in disordered eating behaviors (Kirk et al., 2001). Athletes may experience explicit and implicit pressure from coaches, parents, fans, or teammates to maintain a low weight. A significant amount of research demonstrates that athletes are at an increased risk for the development of eating disorders (Smolak, Murnen & Ruble, 2000; Sundgot-Borgen & Larsen, 1993).

Studies examining prevalence rates of eating disorder diagnoses in athletes have found that athletes are at increased risk for clinical eating disorders. For example, with the use of self-report surveys, Johnson, Powers, and Dick (1999) found 2.9% and 9.2% of female athletes were identified as having clinically significant problems with anorexia and bulimia, respectively. Other research examining the prevalence of eating disorders among female athletes has found the pervasiveness of anorexia and bulimia in female college athletes to be as high as 4.2% and 39.2%, respectively (Burckes-Miller & Black, 1988). Sundgot-Borgen (1993) proposed that the prevalence of eating disorder diagnoses in the athlete population may be inaccurate due to the self-report nature of the measures. Utilizing a clinical interview in a sample of 522 athletes and 448 non-athletes, 18% of
athletes and 5% of non-athletes were found to be suffering from a diagnosable eating disorder.

Research indicates that athletes who do not meet criteria for a diagnosable eating disorder still tend to engage in more disordered eating behaviors than non-athletes. For example, several studies have found that athletes diet more than non-athletes, more frequently use diet pills, laxatives, and diuretics, and more frequently engage in binge eating and purging (Davis & Cowles, 1989; Johnson et al., 1999; Sundgot-Borgen & Larsen, 1993). Use of these weight loss methods may indicate an increased risk for the development of an eating disorder (Fitzgibbon, Sánchez-Johnsen, & Martinovich, 2003).

Although a good deal of research supports the idea that athletes are at greater risk than non-athletes for the development of eating disorders, this research is not unequivocal. Several studies have found no differences between athletes and non-athletes in clinical eating disorders (e.g., Fulkerson, Keel, Leon, & Door, 1999; Sanford-Martens et al., 2005), while others suggest that athletes have less eating disorder symptomatology and healthier psychological functioning than non-athletes (e.g., DiBartolo & Shaffer, 2002; Kurtzman, Yager, Landsverk, Wiesmeier, & Bodurka, 1989).

Perhaps the most authoritative research on the topic comes from two meta-analyses, which provide some clarity of the inconsistent literature. Hausenblas and Carron (1999) conducted a meta-analysis of 92 studies with 560 effect sizes comparing eating disorder symptoms between athletes and non-athletes. Results of this study revealed significant, although small, effect sizes indicating that athletes report more eating disorder symptoms than non-athletes. Specifically, female athletes self-reported more bulimic ($\hat{g} = .16$) and anorexic ($\hat{g} = .12$) symptomatology than non-athletes.
However, female athletes did not demonstrate a greater drive for thinness, a core component of eating disorders. One explanation for this finding is that due to current societal pressures for women to meet an idealized standard of beauty, both female athletes and non-athletes experience a perpetual feeling of discontent with regards to their body, normalizing a drive for thinness (Cooley & Toray, 2001).

Smolak et al. (2000) conducted a meta-analysis of 34 studies examining the overall relationship between female athletes and eating problems and found similar results. A small effect was found, demonstrating that athletes reported more eating problems than non-athletes ($d = .07, p < .01$). When examining the effects of competition level, however, differences were greater among higher competitive levels, with college student athletes reporting significantly greater eating problems than non-athletes ($d = .15, p < .001$).

Lean versus Non-Lean Sport Athletes

As research indicates that, in general, athletes are at greater risk for the development of eating disorders and experiencing disordered eating behaviors than non-athletes, it is logical to assess potential differences among various subgroups of athletes. Although a good deal of research has been conducted examining individual sports, much of the existing literature has directly compared different subgroups of athletes. One major challenge in this type of research, which contributes to the inconsistency of findings, is developing a classification system for grouping athletes. At seemingly greatest risk for eating disorders are those sports where leanness is emphasized or a thin physique is required for performance or aesthetic purposes (Books-Gunn, Burrow, & Warren, 1988; Davidson, Earnest, & Birch, 2002; Garner, Olmsted, Polivy, & Garfinkel, 1987). As
such, a common classification system for studying eating disorders in athletes is to compare athletes involved in lean sports to athletes involved in non-lean sports. However, there has been an inconsistent use of categorical labels across such studies, such as *lean* versus *nonlean*, *thin body build* versus *normal build*, and *fostering the attainment of a thin physique* versus *low weight not as central* (Hausenblas & Carron, 2002). The lack of consistency in terminology across studies has led to a continued lack of clarity in differences between sport groups.

In spite of these variations in categorical labels, researchers have examined sport type differences. However, along with the inconsistency of labels come differences in how sports are classified in terms of eating disorder risk. For example, Petrie (1996) examined the differences among three groups: two groups of athletes - one group participated in “lean sports” (i.e., swimming, diving, cross-country, wrestling, and gymnastics) and the other group participated in “non-lean sports” (i.e., volleyball, softball, fencing, tennis, basketball, golf, rifle/pistol, track and field, and field hockey) and a non-athletic control group. Petrie found non-significant differences between the three groups on EDI subscales of Bulimia, Perfectionism, Interpersonal Distrust, and Maturity Fears. However, results suggested that lean sport athletes had higher Drive for Thinness scores than the non-lean sport athletes and non-athletes. Although these findings appear straightforward, comparing results across studies fails to provide clarity and consistency.

In a seemingly comparable study, Sundgot-Borgen and Corbin (1987) examined the extent to which female athletes are preoccupied with weight and are at-risk for eating disorders, as measured by the EDI. They too examined three groups: two groups of
female athletes - one group \((n = 35)\) participated in sports that “emphasized leanness” (i.e., ballet dancers, body builders/weight trainers, cheerleaders, and gymnasts) a second group \((n = 32)\) participated in sports that “did not emphasize leanness” (i.e., swimming, track and field, and volleyball), and a non-athletic control group \((n = 101)\). It is important to note that while Petrie (1996) identified swimming as a sport that emphasizes leanness, Sundgot-Borgen and Corbin (1987) identified it as one that does not emphasize leanness. Data from this study were compared to mean EDI scores for individuals diagnosed with anorexia. Results suggested that although no differences existed between athletes and non-athletes in the total number of EDI subscale scores above the means for individuals with anorexia, differences did exist between athlete groups when comparing the total number of subscale scores above that mean. The athletes in sports that emphasized leanness \((21\%)\) had more subscale scores above the means of individuals diagnosed with anorexia than did those in sports not emphasizing leanness \((11\%; \chi^2(1) = 11.65, p < .05)\).

As demonstrated above, a major limitation in the literature examining the differences between sport types is that classification systems are not consistent across studies (Hassenblas & Carron, 2002). This not only creates difficulty in comparing studies, but likely fails to ascertain meaningful differences in causes of disordered eating.

For example, in the common classification system of lean versus non-lean sport athletes, athletes involved in wrestling, figure skating, and distance-running are often categorized as one, without regard for the fact that the underlying reasons for disordered eating behavior may differ considerably across sports. Although wrestlers are under pressure to maintain a specific weight class, figure skaters are under pressure to maintain a low
weight for aesthetic purposes and runners strive for a low weight for performance purposes.

A major strength of the work by Sundgot-Borgen (1993) and Sundgot-Borgen and Larsen (1993) was that they developed a framework for classifying subgroups of athletes above and beyond the traditional lean-nonlean split. They classified 41 sports into six categories based on the specific demands of the sport, including: (a) endurance sports: main training requirement was aerobic endurance training, (b) aesthetic sports: most important element is a subjective evaluation in competitive performance, (c) weight-dependent sports: specific weight was required to compete, (d) ballgames: game centers around exchange of ball among teammates, (e) power sports: main component of training was strength training, and (f) technical sports: other sports that did not fit into the previous five categories (e.g., golf).

Categorized in this way, Sundgot-Borgen (1993) found that overall, a similar proportion of female athletes and non-athletes were classified as being at risk of developing eating disorders. However, when examining only the athletes involved in sports in which leanness or a specific weight was considered important, a higher proportion of athletes than non-athletes were considered to be at risk of developing an eating disorder. Specifically, she found that the prevalence of eating disorders in athletes involved in aesthetic (34%) and weight dependent (27%) sports was markedly higher than those involved in endurance sports (20%), technical sports (13%), and ball-game sports (11%). In examining eating disorder symptoms, results indicated that the highest prevalence of athletes using pathogenic weight control methods was found among athletes involved in aesthetic (34%), weight dependent (32%), and endurance sports.
(20%). These findings support the notion that athletes competing in sports in which leanness or a specific weight is deemed central to performance are at greater risk for the development of eating disorders than non-lean sport athletes.

Although this classification system shows promise, some important within-group differences still remain. For example, the endurance sport group includes both long-distance running and orienteering, which likely have significantly different implications for weight concerns and disorder eating. In fact, this notion is supported by the finding that the prevalence of eating disorders varied significantly among the endurance sport athletes. Specifically, the prevalence was significantly higher for distance runners and cross-country skiers than for cyclists, swimmers, and orienteerers (Sundgot-Borgen, 1993). Important differences exist across these sports with regard to body type. Whereas a body type component exists for distance runners and cross-country skiers in that a thin build is required, body types are not as generalizable for cyclists, swimmers, and orienteerers. To move beyond this limitation, the proposed study will extend the literature on sport group differences by moving beyond the didactic split between lean and non-lean athletes to include differences between female lean sport athletes, specifically, aesthetic lean sports (i.e., sports where a low body weight is deemed central to for aesthetic purposes; e.g., figure skating and gymnastics) and non-aesthetic lean sports (i.e., sports where low body weight is deemed central for performance purposes; e.g., cross-country running and Nordic skiing), as well as a non-lean comparison group (i.e., low body weight is not deemed central to the sport; e.g., soccer).
Differences among Lean Sport Athletes

Although evidence exists to suggest that lean sport athletes may be at greater risk of developing eating disorders than non-lean sport athletes, differences between subgroups of lean sport athletes remain unclear. It is possible that eating beliefs and behaviors of athletes involved in lean sports in which athletes experience pressure to be thin to gain the subjective approval of others (e.g., judges; i.e., aesthetic lean sports) differ in some fundamental ways from athletes involved in lean sports in which low body weight is deemed central to enhance objective performance (e.g., a higher strength to weight ratio increases speed in endurance runners; i.e., non-aesthetic lean sports). Although athletes in both sport types are under pressure to maintain a low body weight, aesthetic lean sports have unique elements in that they tend to involve subjective judgment of others to determine athletic success and tend to require tight fitting, feminine attire.

Initial support for the differences between lean sport groups came when Warren, Stanton, and Blessing (1990) examined lean and non-lean female athletes to identify risk of disordered eating patterns. After collecting data with gymnasts and cross-country runners assumed to represent the lean sport group, analyses comparing the gymnasts and the runners yielded several group differences. Gymnasts reported higher scores on the Eating Attitudes Test (EAT), $F(1,25) = 5.04, p < .05$, and on the EDI subscales of Drive for Thinness, $F(1, 25) = 8.57, p < .01$, Body Dissatisfaction, $F(1, 25) = 5.88, p < .05$, and Interoceptive Awareness $F(1, 25) = 4.62, p < .05$. Subsequent analyses were run on four groups: 15 gymnasts, 12 cross-country runners, 47 non-lean sport athletes, and 52 non-athletes. Results indicated that cross-country runners reported fewer symptoms of
disordered eating on the EDI and EAT and were at slightly less risk for body
dissatisfaction than the non-athlete control. Competitive female gymnasts, on the other
hand, were at greater risk for weight preoccupation.

Research examining aesthetic lean sports has provided consistent evidence that
these athletes are at high risk for eating disorders. For example, Ringham et al. (2006)
compared ballet dancers and individuals with anorexia nervosa, bulimia, and no eating
pathology and found that dancers were more similar to eating-disordered individuals than
non-athletes on measures of eating pathology. Further, high rates of eating disorders were
found among dancers when examining lifetime prevalence of anorexia (6.9%), bulimia
(10.3%), and EDNOS (55.0%).

surveyed 31 individuals diagnosed with anorexia, 111 aesthetic athletes, 68 non-aesthetic
athletes, and 248 non-athletes to test the hypothesis that aesthetic athletes have anorexic-
like eating attitudes and behaviors and are at high risk for the development of eating
disorders. Results indicated that between-group differences existed with regards to
lifetime prevalence of eating disorders. In the aesthetic athlete group, 18% had been
diagnosed with anorexia, bulimia or EDNOS, as compared to 8.6% in the non-aesthetic
athlete group and 10.4% of non-athletes.

Although the literature is fairly consistent in finding that aesthetic lean sport
athletes are at increased risk for the development of eating disorders, the findings are less
consistent with regard to non-aesthetic lean sport athletes. Hulley and Hill (2001)
examined the presence of eating disorders, as measured by the Eating Disorders
Examination Questionnaire (Fairburn & Beglin, 1994) in 181 elite female distance
runners, as well as differences in training, dieting, general health, and well-being. Results indicated that 16% of participants had a diagnosable eating disorder at the time of the study, and these individuals were significantly less satisfied with their physical appearance and had poorer psychological health than their non-eating disordered counterparts. Participants were specifically at increased risk for anorexia (3.8%) when compared to national norms in the United Kingdom (.28%). In contrast, Hausenblas and McNally (2004) examined eating disorder symptoms and diagnoses in 412 male and female track and field athletes and higher- and lower-active non-athletes. They found that track and field athletes, including middle and long distance runners, did not report more eating disorder symptoms and diagnoses than non-athletic groups.

Two meta-analyses have examined the specific differences in eating disordered behaviors among athletes participating in different types of sports. Hausenblas and Carron (1999) examined bulimia indices, anorexia nervosa indices, and drive for thinness in male and female athletes. Sports were divided into six categories based on their sport-specific demands, following the protocol set by Sundgot-Borgen and Larsen (1993). Although differences between athletes and non-athletes with regard to drive for thinness were found to be non-significant ($\hat{g} = -0.01$), differences in drive for thinness and anorexic symptoms did exist between athletic groups. Athletes in aesthetic sports reported greater drive for thinness ($\hat{g} = 0.09$) than ball-game athletes. Average effect sizes of anorexic indices for aesthetic sport athletes ($\hat{g} = 0.38$) were significantly greater than both endurance athletes ($\hat{g} = -0.04$) and ball-game athletes ($\hat{g} = -0.17$). However, the groups did not differ significantly on measures of bulimic symptomatology.
Smolak et al. (2000) conducted a meta-analysis of 34 studies examining the overall relationship between female athletes and eating problems and found similar results. In examining differences among sport groups as compared to non-athletes, results indicated that no significant differences existed for runners or swimmers. Gymnasts were found to have slightly less eating problems than non-athletes ($d = -.11$), however, these differences were not significant. Significant differences did exist for athletes involved in various forms of dance/performance sports (e.g., ballet, cheerleading; $d = .42$, $p < .001$). The authors concluded non-elite, non-lean sports may have a slight protective effect against the development of eating problems, while those athletes involved in elite, lean sports are at increased risk.

Taken together, this research indicates that athletes involved in aesthetic lean sports are at greatest risk for the development of eating disorders. However, two issues remain unclear. First, minimal research has examined the effect of seasonal status on disordered eating behavior, particularly across different subgroups of athletes. Research in this area could have significant implications in understanding the importance of the athletic environment on disordered eating behaviors. Second, if differences in disordered eating across seasonal status do exist between different groups of athletes, there is little understanding of the theoretical explanations for these differences. These two issues will be addressed in the final sections of this chapter.

One way of determining differences in disordered eating patterns across sport types would be to examine the link between disordered eating behaviors and the sport environment. Although athletes in general appear to be at greater risk than non-athletes for turning to extreme weight loss methods in order to meet the standards set by coaches,
judges, teammates, or parents, it is unclear whether these eating disorder symptoms are environment specific, and therefore less indicative of a true eating disorder, or have become internalized, generalizable, mental health concerns.

Identification of “At-Risk” Athletes: The Role of Seasonal Status

As has been demonstrated, much research has been conducted in attempt to understand the role of athletics in the development of eating disorders. Complicating this issue is the fact that some of the characteristics associated with anorexia nervosa may often be found in “good athletes,” and could, in part, be responsible for their success in athletics (Thompson & Sherman, 1999). Thompson and Sherman demonstrated similarities between traits of good athletes and anorexic characteristics, such as commitment to training/excessive exercise, pursuit of excellence/perfectionism, and performance despite pain/denial of discomfort. In understanding the risk of eating disorders among athletes, it is important to also understand the context of the disordered eating.

King (1989) studied eating disorders in a general practice and stated that it is important to “distinguish between behaviors (no matter how extreme) aimed principally at maintaining a low weight for reasons such as a vocation, and the central psychopathology of an eating disorder” (p. 16). Johnson and Tobin (1991) also discussed the importance of considering the context and pattern of behavior in athletes before determining whether the behavior is pathological. Specifically, they suggest that when evaluating an athlete’s dieting and binge-purge behavior, the demands of the particular sport must be taken into consideration. They argued that the more circumscribed a
particular pattern of weight control, the less likely it is to reflect the presence of an eating disorder or other psychological concern.

Among athletes, the training demands associated with seasonal status may be an important contextual variable in understanding disordered eating behavior. It is possible that seasonal status is associated with the transience of disordered eating symptoms and the motivation to engage in eating disordered behaviors. Because a clinical eating disorder is a theoretically stable condition, those who meet diagnostic criteria for eating disorders should not experience transient symptoms across seasonal status. In contrast, some athletes may engage in various disordered eating behaviors during their competitive seasons due to the environmental pressures associated with their sport, but such symptoms dissipate during the off-season. Empirical support of this premise may suggest that the eating disorder symptoms demonstrated by athletes during the athletic season may, in some cases, be different in some important way from the psychological development of an eating disorder.

This proposed shift in disordered eating behaviors may be due to the intensity and drive of the athletic training. The training and competitive season of collegiate sports is often intense, with daily practices, and, with some sports, regular weigh-ins (e.g., wrestling, gymnastics). The intensity of this sport-specific focus on physical fitness does not last year round, but rather waxes and wanes throughout the year, likely in conjunction with the athletic season. As such, athletes may engage in disordered eating behaviors during the athletic season, yet decrease these behaviors during the off-season when fitness and body weight are not as imperative to performance.
To date, minimal research has examined the influence of seasonal status on athletes’ health behaviors. Only one published study has addressed the relationship between seasonal status and disordered eating. Dale and Landers (1999) acknowledged the behavioral similarities between wrestlers and individuals suffering from bulimia, and examined symptom changes in and out of the wrestling season to determine whether an increased risk of bulimia existed for wrestlers. Eighty-five junior high and high school wrestlers completed the EDI in and out of their wrestling season. A non-wrestling control group also completed the measure. Those who scored above specific cutoff scores were invited to participate in a clinical interview following the Eating Disorder Examination (Cooper & Fairburn, 1987) format. Results indicated that there were no significant differences between the number of in-season wrestlers (36%) and non-wrestlers (29%) classified as at risk for bulimia ($p = .34$). However, significant differences did exist on the Drive for Thinness subscale between in-season wrestlers (27%) and non-wrestlers (13%; $p < .05$), and between in-season wrestlers and off-season wrestlers (15%; $p < .05$). Although a significant difference was demonstrated between in-season wrestlers (36%) and non-wrestlers (19%; $p < .01$), the same wrestlers tested off-season did not differ significantly from non-wrestlers. The authors concluded that the wrestlers’ “at-risk” behavior was confined to the wrestling season, which is not characteristic of a clinical eating disorder. They suggested that the transience of the disordered eating behaviors with the change of athletic season indicates that these patterns of behavior represent a greater physical health risk than risk to the athlete’s mental health. A major limitation of this study, though, is that the sample consisted of only one sport type (i.e., wrestling) and
one gender (i.e., men). This limitation raises questions regarding the generalizability of the findings to other sports and across genders.

Studies of other areas of health behaviors have assessed seasonal differences with more representative samples. For example, one area that has been examined in relation to athletic seasonal status is athlete drinking behavior. Research on alcohol consumption suggests that intercollegiate athletes drink less during their competitive seasons than in their off-seasons. One such study surveyed 297 athletes and found that the majority of college athletes who met criteria for heavy drinking reported that they engaged in such drinking only in the off-season. Further, 37% of athletes reported abstaining during their competitive season (Thombs, 2000). Martens, Dams-O’Connor, and Duffy-Paiement (2006) surveyed a sample of 160 intercollegiate athletes in and out of their athletic season. Results indicated that overall alcohol use decreased from off-season to in-season and that 77% of those who reported drinking in the off-season reduced their drinks per week during the athletic season.

Given the difficulty of determining the risk of eating disorders in athletes, one promising method seems to be measuring the transience of the behavior as determined by differences in and out of the athletic season. As noted earlier, an eating disorder is a theoretically stable condition, thus the prevalence of eating disorder diagnoses would likely not change with seasonal status. A significant increase in disordered eating behavior during the athlete’s competitive season would not necessarily correlate with a significant increase in the diagnoses of eating disorders among athletes. This change of disordered eating behaviors with seasonal status, combined with no changes in diagnosis, would support the notion that these unhealthy eating behaviors are likely not indicative of
an eating disorder, but rather are risks primarily to the athletes’ physical health. In addition to understanding the effect of seasonal status on disordered eating, it is important to explore possible reasons for the proposed differences between groups of athletes.

Objectification Theory

One factor that may lead to the proposed differences between these two groups of athletes is the internalization of messages related to low weight demands and body objectification. Objectification theory (Fredrickson & Roberts, 1997) offers a framework for understanding the various psychological consequences for living in a culture that pervasively objectifies the female body, particularly the experiences and mental health risks of women who encounter sexual objectification. According to Fredrickson and Roberts (1997), sexual objectification occurs when a woman’s body is separated from her person and treated as though it represents her whole being. The most subtle form of sexual objectification is the gaze, or visual inspection of the body, which exists on three levels. It occurs within actual interpersonal and social encounters, in visual media that depict interpersonal and social encounters, and visual media that spotlight bodies and body parts. Common across all forms of sexual objectification, however, is the experience of being treated as a body that exists primarily for its use to others (Fredrickson & Roberts, 1997).

Objectification theory posits that due to the pervasiveness of sexual objectification, women are socialized to treat themselves as objects to be looked at and evaluated (Fredrickson & Roberts, 1997). As such, on some level, women objectify themselves. They begin to view their own body from an observer’s perspective, focusing on observable body attributes, rather than from a first-person perspective, focusing on
non-observable body attributes. Fredrickson and Roberts (1997) argue that self-objectification has a number of emotional consequences, such as shame and anxiety about one’s body, which in turn leads to three particular psychological disorders experienced predominantly by women: unipolar depression, sexual dysfunction, and eating disorders.

Some evidence exists in support of objectification theory. Noll and Fredrickson (1998) tested a mediational model of disordered eating based on objectification theory, proposing that body shame mediates the relationship between self-objectification and disordered eating. In two separate samples of undergraduate women (Ns = 93 and 111), they found a direct link between self-objectification and disordered eating, as well as a link mediated by body shame. Specifically, in the first sample, self-objectification accounted for 18% of the variance in bulimic symptoms (p < .01). When bulimic symptoms were regressed on both body shame and self-objectification, the amount of variance in bulimic symptoms accounted for by self-objectification was reduced to 2%, a small, yet still statistically significant, effect. In the second sample, direct effects of self-objectification on disordered eating were also observed for bulimic symptoms, anorexic symptoms, and dietary restraint, accounting for 4%, 3%, and 5% of the variance, respectively. The authors proposed that anticipated body shame motivates self-objectifying women who are satisfied with their weight to engage in disordered eating in an effort to maintain that satisfaction. These findings are consistent with self-objectification theory, which posits that women may experience negative consequences of self-objectification regardless of body satisfaction (Fredrickson & Roberts, 1997).
Muehlenkamp and Saris-Baglama (2002) tested the direct relationship between self-objectification and disordered eating in 384 undergraduate women. Results of the structural equation model indicated that self-objectification had a direct relationship to restrictive eating ($\beta = .86, p < .001$) and bulimic symptoms ($\beta = .62, p < .001$).

Tiggemann and Slater (2001) tested objectification theory as it applies to disordered eating in 50 former students of ballet and 51 undergraduate students. As predicted, results indicated that former dancers scored higher on self-objectification than did non-dancers, $t(94) = 2.04, p < .05$. A significant difference between former dancers and non-dancers was also revealed on measures of disordered eating, $t(98) = 2.26, p < .05$, with former dancers having significantly higher levels of disordered eating. However, when testing self-objectification as a covariate, the difference in disordered eating between the two groups was non-significant. There was a direct pathway between self-surveillance and disordered eating, suggesting that habitual self-surveillance, which characterizes self-objectification, may directly impact symptoms of disordered eating, regardless of whether or not one experiences body shame or appearance anxiety.

Piran and Cormier (2005) surveyed a community sample of 394 young women to examine the impact of the social construction of women on the development of disordered eating. Results indicated that an objectified experience of one’s own body, reflecting the internalization of the sexualized scrutinizing gaze, added significantly to the prediction of eating disorder measures attained by self-silencing and anger suppression. Taken together, results from these studies support the notion that degree of self-objectification may function as a risk factor for disordered eating.
Participation in athletics has potential to both increase and decrease one’s level of self-objectification and subsequent consequences. Involvement in sports may promote a more active, instrumental experience of the self (Parsons & Betz, 2001). However, participation in sports in which low body weight is deemed central, particularly for aesthetic purposes, may lead to an emphasis on awareness of observers’ perspectives on their bodies (Tiggemann & Slater, 2001). As such, differences likely exist in the degree to which athletes in different types of sports self-objectify. Although non-aesthetic lean sport athletes experience pressure to be thin to enhance objective performance (e.g., a higher strength to weight ratio increases speed in endurance runners), aesthetic lean sport athletes experience pressure to be thin to gain the subjective approval of others (e.g., judges). Competition within aesthetic lean sports entails performing primarily to be looked at and evaluated by others. This subjective nature likely enhances the athlete’s awareness of the observer’s perspective on her body. Further, one component of obtaining approval within sport competition in aesthetic lean sports is the use of tight-fitting, feminine attire, which allows others to view the lines of her body. According to objectification theory, aesthetic lean sport athletes would likely have higher levels of self-objectification, given the heightened awareness and importance of other’s perspectives.

Support for the notion that self-objectification can be triggered and magnified by certain situations, such as wearing tight fitting clothing, has begun to emerge. For example, Fredrickson, Roberts, Noll, Quinn, and Twenge (1998) manipulated self-objectification by having participants try on either a swimsuit or a sweater while alone in a dressing room. Participants were told they were participating in a study examining emotions and consumer behavior. While wearing the garment, participants completed a
measure of body shame. After they changed back into their street clothes, participants were given cookies and asked to evaluate them for “consumer research.” Restrained eating was then measured by the amount of cookies eaten. Results indicated that trying on a swimsuit led to increased body shame, which in turn predicted restrained eating. Results from this study provided support for the prediction that restrained eating can be linked to the body shame caused by self-objectification. Price and Pettijohn (2006) had similar findings when they assessed body and self-perceptions in 38 female ballet dancers after wearing either a leotard and tights or loose-fitting clothing. Participants reported significantly lower self- and body-perception ratings in the leotard with tights compared to the loose-fitting clothing.

According to self-objectification theory, aesthetic lean sport athletes may have greater levels of self-objectification and may be at greater risk for the development of eating disorders. To date, limited literature has examined self-objectification in athletics. Greenleaf and McGreer (2006) examined objectification theory among physically active and sedentary women and found that self-objectification directly predicted disordered eating in both groups. In fact, for the physically active participants, 47% of the variance in disordered eating attitudes was accounted for by the objectification theory model. For sedentary women, the model accounted for 53% of the variance in disordered eating attitudes.

Strelan, Mehaffey and Tiggemann (2003) examined the mediating role of reasons for exercise between self-objectification, body esteem, and self-esteem among female university fitness center attendees. They found that those experiencing higher levels of self-objectification were significantly more likely to experience reduced body
satisfaction, body esteem, and self-esteem. Further, women who were high on self-objectification also tended to exercise more for appearance oriented reasons and less for functional reasons, while those with lower scores exercised for health benefits.

Parsons and Betz (2001) examined the relationship between sports participation and self-objectification, particularly in terms of the perceived stereotypical masculinity or femininity of the sport. After determining the perception of femininity/masculinity of sports in 195 male and female students, Parsons and Betz examined 437 college women and found that body shame was consistently related to both sports and physical activity, assessing an individual’s degree of potential shame if she did not fulfill cultural expectation for the female body ($\beta = .13$, $p < .05$). Potential concern over failing to meet cultural standards for beauty was found to be related to a higher level of participation in sports, especially those emphasizing the female body and femininity.

Daubenmier (2002) conducted one of the only published studies comparing various sport groups and self-objectification, comparing Hatha yoga participants and body-oriented, aerobic exercisers. Results indicated that the Hatha yoga participants scored significantly lower on self-objectification and the frequency of which they compared their body to others, but higher on body satisfaction, than the participants of body-oriented, aerobic, activities. The focus by yoga on both body and mind appears to have significant impact on the overall being.

Taken together, this literature suggests that although lean sport athletes experience pressure from the sport to maintain a low weight, unlike non-aesthetic lean sport athletes and non-lean athletes, aesthetic lean sport athletes may have higher levels
of self-objectification. This is likely due to both the subjective judgment involved in the sports, as well as the revealing attire worn by the athletes.

Summary

Research examining eating disorder symptoms and diagnoses in female college athletes indicates that athletes may be at increased risk for the development of eating disorders when compared to non-athletes. Studies examining prevalence rates of eating disorder diagnoses in athletes have found that a higher number of athletes than non-athletes actually suffer from an eating disorder. Despite considerable discrepancies across studies, it appears that certain subgroups of athletes may be at greater risk than others. At seemingly greatest risk are athletes involved in sports where a low weight is deemed central to performance. When examining differences between lean and non-lean sport athletes, it appears that pressure among lean sport athletes to maintain a low weight may lead to increased risk for disordered eating. However, minimal research has examined differences among different groups of lean sport athletes.

The present study is aimed to clarify some of the differences in eating disorder symptoms and diagnoses in aesthetic lean, non-aesthetic lean and non-lean sport athletes. In addition, the present study will extend current literature in two ways. First, this study will examine the role of athletic seasonal status on disordered eating. Initial findings indicate that eating disorder symptoms increase with the athletic season and decrease during the off-season. An extension of these findings in various sports would provide insight as to the function and pathology of the disordered eating behavior, which has significant implications for treatment and prevention. Second, this study will examine self-objectification as a possible explanation for the proposed differences between sports.
Based on objectification theory, it is proposed that athletes involved in aesthetic lean sports will have higher levels of self-objectification and, in turn, have more eating disorder diagnoses and less transient eating disorder symptoms.
Chapter III

Method

This study examined the relationship between athletes and eating disorder symptoms and diagnoses in two ways. First, the relationship between the eating disorder variables and athletes was examined as a function of seasonal status. Second, self-objectification is expected to mediate the relationship between sport type and disordered eating.

Design

This study first determined whether differences exist between three different sport groups (i.e., aesthetic lean, non-aesthetic lean, and non-lean) in terms of eating disorder symptoms and diagnoses. Next, this study investigated whether eating disorder symptoms and diagnoses change with seasonal status. The final analysis in this study investigated whether self-objectification mediates the relationship between sport type and disordered eating. The between subjects variable in this ex-post-facto survey-based research study is type of sport (aesthetic lean, non-aesthetic lean, and non-lean) and the within-subject variable is seasonal status (in vs. off). The criterion variables are eating disorder diagnoses, general eating disorder symptoms, athlete-specific eating disorder symptoms, and level of self-objectification.

Participants

Initial participants in this study included 282 female athletes from 14 colleges and universities in the Midwest and Northeastern United States. Of these, 176 participants provided complete data at both in- and off-season data collection. The mean age of the participants was 19.68 years ($SD = 1.66$). The majority of the sample (91.3%) was White,
with other ethnocultural groups represented as follows: 3.3% Asian/Pacific Islander, 2.2% Hispanic, 1.4% Multiracial, 1.4% Other, and 0.4% African-American. Class status in college was also tallied, indicating that 33.8% of the sample were freshman, 22.9% were sophomores, 24.2% were juniors, 15.8% were seniors, and 3.3% were graduate students.

Thirty-six participants (12.8%) reported currently being on an athletic scholarship for their sport. The average self-reported weight for the sample was 137.5, and the average self-reported ideal weight was 140.5. The average self-reported height for the sample was 5’5”. The average in- and off-season BMI for participants was 22.7 and 23.0 respectively. Sixteen participants (5.7%) reported a history of being diagnosed with an eating disorder. These athletes consisted of nine cyclists, three soccer players, two cross-country runners, one gymnast, and one field hockey player.

The participants represented 4 varsity sports (Cross-country running, Field Hockey, Soccer, and Gymnastics), and 2 club sports (Figure Skating and Cycling). These sports were chosen to represent both aesthetic-lean sports (i.e., synchronized figure skating and gymnastics), non-aesthetic lean sports (i.e., cross-county running and cycling), and a non-lean comparison group (i.e., soccer and field hockey). The original 282 participants consisted of 90 aesthetic lean athletes (59 gymnasts, 31 figure skaters), 80 non-aesthetic lean athletes (34 cyclists, 46 cross-country runners), and 112 non-lean athletes (59 soccer players, 53 field hockey players).

The original selection of schools invited to participate in this study was based on the number of relevant sports offered at each school. IRB approval was obtained from those schools that offered several of the relevant sports or had large teams of the less
common sports (e.g., figure skating). The 14 schools sampled consisted of seven Division I schools and seven Division III schools. Within these 14 schools, 24 teams were invited to participate in the study, 19 (79%) of which completed the in-season data. The sample size for this study was chosen to provide a power of the test statistic at or above 80% (Cohen, 1992). Several power analyses were performed to estimate the necessary number of participants for this study. These power analyses were conducted based on estimated effect sizes in the existing literature for the constructs in this study, following the methods of Cohen (1988). A meta-analytic integration of studies (Smolak, Murnen, & Ruble, 2000) examining the relationship between athletic participation in females and disordered eating reports average effect sizes (as measured by $d$) of .34 for lean sport athletes, indicating that lean sport athletes are at greater risk for showing signs of eating problems than non-athlete controls. The average effect size of between group differences for non-lean sport athletes and non-athlete controls was estimated to be .02. Further, compared to non-athlete controls, the average effect size was .42 for aesthetic lean sport athletes and .36 for non-aesthetic lean sport athletes. However, the effect size of differences in eating disorders between groups of lean sports, which is of greatest interest for the proposed study, is unknown. Thus, the average effect size for lean sport athletes (.34) was used. This power analysis indicated that to achieve 80% power, the number of participants needed to test the relationship between sport type and eating disorder symptoms and diagnoses was 87.

For the tests of self-objectification as a mediating variable between sport type and eating disorder symptoms and diagnoses, another power analysis that requires effect sizes for all planned regressions was needed. Effect sizes (as measured by $r^2$) documenting the
magnitude of the relationship between self-objectification and bulimic symptoms, anorexic symptoms, and dietary restraint were .04, .03, and .05, respectively (Noll & Fredrickson, 1998). Although no known literature has examined self-objectification and disordered eating in athletes, several studies have examined this relationship in relation to related populations of exercisers and dancers. For example, the effect size reported in the literature describing the relationship between self-objectification and former dancers and non-dancers, as measured by \( r^2 \), was approximately .15 and .16, respectively (Tiggemann & Slater, 2001). Greenleaf and McGreer (2006) examined the relationship between self-objectification and disordered eating in physically active and sedentary individuals and found an effect size, as measured by \( r^2 \), of .123 and .082, respectively. Using the average effect size for self-objectification and eating disorders \( (r^2 = .04) \), this power analysis indicates that approximately 180 participants were needed to achieve the recommended 80% power (Cohen, 1992) for the effect of self-objectification as a mediator. This number is expected to provide the necessary power for all analyses.

Measures

*Eating Disorder Diagnostic Scale (EDDS).* The EDDS (Stice, Telch, & Rizvi, 2000) is a 22-item self-report scale in which items use a combination of Likert, yes-no, frequency, and write-in response formats to assess the DSM-IV diagnostic criteria for anorexia nervosa, bulimia nervosa, and binge-eating disorder (see Appendix A). Sample items include: “Over the past three months have you had a definite fear that you might gain weight or become fat?;” “During the past 6 months have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream,) given the circumstances?;” and “How many times per week
on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating?” The EDDS generates diagnoses for all three DSM-IV eating disorders and a continuous eating disorder composite. For the present study, diagnoses scores were used in a categorical manner to differentiate prevalence of eating disorders across sport type (i.e., eating disorder diagnosis or not).

During initial scale development, Stice and Telch (2000) examined the utility of the EDDS in a population of women with and without eating disorders that was diverse in age, socioeconomic status, and geographic location. Data provided evidence of test-retest reliability (mean κ = .80) and criterion validity with interview diagnoses (mean κ = .83). In support of convergent validity, EDDS-identified individuals with eating disorders showed elevations on validated measures of eating disturbances relative to EDDS-identified individuals without an eating disorder. The overall eating disorder symptom composite showed test-retest reliability ($r = .87$), internal consistency (mean $\alpha = .89$), and convergent validity with existing eating pathology scales. The one-week test-retest kappa coefficient was .95 for anorexia nervosa diagnoses, and the overall accuracy rate was .98.

Stice, Fisher and Martinez (2004) conducted a series of studies to further examine the reliability and validity of the EDDS in a sample of adolescent girls and young women. The criterion validity was assessed by examining the concordance between EDDS diagnoses and the Eating Disorder Examination (EDE) interview diagnoses for anorexia nervosa, bulimia nervosa, and binge eating disorder. The kappa coefficient was found to be .78. Mean internal consistency, as measured by Cronbach’s alpha, was found to be .89.
ATHLETE Questionnaire. The ATHLETE Questionnaire (Hinton & Kubas, 2006) is an athletics-oriented measure of psychological indices of disordered eating (see Appendix B). It is a self-report questionnaire designed to assess psychosocial factors associated with disordered eating in athletes. The ATHLETE was designed to capture six of the theoretical constructs assessed by the EDI (Garner, Olmsted, & Polivy, 1983) (i.e., body dissatisfaction, drive for thinness, interoceptive awareness, perfectionism, ineffectiveness, and interpersonal distrust) and three additional constructs: social pressure on body shape, social pressure on eating behavior, and the importance of being an athlete to self-concept. Nine subscales, consisting of 80 items, were developed to measure these constructs. Each of the nine subscales consisted of five to twelve items with 5-point Likert-type response options, ranging from strongly agree to strongly disagree, with unsure as a neutral choice. To reduce bias approximately one fourth of the items were phrased in the positive direction.

Hinton and Kubas (2006) tested the validity and reliability of the ATHLETE and report the following evidence for use of this measure. Acceptable internal consistency was found among the items, with seven of the nine theoretical subscales having alpha coefficients ranging from .73 to .88. Subscales developed to assess Ineffectiveness and Interoceptive Awareness had alpha coefficients falling below .70, so the items in these subscales were not included in the factor analysis. The factor analysis identified seven meaningful factors, containing 39 items. The Drive for Thinness construct resulted in two separate factors. Factor 1 items center on eating behaviors and sport performance and Factor 2 items measure attitudes toward body weight and sport performance. These two factors were correlated \( r = .65, p < .001 \), and thus were combined into one. There was
internal consistency among items, with an alpha coefficient of .91 for the combined subscales. Reliability estimates using coefficient alpha exceeded .74. The ATHLETE’s five distinct psychological factors (Drive for Thinness and Performance, Social Pressure on Eating, Performance Perfectionism, Social Pressure on Body Shape, and Team Trust) were positively associated with disordered eating in female athletes.

Construct validity was confirmed by the instrument’s convergent and discriminant validity. Convergent validity was evidenced in the strong correlations between subscales of the EDI, SCANS, and ATHLETE, ranging from .45 to .80. The ATHLETE subscales correlated most strongly and frequently with the EDI subscales for Drive for Thinness, Body Dissatisfaction, and Bulimia, which assess attitudes and behaviors related to eating and body shape and which may be disturbed in dieters as well as those with anorexia nervosa (Garner, Olmsted, Polivy, 1983). ATHLETE subscales also exhibited moderate to strong correlations with EDI Interpersonal Distrust, Ineffectiveness, and Perfectionism subscales, which have been identified as aspects of the psychopathology of anorexia nervosa (Garner et al., 1983). For the current study, the composite score (the sum of scores on all six subscales) was used to measure athlete specific disordered eating symptoms on a continuous scale.

Eating Attitudes Test (EAT-26). The EAT-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982) was used to measure general disordered eating behaviors (see Appendix C). The EAT is a 26-item self-report questionnaire assessing characteristics and symptoms of eating disorders. Participants are asked to rate how often they engage in the behaviors, based on a 4-point scoring system (0 = never, rarely, and sometimes; 1 = often; 2 = usually; 3 = always).
The EAT-26 contains three subscales: Dieting, which refers to a desire to be thinner and avoidance of fattening foods; Bulimia and Food Preoccupation, which refers to preoccupation with food and bulimic behaviors; and Oral Control, which refers to self-control around food, even when under pressure from others to eat. For the present study, the total score (the sum of scores on all three subscales) was used to measure general disordered eating symptoms on a continuous scale.

The EAT-26 has been reported to have high internal consistency. In a sample of patients with anorexia nervosa and a comparison group of female university students, coefficient alpha estimates were reported as .90 and .83 respectively (Garner et al., 1982). In another sample of 207 female college athletes, internal consistency reliability coefficients for the subscales scores ranged between .70 and .88 (Doninger, Enders, Burnett, 2005). Convergent validity evidence was established by correlating EAT-26 subscales with body mass index \( r = .24 - .25 \), the difference between self-reported ideal and actual weights \( r = .12 - .45 \), the Drive for Thinness subscale for the EDI-2 \( r = .18 - .88 \), and the Body Dissatisfaction subscale of the EDI-2 \( r = .14 - .65 \).

**Self-Objectification Questionnaire (SOQ).** The SOQ (Noll & Fredrickson, 1998) is based on objectification theory (Fredrickson & Noll, 1997) and the Body Esteem Scale (Franzoi & Shields, 1984) and assesses the extent to which females view their bodies in objectified terms (see Appendix D). Specifically it measures the extent to which the respondent views her body in observable, appearance-based terms or non-observable, competence-based terms. The SOQ diverges from the Body Esteem Scale in that it does not examine one’s satisfaction with her body, as a major tenant of objectification theory.
is that self-objectification is not limited to those who are dissatisfied with their physical appearance.

The SOQ lists ten body attributes: five that are appearance based (physical attractiveness, weight, sex appeal, measurements, and muscle tone) and five that are competence based (muscular strength, physical coordination, health, physical fitness, and physical energy level). Participants are instructed to rank each of the listed body attributes in order of importance to their physical self-concept (rank 0 = least impact; rank 9 = most impact). Scores are computed by summing the ranks for the appearance and competence attributes separately, then computing a difference score. Scores range from -25 to 25, with higher scores reflecting a greater emphasis on appearance, which indicates greater self-objectification.

The Self-Objectification Questionnaire demonstrates satisfactory construct validity. Convergent and divergent validity were established for the SOQ through positive correlation with scores on the Appearance Anxiety Questionnaire (Dion, Dion, & Keelan, 1990), which assesses one’s preoccupation with observable aspects of the physical self ($r = .52, p < .01$), and the Body Image Assessment (Williamson, Davis, Bennett, Goreczny, & Gleaves, 1985), a measure of individuals’ body-size dissatisfaction ($r = .46, p < .01$) (Noll, 1996). Body shame and self-objectification were found to be positively correlated at $r = .54$ (Noll, 1996). Acceptable internal consistency was found among items, with alpha coefficients of .87 to .91 (Noll, 1996).

Demographics questionnaire. Participants completed a demographics questionnaire that included information such as: age, gender, status in school, racial/ethnic origin, height, weight, and sport (see Appendix E).
Procedure

Approval was obtained both from the university’s Institutional Review Board, as well as the Institutional Review Board of each college or university invited to participate in the study. After permission was obtained, the head coach of each team was first recruited through email prior to or during the beginning of the team’s athletic season. A follow-up phone call was made after two weeks to ensure participation. Coaches were informed that data collection would take place at two points - during the team’s athletic season (in-season) and approximately four months after the athletic season has ended (off-season). They were also informed that in-season data collection would take place at a team meeting, with paper-and-pencil surveys, whereas off-season data collection would take place individually with the use of an online survey.

For each team that agreed to participate, a time was scheduled during a practice or a team meeting where a member of the research team collected the data in-person. When this was not possible, each participating team had a designated, non-coaching staff (e.g., the athletic trainer or team manager) individual responsible for the administration of the questionnaires. The designated person was sent a packet of questionnaires to be administered at a team meeting approximately midway through the team’s competitive season (“in-season”). During all data collections the coach was not present during administration of the questionnaire. An explanation of the study was presented to each team by the designated person. Informed consent was obtained from all athletes. Athletes were guaranteed confidentiality for their responses. Completed questionnaires were returned directly to the designated person, who mailed the surveys directly to the principal investigator. At this time, participants were also asked to provide their name,
telephone number and email address, to be used for off-season follow-up purposes (see Appendix F). This information was collected and kept separately from their survey responses to ensure confidentiality.

Athletes were contacted by email, requesting follow-up participation approximately four months after the end of their athletic season. This email included a description of the study, information about one’s rights as a research participant, and a web link that led to the online survey. Individuals who wished to participate acknowledged their informed consent to participate and began the study simply by clicking on the web link provided.

Completion of the questionnaires typically took approximately 20 minutes. Participants first completed the demographics questionnaire, followed by the EDI, ATHLETE, EDDS, and finally the SOQ. Also attached was a list of local resources for obtaining help with eating disorders, which participants were directed to keep for future use. The final page of the questionnaire was a contact information sheet requesting their name, phone number, and email address that would be used for follow-up purposes. Participants were instructed to separate this sheet in order to submit it separate from the survey. In addition, this page asked participants to indicate whether they were interested in being entered into the drawing for a raffle. Students’ contact information was kept separately from their responses to the questionnaires. Participants were tracked using the four-digit month and day of their birth and the last four digits of their social security number.

One incentive for participants to complete the survey during the in-season data collection was their potential involvement in a raffle for one $50 cash prize. Students
were told that each time they complete the questionnaires they would have the opportunity to be entered into a drawing for this prize. During the off-season data collection, participants were able to choose between being entered for the raffle or receiving a $2 or $5 gift card to iTunes or Target (amount increased as the study progressed).

Statistics and Data Analysis

Data was first examined for missing data points, outliers, and tests of the assumptions of normality. Missing data were handled after assessing the effect and trend of the missing data. The effect and seriousness of missing data depends on several factors: the size of the data set, the number of missing cases within that set, and the randomness of the missing data (Tabachnick & Fidell, 2001). The analyses for outliers and normality was done by creating frequency tables and graphs, examining means, variance, kurtosis and skewness statistics for all variables collected.

Data analysis was conducted in a two-step process. The first step in the data analyses, determining the sport group differences, examined the changes in eating disorder symptoms and diagnoses as a function seasonal status. Because different patterns of relationship were expected across the eating disorder variables, between group differences in eating disorder diagnoses were examined through three sets of analysis of variance (ANOVA). Two sets of ANOVAs were conducted to assess for between group differences on each of the three disordered eating variables in and out of the athletic season. To examine the interaction effect between sport type and seasonal status on the three eating disorder variables (i.e., general and athlete-specific eating disorder symptoms and eating disorder diagnoses), a third set of ANOVAs was conducted with three separate
2 (seasonal status) x 3 (sport type) mixed-model univariate analyses. For all analyses, F-values was the test statistic used, and strength of association was described by Eta-squared. Alpha levels will be set at $p < .05$.

It was hypothesized that self-objectification mediates the relationship between sport type and general eating disorder symptoms, as measured by the EAT-26, athlete specific eating disorder symptoms, as measured by the ATHLETE, and eating disorder diagnoses, as measured by the EDDS. Tests of these hypotheses were intended to be accomplished through three separate regression analyses. The mediating effect of self-objectification on the relationship between sport type and disordered eating was examined according to the method recommended by Baron and Kenny (1986), in which sport type is regressed on disordered eating, disordered eating is regressed on self-objectification, and disordered eating is regressed on both sport type and self-objectification to test the mediation effect. It was expected that sport type would be associated with self-objectification and disordered eating, as shown by the first and second regression equations. It was also expected that self-objectification would be associated with each of the disordered eating variables; if the hypothesized mediating effect of self-objectification is true, once self-objectification is entered into the equation, sport type should cease to predict the variance in disordered eating. For these analyses, F-values was the test statistic used, strength of association was described by $R^2$, and all alpha levels were set at $p<.05$. 
Chapter IV

Results

Preliminary Analyses

The preliminary analyses were conducted to evaluate the nature of missing data, the accuracy of data entry, and normalcy of the data. Initial data entry was performed using SPSS 16.0; all data were coded and entered into an SPSS spreadsheet. Two methods were used to address the problem of missing data. First, participants who had not provided sufficient data on the measures included in the study were eliminated from data analysis. Specifically, participants who had not provided responses to more than one question (10.0% of the measure) on the SOQ, more than two questions on the EAT (7.7% of the measure) and the EDDS (7.7% of the measure), or more than three questions on the ATHLETE (7.7% of the measure), were eliminated from analyses. Second, the missing values for remaining participants were imputed based on the mean response for the item across all participants from that sport.

Of the initial 282 participants, 246 participants provided completed responses to all of the in-season questionnaires. Two cases were eliminated because they did not provide sufficient data on the measures included in the study, leaving a sample size of 280 females. An additional 12 participants incorrectly completed the SOQ survey.iii These participants were eliminated from the analysis of the hypotheses relevant to that measure.

Of the 183 participants who provided completed responses to all of the off-season questionnaires during the follow-up, two cases were eliminated because they appeared to be duplicate cases and three cases were eliminated due to inaccurate ID
codes, making it impossible to match them to the in-season data. An additional two cases were eliminated due to insufficient data on the measures included in the study based on the method described above. These eliminations resulted in a sample size of 176 for the analyses examining seasonal status. All 280 participants that completed the entire in-season survey were used in the analysis of self-objectification as a mediator.

The data were examined for incorrect entry with a comparison of the actual student responses on the questionnaires and the data spreadsheet entries for the entire dataset. Results indicated that no incorrect values were entered. An inspection of the minimum and maximum values for out of range and outlying values was completed, and the entire range of answers was used in the completion of the instruments.

Skewness and kurtosis values for each of the variables were examined to assess the assumption of normality for both in- and off-season data. These examinations revealed that the SOQ and ATHLETE scores had normal skewness values at both time points. In-season values were .527 and .511 and off-season values were .482 and .373, respectively. EAT and EDDS scores were positively skewed at both time points, with in-season values of 2.15 and 5.18 and off-season values of 2.02 and 4.08, respectively. Examinations of kurtosis revealed that the SOQ and ATHLETE scores had normal kurtosis values at both time points. In-season values were -.734 and .029 and off-season values were -.575 and -.378, respectively. EAT and EDDS scores were elevated at both time points with in-season values of 6.13 and 25.11 and off-season values of 4.56 and 14.85, respectively. These values are consistent with expectations given the low incidence of eating disorders. Due to the skewness of the EAT and EDDS, data for these variables were transformed by taking the square root of the raw scores and by using the
log 10 transformation to ensure normality. These transformations did not have a significant effect of the results of the analyses, therefore original data were used. Homoscedasticity for the measures was examined using Levene’s statistic. All were non-significant, indicating that the assumption of equal variances was not violated.

ANOVA analyses

The first objective of this study was to examine the differences in eating disorder symptoms and diagnoses across three groups of athletes (i.e., aesthetic lean sport athletes, non-aesthetic lean sport athletes, and non-lean sport athletes). It was hypothesized that the proportion of aesthetic lean sport athletes who met criteria for eating disorder diagnoses would be greater than non-aesthetic lean sport athletes and the comparison group. It was also hypothesized that eating disorder symptoms would be greater for both groups of lean sports than for the control group.

In-season sport differences. Three univariate ANOVAs were conducted, one for each of the surveys, to evaluate the differences across sport type (i.e., aesthetic lean, non-aesthetic lean, and non-lean) during the athletic season. A summary of in-season results are presented in Table 1.

Tests for differences in eating disorder diagnoses, as measured by the EDDS, failed to reach significance across sport types, $F(2, 173) = 1.125, p = ns$. See Table 2 for all mean differences for in-season data. Mean scores for the EAT in this study are consistent with literature examining the validity of the EAT in the female athlete population (Doninger, Enders, & Burnett, 2005). Differences between sports types in eating disorder symptoms as measured by the EAT also failed to reach significance, $F(2, 173) = .291, p = ns.$
For the ATHLETE Questionnaire, athlete specific eating disorder symptoms were significantly different across sport type, $F(2, 175) = 6.818, p = .001$. Estimates of effect size yielded a partial $\eta^2 = .072$. Values of this size are generally considered to indicate a medium strength in association. Bonferroni’s post hoc test was conducted to determine which sport types were significantly different in athlete specific eating disorder symptoms. Results reveal that non-aesthetic lean sport athletes were significantly different from both aesthetic lean sport and non-lean sport athletes. Non-aesthetic lean sport athletes ($M = 12.06$) reported fewer athlete specific eating disorder symptoms than did the other two groups. Aesthetic lean sport ($M = 13.60$) and non-lean sport athletes ($M = 13.95$) were not significantly different with regards to eating disorder symptoms. An additional ANOVA was run to test differences between groups on each of the ATHLETE subscales. However, these results were consistent with the findings from the full scale tests in that non-aesthetic lean sport athletes reported fewer symptoms than the other two groups on each of the subscales. Further, on aesthetic lean sports and non-lean sports were not significantly different from each other on any of the subscales.

*Off-season sport differences.* Three univariate ANOVAs, one for each measure of eating disorder symptoms, were conducted to evaluate the differences across sport type (i.e., aesthetic lean, non-aesthetic lean, and non-lean) approximately four months after the end of the athletic season. A summary of off-season results is presented in Table 3.

When testing for differences in eating disorder diagnoses, as measured by the EDDS, main effect results revealed no significant differences across sport types, $F(2, 171) = .503, p = \text{ns}$. It is important to note, however, that only six participants (2.1%) qualified for a diagnosable eating disorder during the athletic season. As such, the
prevalence rate for eating disorder diagnoses was likely not sufficient to adequately test this hypothesis. The analysis also failed to reveal significant differences between sport types on general eating disorder symptoms as measured by the EAT, $F(2, 170) = .320, p = ns.$ For the ATHLETE, main effect results revealed that athlete specific eating disorder symptoms were significantly different across sport types, $F(2, 171) = 3.391, p = .036$, partial $\eta^2=.038$. Estimates of effect size reveal low strength in associations. Bonferroni’s post hoc test was conducted to determine which sport types were significantly different in eating disorder symptoms. Results reveal that non-aesthetic lean sport athletes were significantly different from non-lean sport athletes. Non-aesthetic lean sport athletes ($M = 12.85$) reported fewer athlete specific eating disorder symptoms than did the non-lean sport athletes ($M = 14.42$). Aesthetic lean sport ($M = 13.66$) and non-lean sport athletes were not significantly different with regards to eating disorder symptoms. See Table 4 for all mean differences for off-season data.

An additional ANOVA was run to test differences between groups on each of the ATHLETE subscales. These results were fairly consistent with the findings from the full scale tests in that non-aesthetic lean sport athletes reported fewer symptoms than the other two groups on each of the subscales with two exceptions. Aesthetic lean sport athletes had significantly lower scores than non-lean sport athletes on the subscales measuring the athlete’s feelings about being an athlete and perceived support from teammates.

Sport by Season Interactions

The second objective of this study was to examine changes in eating disorder symptoms and diagnoses across athletic seasonal status. It was hypothesized that the
incidence of eating disorder diagnoses would remain stable regardless of seasonal status, but that eating disorder symptoms would increase in the athletic season. It was also hypothesized that expected increases in symptoms during the athletic season would be greater for non-aesthetic lean sport athletes and the comparison group than for aesthetic lean sport athletes.

To test these hypotheses, three 2 (seasonal status) X 3 (sport type) mixed-model ANOVAs were conducted to measure the interaction between seasonal status and sport type for each of the three eating disorder measurement tools. When examining general eating disorder symptoms, a significant main effect for seasonal status was obtained, $F(2, 151) = 5.102, p < .03$, though this was a weak effect (partial $\eta^2 = .03$). Contrary to the hypothesized effect, general eating disorder symptoms were significantly lower during the athletic season ($M = 7.13$) than in the off-season ($M = 8.27$). A significant seasonal status X sport type interaction was not obtained, $F(2, 151) = .766, p > .05$. A summary of these results are presented in Table 5.

When examining athlete specific eating disorder symptoms, as measured by the ATHLETE, a significant main effect for seasonal status was obtained, $F(2, 171) = 5.864, p < .02$, though this was a weak effect (partial $\eta^2 = .03$). General eating disorder symptoms were significantly lower during the athletic season ($M = 13.16$) than in the off-season ($M = 13.64$). However, a significant seasonal status X sport type interaction was not detected, $F(2, 171) = .838, p > .05$. A summary of these results is presented in Table 6.

For the EDDS, a significant main effect for seasonal status was not obtained, $F(2, 169) = 1.132, p > .05$. A significant seasonal status X sport type was also not obtained,
\( F (2, 169) = 1.935, p > .05. \) A summary of these results is presented in Table 7. During the off-season, nine athletes (5.1\%) qualified for a diagnosable eating disorder. This prevalence rate likely was not sufficient to adequately test this hypothesis.

**Regression Analyses**

*Self-Objectification as a mediator of sport type and disordered eating.*

The final objective of this study was to test whether self-objectification mediates the relationship between sport type and disordered eating. It was hypothesized that athletes involved in aesthetic lean sports will have higher levels of self-objectification than the other two groups and, in turn, have more disordered eating and less transient eating disorder symptoms.

Medialional analyses were planned to be conducted to test whether self-objectification accounted for the differences in disordered eating across sport types for each of the three eating disorder measures. However, sport type differences were identified only for athlete specific eating disorder symptoms. As such, meditalional analyses were only conducted for the ATHLETE Questionnaire.

According to Baron and Kenny (1986), the following three conditions must be met before mediation can be tested: (a) the predictor variable (e.g., sport type) must correlate with the predicted variable (disordered eating), (b) the predictor variable must correlate with the proposed mediator (e.g., self-objectification), and (c) the proposed mediator must correlate with the predicted variable. If these conditions are met, the predictor variable is entered on the first step of a regression equation and the proposed mediator on the second step to predict the predicted variable. Mediation is demonstrated
when the partial regression coefficient (beta weight) of the predictor variable is substantially reduced once the proposed mediator enters the equation.

When testing for self-objectification as a mediator between sport type and athlete specific eating disorder symptoms, as measured by the ATHLETE, sports were dummy coded into two groups, non-aesthetic lean sports in one group and non-lean and aesthetic lean sports in the other. Results indicated that the first criterion for mediation was met. Sport type was significantly associated with athlete specific eating disorder symptoms, $F(2,272) = 11.089, p < .01, R^2 = .075$. However, sport type was not significantly associated with self-objectification, $F(2,258) = .768, p > .05, R^2 = .006$. Finally, self-objectification was significantly associated with athlete specific eating disorder symptoms $F(1,258) = 16.206, p < .01, R^2 = .059$. These results were unexpected given the hypothesis that individuals aesthetic lean sport athletes would have higher levels of self self-objectification than the other two groups and, thus, report more eating disorder symptomatology. Because the second condition was not met, a test for mediation was not conducted.
Chapter V
Discussion

Current literature suggests that lean sport athletes are at greater risk for the development of an eating disorder than non-lean sport athletes. This idea has significant clinical and practical implications in terms of understanding the impact of sport involvement on mental and physical well-being, as well as in the development of preventive measures and treatment approaches for working with athletes. Unfortunately, the literature to date is inconsistent. Although it appears that lean sport athletes are at greatest risk for the development of eating disorders, the literature lacks a unified classification system for sports, which results in a lack of insight into potential differences between lean sport athlete typology.

The current study set out to clarify some of the inconsistencies in existing literature and examine some of the differences in eating disorder symptoms and diagnoses in aesthetic lean, non-aesthetic lean and non-lean sport athletes. Further, this study examined the differences in eating disorder symptoms and diagnoses across seasonal status. It was theorized that because eating disorders are a pervasive condition, the proportion of individuals with an eating disorder diagnosis would remain stable both in and out of the athletic season. However, some athletes may engage in disordered eating behaviors during the athletic season to meet the demands of the sport, but decrease this behavior in the off-season when the demands are lessened. This behavior would not be characteristic of an eating disorder, which is a mental health concern, but rather would indicate an unhealthy eating behavior.
Discussion of Results

Differences between sports: General eating disorder symptoms and diagnoses. It was hypothesized that aesthetic lean sport athletes would report more eating disorder diagnoses than non-aesthetic lean or non-lean sport athletes and that both lean sport groups would report more eating disorder symptoms than the non-lean sport group. However, results revealed no differences in eating disorder diagnoses and general eating disorder symptoms across sports. While this finding was unexpected, the current study achieved adequate power to detect a moderate effect if one did, in fact, exist. It may be that any existing differences between sports are overpowered by the general societal pressures to be thin as a female in the American culture.

Another explanation for the lack of differences found on the EAT may be attributable to a weakness in the measure. Although EAT scores are commonly summed into a single scale in the eating disorder literature (as was done in this study), Lane, Lane, and Matheson (2004) suggest that the exercisers report higher scores for dieting behaviors than oral control, food preoccupation, and bulimia. This can influence the composite score and mask relatively small, but possibly important indicators of eating disorders. As such, they recommend using each of the EAT subscales independently when measuring exercisers.

Differences between sports: Athlete-specific eating disorder symptoms. When examining athlete-specific eating disorder symptoms, differences between sports were revealed. First, aesthetic lean sport athletes had greater eating disorder symptoms than non-aesthetic lean sport athletes, which supports the hypothesis. Second, non-lean sport athletes were not significantly different than aesthetic lean sport athletes and reported
more eating disorder symptoms than non-aesthetic lean sport athletes. This finding was unexpected; however, it may support the literature that suggests that there are no differences between sports with regards to rates of disordered eating. For example, Kirk, Singh, and Getz (2001) examined disordered eating in a sample of female athletes that included both aesthetic lean and non-lean sport athletes and similarly found no differences between sports. Additionally, in their meta-analysis of 92 studies with 560 effect sizes comparing eating disorder symptoms between athletes and non-athletes, Hausenblas & Carron (1999) suggest that while female athletes in general are at greater risk than non-athletes for various eating disordered behaviors, the magnitude of the risk may be relatively small. It may be that athletic involvement in general, or specific sport involvement, may have less of an impact on one’s eating behaviors than does the general societal pressures to be thin.

Further, while non-aesthetic lean sport athletes reported fewer athlete-specific eating disorder symptoms than the other two groups, a similar pattern was revealed with regards to athlete BMI’s. During both the in-season and off-season non-aesthetic lean sport athletes, on average, had a lower BMI (X = 21.5 and 21.7) than non-lean (X = 23.3 and 23.6) or aesthetic lean (X = 23.2 and 23.4, respectively) sport athletes. It is possible that the body mass index of the athlete, combined with the societal pressure of a woman to maintain a low body weight plays a greater role in disordered eating behaviors than does sport involvement. However, given the conflict with much of the existing research and the hypothesized results, these findings should be considered tentative.

This study set out to examine whether differences existed in disordered eating between lean sport groups. These expected differences were revealed and have important
clinical implications. Some research has suggested that involvement in certain sports may serve as a protective factor against the development of an eating disorder. For example, in a meta-analysis of 34 studies examining the overall relationship between female athletes and eating problems, Smolak et al. (2000) concluded that non-elite, non-lean sports may have a slight protective effect against the development of eating problems. Further, Zucker et al. (1999) examined differences in non-athletes, athletes involved in refereed sports, and athletes involved in judged sports. Results indicated that participation in refereed sports may function as a protective factor against the development of an eating disorder. Although this conclusion cannot be rendered from the current study, results do suggest that non-aesthetic lean sport athletes demonstrate fewer eating disorder symptoms. It is possible that, similar to refereed sports, non-aesthetic lean sport athletes are less at risk for the development of an eating disorder.

One possible explanation for these results is that the energy demands for non-aesthetic lean sport athletes like cyclists and cross country runners require eating and burning large amounts of calories. This may reduce concern with attaining goal weights through extraneous actions because of the caloric expenditure inherently involved in training for the sport. In other words, the mechanism of weight control may be built into the training regimen for these athletes, so the drive for thinness is not as evident. Another explanation for this may have to do with the sample used. The cross-country runners involved in the study came primarily from division III schools, which tend not to have elite level athletes where weight may be more important. Further, the cyclists involved almost 19% graduate students, a population that may be at slightly lower risk for disordered eating (Drewnowski, Hopkins, & Kessler, 1988).
Seasonal status

It was hypothesized that the proportion of athletes with eating disorder diagnoses would remain stable in and out of the athletic season. However, an insufficient number of athletes presented with eating disorder diagnoses to allow this to be adequately tested. It was also hypothesized that eating disorder symptoms would increase during the athletic season across sports and that increases would be greater for non-aesthetic lean and non-lean sport athletes than aesthetic lean sport athletes.

Although results did not reveal differences between sports with regard to changes in disordered eating across seasonal status, athletes did report fewer general and athlete-specific eating disorder symptoms during the athletic season than in the off-season. This, too, was not in the expected direction. Although few studies have examined this relationship with regard to eating behaviors, Dale and Landers (1999) found that wrestlers decreased their disordered eating behaviors during the off-season, when weight demands were diminished. These findings are, however, consistent with findings in other areas. For example, Martens et al. (2006) found that athletes decrease their alcohol use during the athletic season.

One potential explanation for this finding is that, due to the physical demands of the sport, athletes cannot afford to engage in disordered eating behaviors during the athletic season. Another possible explanation is that as the training demands decrease with the end of the athletic season, athletes increase disordered eating behaviors to compensate for the change in caloric expenditure.

Finally, it had been hypothesized that self-objectification would mediate the expected differences in disordered eating between sports in that aesthetic lean sports
would have higher levels of self-objectification than the other two groups. However, because differences were not revealed, this hypothesis was not relevant to be tested. As noted above, there are several possible explanations for the lack of differences found between sports. It is possible that the sample sizes in the current study were too small to detect differences. It is also possible that the self-report measures used failed to detect differences in symptoms between sports.

**Clinical Implications**

Although many expected between-sport differences were not revealed, some of the findings from the current study may have important clinical implications. Three findings seem particularly relevant clinically: non-lean sport athletes (e.g., soccer players) reported more athlete-specific symptoms than non-aesthetic lean sport athletes (e.g., cyclists) both in and out of the athletics season, non-aesthetic lean sport athletes reported fewer athlete-specific symptoms than the other two groups during the athletic season, and athletes report fewer general and athlete-specific eating disorder symptoms during the athletic season than in the off season.

The finding that non-lean sport athletes reported similar levels of athlete-specific eating disorder symptoms to aesthetic lean sport groups, presumably the group at greatest risk for the development of eating disorders, has significant clinical implications. Because of the expectation that lean individuals are at greatest risk for the development of eating disorders, non-lean sport athletes may not be receiving the attention and treatment needed to improve their eating attitudes and behaviors. Disordered eating in these athletes may go overlooked by coaches and other professional staff, leaving these athletes with fewer resources, less communication on the topic, and possibly denial.
regarding the risk of these athletes. Further, in a culture where eating disorders are not discussed adequately, athletes may fear that seeking help for these problems may result in penalties in their play time or that they will be stigmatized by others (Bachner-Melman et al., 2006).

Further, it is unclear what puts these athletes at greater risk for engaging in disordered eating. It is possible that the disordered eating reported by these athletes has less to do with sport involvement and more to do with the pervasive focus on thinness and disordered eating that has become common in our culture. One additional theory that may need to be examined in the future is the possibility that non-lean sports typically require a larger, more powerful structure to play successfully, which conflicts with the traditional expectations of a feminine physique. As such, these females may feel conflicting pressures. It is important to increase awareness of the disordered eating in non-lean sport populations in order to develop effective prevention and treatment programs.

The finding that non-aesthetic lean sport athletes reported fewer eating disorder symptoms than the other two groups may also have important implications for clarifying differences in the clinical needs of lean sport athletes. It appears from the present study that non-aesthetic lean sport athletes are at lower risk for the development of eating disorders than aesthetic lean and even non-lean sport athletes. However, because these athletes are under pressure to maintain a low body weight, it is important for clinicians and coaching staff members to understand the drive and methods for obtaining and maintaining a low body weight. While it may keep these athletes at lower risk for the development of an eating disorder, these athletes may be engaging in unhealthy eating
habits. In combination with the high energy demands of the sport, this may pose serious health risks.

Additionally, presumptions about thin athletes may lead professionals to assume a causal link between disordered eating and sports participation, when the athletic involvement may already be providing a protective factor against the development of an eating disorder. Those working with female college athletes, particularly those involved in non-aesthetic lean sports, need to understand the athletes’ motives behind participation in the sport and specific training methods, including caloric replacement.

Across all sports, there may be a feeling that abnormal weight control methods are normal and acceptable due to the frequency in which they occur. As such, it is critical that coaches, trainers, sport psychologists, and college counseling centers are aware of the risk of problematic eating behaviors in athletes and are trained to detect difficulties and provide access, when needed, to appropriate support and treatment (Bachner-Melman et al., 2006).

Finally, the finding that athletes reported fewer eating disorder symptoms during the athletic season then during the off-season has important clinical implications. Increases in disordered eating during the off-season could have significant ramifications, negatively impacting an athlete’s training and subsequent athletic performance. More importantly, however, it is possible that disordered eating behaviors and eating disorders may be overlooked due to the timing of the screening and coaching staff supervision. Results from this study indicate that more athlete/coach contact may be warranted in the off-season to monitor physical changes that may be due to unhealthy behaviors.
As mentioned previously, disordered eating in the off season can have a negative consequence on subsequent performance. A productive off-season is key for physiological recovery. Proper rest and nutrition are imperative to recovery and necessary for an athlete to be positioned for increases in physical capabilities in the subsequent season. Disordered eating may assist in achieving thinness, but undermines the bodies’ attempt to rebuild itself.

Limitations

There are certain limitations to this study and research of this nature. First, the methodology of this study involved self-report instruments, which allows the possibility that some participants may have provided inaccurate responses. In addition, it is possible that students may have falsified information or misrepresented themselves. However, actions such as excluding coaches during administration of the survey and guaranteeing confidentiality and anonymity were taken to minimize apprehension and encourage truthful responses. In addition, although literature indicates that athletes underreport both the use of certain pathogenic weight control methods and eating disorders in self-report measures (Sundgot-Borgen, 1993), the majority of the research in this area has relied on self-report measures to investigate the constructs of interest in this study.

Another limitation of this study has to do with the measures used to assess general eating disorder symptoms. The EAT-26, though a psychometrically sound means of measuring disordered eating on a continuum, has been criticized for having low positive predictive value due to the rarity of eating disorders (Garfinkel & Newman, 2001). Additionally, as mentioned above, although this study assessed disordered eating on a continuum without differentiating between binging, purging, or restricting behaviors,
using each subscale independently may have revealed additional information regarding eating behaviors.

Another potential limitation of this study is the possibility of self-selection of participants. Individuals who chose to participate in this study may differ in some fundamental way from those who chose not to participate. Additionally, it is also possible that individuals who engage in more extreme unhealthy eating behaviors may have chosen not to participate for fear of being “discovered” by the coach. Cautions were taken to prevent this occurrence, both by assuring the participants of the confidentiality of their responses and ensuring that the coach was not present during data collection.

Similarly is the possibility of self-selection of coaches. Coaches who chose to allow their team to participate in this study may differ in some fundamental way from those who did not allow their team to participate. For example, a coach who suspects his or her team has a high prevalence of eating disorders may opt not to participate in the study for fear of triggering the athletes.

Additionally, due to the nature of the sport, cyclist data was collected at one meet in the Northeast. It happened that many of the athletes at this particular race came from competitive, Ivy league schools, which may self-select a different population of students.

Despite these limitations, this study makes an important contribution to the sport psychology literature by establishing a baseline understanding of changes in disordered eating as an effect of athletic season status and by revealing sport type differences in athlete specific eating disorder symptoms. Although a substantial amount of literature exists examining the prevalence of eating disorders in athletes, only one known study exists examining the effect of seasonal status on disordered eating (Dale & Landers,
Understanding this relationship, as well as the differences between various lean sports, is a critical step in further developing prevention and treatment for athletes.

Future Research

Future research should continue to address these limitations. At a methodological level, future studies should improve on the methodology used in this study by using clinical interviews in addition to self-report when examining disordered eating. This would allow for better detection of clinical eating disorders and disordered eating behavior, and may result in a clearer understanding of between sport differences. Additionally, future studies should utilize a larger sample, which would also allow for better detection of between sport differences.

A paucity of research has examined the role of athletic seasonal status on the disordered eating behaviors of athletes. Additional longitudinal research is needed to better understand the pattern of disordered eating engaged in by athletes. Although expectations of in-season disordered eating were hypothesized, future research may be needed to focus on an understanding of the motivations of weight control and caloric intake of female athletes. These motivations may provide more insight into the seasonal behaviors.

Further, future research should continue to examine other variables that may account for differences between groups. For instance, it is possible that athletic identity, or the degree to which a person identifies as being an athlete, may impact the relationship between sport type and disordered eating. Specifically, individuals with high athletic identity may experience greater sport related pressure to maintain a low body weight than individuals with low athletic identity. Similarly, perceived success at one’s sport may
impact an athlete’s motivations and pressures to obtain or maintain a low body weight through disordered eating behaviors.

The culture of the team and the coaches attitudes and behaviors relative to disordered eating should be examined in future research. These variables may play a significant role on the pressures experienced by the athletes and resulting disordered eating behaviors.

At a theoretical level, future studies should further explore differences in eating disorders and “at-risk” behaviors of athletes from different sport types. A unified classification system must be developed in this area of research in order to more clearly understand which athletes are at greatest risk for the development of eating disorders and to begin to understand what factors contribute to between sport differences. It had been hypothesized that self-objectification may mediate the relationship between sport type and disordered eating. Results from this study did not allow for the testing of this hypothesis. Future research should examine the role of self-objectification, as well as other possible mediators.
References


Appendix A

**Eating Disorder Diagnostic Scale (Stice, Telch, Rizvi, 2000)**

Please carefully complete all questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you felt fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Have you had a definite fear that you might gain weight or become fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Has your weight influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Has your shape influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

5. During the past **6 months** have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances? **YES** **NO**

6. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)? **YES** **NO**

7. How many **DAYS per week** on average over the **past 6 MONTHS** have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7

8. How many **TIMES per week** on average over the **past 3 MONTHS** have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

**During these episodes of overeating and loss of control did you...**

9. Eat much more rapidly than normal?  **YES** **NO**

10. Eat until you felt uncomfortably full?  **YES** **NO**

11. Eat large amounts of food when you didn't feel physically hungry?  **YES** **NO**

12. Eat alone because you were embarrassed by how much you were eating?  **YES** **NO**

13. Feel disgusted with yourself, depressed, or very guilty after overeating?  **YES** **NO**

14. Feel very upset about your uncontrollable overeating or resulting weight gain?  **YES** **NO**

15. How many **times per week** on average over the past **3 months** have you made yourself vomit to prevent weight gain or counteract the effects of eating?
16. How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

18. How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

19. Over the past 3 months, how many menstrual periods have you missed?

0 1 2 3

20. Have you been taking birth control pills during the past 3 months? . .YES NO
Appendix B

ATHLETE Questionnaire (Hinton & Kubas, 2005)

Instructions: This questionnaire asks about different attitudes, feelings and behaviors. Some of the questions relate to food and eating. Others ask about your feelings about yourself as an athlete and as person. THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOUR ANSWERS. YOUR RESPONSE IS ANONYMOUS. Please answer each question very carefully. Thank you.

This portion of the questionnaire asks about a variety of feelings and behaviors related to being an athlete.

Feelings about Being an Athlete
The following statements ask about your feelings about being an athlete. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

- Being an athlete is my most meaningful ability. SA A U D SD
- I cannot imagine what it will be like when I am no longer competing. SA A U D SD
- For me, the ideal job would be to be a professional athlete. SA A U D SD
- I will spend as much time and energy as it takes to train even if it means I will not do as well academically. SA A U D SD
- I will spend as much time and energy as it takes to train even if it means less time being with my friends. SA A U D SD

Your Body and Sports
The following statements ask about your feelings about your body and sports. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

- I would be more successful in my sport if my body looked better. SA A U D SD
- I often wish I were leaner so I could perform better. SA A U D SD
- Because of my sport, I am very careful to not gain weight. SA A U D SD
- I am trying to lose weight for my sport. SA A U D SD
I train more than is required by my sport to burn more calories.  
SA A U D SD

I restrict my diet even when my sport is not in season.  
SA A U D SD

I spend a lot of time thinking about how many calories I have burned during practice or training each day.  
SA A U D SD

I worry that my diet may limit my ability to perform to my potential.  
SA A U D SD

When practice is shorter or less intense than usual I will compensate by either exercising on my own or by eating less.  
SA A U D SD

I feel guilty when my team is tapering before a big event.  
SA A U D SD

I do not feel any pressure to change my diet.  
SA A U D SD

I am able to eat what I would like regardless of what my teammates are eating.  
SA A U D SD

**Feelings about Performance**  
The following statements ask you about your feelings about your performance in practice and competition. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

No matter how successful I am, I never feel satisfied.  
SA A U D SD

My parents expect more of me athletically than I do of myself.  
SA A U D SD

Even when my parents praise me, I feel that they really think I could have done better.  
SA A U D SD

Even when my coach praises me, I feel that he/she really thinks I could have done better.  
SA A U D SD

I feel my parents care more about my athletic performance than I do.  
SA A U D SD

I worry about my letting my parents down if I don’t play/perform up to their expectations.  
SA A U D SD
I worry about my letting my coach down if I don’t play/perform up to his/her expectations. SA A U D SD

**Support From Your Teammates**
The following statements ask about your feelings about your coach and teammates. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

It is hard to get close to my teammates because we are constantly competing against each other. SA A U D SD

I do not open up to others on my team because I am afraid they will talk about me to the coach or other teammates. SA A U D SD

My teammates are some of my closest friends. SA A U D SD

I trust my teammates and talk to them about my true feelings. SA A U D SD

**Feelings About Your Body**
These questions ask about how other people in your life make you feel about your body. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

My friends (non-athletes) make me feel I am too fat. SA A U D SD

My coach makes me feel I am too fat. SA A U D SD

My mom makes me feel I am too fat. SA A U D SD

My dad makes me feel I am too fat. SA A U D SD

My teammates make me feel I am too fat. SA A U D SD

Society makes me feel I am too fat. SA A U D SD

**Feelings About Eating**
The following statements relate to feelings about eating. Please circle the response that best describes your feelings: Strongly Agree (SA), Agree Somewhat (A), Unsure (U), Disagree Somewhat (D) or Strongly Disagree (SD). Thank you.

I feel uncomfortable eating in front of my friends (non-athletes). SA A U D SD

I feel uncomfortable eating in front of my coach. SA A U D SD

I feel uncomfortable eating in front of my mom. SA A U D SD
I feel uncomfortable eating in front of my dad.  
I feel uncomfortable eating in front of my teammates.
## Eating Attitudes Test (Garner, 1997)

Please check a response for each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Am terrified about being overweight</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. Avoid eating when I am hungry</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. Find myself preoccupied with food</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. Have gone on eating binges where I feel that I may not be able to stop</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. Cut my food into small pieces</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. Aware of the calorie content of foods that I eat</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. Particularly avoid food with a high carbohydrate content (i.e. bread,</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>rice, potatoes, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Feel that others would prefer if I ate more</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9. Vomit after I have eaten</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10. Feel extremely guilty after eating</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11. Am preoccupied with a desire to be thinner</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12. Think about burning up calories when I exercise</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13. Other people think that I am too thin</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14. Am preoccupied with the thought of having fat on my body</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15. Take longer than others to eat my meals</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16. Avoid foods with sugar in them</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>17. Eat diet foods</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>18. Feel that food controls my life</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>19. Display self-control around food</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>20. Feel that others pressure me to eat</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>21. Give too much time and thought to food</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>22. Feel uncomfortable after eating sweets</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>23. Engage in dieting behavior</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>24. Like my stomach to be empty</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>25. Enjoy trying new rich foods</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>26. Have the impulse to vomit after meals</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
Appendix D

Self-Objectification Questionnaire (Noll & Fredrickson, 1998)

I am interested in how people think about their bodies. The questions below identify 10 different body attributes. I would like you to rank order these body attributes from that which has the greatest impact on your physical self-concept (rank this as a “9”), to that which has the least impact on your physical self-concept (rank this as a “0”).

Note: It does not matter how you describe yourself in terms of each attribute. For example, fitness level can have a great impact on your physical self-concept regardless of whether you consider yourself to be physically fit, not physically fit, or any level in between.

Please first consider all attributes simultaneously, and record your rank ordering by writing the ranks in the rightmost column.

IMPORTANT: Do Not Assign The Same Rank To More Than One Attribute!

9 = greatest impact
8 = next greatest impact
7 = next to least impact
1 = next to least impact
0 = least impact

When considering your physical self-concept...

1…what rank do you assign to physical coordination? _____
2…what rank do you assign to health? _____
3…what rank do you assign to weight? _____
4…what rank do you assign to strength? _____
5…what rank do you assign to sex appeal? _____
6…what rank do you assign to physical attractiveness? _____
7…what rank do you assign to energy level (e.g., stamina)? _____
8…what rank do you assign to firm/sculpted muscles? _____
9…what rank do you assign to physical fitness level? _____
10…what rank do you assign to measurements (e.g., chest, waist, hips)? _____
Appendix E

Demographic Questionnaire

Instructions: Please provide the following demographic information, to the best of your ability.

1. Gender: Male Female

2. Age:__________

3. Ethnic Origin:
   a. White (non-Hispanic)
   b. Asian/Pacific Islander
   c. Hispanic
   d. Black (non-Hispanic)
   e. Native American
   f. Multiracial
   g. Other

4. Classification:
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Graduate Student

5. Sport:
   a. Gymnastics
   b. Figure skating
   c. Cycling
   d. Cross-country running
   e. Field hockey
   f. Soccer

6. How tall are you? _____ft_____in.

7. How much do you weigh? If uncertain, please give your best estimate ______lbs.

8. Please estimate your highest weight (excluding pregnancy): ______lbs.

9. Please estimate your lowest adult weight: ______lbs.

10. What is your desired weight? ______lbs.

11. My frame size is: small medium large

12. Age at first menstrual period: __________

13. After you began menstruating, what was the longest time you ever went between menstrual periods _____? How long ago ______?

14. Have you ever been diagnosed with an eating disorder? ……YES NO

15. What sports (include dance) have you trained for or played competitively during your lifetime and at what ages?________________________________________

16. Do you receive an athletic scholarship? YES NO NA

17. If you are not currently in your competitive season, are you engaging in some type of formal competition? (e.g., road races) YES NO NA
   a. If so, please rate the importance of these competitions to you.

   1 = not at all important
   10 = extremely important
   1 2 3 4 5 6 7 8 9 10

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Appendix F

Follow-up Contact Information

We would like to contact you approximately two months after the end of your athletic season to complete another round of questionnaires, which will be sent to you via email and completed online. At that time, you will also be given another chance to enter the drawing for one of three $50 prizes. Please take a moment to provide your contact information so that may send you an invitation to participate. Please detach this sheet prior to submitting your survey, so that this information is kept separate from your survey responses. This information will not be used for any other purpose than to contact you regarding the next round of questionnaires. You do not need to provide your name.

____________________________________
Email address

____________________________________
Phone number
Table 1.

*In-season Sport Differences ANOVA Summary Table.*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAT</td>
<td>33.78</td>
<td>2</td>
<td>16.89</td>
<td>.291</td>
<td>.748</td>
<td>.003</td>
</tr>
<tr>
<td>ATHLETE</td>
<td>112.92</td>
<td>2</td>
<td>56.46</td>
<td>6.81</td>
<td>.001</td>
<td>.072</td>
</tr>
<tr>
<td>EDDS</td>
<td>.074</td>
<td>2</td>
<td>.037</td>
<td>.037</td>
<td>.327</td>
<td>.013</td>
</tr>
</tbody>
</table>
Table 2.

*Means by Sport In-season Data Summary Table.*

<table>
<thead>
<tr>
<th>Sport type</th>
<th>EAT</th>
<th>ATHLETE</th>
<th>EDDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Aesthetic lean</td>
<td>6.70</td>
<td>6.04</td>
<td>13.60</td>
</tr>
<tr>
<td>Non-aesthetic lean</td>
<td>7.71</td>
<td>9.78</td>
<td>12.06</td>
</tr>
<tr>
<td>Non-lean</td>
<td>6.79</td>
<td>6.96</td>
<td>13.95</td>
</tr>
</tbody>
</table>
Table 3.

*Off-season Sport Differences ANOVA Summary Table.*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAT</td>
<td>50.66</td>
<td>2</td>
<td>25.33</td>
<td>.320</td>
<td>.726</td>
<td>.004</td>
</tr>
<tr>
<td>ATHLETE</td>
<td>70.91</td>
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<td>35.45</td>
<td>3.39</td>
<td>.036</td>
<td>.038</td>
</tr>
<tr>
<td>EDDS</td>
<td>.050</td>
<td>2</td>
<td>.025</td>
<td>.503</td>
<td>.605</td>
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</table>
Table 4.  

*Means by Sport Off-season Data Summary Table.*

<table>
<thead>
<tr>
<th>Sport type</th>
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<th></th>
<th>EAT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Aesthetic lean</td>
<td>7.96</td>
<td>8.15</td>
<td>13.66</td>
<td>3.14</td>
<td>.07</td>
<td>.25</td>
</tr>
<tr>
<td>Non-aesthetic lean</td>
<td>8.52</td>
<td>11.44</td>
<td>12.85</td>
<td>3.32</td>
<td>.06</td>
<td>.24</td>
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<tr>
<td>Non-lean</td>
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<td>7.15</td>
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<td>3.24</td>
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</table>
Table 5.

*EAT Season by Sport Two-Way ANOVA Summary Table.*

<table>
<thead>
<tr>
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<th>F</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport type</td>
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<td>54.79</td>
<td>.431</td>
<td>.651</td>
<td>.006</td>
</tr>
<tr>
<td>Seasonal status</td>
<td>98.22</td>
<td>1</td>
<td>98.22</td>
<td>5.10</td>
<td>.025</td>
<td>.033</td>
</tr>
<tr>
<td>Sport type x Seasonal Status</td>
<td>29.481</td>
<td>2</td>
<td>14.74</td>
<td>.766</td>
<td>.467</td>
<td>.010</td>
</tr>
</tbody>
</table>
Table 6.

*ATHLETE Season by Sport Two-Way ANOVA Summary Table.*

<table>
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<tr>
<th>Source</th>
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<th>MS</th>
<th>F</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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<td>2</td>
<td>2.85</td>
<td>.838</td>
<td>.434</td>
<td>.010</td>
</tr>
</tbody>
</table>
Table 7.

**EDDS Season by Sport Two-Way ANOVA Summary Table.**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport type</td>
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<td>2</td>
<td>.001</td>
<td>.13</td>
<td>.987</td>
<td>.000</td>
</tr>
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<td>.036</td>
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<td>.289</td>
<td>.007</td>
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<td>.061</td>
<td>1.94</td>
<td>.148</td>
<td>.022</td>
</tr>
</tbody>
</table>
Footnotes

1. The term *eating disorder* will be used to refer only to the clinical diagnosis of eating disorders whereas the term *disordered eating behaviors* will be used to refer to eating disorder symptoms.

ii. University club teams were used for synchronized skating and cycling. Because clubs are the highest level of intercollegiate skating and cycling competition, it is comparable to varsity sport.

iii. Rather than ranking items from 0-9, using each number only once, these participants rated each item on a scale of 0-9.