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The purpose of this present study was to examine subclinical eating disorders among female collegiate athletes. Specifically, this study investigated the prevalence of subclinical eating disorders among athletes, compared the prevalence among athletes and non-athletes, and explored differences in the prevalence among sports. Also, the present study investigated athletic identity and self-presentational perfectionism as possible risk factors associated with subclinical eating disorders.

Two hundred forty-five female athletes from ten different sports at four universities and sixty-one female non-athlete students from two different universities participated in this study. Those over the age of 24 or who had previously been diagnosed with a clinical eating disorder were excluded. All participants completed surveys including demographic information, the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the Eating Disorder Inventory, the Eating Attitudes Test, the Body Shape Questionnaire, the Body Attractiveness subscale of the Physical Self Perception Profile, the Eating Disorder Inventory Symptom Checklist, the Athletic Identity Measurement Scale, and the Perfectionistic Self-Presentation Scale.

The results indicated that athletes do not have a greater prevalence of subclinical eating disorders than non-athletes. However, 7% of athletes still met the classification criteria for a subclinical eating disorder. Also, athletes exhibited a high frequency in meeting each of the 6 criteria (ranging from 8.2% to 71.8%), which indicated that eating pathology was evident among the athletes. There was no significant difference in the

prevalence of subclinical eating disorders among different sports, which suggests that all sports are at risk. Finally, athletic identity and self-presentational perfectionism were found to be risk factors associated with subclinical eating disorders for athletes.

SUBCLINICAL EATING DISORDERS AMONG
FEMALE COLLEGIATE
ATHLETES

by

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APPROVAL PAGE

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CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Female collegiate athletes have been identified as a population at risk for developing eating disorders (Davis, 1992; Johnson, 1994; Johnson, Powers, & Dick, 1999; Petrie, 1993; Sundgot-Borgen, 1994). This risk may be due to the emphasis the sport environment places on obtaining an optimal weight and body shape for athletic performance, along with the athlete's unrealistic expectations of a muscular body with little to no fat. Despite the competitive advantages athletes may obtain (or think they obtain) by controlling their body weight, those involved with athletics should be aware of potentially unhealthy and dangerous practices (such as excessively restricting caloric intake, self-induced vomiting, taking diuretics, laxatives, or diet pills). Because clinicians only have criteria to diagnose full blown eating disorders such as Anorexia Nervosa and Bulimia Nervosa, coaches and athletes may only recognize these disorders as problematic. Many athletes, however, show eating disorder symptoms without meeting all criteria necessary to receive a diagnosis. For example, unlike persons with Anorexia Nervosa, athletes may not be drastically below a healthy weight for their height due to their large muscle masses, yet they may be just as likely to experience health problems and performance decrements as Anorexic or Bulimic patients. Furthermore, athletes may demonstrate sound mental health (compared to psychiatric patients who have been diagnosed with clinical eating disorders), but be at risk for subclinical eating

disorders due to their sport experiences (Parker, Lambert, & Burlingame, 1994; Beals & Manore 1994).

The present study is designed to examine subclinical eating disorders and possible risk factors for subclinical eating disorders among female collegiate athletes. It is expected that athletes will have a higher prevalence of subclinical eating disorders compared to non-athletes. Additional comparisons will further investigate if some sports have a higher prevalence of subclinical eating disorders than other sports. The present study will also examine athletic identity and self-presentational perfectionism as risk factors. It is expected that athletes classified with subclinical eating disorders will have stronger athletic identities and increased self-presentational perfectionism. The results of this study may alert coaches and athletic personnel to the prevalence, possible risk factors, and concerns related to subclinical eating disorders.

The review of relevant literature is presented in five main sections. The first section will define clinical eating disorders. The second section will define subclinical eating disorders. The third section will examine the prevalence of subclinical eating disorders in sport. The fourth section will discuss health and performance consequences associated with athletes who exhibit subclinical eating disorder symptoms. The fifth and final section will examine risk factors of subclinical eating disorders among athletes. Perceived body weight, negative body image, the sport environment, personality, self-presentational perfectionism, athletic identity, and type of sport will be discussed.

Defining Clinical Eating Disorders

It is important to first note the diagnostic criteria for subclinical and clinical eating disorders for subsequent reference. Eating disorders can be conceptualized on a continuum, with clinically diagnosed eating disorders, such as Anorexia Nervosa and Bulimia Nervosa, being the most severe. The Diagnostic and Statistical Manual, fourth edition (DSM-IV) is the assessment criteria used by clinicians which outlines the psychological, behavioral, and physical criteria that must be exhibited by patients to warrant a clinical eating disorder (APA, 2000). Although the DSM-IV eating disorder criterion is comprehensive, it does not include criteria for possible subclinical problems.

Anorexia Nervosa, Bulimia Nervosa, and Eating Disorders Not Otherwise Specified (EDNOS) are the classifications for eating disorders listed in the DSM-IV. The diagnostic criteria for Anorexia Nervosa (APA, 2000) includes: “(a) refusal to maintain body weight at or above a minimally normal weight for age and height; (b) intense fear of gaining weight or becoming fat, even though underweight; (c) disturbance in the way in which one’s body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight; and (d) in postmenarcheal females, amenorrhea” (p. 589). Patients with Anorexia Nervosa can be more specifically classified into the restricting type or the binge-eating/purging type.

The diagnostic criteria for Bulimia Nervosa (APA, 2000) includes: “(a) recurrent episodes of binge eating, (b) recurrent inappropriate compensatory behavior in order to prevent weight gain, (c) the binge eating and inappropriate compensatory behaviors both

occur, on average, at least twice a week for 3 months, (d) self-evaluation is unduly influenced by body shape and weight, and (e) the disturbance does not occur exclusively during episodes of Anorexia Nervosa” (p. 594). Bulimia Nervosa is further classified into two subtypes: purging type and non-purging type.

EDNOS is a third classification outlined in the DSM-IV, which acknowledges the existence of a variety of eating disturbances that may not fit into Anorexia Nervosa or Bulimia Nervosa classifications. For example, EDNOS (APA, 2000) includes: “(a) for females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses; (b) all of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual’s current weight is in the normal range; (c) all of the criteria for Bulimia Nervosa are met except the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months; (d) the regular use of inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of 2 cookies); (e) repeatedly chewing and spitting out, but not swallowing, large amounts of food; and (f) binge eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of Bulimia Nervosa” (p. 594). Although the classification of EDNOS accounts for situations in which symptoms do not clearly fit into either Anorexia Nervosa or Bulimia Nervosa, the diagnostic criteria for EDNOS remains severe. As a result, no criteria or guidelines exist for identifying those who demonstrate

lower frequencies of or less severe symptoms than what's considered clinical, therefore falling into "subclinical" range.

Defining Subclinical Eating Disorders

Many athletes exhibit pronounced eating disorders symptoms, but do not meet all of the diagnostic criteria for Anorexia Nervosa, Bulimia Nervosa, or EDNOS, as outlined in the DSM-IV (Beals & Manore, 1994; Black & Burkes-Miller, 1988; Johnson, 1994; Johnson, Powers, & Dick, 1999; Petrie, 1993; Rosen & Hough, 1988; Rosen, McKeag, Hough, & Curley, 1986; Sundgot-Borgen, 1994). These athletes may be considered as having a subclinical eating disorder. Subclinical eating disorders may result in various health problems and performance decrements, yet are often not recognized as problematic (Beals & Manore, 2002; Beals & Manore, 1994; Brownell, Steen, & Wilmore, 1987). One main reason people are unaware of subclinical eating disorders may be due to a lack of classification for them in the DSM-IV. Furthermore, the paucity of research on subclinical eating disorders may explain the lack of awareness and contribute to the minimal recognition of subclinical eating disorders.

It is important to study subclinical eating disorders among athletes because a major criticism of the DSM-IV clinical eating disorder criteria is that it does not apply especially well to athletes. For example, the body weight criterion for Anorexia Nervosa, which is 15% lower than expected by age and height tables, does not take muscle mass into account (muscle weighs more than fat). Most athletes have more lean body mass than non-athletes, thus an athlete may be the same weight as a non-athlete but have much

more muscle and much less fat. Athletes may also experience pressures to maintain an ideal weight and body composition, yet due to their muscle weight their body weight may not be significantly lower (as much as 15%) than an average weight for height. Thus, their large muscle mass and low body fat may put them at risk, even though their weight may be normal. Therefore, an athlete's weight, even if it is considered normal or only 5% lower than expected, may actually be too low. Thus, athletes, coaches, and athletic trainers need more alternative criteria appropriate for sport, such as significant body image disturbances and pathological weight control methods, to identify athletes as having a clinical eating disorder, or a subclinical problem deserving attention.

Sundgot-Borgen (1994) and Beals and Manore (2000) have produced the best current research and alternative guidelines for identifying subclinical eating disorders among athletes. Sundgot-Borgen recognized that athletes were a population at risk for eating disturbances, and modified criteria for a subclinical version of Anorexia Nervosa that she labeled Anorexia Athletica. These guidelines are based on the data collected from the interviews of 103 at-risk athletes and 30 athlete controls screened from 522 elite female athletes. The athletes were considered at risk for eating disorders if they had elevated scores on the Drive for Thinness (=15) and Body Dissatisfaction (=10) subscales of the Eating Disorder Inventory (EDI). To be diagnosed with Anorexia Athletica, the athlete has to exhibit all of the following criteria: (a) below 5% of normal body weight by height and weight, (b) gastrointestinal complaints, (c) absence of medical illness or affective disorder explaining the weight reduction, (d) excessive fear of becoming fat, and (e) restriction of caloric intake to 1200 calories or less. Plus, the athletes must also

demonstrate one or more of the following: (f) use of purging methods, (g) binge eating, (h) compulsive exercising, (i) delayed puberty, (j) menstrual dysfunction, or (k) disturbed body image.

In 2000, Beals and Manore attempted to further define Sundgot-Borgen's (1994) criteria. They argued that some features of Anorexia Athletica were not well defined, and others, such as the restriction of caloric intake below 1200 calories, were too exclusionary (especially since athletes have much greater energy expenditures than non-athletes). After screening 65 female athletes through questionnaires and interviews, they selected 25 athletes with subclinical eating disorders and 25 athlete controls. To be initially classified as having a subclinical eating disorder, an athlete had to demonstrate a high score associated with disordered eating on at least 3 of 5 surveys (the Drive for Thinness, Bulimia, and Body Dissatisfaction subscales of the EDI, the Eating Disorder Inventory Symptom Checklist (EDI-SC), and the Body Shape Questionnaire (BSQ) and meet at least 2 but fewer than 4 of the DSM-IV criteria for Anorexia Nervosa and Bulimia Nervosa. To be a control subject the athlete could not demonstrate more than one high score on any of the surveys and could meet no more than one of the DSM-IV criteria for Anorexia Nervosa and Bulimia Nervosa. Based on their results, the following set of characteristics for female athletes with subclinical eating disorders were identified: (a) preoccupation with food, calories, and body weight; (b) distorted body image or dissatisfaction with body weight or shape; (c) undue influence of body weight or shape on self-evaluation; (d) intense fear of becoming fat, gaining weight, or feeling fat; (e) attempts to reduce body weight or maintain reduced body weight; (f) strict dietary rules

followed by extreme guilt upon breaking the rules; and in some cases, (g) menstrual dysfunction. Although these characteristics are similar to those defined in Anorexia Athletica, it is obvious that there is still not one clear definition that would enable someone to easily detect an athlete with a subclinical eating disorder. However, Beals and Manore's criteria seem to be the best diagnostic standards currently available to determine the prevalence of subclinical eating disorders among athletes.

Prevalence of Subclinical Eating Disorders

It is difficult to approximate the prevalence of subclinical eating disorders among female athletes because a universal and clear definition has not yet been widely established. Varying methodologies are being used to measure different definitions causing a wide range of prevalence estimates. Since no clear definition of subclinical eating disorders exists or is recognized, it is unlikely that University athletic departments are even aware of what subclinical eating disorders are, how prevalent they may be, or potential negative health and performance consequences associated with them. Therefore it seems likely that subclinical eating disorders may be largely undetected and untreated among athletes.

Much of the research that has examined prevalence has included at-risk athletes, who do not meet DSM-IV criteria but may be exhibiting subclinical eating disorder symptoms. Scores from the EDI, the Eating Attitudes Test (EAT), or other self-developed questionnaires have been used to identify athletes at risk for eating disorders. However, studies use different criteria to determine who is at risk for an eating disorder

(i.e., Anorexia Nervosa or Bulimia Nervosa). The following results are from studies that examined athletes identified as at-risk for an eating disorder.

Sundgot-Borgen's work (1994), found that 22% of elite female athletes were at risk for developing an eating disorder, and that 89% of those identified at risk also met criteria for Anorexia Nervosa, Bulimia Nervosa, or Anorexia Athletica.

A study of NCAA Division I female athletes investigated athletes at risk for eating disorders (Johnson et al., 1999). Athletes were identified as at risk for Anorexia Nervosa if they exhibited a BMI less than or equal to 20 kg/m^2 , amenorrhea, or elevated scores on the EDI Drive for Thinness or Body Dissatisfaction subscales. Athletes were identified as at risk for Bulimia Nervosa if they reported 6 episodes of binge eating or vomiting, laxative or diuretic abuse, use of diet pills, or elevated scores on either EDI subscales. The results showed that 25% of athletes were at risk for Anorexia Nervosa and 58% were at risk for Bulimia Nervosa.

Beals and Manore (2002) found that 15.2% of female college athletes were at risk for Anorexia Nervosa and 32.4% were at risk for Bulimia Nervosa based on scores from the EAT and Body Dissatisfaction subscale of the EDI, thus supporting the prevalence of subclinical disturbances. Only 3.3% met the criteria for Anorexia Nervosa and 2.3% for Bulimia Nervosa.

Petrie (1993) found 61.3% of NCAA Division I gymnasts were classified as having a subclinical eating disorder (he categorized the athletes as intermediate eating disordered along an eating disorder continuum) based on scores on the Bulimia Test-Revised.

Another method that has been used to estimate the prevalence of subclinical eating disorders is the investigation of pathogenic eating behaviors and weight control methods. Many athletes routinely engage in pathogenic eating behaviors and weight control methods (such as chronic dieting, fasting, laxative use, diet pills, diuretics, and vomiting) during their competitive season in attempt to achieve or maintain a certain weight for peak performance. The increased use of pathogenic eating as a weight control method is a serious health concern for athletes especially because of the increased physical demands they endure compared to non-athletes or non-active people.

Rosen, McKeag, Hough, and Curley (1986) reported that 32% of 182 intercollegiate female athletes practiced at least one pathogenic weight control method. In 1988, Rosen and Hough examined 42 collegiate gymnasts, and found that all of them were actively attempting to diet for performance enhancement and appearance, and 62% were using at least one pathogenic weight control method. Johnson et al. (1999) examined 562 female NCAA Division I athletes and found that 27% reported binge eating, 23.9% reported vomiting as weight control, 11.7% use laxatives, 3.9% use diuretics, and 14.3% use diet pills. Similarly Black and Burkes-Miller (1988) found that 30.7% of female collegiate athletes in 8 different sports used pathogenic weight reduction methods.

These studies clearly demonstrate the frequency that athletes engage in pathogenic eating behaviors and weight control methods. These weight control methods may be reflective of subclinical eating disorders. Thus, pathogenic weight control methods may be warning sign for coaches, athletic trainers, and teammates.

Health and Performance Consequences

It is important to determine the prevalence of subclinical eating disorders among female athletes considering the potential health consequences and performance decrements that may occur as a result. The female athlete triad is one major consequence of disordered eating among female athletes (Beals & Manore, 2002; Beals & Manore 1994; Brownell et al., 1987; Johnson et al., 1999). The triad is characterized by disordered eating behaviors, which lead to amenorrhea, and, in turn, lead to decreased bone mass density and eventually premature osteoporosis.

One study which examined eating attitudes and caloric intakes among 21 female competitive ice skaters reported nutritional risk factors were associated negative health consequences (Ziegler et al., 1998). The twenty-one athletes, on average, only consumed 82% of the Recommended Dietary Allowance (RDA) for energy intake. Furthermore, when they calculated their extra energy expenditure due to their demanding training, they only met 66% of the RDA energy intake. One consequence of their low energy intake was that 9 of the 17 athletes who had already begun menstruation had irregular periods. Thus, these skaters, and perhaps other athletes, may be in a state of energy deficit which can cause amenorrhea and lowered bone density and ultimately lead to bone injury.

Lebenstedt, Platte, and Pirke (1999) specifically investigated metabolism, nutrition, and menstrual function. Twelve of thirty-three (36%) normal weight female endurance athletes had a disturbed menstrual cycle. Their resting metabolic rate was significantly lower compared to athletes with normal menstruation.

Beals and Manore (2002) also examined different aspects of the female athlete triad with 425 female collegiate athletes. Thirty percent of the athletes displayed attitudes and behaviors of disordered eating, and 31% of those not taking birth control to regulate their periods reported menstrual irregularities. Those athletes that exhibited disordered eating more frequently also had more bone injuries during their college career.

Higher rates of menstrual dysfunction were also detected in athletes with subclinical eating disorders (61%) compared to a control group (3%) (Beals & Manore, 2000). Also, more athletes with subclinical eating disorders reported using birth control pills to regulate their periods.

A questionnaire distributed to 562 NCAA Division I intercollegiate female athletes found that their intent was to stop their menstruation (Johnson et al., 1999). The overall goal of these female athletes who restrained their diet was to reduce their body fat content so low that it would result in amenorrhea. This restrained dietary intake displayed by athletes has serious consequences and warrants attention among those involved with University athletics.

Dietary restraint and pathogenic weight control methods put athletes at an increased risk for other health problems that may also hinder performance. Although the athlete may not appear unhealthy (compared to a patient with Anorexia Nervosa) pathogenic weight control techniques may place them at risk for hypokalemia, hypoglycemia, or excessive adrenergic stimulation, which ultimately impairs strength, speed, endurance, and reflexes (Rosen et al., 1986). A review by Brownell et al. (1987) showed that many athletes lose weight rapidly over a short period of time, which

minimizes the loss of fat and leads to a substantial loss in lean tissue and water, both essential to athletes' performance. Thus, performance ultimately decreases due to loss of strength. A 1994 review by Beals and Manore found that the inadequate nutrient intake of those with subclinical eating disorders deprives the body of energy to perform because it does not receive the carbohydrate needed to replace glycogen and the protein needed for tissue building and repair. Therefore the performance of athletes with subclinical eating disorders will suffer as a result. Furthermore, during severe malnutrition, oxygen consumption dramatically decreases (up to 28%), which may drastically impair athletes' performance in sports requiring aerobic fitness. Additionally, chronic nutrient deficiency can lead to chronic fatigue, increased susceptibility to infection, poor or delayed healing/recovery from injury, anemia, electrolyte imbalances, cardiovascular changes, endocrine abnormalities, and low bone mineral density. Thus athletes with chronic nutrient deficiency are more likely to become sick or injured, and have more difficulty maintaining or regaining their health and fitness. Chronic nutrient deficiency may also lead to depression and obsession with food and weight, both which, in turn, may lead to clinical eating disorders and other serious health issues. Negative affective disturbances (i.e., depression, anxiety) are also likely to hinder an athlete's performance.

Unfortunately the adverse health outcomes of subclinical eating disturbances may not be seen immediately because it takes time for the body to adapt to the metabolic changes, leaving the athlete unaware of the damage she is inflicting upon herself (Johnson, 1994). Also, since these negative performance and health consequences are

not immediate and do not occur at the same time, the athlete may not realize that her performance and health decrements are consequences of her dietary restraint.

Risk Factors

Because research shows an increased prevalence of subclinical eating disorders among athletes and negative health consequences associated with subclinical eating disorders, it may be useful to delineate the risk factors in order to better identify those at risk. The following section will discuss four main factors (perceived body weight, body image, unique pressures in the sport environment, and personality) that have been suggested to contribute to subclinical eating disorders. Self-presentational perfectionism and athletic identity will also be discussed in the present study as additional personality risk factors. In addition, the type of sport will be examined as a possibility. It is also important to note that it is the combination of many different factors, and not just one sole determinant, that contribute to eating disturbances.

Perceived Body Weight

Some people, who are underweight by objective measures, may be dissatisfied with their bodies and desire to be thinner. This distorted perceived body weight is related to an increased risk of subclinical eating disorders (Davis, 1992). Athletes, as a population, tend to be more fit than non-athletes. However many athletes who are underweight have a distorted body image in that they perceive themselves as too big (this may also be associated with perfectionism tendencies). Davis (1992) indicates that one's subjective body size, as opposed to actual size, influences dieting and body satisfaction

behaviors and attitudes. Davis also found that athletes weighed significantly less than controls (and also had more muscle) but also had significantly more weight and body image concerns. The athletes who were underweight (according to BMI) wanted to be thinner, were dissatisfied with their body, and engaged in dieting frequently.

Negative Body Image

A second factor related to increased risk of subclinical eating disorders is negative body image. It has been suggested that athletes have a heightened body awareness, which in turn makes them more prone to body image concerns (Johnson, 1994). In Beals and Manore's study (2000), subclinical eating disordered athletes reported more body image disturbances than controls. Williamson et al. (1995) found that over-concern with body size was the primary risk factor in the development of an eating disorder in 98 intercollegiate athletes participating in a variety of sports. They found that if an athlete was over-concerned with her body size, then social influence for thinness, anxiety about athletic performance, and negative appraisal of athletic achievement, were risk factors shown to be strongly predictive of eating disorder symptoms. Ziegler et al. (1998) also measured body satisfaction. They found that their sample of 20 elite female ice skaters viewed themselves as normal or underweight, and that while most were satisfied with their physical attractiveness and body shape, they still wanted to lose weight. Perhaps external factors stressing the ultra-thin build specific to figure skating contributed to their desire to be even thinner, which suggests the influence of environmental factors in sport.

The Sport Environment

Thirdly, despite being generally psychologically healthy, athletes have a high risk of developing eating disorders due to the extreme and unique pressures of the sport environment, such as performing well and meeting their coaches' expectations. Many athletes feel pressure and desire to optimize performance (Johnson, 1994). The athlete's drive for sport performance may be channeled into her drive for disordered eating if she believes being thinner would optimize her performance. Also, the high level of collegiate competition may result in the athlete taking risks to maintain or lose weight (i.e., in attempt to succeed and maintain her scholarship).

One study examining eating disorders among athletes and non-athletes found similarities in eating disordered athletes' and non-athletes' dieting attitudes, however not in their psychopathology (Parker et al., 1994). The athletes with eating disorders did not exhibit the substantial psychopathology demonstrated in the non-athletes with eating disorders (i.e., Anorexia Nervosa or Bulimia Nervosa). Thus, since the eating-disordered athletes do not substantially display psychopathology typically associated with eating disorders, some external factors within the athletic environment may be contributing to the athletes' development of disordered eating.

Personality

Fourth, personality has been suggested as an influence in disordered eating. In particular, perfectionism is a personality trait that is a characteristic of successful athletes in high levels of competition (Gould, Dieffenbach, & Moffet, 2002), and is also associated with the development of eating disorders (Johnson, 1994). McNulty, Adams,

Anderson, and Affenito (2001) found that athletes with eating disorders had the highest mean score for the perfectionism subscale of the EDI compared to athletes without eating disorders and college women with eating disorders. Thus it is possible that some athletes may have predisposing personal attributes that make them both good competitors and place them at risk for disordered eating. In 2001, Krane, Stiles-ShIPLEY, Waldron, and Michalenok found that female collegiate athletes scored higher on perfectionism than female aerobic exercisers. They found that the more perfectionism a female possessed, the more social physique anxiety she experienced. Hence, athletes display increased levels of perfectionism, and they are also more likely to experience distraught feelings about their bodies, which may increase their likelihood for developing eating disorder symptoms.

Two additional subtopics of personality that have not previously been investigated may be associated with an increased risk of subclinical eating disorders are self-presentational perfectionism and athletic identity. This study will explore self-presentational perfectionism and athletic identity as possible risk factors.

Self-Presentational Perfectionism.

Perfectionism is a multidimensional trait. Self-presentational perfectionism is a more specific facet of perfectionism defined by having strong needs of presenting an image of perfection to others or to avoid revealing imperfection in the self (Hewitt, Flett, & Ediger, 1995). Hewitt et al. conducted the first known study which examined the extent to which perfectionistic self-presentation is relevant to eating disorder behavior. Among the eighty-one female collegiate students surveyed, those students high in self-

presentational perfectionism displayed more eating disordered tendencies. It is proposed that self-presentational perfectionism is a specific personality characteristic associated with athletes with subclinical eating disorders. This may be due to the fact that sport is a social experience (athletes participate with teammates/coaches and have spectators watching them); combined with the notion that athletes' personalities are already characterized as more perfectionistic (Gould et al., 2002). Thus, athletes may be more apt to have strict standards and evaluations about their bodies in order to present an image of being a better athlete.

Athletic Identity.

Another possible personality risk factor for subclinical eating disorders in need of investigation is athletic identity. Athletic identity is defined as the degree to which an individual identifies with the athlete role (Brewer, Van Raalte, & Linder, 1993). Brewer et al. conceptualized athletic identity "to hold that an individual with strong athletic identity ascribes great importance to involvement in sport and is especially attuned to self-perceptions in the athletic domain" (p. 238). In its narrowest sense, athletic identity is a self-schema, in which an athlete interprets events in terms of her role as an athlete. In its broadest sense, athletic identity is an occupational self-image, which is the extent one is socially-labeled an "athlete" by friends, family, teachers, coaches, and media. In terms of this broader definition, one must also look the part of an athlete because sense of self is partially derived from others' appraisals. Brewer et al. suggested the possibility that a strong athletic identity may prompt individuals to engage in a sport to the extent that their physical health is jeopardized. It is proposed that athletes high in athletic identity may

engage in the pathogenic eating methods associated with subclinical eating disorders to look the part of an athlete, which by societal standards is thin and muscular.

Type of Sport

There are many different findings in the research as to whether or not the type of sport is another aspect that influences disordered eating. Research shows that athletes from many different sports, but especially lean build sports (aesthetic and weight dependent sports), engage in pathogenic eating and dieting. Sundgot-Borgen (1994) examined risk and trigger factors in the development of eating disorders and showed that the prevalence of eating disorders was significantly higher among athletes in aesthetic and weight-dependent sports (e.g., gymnastics), as opposed to the other sport groups that do not place such a large emphasis on thinness. Beals and Manore (2002) surveyed 425 intercollegiate female athletes participating in aesthetic, endurance, or team/anaerobic sports, and also found aesthetic sports to have a higher prevalence of athletes with weight concerns and disordered eating behaviors. Davis and Cowles (1989) confirmed that athletes participating in sports demanding a thin build are at a higher risk of developing an eating disorder, due to the combination of strenuous physical activity and pressures from their sport to be thin.

However, other research suggests that both thin build and normal build sports are at an increased risk. Berry and Howe (2000) and Black and Burkes-Miller (1988) found a wide range of sports to show eating disorder symptoms and unhealthy dieting practices. Davis (1992) also found athletes in all sport groups, not just thin build, were excessively weight preoccupied. Rosen et al. (1986) similarly found that intercollegiate athletes in

sports that emphasized thinness, as well as those in which extreme thinness was not the typical physique or deemed necessary for performance, also employed pathogenic weight control methods.

However, the previous research only compared athletes from thin or normal build sport types. When compared to non-athlete control groups, it appears that all athletes possess a greater risk for eating disordered behaviors than non-athletes (Davis 1992; Sundgot-Borgen & Corbin 1987). Thus, all athletes warrant attention for having a greater risk of subclinical eating disorders than the normal population. Also, the majority of the research focuses on disturbed eating only in lean-build sports. Despite the likelihood that female athletes in all sports have an increased risk for developing a subclinical eating disorder, research seems biased towards the sports that are expected to be problematic and that typically have more clinically diagnosable eating disorders (e.g., gymnastics).

Thus, perfectionism, perceived body weight, body image, and the sport environment appear to be factors that put an athlete at an increased risk for a subclinical eating disorder, and self-presentational perfectionism and athletic identity warrant investigation as possible risk factors associated with subclinical eating disorders.

Purpose and Hypotheses

The present study should provide significant information to the research in the area of subclinical eating disorders. The current research has no clear definition of a subclinical eating disorder, thus all of the studies use different terms (i.e., disordered eating, at risk, etcetera) with different criteria to assess a prevalence of subclinical eating

disorders. The present study uses the best available guidelines, based on the definition of Anorexia Athletica, to examine subclinical eating disorders. This definition may be used in future studies to further examine the prevalence of subclinical eating disorders, as well as risk factors associated with subclinical eating disorders. It would also be useful to have one clear definition in examining the negative health and performance consequences associated with subclinical eating disorder symptoms, so that the athletes, coaches, athletic trainers, and everyone involved in athletics understand why it is important to identify and prevent subclinical eating disorders.

The purpose of this study is to examine the prevalence of subclinical eating disorders among female collegiate athletes, and to compare the prevalence between athletes and non-athletes. It is hypothesized that the athletes will have a higher prevalence of subclinical eating disorders than non-athletes. This study will also explore the prevalence of subclinical eating disorders across different sports. Furthermore, this study will examine two personality factors, athletic identity and self-presentational perfectionism, as possible risk factors. It is hypothesized that the athletes that meet the criteria to be classified with a subclinical eating disorder will have stronger athletic identities and greater self-presentational perfectionism tendencies

The results of this study will contribute to making coaches, athletes, athletic trainers, consultants, and everyone involved in athletics, aware of how common subclinical eating disorders are in female college athletes. Identifying the prevalence of subclinical eating disorders in these athletes is significant because it is important to recognize and detect subclinical eating disorder symptoms in college athletics to prevent

performance decrements and negative health consequences. Furthermore, identifying risk factors, such as athletic identity and self-presentational perfectionism, may aid in detecting those athletes who may have a subclinical eating disorder or may be vulnerable to developing subclinical eating disorders. Hopefully, this study will contribute to future research and useful practical implications for subclinical eating disorders in female sports.

CHAPTER II

METHOD

This study is descriptive research in that surveys were used to examine the prevalence of subclinical eating disorders among female collegiate athletes and non-athletes, as well as to examine differences in the prevalence of subclinical eating disorders across different sports. Additionally, the inter-relationships among athletic identity, self-presentational perfectionism, and subclinical eating disorders were investigated.

Participants

The participants in this study were female NCAA division I athletes (N = 245) participating in ten different sports (basketball, cross country, golf, lacrosse, softball, soccer, swimming and diving, tennis, track and field, volleyball), and female non-athlete college students (N = 65). All subjects who were between 17 and 24 years old, and had not previously been diagnosed with a clinical eating disorder were included. Thirteen participants (nine athletes and four non-athletes) were excluded because they responded that they had been previously diagnosed with a clinical eating disorder, and four non-athlete college students were excluded because they were over 24 years old. Thus, the surveys from 289 participants were used in the present study (236 athletes and 57 non-athletes).

The non-athlete subjects were recruited from physical activity classes at the University of North Carolina at Greensboro and Binghamton University. A basketball and weight training class from the University of North Carolina (n = 36) and the weight training for women class from Binghamton University (n = 25) participated.

The athletes were recruited from teams across three eastern states: the University of North Carolina at Greensboro, Duke University, High Point University, Wake Forest University, University of North Carolina at Chapel Hill, North Carolina State University, Elon University, East Carolina University, North Carolina A&T University (all in North Carolina); Mount Saint Mary's University (in Maryland); and Binghamton University (in New York). These schools were chosen by convenience of their location, investigator contacts, and their NCAA Division I status (compared to NCAA Division II or III schools). It is expected that subclinical eating disorders may be especially prevalent in the more competitive sport environments that have greater pressures for performance, such as Division I schools. Available research has shown that athletes at higher levels of competition (NCAA Division I female athletes vs. NCAA Division III female athletes) showed more signs of pathological eating and were at increased risks for eating disorders (Picard, 1999). Thus, this study focused only on NCAA Division I athletes. Athletes from Binghamton University (all sports), the University of North Carolina at Greensboro (all sports except for cross country), High Point University (cross country, soccer, and tennis), and Mount Saint Mary's University (only cross country) participated in this study. The athletic directors from the other schools declined to have their athletes participate due to concerns about the length of the surveys, because their athletes recently

have completed a similar survey, to protect their athletes' time because the University receives so many requests to participate in research, and because they were not interested.

Measures

Ten surveys were compiled and administered to the athlete and non-athlete groups to measure the prevalence of subclinical eating disorders, athletic identity, and self-presentational perfectionism.

Beals and Manore's (2000) criteria were included in self-report survey form to obtain a comparable non-clinical assessment of the likelihood of the prevalence of subclinical eating disorders. Table 1 lists the eight criteria for subclinical eating disorders identified by Beals and Manore (2000) with the measures Beals and Manore used to assess each criterion, as well as the measures this study used to assess each criterion. In the present study a participant must meet at least five of the six criteria assessed to be identified as having a subclinical eating disorder.

Table 1

<u><i>Beals & Manore (2000) SCED Measures</i></u>	<u><i>Measures used in this study</i></u>
#1.) Preoccupation with food, calories, and body weight.	
Score =9 on Drive for Thinness subscale of EDI, score =5 on Bulimia subscale of EDI, or positive responses to questions concerning these issues on the EDE	Score =9 on Drive for Thinness subscale of EDI or score =5 on Bulimia subscale of EDI
#2.) Distorted body image or dissatisfaction with body weight or shape.	
Score =10 on Body Dissatisfaction subscale of EDI, score =90 on BSQ, or positive response to questions concerning these issues on the EDE	Score =10 on Body Dissatisfaction subscale of EDI, or score =90 on BSQ
#3.) Undue influence of body weight or body shape on self-evaluation.	
Responses from clinical interview	Score 1 standard deviation above the mean (18) on the Body Attractiveness subscale of the PSPP
#4.) Intense fear of gaining weight, becoming fat, and/or feeling fat even though at or slightly below (~5%) normal weight for height, and/or body fat for sport.	
Responses from clinical interview and weight for height chart to indicate if below normal weight for height or body fat for sport	Score =20 on EAT-26 if subject is at or slightly below normal weight using self-reported height & weight, & calculating BMI
#5.) Attempts to reduce body weight or maintain a lowered body weight for sport using one or a combination of the following methods: severe restriction of energy intake, severe limitation of food choices or food groups, excessive exercise, or pathogenic weight control methods (fasting, self-induced vomiting, laxatives, or diuretic use).	
Energy intake measured by energy intake (kcal/d) < 80% of energy expenditure (kcal/day), Severe limitation of food choices or food groups as evidenced by food frequency, diet history, or 7-14 day diet records, more exercise than necessary for success in the sport or as compared to athletes of similar fitness levels, or responses in a clinical interview indicating use of pathogenic weight control methods	Positive responses in the Dieting, Exercise, Purging, Laxative, Diet Pills, or Diuretic sections of the EDI-SC which indicate attempts to reduce body weight or maintain a lowered body weight

#6.) Food intake governed by strict dietary rules or dietary boundaries accompanied by extreme feelings of guilt or self-hatred upon breaking a rule or surpassing dietary boundaries.

Responses from clinical interview (e.g. restriction of calories or fat grams to a specific amount, avoidance of specific foods or food groups, eating only at certain times of the day, chronic avoidance of “bad” foods)

A score =20 on the EAT-26

#7.) Absence of medical illness or affective disorder explaining energy restriction, weight loss, or the maintenance of low body weight or body fat percentage.

Responses from clinical interview

If a participant has positive responses to current medications and disorders on the EDI-SC she will be excluded

#8.) Menstrual dysfunction (not an absolute criterion).

Responses from clinical interview

Will not be a criteria in this study

Eating Disorder Inventory (EDI)

The EDI is a self-report measure of symptoms commonly associated with Anorexia Nervosa and Bulimia Nervosa, which was developed by Garner and Olmsted (1984). It consists of 64-items with 8 subscales (Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears) which assess eating attitudes and behaviors (See Appendix A). Respondents rate whether each item applies always (3 points), usually (2), often (1), sometimes (0), rarely (0), or never (0) (unless the item is scored in reverse). Higher scores indicate more disordered symptoms. Cutoff scores have been established to classify participants with subclinical eating disorder symptoms on the Drive for Thinness subscale (= 9), the Body Dissatisfaction subscale (= 10), and the Bulimia subscale (= 5). The EDI is an easily administered self-report measure which most adults are able to complete in 20 minutes. It provides standardized subscale scores that can identify individuals with subclinical eating disturbances or those who are at risk for developing eating disorders.

For this study, only three subscales of the EDI were examined: Drive for Thinness, Bulimia, and Body Dissatisfaction. The Drive for Thinness subscale assesses excessive concern with dieting, preoccupation with weight, and fear of weight gain. The intense drive to be thinner or fear of fatness, as measured by the Drive for Thinness subscale, is the core psychopathology of Anorexia Nervosa and Bulimia Nervosa. The Bulimia subscale assesses the tendencies to think about and to engage in episodes of uncontrollable overeating and/or bingeing, which is a defining criterion of Bulimia

Nervosa. The Body Dissatisfaction subscale measures dissatisfaction with the overall shape and with the size of those regions of the body that are of greatest concern to those with eating disorders (such as the stomach, butt, and thighs). Severe body dissatisfaction is thought to be a major factor responsible for initiating and sustaining the weight control behaviors displayed in eating disorders. The other subscales, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears, measure the extent to which the subjects display those characteristics as related to eating disorders. To maintain reliability and validity, the EDI was administered in its entirety to include all 8 subscales rather than only using the Drive for Thinness, Bulimia, and Body Dissatisfaction subscales.

The EDI has sound psychometric properties. Internal consistency coefficients of all subscales have been reported to be above 0.80, suggesting that the 8 subscales represent distinct constructs (Espelage, Aggen, Mazzeo, & Quittner, 2003). In this study, the internal consistency for the Drive for Thinness subscale was .85, the Body Dissatisfaction subscale was .87, and the Bulimia subscale was .77. The EDI has also been shown to be a stable measure. Wear and Pratz (1987) reported impressive test-retest reliability among 70 non-patient university undergraduates. The coefficients for all subscales were 0.81 to 0.97, except for the Maturity Fears subscale (0.65). The EDI has also shown strong criterion validity since it is able to discriminate between eating disordered and non-patient samples (Garner, 1991). Garner has also demonstrated construct validity for the EDI by demonstrating high correlations with similar measures (convergent validity), such as with the EAT-26 and Restraint Scale (measure of dieting

behavior), and demonstrating low correlations with distinct constructs (discriminant validity), as well as subscale intercorrelations.

Body Shape Questionnaire (BSQ)

Cooper, Taylor, Cooper, and Fairburn (1987) developed the BSQ to measure concerns about body shape, in particular the experience of feeling fat. The BSQ (Appendix B) is a 34-item self-report measure which can be completed in 10 minutes. Respondents rate whether each item applies never (1), rarely (2), sometimes (3), often (4), very often (5), or always (6). Higher scores indicate increased concerns about feeling fat. A cutoff score (= 90) has been established to classify participants with subclinical eating disorder symptoms.

The BSQ provides a measure of the extent of psychopathology regarding body shape rather than a means of detecting eating disorders (Cooper et al., 1987). Women who declared that they were concerned about their weight and shape scored significantly higher than women who were not. Also, women who had been diagnosed with Bulimia Nervosa scored significantly higher than those who were not bulimic. There was an overlap between the BSQ scores of patients with Bulimia Nervosa and the BSQ scores of women who were not diagnosed with Bulimia Nervosa but had reported that they were concerned about their weight and shape. This demonstrates that the BSQ is a good measure of the extent of psychopathology, but is not a sufficient method to detect eating disorders.

Validity of the BSQ was also tested by measuring the correlation between the BSQ and other similar measures among four samples of women (patients with Bulimia

Nervosa, family planning clinic attenders, occupational therapy students, and female university undergraduate students) (Cooper et al., 1987). Among the patients with Bulimia Nervosa, the BSQ was very highly correlated with the Body Dissatisfaction subscale of the EDI ($r = 0.66$) and moderately highly correlated with the total EAT score ($r = 0.35$). In this study the internal consistency of the BSQ was .97.

The validity of the BSQ was also tested among two groups of patients without Bulimia Nervosa derived from the community sample (Cooper et al., 1987). One group was classified as definite non-bulimic cases and the other group consisted of women who met self-report diagnostic criteria for Bulimia Nervosa and were classified as probable cases. The group of participants classified as probable cases of Bulimia Nervosa scored significantly higher on the BSQ than participants who were classified as definite non bulimic cases.

Physical Self Perception Profile (PSPP)

Fox and Corbin (1989) developed the PSPP to assess perceptions within specific sub domains of the physical self. The PSPP (Appendix C) consists of five 6-item subscales (general domain of Physical Self-Worth, with sub domains of Sports Competence, Body Attractiveness, Physical Strength, and Physical Condition). The respondents choose the degree to which each statement best describes them, from the choices: Not at all True (1), Somewhat Untrue (2), Somewhat True (3), or Completely True (4) (unless the item is scored in reverse). The Body Attractiveness subscale was used in this study to determine if the subject's self-worth was influenced by their appearance. Higher scores indicate an increased influence of appearance on self-worth.

In this study, a score at least one standard deviation above the norm (= 18) was used as the cutoff score to classify participants with subclinical eating disorder symptoms.

The Body Attractiveness subscale has shown sound psychometric properties. The test-retest reliability was 0.89 and the internal consistency was 0.88 (Fox & Corbin, 1989). This validity has only been established on college age students. The mean for college women is 13.79 with a standard deviation of 4.16. The internal consistency found for the Body Attractiveness subscale in this study was .86.

Eating Disorder Inventory Symptom Checklist (EDI-SC)

The EDI-SC is a structured self-report form which is independent of the EDI (Garner, 1991). It takes about 5 to 10 minutes to complete, depending upon the number of symptom areas relevant to the participant (See Appendix D). It provides more detailed information regarding the frequency of specific eating disorder symptoms, including binge eating, purging, usage of laxatives, diet pills, and diuretics, exercise patterns, dieting, and data regarding weight, weight history, and menstrual history. A participant indicates that she engages in a pathogenic eating behavior by marking yes to the dieting, exercise aimed at controlling weight, binge eating, purging, laxative, diet pill, or diuretic sections of the EDI-SC. The more sections a participant marks yes, the more eating disorder symptoms she engages in.

Eating Attitudes Test (EAT-26)

The EAT-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982) is a 26-item measure which is frequently used to assess eating disorder symptoms (See Appendix E). Participants respond to each item with always, usually, often, sometimes, rarely, or never.

The EAT-26 is scored such that the most disordered response is worth 3 points, the second most disordered response is worth 2 points, the third most disordered response is worth 1 point, and the three more non-disordered responses are worth 0 points. Higher scores indicate increased eating disorder symptoms. A cutoff score (= 20) has been established to classify the participants that display subclinical eating disorder symptoms. The EAT-26 is divided into three subscales including: a.) dieting (13 items related to an avoidance of fattening foods and a preoccupation with being thinner), b.) Bulimia and food preoccupation (6 items related to reflecting thoughts about food and Bulimia), and c.) oral control (7 items related to self-control about eating and the perceived pressure from others to gain weight).

The EAT-26 has been described as a measure of abnormal, disturbed, or exaggerated eating patterns in nonclinical samples (Mintz & O'Halloran, 2000). These descriptions are based on the reports that individuals who score above the EAT-26 cutoff are likely exhibiting subclinical eating disorders, weight preoccupation, or are suspected to have Bulimia Nervosa or Anorexia Nervosa, but do not meet all of the criteria for Anorexia Nervosa or Bulimia Nervosa. Mintz and O'Halloran used 136 collegiate females to validate the EAT-26 as a tool to identify non-clinical women who are likely suffering from an EDNOS. Furthermore, without cutoff scores, EAT-26 was shown to be a continuous measure of disordered eating with increasing EAT-26 scores indicative of increased eating pathology.

The EAT-26 has very good psychometric properties of reliability and validity. The test retest reliability (e.g., 0.84) is excellent (Garfinkel & Newman, 2001). In this study, the internal consistency of the EAT-26 was .89.

Athletic Identity Measurement Scale (AIMS)

The AIMS will be used to assess athletic identity (See Appendix F). The AIMS consists of 10 items on a 5-point Likert scale anchored by strongly agree and strongly disagree. Higher scores indicate increased athletic identity. The AIMS was developed and validated by Brewer et al. (1993). Across 3 studies conducted by Brewer et al., the AIMS was found to be a reliable and internally consistent measure. The test-retest reliability coefficient of the AIMS over a 14 day period was 0.89. AIMS scores demonstrated internal consistency by significantly correlating with other measures of similar constructs such as the Self-Role Scale, $r = 0.61$ (Curry & Weiss, 1989) and the Sport Orientation Questionnaire (competitiveness subscale $r = 0.53$) (Gill & Deeter, 1988). In this study, the internal consistency of the AIMS was .90. Athletic Identity is independent of self-esteem, as it was negatively correlated with the Rosenberg Self Esteem Scale, and is also negatively correlated with age.

Perfectionistic Self-Presentation Scale (PSPS)

The Perfectionistic Self-Presentational Scale (PSPS) (Hewitt & Flett, 1993) will be used to assess self-presentational perfectionism. The PSPS (Appendix G) consists of 27-items based on a 7-point Likert scale anchored by disagree strongly and agree strongly. It assesses three aspects of self-presentational perfectionism: a.) the need to appear perfect, b.) the need to avoid appearing imperfect, and c.) the need to avoid

disclosure of imperfection. Higher scores indicate greater self-presentational perfectionism.

A recent study by Hewitt, Flett, Sherry, Fairlie, and Stein (2003) found the PSPS to be valid and reliable. The PSPS was more highly associated with self-oriented and socially prescribed perfectionism items of the Multidimensional Perfectionism Scale than with other-oriented perfectionism. The subscales were internally consistent (alpha values between .78 and .86) and showed adequate convergent validity. The internal consistency of the PSPS in this study was .94. The PSPS was also found to be stable. The test-retest reliability values were all above 0.74. Furthermore, the PSPS can be generalized among diverse samples of university students, community members, clinical sample of psychiatric patients, and a sample from a depression self-help organization.

Procedures

First, approval was granted from the Institutional Review Board at the University of North Carolina at Greensboro. Then, athletes and non-athletes were recruited from various schools to participate in the study.

To recruit non-athlete participants, activity class instructors were asked via email if they were willing to allow their female students to participate. Time slots were set up for them to complete the surveys. All participation was voluntary and confidential (See Consent Form in Appendix I). Participants spent about thirty minutes completing the surveys and then the instructor either gave the completed surveys to the investigator or placed them in the investigator's mailbox after the surveys were completed.

To recruit athlete participants, University athletic directors were asked via email for approval and support. Once the athletic directors gave approval, each team's coach was asked for their approval and support. If athletic directors or coaches did not respond to the emails, they were then contacted over the phone. Once the athletic directors and coaches gave their approval, a time was set up around practice time for the surveys to be completed. Participants spent about 30 minutes completing the surveys and then either returned the surveys to the investigator, or placed them in an envelope for the coach to return to the investigator.

Data Analysis

This study was designed to examine the prevalence of subclinical eating disorders among athletes, to compare athletes to non-athletes, to compare across different sports, and to explore athletic identity and self-presentational perfectionism as possible risk factors for subclinical eating disorders. To determine the prevalence, participants were classified above the cutoff scores on each of the 6 subclinical eating disorder criteria, as defined by Beals and Manore (2000). Participants may have a score ranging from 0 to 6, depending on the number of criteria they meet, with the higher scores indicating an increased likelihood of a subclinical eating disorder.

Descriptive statistics were obtained on sport, school, age, year in school, athletic scholarship status, BMI, length of practice or exercise time, and responses to a question exploring if body weight affects athletic/exercise performance.

Means and standard deviations were also compiled for each survey score. A multivariate analysis of variance (MANOVA) compared the athletes and non-athletes on each of the 8 dependent measures (the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the EDI, the BSQ, the EAT-26, the Body Attractiveness subscale of the PSPP, the AIMS, and the PSPS). Then, follow-up univariate ANOVAs compared the athletes and non-athletes on the different survey scores.

Correlations for all survey scores were also examined. Athletic identity and self-presentational perfectionism were specifically examined to see if they were significantly correlated with certain surveys associated with the subclinical eating disorder criteria.

Multivariate analyses of variance (MANOVA) compared the participants that did not meet any criteria for a subclinical eating disorder and the participants that met at least 5 of the 6 criteria for a subclinical eating disorder on the 8 dependent measures (the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the EDI, the BSQ, the EAT-26, the PSPP, the AIMS, and the PSPS). Then, follow-up univariate ANOVAs compared the means of the 8 survey scores between the participants that did not meet any criteria and the participants that met at least 5 of the 6 criteria for a subclinical eating disorder. These analyses served as a classification check, to be sure that participants classified with subclinical eating disorders scored higher on each criterion measure than did participants who did not meet any criteria for a subclinical eating disorder. These analyses were also used to examine athletic identity and self-presentational perfectionism as risk factors associated with a subclinical eating disorder in athletes with and without subclinical eating disorders.

Frequency distributions for the number of subclinical criteria met (0-6) and for each criterion (#1-6) were compiled to compare the prevalence of subclinical eating disorders between athletes and non-athletes. Chi-square analyses examined the differences among participants based on the number of criteria for a subclinical eating disorder (0-6) they met, as well as between the participants that met no subclinical eating disorder criteria and those participants that were classified with a subclinical eating disorder (met 5-6 criteria).

Frequency tables were also compiled to show the distribution of athletes in meeting the 6 subclinical eating disorder criteria by sport. Chi-square analyses examined the differences between athletes meeting different numbers of criteria for a subclinical eating disorder, as well as between the athletes that met no subclinical eating disorder criteria and the athletes that were classified with a subclinical eating disorder (met 5-6 criteria).

CHAPTER III

RESULTS

Descriptive Statistics

Two hundred and forty-five athletes and sixty-five non-athlete students completed the surveys. Seventeen of these participants were not included in the data. Thirteen of those participants (9 athletes and 4 non-athletes) were excluded because they responded that they have been diagnosed with a clinical eating disorder, and four participants (non-athletes) were excluded because they were over 24 years old. Thus, the data from 236 athletes and 57 non-athletes was used in this study.

Refer to Table 2 for the break down of athletes that completed the surveys by their sport. Broken down by school, school A has approximately 13,000 students, and 132 athletes and 25 non-athlete students completed the surveys; school B has approximately 14,000 students, and 72 athletes and 36 non-athlete students completed the surveys, school C has approximately 3,000 students, and 33 athletes and no non-athlete students completed the surveys, and school D has approximately 2,000 students, and 8 athletes no non-athlete students completed the surveys.

The average age of the participants was 19.50 years ($SD = 1.30$, $N = 306$). Twenty-nine percent of the subjects were freshman, 25.8 % were sophomores, 26.1 % were juniors, 17.0 % were seniors, and 1.3 % were fifth year or more. Most of the subjects (76.1 %) were Caucasian ($n = 233$), however 11.1% were African-American ($n =$

34), 3.3 % were Asian ($n = 10$), and 6.2 % were classified as other ethnic minority (e.g., Latina, multiracial) ($n = 19$).

Table 2

Number of Athletes by Sport

<u>Sport</u>	<u>Participants</u>	<u>Participants Excluded</u>
Basketball	28	1
Cross Country	16	2
Golf	5	0
Lacrosse	20	1
Softball	28	0
Soccer	60	1
Swimming & Diving	17	3
Track & Field	28	1
Tennis	21	0
Volleyball	22	0
<u>Total</u>	<u>236</u>	<u>9</u>

Every athlete playing basketball and golf had a scholarship, and 96.4% of the softball players, 86.4% of the volleyball players, 80% of the lacrosse players, 76.7% of the soccer players, 76.2% of the tennis players, 68.8% of the cross country runners, 46.4% of the track and field athletes, and 23.5% of the swimmers had an athletic scholarship.

Athletes had a significantly lower BMI than non-athletes. BMI was calculated using each subject's self-reported height and weight. The formula to calculate BMI is weight (in pounds), divided by height (in inches) squared, multiplied by 703. According

to the United States Centers for Disease Prevention and Control, a BMI score of 25 or greater is considered overweight and a score less than 25 is normal weight. Thus, in this study if a participant had a BMI less than 25 she would be considered normal weight or below. The average BMI of the athletes was 22.7 ($SD = 2.90$; $n = 241$), and the average BMI of the non-athletes was 23.67 ($SD = 3.17$; $n = 60$). The majority of the participants (77.8%) were not overweight, as calculated by BMI. Eighty-three percent of the athletes were normal weight or below, and 65% of the non-athletes were a normal weight or below. Broken down by sport, 100% of the cross country runners, 96% of the track and field athletes, 95% of the lacrosse players, 91% of the volleyball players, 83% of the soccer players, 81% of the swimmers, 78% of the basketball players, 76% of the tennis players, 57% of the softball players, and 20% of the golfers were a normal weight or below.

On average, athletes exercised twice as long as non-athletes. The athletes exercised just over two hours per practice session ($M = 133.06$ minutes, $SD = 37.01$), and non-athletes exercised for about one hour per session ($M = 59.43$, $SD = 29.53$).

The majority of participants believed that body weight affects athletic or exercise performance. Eighty percent of the athletes ($n = 241$) and seventy-nine percent of the non-athletes ($n = 61$) responded that they think body weight affects athletic or exercise performance.

Survey Scores

Table 3 provides a listing of all the means and standard deviations on each measure. A multivariate analysis of variance (MANOVA) showed an overall significant difference between that athletes and non-athletes in their scores on the eight measures, $F(8, 260) = 24.37, p < .001, \eta^2 = .43$. Univariate analyses of variance (ANOVAs) showed significant differences between the athletes and non-athletes in their scores on the Drive for Thinness subscale of the EDI, the Body Dissatisfaction subscale of the EDI, the BSQ, the PSPP, and the AIMS, and the EAT, with non-athletes scoring higher than athletes on all measures except for the AIMS (See Table 3). There was no significant difference between athletes and non-athletes in their scores on the Bulimia subscale of the EDI or the PSPS, although non-athletes also scored higher than athletes on these measures.

Table 3

Survey Score Means and Standard Deviations For Non-Athletes and Athletes

Surveys (cut-off scores)	Athletes (<i>N</i> = 219)		Non-Athletes (<i>N</i> = 50)		<i>F</i>	<i>p</i>
	Mean	<i>SD</i>	Mean	<i>SD</i>		
Drive for Thinness* (=9)	3.35	4.33	5.80	5.43	11.82	.001
Body Dissatisfact.* (=10)	6.77	5.81	11.28	6.78	23.01	.001
Bulimia (=5)	.96	1.91	1.68	3.99	3.60	.059
BSQ* (=90)	78.53	29.89	99.36	32.99	19.02	.001
EAT-26* (=20)	7.52	8.55	10.7	12.04	4.78	.03
PSPP* (=18)	13.84	3.81	16.14	4.58	13.63	.001
AIMS*	36.58	5.39	23.94	5.43	145.02	.001
PSPS	94.04	25.77	99.86	29.07	1.98	.16

Note: *Indicates a significant difference between the athletes and non-athletes.

Correlations of the Measures

Table 4 presents the correlations between all of the measures. The Drive for Thinness subscale of the EDI, the Body Dissatisfaction subscale of the EDI, the Bulimia subscale of the EDI, the BSQ, the EAT, the Body Attractiveness subscale of the PSPP, the EDI-SC, and the PSPS all correlated significantly with each other, $p < .001$. There were no significant correlations between the AIMS and any other measures, except with the PSPS, $p < .05$. However, when only correlating the athletes scores on the AIMS with

the other measures, there were significant correlations with the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the EDI, the BSQ, the EAT, and the PSPS.

Table 4
Correlations Between the Subclinical Eating Disorder Measures

	Drive	Body	Bulimia	BSQ	EAT	PSPP	EDI-SC	AIMS	PSPS
Drive									
Body	.60*								
Bulimia	.40*	.23*							
BSQ	.75*	.72*	.42*						
EAT	.68*	.46*	.54*	.69*					
PSPP	.49*	.70*	.25*	.70*	.42*				
EDI-SC	.49*	.44*	.35*	.62*	.57*	.41*			
AIMS	-.007	-.12	.069	-.015	.057	-.10	-.012		
PSPS	.36*	.28*	.33*	.47*	.41*	.32*	.30*	.14**	
AIMS (Athletes Only)	.17**	.21*	.13**	.21*	.19*	.128	.16**	1.0*	.27*

Note: *Indicates correlation is significant at the .001 level.
 **Indicates correlation is significant at the .05 level

Subclinical Eating Disorders

The six subclinical eating disorder criteria and cutoff scores are listed in Table 5. Each athlete had a total score ranging from zero to six indicating the extent to which she met the criteria for a subclinical eating disorder. A score of zero did not meet any of the criteria, and a score of six met every criterion for a subclinical eating disorder.

Table 5

Subclinical Eating Disorder Criteria and Cutoff Scores

Criteria	Measure	Cutoff Score
#1	Drive for Thinness subscale -OR- Bulimia subscale	= 9 = 5
#2	Body Dissatisfaction subscale -OR- BSQ	= 10 = 90
#3	PSPP	= 18
#4	BMI -AND- EAT-26	< 25 = 20
#5	EDI-SC	At least 1 positive response
#6	EAT-26	= 20

Differences in Survey Scores Between Participants Who Do and Do Not Meet Criteria

See Table 6 for the means and standard deviations of the participants who did not meet any criteria for a subclinical eating disorder and the participants who met at least 5 of the 6 criteria for a subclinical eating disorder. A MANOVA showed a significant

overall difference between the participants that met 0 criteria for a subclinical eating disorder and the participants that met at least 5 of the 6 criteria for a subclinical eating disorder on the Drive for Thinness subscale of the EDI, the Body Dissatisfaction subscale of the EDI, the Bulimia subscale of the EDI, the BSQ, the EAT, the Body Attractiveness subscale of the PSPP, the PSPS, and the AIMS, $F(8, 61) = 80.98, p < .001, \eta^2 = .91$. One-way ANOVAs showed a significant difference between the participants that did not meet any criteria for a subclinical eating disorder and the participants that met at least five of the six of the criteria on the Drive for Thinness subscale of the EDI, the Body Dissatisfaction subscale of the EDI, the Bulimia subscale of the EDI, the BSQ, the EAT, the Body Attractiveness subscale of the PSPP, and the PSPS (refer to Table 6). There was no significant difference between the participants that met 0 criteria and those that met 5 or 6 criteria on the AIMS.

Table 6

Survey Score Means and Standard Deviations for Meeting Subclinical Eating Disorder Criteria

	<u>Meet 0 Criteria</u>		<u>Meet 5 or 6 Criteria</u>		<u>F</u>	<u>p</u>
	Mean	SD	Mean	SD		
Drive for Thinness*	0.69	1.41	12.53	5.48	206.28	.001
Body Dissatisfaction*	2.00	2.21	14.32	5.76	169.55	.001
Bulimia*	0.33	0.71	5.05	6.03	30.82	.001
BSQ*	50.84	14.14	123.84	30.46	273.29	.001
EAT*	2.12	2.25	32.32	9.51	456.26	.001
PSPP*	10.82	3.14	19.26	3.18	99.32	.001
AIMS	35.39	5.24	35.53	9.70	.006	.94
PSPS*	84.63	20.45	123.84	30.46	38.48	.001

Note: *Indicates a significant difference between the subjects who did not meet any criteria and the subjects who met 5 or 6 criteria.

Athletes vs. Non-Athletes

Four athletes and one non-athlete met the full set of criteria for subclinical eating disorders. Fifteen athletes and five non-athletes met at least five out of the six criteria for a subclinical eating disorder. At the other end, fifty-two athletes and three students did not meet any criteria for a subclinical eating disorder. See Table 7 for the frequency of subclinical eating disorder criteria among the athletes and non-athletes.

Table 7

Frequency of Subclinical Eating Disorders Among Athletes and Non-Athletes

# of Criteria Met	Non-Athletes	Athletes
0	3 (5%)	52 (23%)
1	11 (20%)	80 (35%)
2	17 (31%)	12 (5%)
3	12 (22%)	25 (11%)
4	7 (13%)	14 (6%)
5	4 (7%)	12 (5%)
6	1 (2%)	4 (2%)
Total	55	228

A Pearson's chi-square test showed a significant difference between the athletes and non-athletes in the number of criteria met for a subclinical eating disorder (0-6), $\chi^2(6, N = 283) = 20.52, p < .002$. Also, a Pearson's chi-square test indicated a significant difference between the athletes and non-athletes who did not meet any criteria for a subclinical eating disorder, and those who met at least five of the six criteria, $\chi^2(1, N = 76) = 5.44, p < .02$. Seven percent of the athletes and nine percent of the non-athletes met at least five of the six criteria for a subclinical eating disorder. At the other end, only 5% of non-athletes did not meet any criteria, whereas 23% of athletes did not meet any criteria.

Table 8 gives the frequencies of athletes and non-athletes meeting each of the six criteria. Pearson's chi-square analyses revealed significant differences between the athletes and the non-athletes in meeting criteria number one, two, three, and five, with non-athletes more likely to meet each of these criteria.

Table 8

Frequency of Meeting Each Subclinical Eating Disorder Criteria

Criteria	Athletes	Non-Athletes	χ^2	p
#1	40 (17.2%)	18 (31.6%)	5.95	.02
#2	91 (39.1%)	41 (73.2%)	21.23	.001
#3	42 (17.8%)	21 (36.8%)	9.87	.002
#4	19 (8.2%)	1 (1.8%)	2.84	.09
#5	168 (71.8%)	53 (94.6%)	13.01	.001
#6	23 (9.8%)	6 (10.7%)	.04	.84

Type of Sport

Table 9 gives a frequency table of the athletes that met 0 criteria and the athletes that met 5 or 6 criteria for a subclinical eating disorder by sport. Four athletes met all six of the criteria for a subclinical eating disorder. These four athletes were on the basketball, soccer, track, and volleyball teams. Twelve athletes met five of the six criteria for a subclinical eating disorder. Two of these athletes were on the basketball

team, three played soccer, two ran track, three played softball, one swam, and one participated in volleyball. No athletes from the cross country, golf, lacrosse, or tennis teams met at least five of the six criteria for a subclinical eating disorder.

A Pearson's chi-square test showed no significant differences among the different sports on meeting the criteria for a subclinical eating disorder, $\chi^2 (60, N = 283) = 58.55, p = .53$. Also, a Pearson's chi-square test compared the athletes who met no criteria for a subclinical eating disorder and those who met at least five of the six criteria across the ten sports, and revealed no significant differences, $\chi^2 (9, N = 68) = 6.11, p = .73$.

Table 9

Subclinical Eating Disorder Criteria By Sport

Sport	Number of Criteria Met		Total
	0	5 or 6	
Basketball	7 (26%)	3 (11%)	27
Soccer	9 (16%)	4 (7%)	56
X-C	4 (29%)	0 (0%)	14
Golf	1 (20%)	0 (0%)	5
Lacrosse	4 (21%)	0 (0%)	19
Tennis	5 (25%)	0 (0%)	20
Track	6 (23%)	3 (12%)	26
Softball	6 (21%)	3 (11%)	28
Swimming	2 (17%)	1 (8%)	12
Volleyball	8 (38%)	2 (10%)	21
Total	52	16	236

Risk Factors

Each subject had a score of how many criteria they met for a subclinical eating disorder (0 to 6), as well as a total score on the AIMS (0 to 50) and PSPS (0 to 189). The following section examines athletic identity and self presentational perfectionism as risk factors for subclinical eating disorders among athletes.

Athletic Identity

A one-way ANOVA showed a significant difference between athletes and non-athletes in their scores on the AIMS, $F(1, 267) = 145.02, p < .001$. The athletes had a mean score of 36.58 ($SD = 5.39, n = 219$) and the non-athletes had a mean score of 23.94 ($SD = 5.43, n = 50$).

A one-way ANOVA showed that participants who met at least five of the six criteria for a subclinical eating disorder did not differ on the AIMS from participants who did not meet any criteria, $F(1, 68) = .006, p = .94$. The participants who did not meet any criteria for a subclinical eating disorder had a mean score of 35.39 ($SD = 5.24, n = 55$) on the AIMS, and the participants who met at least five of the six criteria had a mean score of 35.53 ($SD = 9.70, n = 21$) on the AIMS.

However, when only comparing athletes, a one-way ANOVA showed that athletes who met at least five of the six criteria for a subclinical eating disorder scored higher on the AIMS than athletes who did not meet any criteria, $F(1, 66) = 4.82, p < .03$. The athletes who did not meet any criteria had a mean score of 35.58 ($SD = 4.48, n = 52$), and the athletes who met at least five of the six criteria had a mean score of 38.69 ($SD = 6.31, n = 16$). Thus the hypothesis was supported, athletes classified with subclinical eating disorders had stronger athletic identities.

When correlating the scores of the AIMS to scores on the subclinical eating disorder measures, there were no significant correlations, except with the PSPS ($r = .14$), $p < .05$. However, when correlating the scores of athletes only on the AIMS with scores on the subclinical eating disorder measures, there were significant correlations with the

Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the EDI, the BSQ, the EAT, the EDI-SC, and the PSPS.

Self-Presentational Perfectionism

A one-way ANOVA indicated no significant difference between athletes and non-athletes in their scores on the PSPS, $F(1, 267) = 1.98, p = .16$. The athletes had a mean score of 94.04 ($SD = 25.77, n = 219$) and the non-athletes had a mean score of 99.86 ($SD = 29.07, n = 50$).

A one-way ANOVA revealed that participants who met at least five of the six criteria for a subclinical eating disorder scored significantly higher on the PSPS than the participants who did not meet any of the criteria, $F(1, 68) = 38.48, p < .001$. The participants who met at least five of the six criteria had a mean score of 123.84 ($SD = 30.46, n = 19$), and the participants who did not meet any criteria had a mean score of 84.63 ($SD = 20.45, n = 51$).

Also, when comparing only athletes, a one-way ANOVA showed that the athletes who met at least five of the six criteria for a subclinical eating disorder also scored significantly higher on the PSPS than the athletes who did not meet any of the criteria, $F(1, 63) = 27.58, p < .001$. The mean score for the athletes that met at least five of the six criteria was 117.47 ($SD = 25.91, n = 15$), and the mean score for that athletes that did not meet any criteria was 84.10 ($SD = 20.18, n = 50$).

When correlating the scores of the PSPS to scores on the subclinical eating disorder measures, there were significant correlations. The PSPS correlated significantly with the BSQ ($r = .47$), the EAT ($r = .41$), the Drive for Thinness subscale of the EDI (r

= .36), the Bulimia subscale of the EDI ($r = .33$), the PSPP ($r = .32$), the EDI-SC ($r = .30$), the Body Dissatisfaction subscale of the EDI ($r = .28$), $p < .001$.

Thus, the hypothesis was supported, and those athletes classified with a subclinical eating disorder had a greater self-presentational perfectionism.

CHAPTER IV

DISCUSSION

The purpose of this study was to examine subclinical eating disorders among female collegiate athletes. Specifically, this study investigated the prevalence of subclinical eating disorders among athletes, compared the prevalence among athletes and non-athletes, and explored differences in the prevalence among sports. Also, the present study investigated athletic identity and self-presentational perfectionism as possible risk factors associated with subclinical eating disorders. The findings related to each research question are discussed, followed by the strengths and limitations of the present study, future research directions, and potential practical implications.

Research Questions and Hypotheses

The main purpose of this study was to examine the prevalence of subclinical eating disorders among athletes and non-athletes. It was expected that athletes would have a higher prevalence of subclinical eating disorders than non-athletes. However, the results failed to support this hypothesis. There was a significant difference between the athletes and non-athletes in meeting the criteria for a subclinical eating disorder, but in the opposite direction relative to the prediction. The non-athletes were more likely to meet the criteria for a subclinical eating disorder than the athletes. Seven percent of the athletes and nine percent of the non-athletes met at least five of the six criteria for a

subclinical eating disorder. It is important to note, however, that sixteen athletes (7%) is still a noteworthy number of athletes that met at least five of the six criteria to be classified with a subclinical eating disorder.

This study also provided descriptive information on subclinical eating disorders among athletes. Even though a greater percentage of non-athletes compared to athletes met criteria 1, 2, 3, 5, and 6, there was still a meaningful clinical significance in the number of athletes that met each of the six criteria. Refer back to Table 8 to see the percentage of athletes and non-athletes that met each criterion. Seventeen percent of athletes met criteria 1 (preoccupation with food, calories, and body weight), 39.1% met criteria 2 (distorted body image or dissatisfaction with body weight or shape), 17.8% met criteria 3 (undue influence of body weight or shape on self-evaluation), 8.2% met criteria 4 (intense fear of gaining weight, becoming fat, or feeling fat even though at or slightly below normal weight for height or body fat for sport), 71.8% met criteria 5 (attempts to reduce body weight or maintain a lowered body weight for sport), and 9.8% met criteria 6 (food intake is governed by strict dietary rules or dietary boundaries accompanied by extreme feelings of guilt or self-hatred upon breaking a rule or surpassing dietary boundaries).

These results suggest that Beals and Manore's (2000) criteria for a subclinical eating disorder, which were assessed in this study, may be better defined. It seems logical to combine criteria 4 and 6 into one criterion because they both use the same measure to assess them. Criteria 4 used a BMI < 25 and a score = 20 on the EAT to assess an intense fear of gaining weight, becoming fat, or feeling fat even though at or

slightly below normal weight for height or body fat for sport, and criteria 6 just used a score = 20 on the EAT to assess that food intake is governed by strict dietary rules or boundaries accompanied by extreme feelings of guilt or self-hatred upon breaking a rule or surpassing dietary boundaries. Ten percent of athletes met criteria 6 (score = 20 on the EAT), and 8.2% of them also met criteria 4 (BMI < 25 and a score = 20 on the EAT).

Also, criteria 5 did not seem to be an effective criterion in identifying participants with a subclinical eating disorder. Seventy-two percent of the athletes and 94.6% of the non-athletes met criteria 5. Although criteria 5 may be associated in those with a subclinical eating disorder, it does not appear to be sensitive enough to differentiate between the participants that were and were not classified with a subclinical eating disorder.

Thus in future studies, researchers may want to focus on criteria 1, 2, 3, and 4, omit criteria 5, which does not differentiate between those who meet and do not meet the criteria for a subclinical eating disorder, and collapse criteria 6 with 4, which use the same measures. Using these 4 criteria, instead of the 6 criteria assessed in this study, may provide a better assessment of subclinical eating disorders and perhaps more athletes would be classified into the subclinical eating disorder category. Also, the 22% of athletes that were in the middle zone (met 2 to 4 criteria) may be notable. Although they did not exhibit enough symptoms to be classified with a subclinical eating disorder in this study, they still possessed some negative symptoms associated with disturbed eating.

The present study also sought to explore whether or not some sports had a higher prevalence of subclinical eating disorders. The results revealed no significant differences

among the ten sports examined. Contrary to stereotypical expectations, athletes participating in softball (11%) and basketball (11%) had the greatest percentage of athletes classified with a subclinical eating disorder (only behind the 12% of track athletes classified with a subclinical eating disorder). Thus all sports should continue to be explored when examining subclinical eating disorders in research, as well as practical implications.

Athletic Identity and Self-Presentational Perfectionism were also investigated as risk factors for subclinical eating disorders. As hypothesized, athletes that were classified as having a subclinical eating disorder ($N = 16$) had stronger athletic identities and greater self-presentational perfectionism than athletes that did not meet any criteria for a subclinical eating disorder ($N = 52$).

Athletes scored significantly higher on the AIMS than the non-athletes, as they should have. When comparing all of the subjects, there was no significant difference in athletic identity between the subjects who met at least five of the six criteria for a subclinical eating disorder and those who did not meet any criteria. However, when only comparing athletes, those who met at least five of the six criteria for a subclinical eating disorder had higher athletic identity scores than the athletes who did not meet any criteria. Thus, athletes who met more criteria for a subclinical eating disorder also had a greater athletic identity. Athletic identity may be an athlete-specific risk factor in developing subclinical eating disorders. Athletes with a greater athletic identity may be trying to achieve the ideal physique of an athlete, which is thin and muscular.

When exploring self-presentational perfectionism, athletes and non-athletes did not differ in their scores on the PSPS. However, the subjects who met at least five of the six criteria did score higher in self presentational perfectionism than those who did not meet any criteria for a subclinical eating disorder. Among athletes, those who met at least five of the six criteria also scored significantly higher in self-presentational perfectionism than those who did not meet any criteria for a subclinical eating disorder. The current study supports existing literature (Hewitt et al, 1995) that self-presentational perfectionism is also indicative of subclinical eating disorder behavior among female collegiate athletes. Thus, those athletes that have greater self-presentational perfectionism traits may have stricter standards and evaluations of their bodies that, in turn, make them more susceptible to engage in behaviors associated with subclinical eating disorders in order to present an image of being a better athlete.

Study Strengths and Limitations

The results of this study provide insight into the area of subclinical eating disorders among female collegiate athletes. However, the current study was not without limitations.

A main strength to this study is providing exploratory, descriptive information on an issue lacking research. Research on subclinical eating disorders among athletes is limited, and the findings from this study provide initial information that may contribute to continued research in this area.

The instrumentation used in the present study was also a strength. The surveys are all validated measures, many of which have been used extensively in studies of eating disorders with athletes as well as non-athletes.

The sample size of the present study was another strength. Two hundred and forty-five athletes from ten different sports participated. The athletes were from four different universities on the East Coast, which adds strength to the generalizability.

However, the characteristics of the sample may have been a limitation to the study. Although there was a rather large sample of athletes representing a variety of sports, the Division status of the schools selected may have limited generalizability. The present study sought out NCAA Division I schools because more competitive athletes were expected to show more signs of pathological eating and increased risks for eating disorders (Picard, 1999). However, the schools that participated were less prominent Division I schools (Division IAAA). The more competitive, prominent Division I schools (Division IA or IAA) declined to participate. Also, some sports had ample representation, while other sports had many fewer participants. For example, 24% of the athletes that completed the surveys played soccer ($n = 56$), whereas only 2% of the athletes that completed the surveys played golf ($n = 5$). Furthermore, the non-athlete student sample was disproportionately smaller than the athletes (19% non-athletes, 81% athletes). Perhaps more equal sample sizes between the athletes and non-athletes, and among the different sports, would yield different findings. Also, the non-athlete student sample was selected from physical activity classes. The students in these classes had a wide range of different majors. Perhaps the students enrolled in these physical activity

classes were more likely to possess the characteristics associated with subclinical eating disorders, as opposed to students from non-activity academic classes.

Future Research Directions and Practical Implications

The present study was an exploratory study investigating subclinical eating disorders. Future research on subclinical eating disorders in female athletes is needed, as many questions remain unanswered.

More descriptive research on subclinical eating disorders in female athletes is needed. If this study were replicated with a larger sample of athletes and non-athlete students, with more sports, more athletes in each sport sample, and more prominent Division I universities, it may yield very different results that may increase generalizability.

Further research may also determine if athletes in certain sports are more at risk for developing a subclinical eating disorder. Existing research is inconsistent regarding the influence of type of sport on subclinical eating disorders (Beals & Manore, 2002; Berry & Howe, 2000; Black & Burkes-Miller, 1988; Davis & Cowles, 1989; Rosen et al, 1986; Sundgot-Borgen, 1994). Even though this study did not show a difference among sports on subclinical eating disorders, further research is necessary. Obtaining larger samples of athletes for each sport examined, as well as including more aesthetic sports (i.e., gymnastics), may strengthen the findings.

Future research also needs to examine the prevalence of subclinical eating disorders in female athletes at varying training and competition levels (i.e., NCAA

Division I vs. III athletes; elite vs. recreational runners). It was proposed that athletes performing at higher levels were more likely to develop subclinical eating disorders. Fulkerson, Keel, Leon, and Dorr (1999) agreed that athletes performing at higher competition levels are at an increased risk for eating disorders. In their study of high school athletes at risk for an eating disorder, they concluded that athletes may not be at risk until they train for one particular sport in a highly competitive environment. Some studies have shown support for athletes at increased competition levels to experience more eating disturbances (Picard, 1999; Smolak, Murnen, & Ruble, 2000), while others have shown no support (Williams, Sargent, Valois, Drane, Parra-Medina, & Durstine, 2003). Overall, there is a paucity of empirical data to base conclusions on. Also, the level of competition has not been studied specifically in subclinical eating disorders, because a clear definition of subclinical eating disorders is still unavailable.

Future research is also needed to identify personality factors that may predispose female athletes to develop subclinical eating disorders. It appears that athletic identity and self-presentational perfectionism are two risk factors worth exploring. Risk factors can be useful warning signs for identifying vulnerable groups. Future research may clearly delineate the risk factors that are the best predictors of subclinical eating disorders as well as the risk factors that may be the easiest to identify for those involved in athletics.

Once subclinical eating disorders have been examined further, future research will be better able to examine pertinent issues. For example, researchers could examine the likelihood of subclinical eating disorders developing into clinical eating disorders, such

as Anorexia Nervosa or Bulimia Nervosa. Some research has examined the likelihood that partial syndrome eating disorders (also referred to as subclinical eating disorders, subdiagnostic, subthreshold, and atypical) will progress to clinical eating disorders. A review by Shisslak, Crago, and Estes (1995) found in several one to four year longitudinal studies, that 30-45% of the subjects classified with a partial syndrome eating disorder progressed to a clinical eating disorder. However, partial syndrome eating disorders are not well defined. A clear definition of subclinical eating disorders would also enable researchers to investigate the negative performance and health consequences for female athletes with subclinical eating disorders. Showing the negative consequences of subclinical eating disorders may also help those involved in athletics to understand the importance of preventing, detecting, and treating them. Furthermore, long-term consequences should also be examined.

This study has numerous practical implications for female college athletes and those working with them. Education and preventative training about subclinical eating disorders seems warranted. In order to detect and prevent subclinical eating disorders, coaches, athletes, athletic trainers, consultants, and others involved in athletics first need to learn what subclinical eating disorders are, how prevalent they are, and the negative health and performance consequences they can inflict upon an athlete. Once research is able to deliver this information, perhaps an orientation program could be implemented in each team's preseason schedule. This program could also include other health and performance issues that may affect the athletes throughout the season. Coaches, athletes, athletic trainers, and others involved in athletics need to continuously be aware of the risk

factors associated with subclinical eating disorders. A program should then be initiated to provide referrals for athletes who may be suspected of having a subclinical eating disorder. This program should include nutrition education, as well as counseling sessions on negative body image issues.

The link from research to practice is critical in combating subclinical eating disorders. Research must inform those involved in athletics about these issues. Research also is needed to determine the best method to implement this knowledge into a practical forum that will help the female athletes. Perhaps some educational and preventative methods will be more effective than others.

Conclusions

This study examined the prevalence of subclinical eating disorders among female college athletes and students. Although athletes did not show a higher prevalence of subclinical eating disorders than non-athletes, future research should continue to investigate a link since seven percent of the athletes are still a notable number to be classified with a subclinical eating disorder. In this study, there was no difference in subclinical eating disorders among the ten sports examined. All athletes may be at risk because their bodies are essential to their sport performance. Athletic identity and self-presentational perfectionism were investigated, and both were shown to be related to subclinical eating disorder. These factors warrant continued examination.

More research is needed to better delineate the prevalence of subclinical eating disorders among female athletes in various sports and competition levels. This research,

combined with research on the performance and health consequences associated with subclinical eating disorders, should inform coaches, athletes, athletic trainers, consultants, and others involved in athletics about these issues, so detection and prevention programs can be implemented.

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Appendix A
Demographics

Age: _____ Race/Ethnicity: _____

Year in College: Freshman Sophomore Junior Senior 5th yr +

Height: _____ ft _____ in Weight: _____ pounds

Have you ever been diagnosed with a clinical eating disorder? Yes No

What type of body frame do you have? Small Medium Large

Do you currently play an intercollegiate sport? Yes No

If Yes: What sport do you play? _____

Do you have a scholarship? Yes No

How much training/exercise do you typically participate in during a team practice? _____ minutes

How many days per week do you exercise for at least 20 minutes at a moderate to vigorous intensity other than a scheduled team practice/training session? _____ times/week

If you are not an intercollegiate athlete, how many days per week do you exercise for at least 20 minutes at a moderate to vigorous intensity? _____ Days/week

How long do you typically exercise for each session? _____ Minutes

What type of exercise do you normally engage in? _____

Do you think athletes engage in unhealthy eating behaviors more than, less than, or the same as general college students? More Less Same

Do you think your weight affects your athletic/exercise performance? Yes No

Appendix B
Eating Disorder Inventory

Please check one response for each of the following questions.

Always **Usually** **Often** **Sometimes** **Rarely** **Never**

1. I eat sweets and carbohydrates without feeling nervous.
2. I think that my stomach is too big.
3. I wish that I could return to the security of childhood.
4. I eat when I am upset.
5. I stuff myself with food.
6. I wish that I could be younger.
7. I think about dieting.
8. I get frightened when my feelings are too strong.
9. I think that my thighs are too large.
10. I feel ineffective as a person.
11. I feel extremely guilty after overeating.
12. I think that my stomach is just the right size.
13. Only outstanding performance is good enough in my family.
14. The happiest time in life is when you are a child.
15. I am open about my feelings.
16. I am terrified of gaining weight.
17. I trust others.
18. I feel alone in the world.
19. I feel satisfied with the shape of my body.
20. I feel generally in control of things in my life.

21. I get confused about what emotion I am feeling.
22. I would rather be an adult than a child.
23. I can communicate with others easily.
24. I wish I were someone else.
25. I exaggerate or magnify the importance of weight.
26. I can clearly identify what emotion I am feeling.
27. I feel inadequate.
28. I have gone on eating binges where I felt that I could not stop.
29. As a child, I tried very hard to avoid disappointing my parents and teachers.
30. I have close relationships.
31. I like the shape of my buttocks.
32. I am preoccupied with the desire to be thinner.
33. I don't know what's going on inside me.
34. I have trouble expressing my emotions to others.
35. The demands of adulthood are too great.
36. I hate being less than best at things.
37. I feel secure about myself.
38. I think about bingeing (overeating).
39. I feel happy that I am not a child anymore.
40. I get confused as to whether or not I am hungry.
41. I have a low opinion of myself.
42. I feel that I can achieve my standards.

43. My parents have expected excellence of me.
44. I worry that my feelings will get out of control.
45. I think my hips are too big.
46. I eat moderately in front of others and stuff myself when they're gone.
47. I feel bloated after eating a normal meal.
48. I feel that people are happiest when they are children.
49. If I gain a pound, I worry that I will keep gaining.
50. I feel that I am a worthwhile person.
51. When I am upset, I don't know if I am sad, frightened, or angry.
52. I feel that I must do things perfectly or not do them at all.
53. I have the thought of trying to vomit in order to lose weight.
54. I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close).
55. I think that my thighs are just the right size.
56. I feel empty inside (emotionally).
57. I can talk about personal thoughts or feelings.
58. The best years of your life are when you become an adult.
59. I think my buttocks are too large.
60. I have feelings I can't quite identify.
61. I eat or drink in secrecy.
62. I think that my hips are just the right size.
63. I have extremely high goals.
64. When I am upset, I worry that I will start eating.

Body Dissatisfaction Subscale

2.	I think that my stomach is too big. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
9.	I think that my thighs are too large. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
12.*	I think that my stomach is just the right size. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
19.*	I feel satisfied with the shape of my body. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
31.*	I like the shape of my buttocks. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
45.	I think my hips are too big. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
55.*	I think that my thighs are just the right size. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
59.	I think my buttocks are too large. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
62.*	I think that my hips are just the right size. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never

*The questions with an asterix are scored in reverse

Drive for Thinness Subscale

1.*	I eat sweets and carbohydrates without feeling nervous. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
7.	I think about dieting. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
11.	I feel extremely guilty after overeating. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
16.	I am terrified of gaining weight. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
25.	I exaggerate or magnify the importance of weight. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
32.	I am preoccupied with the desire to be thinner. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never
49.	If I gain a pound, I worry that I will keep gaining. <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never

*The questions with an asterix are scored in reverse

Bulimia Subscale

4.	<p>I eat when I am upset.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
5.	<p>I stuff myself with food.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
28.	<p>I have gone on eating binges where I have felt that I could not stop.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
38.	<p>I think about bingeing (overeating).</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
46.	<p>I eat moderately in front of others and stuff myself when they're gone.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
53.	<p>I have the thought of trying to vomit in order to lose weight.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>
61.	<p>I eat or drink in secrecy.</p> <p><input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never</p>

Appendix C
Body Shape Questionnaire

Please check one response for each of the following questions.

Never **Rarely** **Sometimes** **Often** **Very Often** **Always**

1. Has feeling bored made you brood about your shape?
2. Have you been so worried about your shape that you have been feeling that you ought to diet?
3. Have you thought that your thighs, hips or bottom are too large for the rest of you?
4. Have you been afraid that you might become fat (or fatter)?
5. Have you worried about your flesh not being firm enough?
6. Has feeling full (e.g., after eating a large meal) made you feel fat?
7. Have you ever felt so bad about your shape that you have cried?
8. Have you avoided running because your flesh might wobble?
9. Has being with thin women made you feel self-conscious about your shape?
10. Have you worried about your thighs spreading out when sitting down?
11. Has eating even a small amount of food made you feel fat?
12. Have you ever noticed the shape of other women and felt that your own shape compared unfavorably?
13. Has thinking about your shape interfered with you ability to concentrate (e.g., while watching television, reading, listening to conversations)?
14. Has being naked, such as when taking a bath, made you feel fat?
15. Have you avoided wearing clothes which make you particularly aware of the shape of your body?
16. Have you imagined cutting off fleshy areas of your body?
17. Has eating sweets, cakes, or other high calorie food made you feel fat?

18. Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?
19. Have you felt excessively large and rounded?
20. Have you felt ashamed of your body?
21. Has worry about your shape made you diet?
22. Have you felt happiest about your shape when your stomach has been empty (e.g., in the morning)?
23. Have you thought that you are the shape you are because you lack self-control?
24. Have you worried about other people seeing rolls of flesh around your waist or stomach?
25. Have you felt that it is not fair that other women are thinner than you?
26. Have you vomited in order to feel thinner?
27. When in company have you worried about taking up too much room (e.g., sitting on a sofa or a bus seat)?
28. Have you worried about your flesh being dimply?
29. Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?
30. Have you pinched areas of your body to see how much fat there is?
31. Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)?
32. Have you taken laxatives in order to feel thinner?
34. Has worry about your shape made you feel you ought to exercise?

Appendix D

Physical Self Perception Profile

These are statements which allow people to describe themselves. There are no right or wrong answers since people differ a lot. Choose the degree to which each statement BEST describes you:

Not at all True Somewhat Untrue Somewhat True Completely True

- 1.+ I feel that compared to most, I have an attractive body.
- 2.- I feel that I have difficulty maintaining an attractive body
- 3.- I feel embarrassed by my body when it comes to wearing few clothes.
- 4.+ I feel that I am often admired because my physique or figure is considered attractive.
- 5.- I feel that compared to most my body does not look in the best of shape.
- 6.+ I am extremely confident about the appearance of my body.

Appendix E

Eating Disorder Inventory Symptom Checklist

A. DIETING

Have you *ever* restricted your food intake due to concerns about your body size or weight? Yes No

How old were you *the very first time* that you began to seriously restrict your food intake due to concern about your body size or weight? _____years

B. EXERCISE

On average, over the *last three months*, how often have you exercised (including going on walks, riding a bicycle, etc.)? If you exercise more than once a day, please count the *total number of times* that you exercise in a typical week. _____Times a week

On average, how long do you exercise each time? _____Minutes

What percentage of your exercise is aimed at controlling your weight?
0% < 25% 25-50% 50-75% > 75% 100%

C. BINGE EATING

Please remember in answering the following questions that an eating binge *only* refers to eating an amount of food that others of your age and sex regard as *unusually large*. It does *not* include times when you may have eating a normal quantity of food which you would have preferred not to have eaten.

Have you *ever* had an episode of eating an amount of food that others would regard as *unusually large*? Yes No

How old were you when you *first* had an eating binge? _____ Years

How old were you when you began binge eating on a *regular* basis? _____

During the *last three months*, how often have you typically had an eating binge?

- _____ I have not binged in the last three months.
- _____ Monthly – I usually binge _____ time(s) a month.
- _____ Weekly – I usually binge _____ time(s) a week.
- _____ Daily – I usually binge _____ time(s) a day.

At the *worst* of times, what was your average number of binges per week?

How long ago was that? _____ months ago _____ at its worst right now

If you have not binged in the last three months, please skip to Question D.

Do you feel out of control when you binge?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

Do you feel that you can stop once a binge has started?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

Do you feel that you can prevent a binge from starting in the first place?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

Do you feel you can control your *urges* to eat large quantities of food?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

Do you feel distressed by your bingeing?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

Do you find bingeing pleasurable?
___Never ___Rarely ___Sometimes ___Often ___Usually ___Always

D. PURGING

Have you *ever* tried to vomit after eating in order to get rid of the food eaten?
Yes No

If no, please skip to Question E.

How old were you when you induced vomiting for the first time? _____

During the *last three months*, how often have you typically induced vomiting?

- _____ I have not vomited in the last three months.
- _____ Monthly – I usually vomit _____ time(s) a month.
- _____ Weekly – I usually vomit _____ time(s) a week.
- _____ Daily – I usually vomit _____ time(s) a day

At the *worst* of times, what was your average number of vomiting episodes per week? _____ vomiting episodes per week

How long ago was that? _____ months

E. LAXATIVES

Have you ever used laxatives to control your weight or get rid of food? Yes No

If no, please skip to Question F.

How old were you when you *first* took laxatives for weight control? _____

How old were you when you began taking laxatives for weight control on a *regular basis*? _____

During the last *three months*, how often have you been taking laxatives for weight control?

_____ I have not taken laxatives in the last three months.

_____ Monthly – I usually take laxatives _____time(s) a month.

_____ Weekly – I usually take laxatives _____time(s) a week.

_____ Daily – I usually take laxatives _____time(s) a day.

How many laxatives do you usually take each time? _____ Laxatives

What kind of laxatives do you take? _____

At the *worst* of times, what was the average number of laxatives that you were taking per week? _____ Laxatives/week

How long ago was that? _____ months

F. DIET PILLS

Have you *ever* taken diet pills? Yes No

If no, please skip to Question G.

During the last *three months*, how often have you typically taken diet pills?

_____ I have not taken diet pills in the last three months.

_____ Monthly – I usually take diet pills _____time(s) a month.

_____ Weekly – I usually take diet pills _____time(s) a week.

_____ Daily – I usually take _____ diet pills a day.

At the *worst* of times, what was the average number of diet pills that you were taking per week? _____ diet pills/week

How long ago was that? _____ months

G. DIURETICS

Have you *ever* taken diuretics (water pills) to control your weight? Yes No

If no, please skip to Question H.

During the last *three months*, how often have you typically taken diuretics?

- I have not taken diuretics in the last three months.
- Monthly – I usually take diuretics _____ time(s) a month.
- Weekly – I usually take diuretics _____ time(s) a week.
- Daily – I usually take _____ diuretics a day.

At the *worst* of times, what was the average number of diuretics that you were taking per week? _____ Diuretics/week

How long ago was that? _____ months

H. MENSTRUAL HISTORY

Have you ever had a menstrual period? Yes No

If no, please skip the following.

How old were you when you first started menstruating? _____ Years

Do you have menstrual periods now? (check one)

- Yes, regularly every month.
- Yes, but I skip a month once in a while.
- Yes, but not very often (for example, once in six months).
- No, I have not had a period in at least six months.
- No, I am post-menopausal, have had a hysterectomy, or am pregnant.

How long has it been since your last period? _____ Months

Have you ever had a period of time when you did not menstruate for three months or more (excluding pregnancy)? Yes No

Appendix F
Eating Attitudes Test

Please check one response for each of the following questions.

Always **Usually** **Often** **Sometimes** **Rarely** **Never**

1. I am terrified about being overweight.
2. I avoid eating when I am hungry.
3. I find myself preoccupied with food.
4. I have gone on eating binges where I feel that I may not be able to stop.
5. I cut my food into small pieces.
6. I am aware of the calorie content of foods that I eat.
7. I particularly avoid food with high carbohydrate content (i.e. bread, rice, potatoes, etc.)
8. I feel that others would prefer if I ate more.
9. I vomit after I have eaten.
10. I feel extremely guilty after eating.
11. I am preoccupied with a desire to be thinner.
12. I think about burning up calories when I exercise.
13. Other people think that I am too thin.
14. I am preoccupied with the thought of having fat on my body.
15. I take longer than others to eat my meals.
16. I avoid foods with sugar in them.
17. I eat diet foods.
18. I feel that food controls my life.
- 19.* I display self control around foods.
20. I feel that others pressure me to eat.

21. I give too much time and thought to food.
22. I feel uncomfortable after eating sweets.
23. I engage in dieting behavior.
24. I like my stomach to be empty.
- 25.* I enjoy trying new rich foods.
26. I have the impulse to vomit after meals.

Appendix G

Athletic Identity Measurement Scale

Please circle the response which best describes you.

1 2 3 4 5
Strongly Disagree Disagree Neither Agree Strongly Agree

1. I consider myself an athlete.
2. I have many goals related to sport.
3. Most of my friends are athletes.
4. Sport is the most important part of my life.
5. I spend more time thinking about sport than anything else.
6. I need to participate in sport to feel good about myself.
7. Other people see me mainly as an athlete.
8. I feel bad about myself when I do poorly in sport.
9. Sport is the only important thing in my life.
10. I would be very depressed if I were injured and could not compete in sport.

Appendix H

Perfectionistic Self-Presentation Scale

Listed below are a group of statements. Please rate your agreement with each of the statements using the following scale:

	1	2	3	4	5	6	7
	Disagree Strongly			Neutral			Agree Strongly
1. It is okay to show others that I am not perfect.....	1	2	3	4	5	6	7
2. I judge myself based on the mistakes I make in front of other people.....	1	2	3	4	5	6	7
3. I will do almost anything to cover up a mistake.....	1	2	3	4	5	6	7
4. Errors are much worse if they are made in public rather than in private.....	1	2	3	4	5	6	7
5. I try always to present a picture of perfection.....	1	2	3	4	5	6	7
6. It would be awful if I made a fool of myself in front of others..	1	2	3	4	5	6	7
7. If I seem perfect, others will see me more positively.....	1	2	3	4	5	6	7
8. I brood over mistakes that I have made in front of others.....	1	2	3	4	5	6	7
9. I never let others know how hard I work on things.....	1	2	3	4	5	6	7
10. I would like to appear more competent than I really am.....	1	2	3	4	5	6	7
11. It doesn't matter if there is a flaw in my looks.....	1	2	3	4	5	6	7
12. I do not want people to see me do something unless I am very good at it.....	1	2	3	4	5	6	7

13. I should always keep my problems to myself.....1	2	3	4	5	6	7
14. I should solve my own problems rather than admit them to others...1	2	3	4	5	6	7
15. I must appear to be in control of my actions at all times.....1	2	3	4	5	6	7
16. It is okay to admit mistakes to others.....1	2	3	4	5	6	7
17. It is important to act perfectly in social situations.....1	2	3	4	5	6	7
18. I don't really care about being perfectly groomed.....1	2	3	4	5	6	7
19. Admitting failure to others is the worst possible thing.....1	2	3	4	5	6	7
20. I hate to make errors in Public.....1	2	3	4	5	6	7
21. I try to keep my faults to myself... ..1	2	3	4	5	6	7
22. I do not care about making mistakes in public.....1	2	3	4	5	6	7
23. I need to be seen as perfectly capable in everything I do.....1	2	3	4	5	6	7
24. Failing at something is awful if other people know about it.....1	2	3	4	5	6	7
25. It is very important that I always appear to be on top of things.....1	2	3	4	5	6	7
26. I must always appear to be perfect.....1	2	3	4	5	6	7
27. I strive to look perfect to others.....1	2	3	4	5	6	7

Appendix I
Consent Form

The University of North Carolina at Greensboro
Consent To Act As A Human Participant

Project Title: Subclinical Eating Disorders Among Female Collegiate Athletes

Project Director: Marie Lloyd

Participants Name: _____ Date of Consent: _____

DESCRIPTIONS AND EXPLANATIONS OF PROCEDURES:

This present study is descriptive research using surveys to examine eating behaviors, athletic identity, and perfectionism among female collegiate athletes and non-athletes, as well as to examine differences among sports.

BENEFITS:

The results of this study will contribute to making coaches, athletes, and everyone involved in athletics, aware of subclinical eating disorders. It is important to recognize and detect subclinical eating disorders to prevent performance decrements and negative health consequences. Furthermore, delineating risk factors, such as athletic identity and self-presentational perfectionism, may aid in detecting those athletes that may be vulnerable to developing subclinical eating disorders.

RISKS:

There are no major risks for participating in this project. To maintain confidentiality, all surveys will be coded by number so that participants will be anonymous. These surveys will be stored in a locked filing cabinet for 1 year following the collection date and then will be shredded.

CONSENT:

By signing this consent form, you agree that you understand the procedures and any risks and benefits involved in this research. You are free to refuse to participate or to withdraw your consent to participate in this research at any time without penalty or prejudice; your participation is entirely voluntary. Your privacy will be protected because you will not be identified by name as a participant in this project. The surveys will be stored in a secure area and will be shredded 1 year following the completion of the study.

The research and this consent form have been approved by the University of North Carolina at Greensboro Institutional Review Board, which insures that research involving people follows federal regulations. Questions regarding your rights as a participant in this project can be answered by calling Mr. Eric Allen at (336) 256-1482. Questions regarding the research itself can be answered by calling Marie Lloyd at (336) 202-6634. Any new information that develops during the project will be provided to you if the information might affect your willingness to continue participation in the project.

Feel free to ask any questions as you complete the following forms. They should take about 30 minutes to complete.

By signing this form, you are agreeing to participate in the project described to you by Marie Lloyd

Participants Signature*

Date