SOCIAL PRESSURES AND BODY IMAGE
AS CONTRIBUTORS TO EATING HABITS
AMONG COLLEGIATE WOMEN ATHLETES

A Dissertation
Presented to
The Graduate Faculty of The University of Akron

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Philosophy

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August, 2007
SOCIAL PRESSURES AND BODY IMAGE

AS CONTRIBUTORS TO EATING HABITS

AMONG COLLEGIATE WOMEN ATHLETES

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Dissertation

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ABSTRACT

Researchers have often stated that when examining the development of eating disorders, it is fruitful to take a multi-dimensional approach in order to identify the role of several contributing factors. Unfortunately, not only has this framework been used all too rarely in the general research on eating disorders, it has hardly ever been used when looking at the development of disordered eating among athletes. To this end, relationships among self-reported symptoms of disordered eating, body image dissatisfaction, and two types of perceived pressure for thinness (social and athletic) were investigated in a sample of 206 women collegiate athletes from two Division I schools, representing 12 different sports.

A series of regression analyses, and a test of mediation, were used to analyze the data. It was hypothesized that body image dissatisfaction and perceived pressure for thinness would each account for a significant amount of variance in symptoms of disordered eating, and that body image dissatisfaction would mediate the relationship between both kinds of perceived pressure for thinness and disordered eating.

Support was garnered for several of the hypotheses. Specifically, the independent variables of body image dissatisfaction, social pressure for thinness, and athletic pressure for thinness each uniquely accounted for variance in disordered eating. Somewhat differing from the hypothesized relationship, body image dissatisfaction functioned as a partial mediator, rather than a full mediator, in the relationship between social pressure
for thinness and disordered eating, as well as in the relationship between athletic pressure for thinness and disordered eating.

Additional exploratory analyses indicated that athletic pressure did not account for additional variance in disordered eating above and beyond that accounted for by social pressure for thinness. Further, significant differences emerged on the variables of bulimia and athletic pressure for thinness when comparing individual sports and when comparing lean (e.g., cross-country, track, swimming, diving, gymnastics) vs. nonlean (e.g., rifle, tennis, golf, basketball, softball, volleyball, soccer) sports.

Therefore, all three variables (i.e., body image dissatisfaction, social pressure for thinness, and athletic pressure for thinness) were supported in the role they play in the development of disordered eating among women athletes. The finding of partial mediation of these relationships provides support for the continued examination and clarification of how these variables all uniquely contribute to this development.
ACKNOWLEDGEMENTS

A project such as this could never have been complete without the help of a number of people. I would like to first thank my advisor, Dr. Linda Subich, for her support, encouragement, patience, and dedication in guiding me through the dissertation process. I would also like to express my gratitude to my committee members for their valuable time and insights (Drs. Alan Kornspan, Sue Hardin, Jim Rogers, and Jim Werth). A well-deserved thank you goes to those who assisted in my data collection, including the numerous staff members associated with the athletic teams at both universities, and Nick Felber and Mindi Thompson for the hours spent recruiting participants and being my “go-betweens” when I was out of state. I am extremely grateful to the women athletes for participating in my study and to the coaches for allowing their athletes time to complete my questionnaires. My gratitude is also extended to the staff at University Health and Counseling Services of University of Wisconsin-Whitewater, for allowing me the time and flexibility necessary to finish this project.

Additionally, I want to acknowledge the people who have been there for me since I started graduate school (and even before). I thank my undergraduate advisor, Dr. David Skeen; our conversations in his office are what started it all. To all of the friends and confidantes I have made over the years, I express my sincere appreciation for enriching my life. From my interactions and life experiences shared with my cohorts from Iowa State University and The University of Akron (especially with Allison Schomburg), I
have learned and grown more than I can say. I appreciate the support and encouragement provided by my family and in-laws, who never seemed to doubt that the dissertation would, in fact, some day be completed. Finally, my husband and best friend, Matt Mallin, has made numerous sacrifices in the past few years. His consistent understanding, soothing presence, and ability to handle the emotional roller coaster that has been graduate school for me have been invaluable.
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Eating disorders are a problem in Western society. Prevalence rates for anorexia nervosa and bulimia nervosa have been estimated to be between 1% and 4% (American Psychiatric Association, 2000), depending on the population sampled and the criteria employed in each study. Further, on college campuses, studies have shown that the prevalence rates of eating disorders for women range from 4% to 19% (Borgen & Corbin, 1987). This greater incidence of unhealthy eating practices may be linked to the new experiences faced at college, higher academic demands, and a lack of predictability. Further, looking beyond full-blown eating disorders, research on disordered eating indicates this is also a significant problem for college women. Disordered eating takes into account not only eating disorders per se, but also the full spectrum of unhealthy eating and exercise behaviors (Yeager, Agostini, Nattiv, & Drinkwater, 1993). Mintz and Betz (1988) found that 15% to 62% of college women reported disordered eating behaviors (e.g., purging, taking appetite suppressants, fasting).

High Risk Populations

Although studies have shown that disordered eating is a risk for all women, some sub-populations may be at higher risk than others. Ballet dancers and models, for example, are two groups of women who seem to be held to an extremely rigid body type
and weight in their occupations (Brooks-Gunn, Burrow, & Warren, 1988; Garner, Garfinkel, Rockert, & Olmsted, 1987; Petrie, 1993). Also, predisposing factors such as a history of abuse, genetics, having a family member with an eating disorder (or one who is especially focused on weight and body shape), having a personal and familial history of being overweight, and having a history of dieting can place an individual at higher risk of developing an eating disorder or disordered eating compared to others (Garner & Garfinkel, 1997).

The athletic arena also has begun to emerge as one in which persons may be at higher risk of developing an eating disorder or disordered eating. Research has been conducted with men and women who are athletes in a myriad of sports at a variety of competition levels (from adolescents to elite athletes) in an attempt to determine whether the athletic environment is associated with the development of eating disorder symptomatology (e.g., Johnson, Powers, & Dick, 1999; Picard, 1999; Sundgot-Borgen, 1994a). More specifically, empirical studies have examined whether sports that emphasize leanness place women who are athletes at higher risk for developing disordered eating behaviors than do sports that do not emphasize leanness (e.g., Borgen & Corbin, 1987; Davis & Cowles, 1989; Kirk, Singh, & Getz, 2001).

Disordered Eating Among Athletes

Despite the numerous studies that have been conducted, debate continues about the relationship between participation in athletics and the development of eating disorders. Most of the existing research on athletes has been aimed at determining the prevalence of eating disorders or pathogenic weight control behaviors (Garner, Rosen, & Barry, 1998), yet currently the exact prevalence is unknown (Brownell & Rodin, 1992).
Authors (e.g., Petrie, 1993; Zucker, Womble, Williamson, & Perrin, 1999) have identified a variety of methodological flaws in the literature that may have contributed to the difficulty determining prevalence. For example, it may not be appropriate to cluster athletes from varying levels of competition into one aggregated group. It is possible that combining athletes from different divisions of colleges, high school athletes, club sport/recreational athletes, and national or Olympic teams may complicate findings because there are different motivations and influences operating at each level of competition. Indeed, Picard (1999) found women athletes at the Division I level reported a higher prevalence of disordered eating, preoccupation with thinness, and fear of gaining weight than did women athletes at the Division III level. Additionally, some measures employed in prior studies have not been validated specifically on an athletic population, and others have not been validated at all (Stein, 1991).

Nevertheless, several relatively sound empirical studies have revealed a disturbing incidence of disordered eating patterns in competitive athletes (e.g., Burckes-Miller & Black, 1988b; Petrie, 1993; Rucinski, 1989; Sundgot-Borgen, 1994a; Taub & Blinde, 1992). Among such studies, the prevalence of eating disorders in women athletes has been reported to be between <1% and 40%, with estimates varying greatly depending on the athletic population investigated and the data collection methods used (Sundgot-Borgen). In a study sponsored by the National Collegiate Athletic Association (NCAA), Johnson and colleagues (1999) surveyed 1445 men and women athletes from 11 Division I schools and 11 different sports. Although only about 1% of the sample met the Diagnostic and Statistical Manual of Mental Disorders –Fourth Edition (DSM-IV; APA, 2000) criteria for an eating disorder, over 13% of athletes reported clinical
symptoms of eating disorders. The authors concluded that women athletes, specifically, were at significant risk for developing thoughts and behaviors associated with disordered eating.

Additionally, Rosen, McKeag, Hough, and Curley (1986) found that 32% of the 182 women varsity athletes they surveyed reported using potentially dangerous weight control behaviors (e.g., vomiting, taking diet pills). Rosen and Hough (1988) surveyed 42 college gymnasts and found 26% of them reported vomiting, all of them were actively dieting, and two-thirds had been told by their coach to lose weight. Further, Sundgot-Borgen (1994a) examined risk factors for eating disorders among 522 elite athletes in six different groups of sports. This author found 22.4% of the athletes she surveyed were at risk for the development of an eating disorder, and of the 103 at-risk participants who completed a follow-up interview, 48% met the criteria for anorexia or bulimia.

Prevalence studies also have been conducted to determine whether athletes display more eating disorder symptomatology than do various comparison groups. These studies have resulted in equivocal findings. A common problem throughout these studies is that the definition of “athlete” and the definition of “comparison group” have not been consistent, and sometimes these groups have not been defined at all (Petrie, 1993). Nevertheless, Brownell and Rodin (1992) reviewed 23 studies on eating problems in athletes and concluded that athletes showed more problems with eating, dieting, and body image than did nonathletes. Smolak, Murnen, and Ruble (2000) conducted a meta-analysis of 34 studies and concluded athletes were more at risk for developing eating disorder symptoms than were nonathletes. Other researchers also have found that athletes are more at risk for developing eating disorder symptoms than are nonathletes.
Yet, a few studies have shown that athletes are actually less at risk than are nonathletes (e.g., Kurtzman, Yager, Landsverk, Weismeier, & Bodurka, 1989; Marten DiBartolo & Shaffer, 2002; Wilkins, Boland, & Albinson, 1991). Additionally, several studies have found no difference in eating disordered behaviors and attitudes between athletes and nonathletes (e.g., Fulkerson, Keel, Leon, & Dorr, 1999; Harris & Greco, 1990; Kirk et al., 2001).

One of the difficulties in interpreting these various findings is that there is a discrepancy with the measures designed to assess symptomatology employed in these studies. Some instruments classify individuals into eating disorder categories by strict diagnostic criteria, and others employ the continuum framework to obtain a broader perspective of unhealthy eating habits. Still others select only certain subscales from established measures in order to focus on evidence supportive of their hypotheses. Most of these studies also failed to conceptualize fully disordered eating behaviors along a continuum, which may lead to an omission of several behaviors indicating an individual may be at risk for disordered eating (Petrie, 1993).

A Multi-Dimensional View

Although the existing research seems to indicate a high degree of eating disorder symptomatology in the athletic population, the literature is unclear as to whether the problem is especially severe in women athletes compared to other populations of women, and little systematic work has been done to clarify what factors might put certain women athletes at greater risk. One way to begin to explore the question of what variables may
contribute to disordered eating in women athletes is to utilize a theoretical structure as a guide. Tylka and Subich (2004) offered one such framework that they derived from existing research on disordered eating among women. In it, they categorized variables into three groups: personal factors (including internalization of the thin ideal stereotype, interoceptive awareness, body image dissatisfaction, and negative affect), sociocultural factors (such as pressure for thinness), and relational factors (such as social support from family and friends). The multi-dimensional view proposed by these authors, and the less comprehensive ones proposed by others (e.g., Fredrickson & Roberts, 1997; Stice, Nemeroff, & Shaw, 1996), attempt to take into account several factors simultaneously to see how they may influence one another.

Through structural equation modeling, Tylka and Subich (2004) found support for their proposal that sociocultural pressure for thinness had a direct effect on family social support, friend social support, women’s negative affect, internalization of the thin ideal stereotype, and body image disturbance. Further, only body image disturbance, negative affect, and friend social support were related directly to eating disorder symptomatology. Although causality cannot be inferred from this research, their data suggest support for their proposed model and illuminate several factors that may be useful to explore with a sample of women athletes. Tylka and Subich’s framework may offer a lens through which to consider concurrently a number of factors that have been suggested previously to influence the development of eating disorder symptomatology in women athletes. Two of their proposed factors, sociocultural and personal influences, seem especially relevant for an investigation with this population.
Sociocultural Factors

The sociocultural domain encompasses features of the social environment such as perceived pressure for a thin body, internalization of the thin ideal, societal expectations about the roles of women, and body objectification (Tylka & Subich, 2004). Some theorists have proposed that the rise in the number of eating disorders among women in recent decades might be a result of the media’s emphasis on women’s appearance and weight, gender role expectations, and sexism in our society (Fouts & Burggraf, 1999; Garner, Garfinkel, Schwartz, & Thompson, 1980; Maine, 2000; Thompson, 1996). The social influence of the media has been found relevant to disordered eating (e.g., Garner & Garfinkel, 1980), and perceived pressure for thinness and internalization of the thin ideal stereotype are related to the level of eating disturbances among women (e.g., Griffiths et al., 1999; Mintz & Betz, 1988; Stice, 1994; Striegel-Moore et al., 1986; Thompson & Heinberg, 1993). Additionally, having a history of being teased about one’s appearance can affect eating behaviors (Rosen, 1992; Thompson, 1992). Hoelter (1984) suggested that various individuals may differentially influence the development of disordered eating and body satisfaction in adolescent girls, although it is not clear how at this point.

Some authors (e.g., Berry & Howe; 2000; Striegel-Moore, Silberstein, & Rodin, 1986; Thompson & Sherman, 1993a) have argued that not only are women athletes exposed to the typical cultural pressures regarding weight felt by all women, but in addition they are exposed to unique pressures within the athletic arena. One such pressure is the urging from sources such as coaches and teammates to reach a certain body weight (as this is supposed to be related to superior performance), to maintain a particular body shape that “looks good” and is “aesthetically appealing” to the judges and to the
audience, and to “make weight” in order to qualify for a particular category of
competition (e.g., Blinde, 1989; Fairbanks, 1987; Rosen & Hough, 1988; Sundgot-
Also, team weigh-ins are rarely private, and this may contribute to an athlete’s sense of
shame and embarrassment if she should be found to be “overweight” (Thompson &
Sherman).

In athletics, there are also strong performance advantages to reducing body fat to
very low levels (Davis, 1992). Many athletes are taught early on that maintaining a
particular weight and body shape is a necessity for peak performance (Thompson &
Sherman, 1993a). Excess weight can inhibit speed, endurance, and agility, and increase
fatigue, and leanness (lower weight and lower percentage body fat) often enhances
performance; this is also referred to as “performance thinness” (Powers & Johnson,
1996). Performance advantages, combined with the cultural ideal of extreme slenderness,
“are likely to create especially strong aversions to fatness among female athletes and
equally strong incentives to reduce body fat to very low levels” (Davis, 1992, p. 180).

Additionally, in the athletic arena, athletic body stereotypes exist. Society expects
athletes in some sports to exhibit a characteristic body shape or size. These stereotypes
may make it easier for a coach or an athlete to have unrealistic shape or size expectations
and may contribute to the difficult task of identifying at-risk athletes. That is, an athlete’s
size or shape might not look unhealthy if it is the expected one for his or her sport
(Thompson & Sherman, 1999a). Thus, the incidence of eating disorder symptoms (such
as purging or severely restricting caloric intake) in sports may be being overlooked
simply because such practices may seem normal in this population.
Further, in a private, close-knit environment such as that found among athletic teams, it is possible for a contagion effect to occur and maintain itself (Thompson & Sherman, 1999a). This can occur when one individual is influenced by another to begin using a particular method of weight loss. Crandall (1988) discussed the social processes involved in bulimia and binge eating, and stated that social groups such as athletic teams develop norms about eating, dieting, and losing weight. Contributing to this effect is that it is easy for athletes to make body comparisons when they shower and dress together, or spend time in revealing sport apparel such as bathing suits.

Nevertheless, few empirical studies have specifically examined the role of pressure for thinness in relation to eating disorder development in athletes. Social pressure to lose weight has been hypothesized to be a contributing variable to the development of eating disorders in athletes (e.g., Rosen & Hough, 1988; Sundgot-Borgen, 1994b; Williamson et al., 1995), but the role of social factors such as pressure from coaches and peers has not been identified clearly and needs to be examined further (Berry & Howe, 2000). In a rare examination of this area, Berry and Howe found that negative body image and social pressure from peers and coaches to lose weight were significant predictors of restrained eating.

**Personal Factors**

The personal domain outlined by Tylka and Subich (2004) includes personality characteristics, interoceptive awareness, cognitive factors, coping skills, dieting history, life events, biological factors, and body image dissatisfaction. Quite a number of specific personality variables have been investigated to determine their relation to disordered eating among women in general. Some of these characteristics include neuroticism
(Davis, 1992), perfectionism, self-worth linked to external validation (Garner & Garfinkel, 1997), a need for acceptance, negative self-evaluation of achievement (Striegel-Moore et al., 1993), low self-esteem, and negative affect or stress (Shatford & Evans, 1986). Finally, poor interoceptive awareness is also related to disordered eating in women (Bruch, 1973; Garner & Garfinkel, 1997).

Several authors (e.g., Brownell, Rodin, & Wilmore, 1992; Thompson & Sherman, 1999; Yates, Shisslak, Allender, Crago, & Leehey, 1992) have argued that there are many similarities between the characteristics of individuals with eating disorders and competitive athletes. For example, many individuals with anorexia display such characteristics as a need for acceptance, compulsiveness, a denial of discomfort, desire to please others, drive for perfectionism, overcompliance, persistence, high achievement expectations, and a commitment to working hard. These characteristics are some of the same ones that help an athlete to be successful in his or her sport, and as such may increase an athlete’s vulnerability to eating disorders (Davis, 1992; Johnson, 1994; Thompson & Sherman, 1993a).

Body image dissatisfaction is an important personal characteristic that has been linked to the tendency to diet and pressure for thinness. Among nonathletes, body image dissatisfaction predicts disordered eating (Cattarin & Thompson, 1994; Cooper, Taylor, Cooper, & Fairburn, 1987; Molinari, 1995; Phelps, Johnston, & Augustyniak, 1999), is a precursor to unhealthy eating behaviors, and predicts the severity of eating problems (Striegel-Moore et al., 1986; Striegel-Moore, Silberstein, & Rodin, 1993). Further, Berry and Howe (2000) and Williamson and colleagues (1995) found that negative body image was linked to disordered eating symptoms in athletes. Indeed, Krane, Waldron,
Michalenok, and Stiles-Shipley (2001) stated “performance-related body image concerns (i.e., the need to be more muscular and less fat) and cultural pressures to present the ideal body (i.e., toned but not too muscular) both may contribute to unhealthy mental states and problematic eating and exercise behaviors in female athletes” (p. 47).

Extending Prior Research

The present study was framed in Tylka and Subich’s (2004) multi-dimensional outline of the development of eating disorders. Constructs drawn from two of the domains examined in their study were explored in the present research: social pressure for thinness (a sociocultural factor) and body image dissatisfaction (a personal factor). These constructs were chosen because they have been shown to be related to eating disorder development in general, and they seemed to be especially important to explore with women participating in the athletic arena. Further, in an attempt to extend the current research, perceived pressure for thinness in the athletic realm was assessed separately from perceived social pressure for thinness outside of this context. An attempt was made to determine whether women athletes’ perceptions of pressure to be thin from sources such as coaches and teammates, in conjunction with other typical societal pressures to maintain a thin body, account for variance in eating disorder symptomatology. This additional pressure from athletic sources could have an additive effect on women athletes and place them at higher risk for developing symptoms of an eating disorder.

The decision to focus on these two variables is supported by two other psychosocial studies that attempted to investigate similar concepts in relation to disordered eating symptoms among women athletes. Williamson and colleagues (1995)
investigated several variables conceptually similar to those of interest in the present research with regard to their relation to symptoms of bulimia and anorexia in collegiate women athletes. Three antecedent risk factors were identified and assessed through questionnaires: social influence for thinness (a sociocultural factor measured by five items that assessed the degree to which the athlete perceived pressure about body weight or size from coaches and teammates), athletic performance anxiety (a personal factor), and self-appraisal of athletic achievement (a personal factor). Concern with body size (a personal factor) was assessed using the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987). A structured interview (the Interview for Diagnosis of Eating Disorders; Williamson, 1990) was used to determine the presence and severity of eating disorder symptoms. The authors hypothesized that overconcern with body shape and size would mediate the relation between the three risk factors and eating disorder symptoms.

Ninety-eight women athletes from eight different sports participated in the study. Structural equation modeling was employed and supported the hypothesized model. Cross validation showed stable findings. Results indicated that social pressure for thinness from coaches and peers, along with anxiety about athletic performance and negative self-appraisal of athletic achievement, predicted symptoms of eating disorders when mediated by concern about body size and shape. The authors concluded that eating disorders in women college athletes are not simply a function of the emphasis on thinness in some sports, or the personality characteristics of some women, but rather it is likely that several risk factors must occur during the same time period to cause overconcern
with body size and shape, which then leads to disturbed eating, dieting and purging habits (Levine & Smolak, 1992).

Although the model developed in the study by Williamson and colleagues (1995) can serve as a template and impetus for future research, one may note that the study is already 10 years old, and little to no follow-up research has been conducted. Limited information was provided about the measures used, a common problem throughout this area of research. Further, the method was problematic in that the sample size was too small to be appropriately analyzed using structural equation modeling and very small to be split for cross-validation.

In a more recent study, Berry and Howe (2000) examined social pressure (a sociocultural factor measured by questions regarding social and peer influence on dieting behavior), self-esteem (a personal factor), competition anxiety (a personal factor), and body image satisfaction (a personal factor assessed by the Body Shape Questionnaire; Cooper et al., 1987) as risk factors in the development of disordered eating patterns in women athletes. Forty-six women varsity athletes from five different sports participated in the study and completed a series of questionnaires. Canonical correlations and MANOVAs were used to analyze the data. Results indicated that those athletes who showed high restrained eating and high emotional eating also reported low body image satisfaction, high social pressure, low self-esteem, and high competition anxiety. Individual regression analysis indicated that body image satisfaction and social pressure accounted for significant variance in restrained eating. Body image satisfaction also explained a significant amount of variance in emotional eating. There were no significant differences among members of different teams on the measures of disordered eating.
These authors concluded that body image satisfaction and social pressure from coaches and peers were significantly related to restrained eating (which supported previous research). Further, each of the risk factors (self-esteem, competition anxiety, social pressure, and body image satisfaction) was significantly correlated with indicators of unhealthy diet practices. Berry and Howe (2000) proposed that there should be a closer examination of the role a coach or peer can play in the development of an eating disorder.

The goal of this study, then, was to determine how body image dissatisfaction and pressure for thinness (both from inside the athletic realm and from general society) relate to eating disorder symptomatology in women collegiate athletes. Although some research has been done in these separate areas, few studies (e.g., Berry & Howe, 2000; Williamson et al., 1995) have attempted to investigate these constructs in a multidimensional manner specific to women athletes. Further, existing research has not examined the separate and possibly additive effect of pressure for thinness specific to women athletes. This additional perceived pressure, when combined with the typical cultural pressure, might increase the risk of developing disordered eating for these individuals. This study may then help illuminate the complex relationships between the variables contributing to disordered eating in the collegiate athlete population of women.
CHAPTER II
LITERATURE REVIEW

Although only a small percentage of college women (1%-3%) have diagnosable eating disorders, many (estimated at 10%-30%) appear to be at risk for developing an eating disorder over the course of their college years (Hill, 2002). Prevalence rates for disordered eating among college women were estimated to range from 15% to 62%, according to Mintz and Betz (1988). More recently, in a sample of first year college women, Mintz, O’Halloran, Mulholland, and Schneider (1997) found that 4% had an eating disorder and 19% had some risk factors for the development of a diagnosable eating disorder. Given this prevalence of eating symptomatology among college women, it follows to examine the development of disordered eating in specific groups of these women.

Of interest in the present research are women who are college athletes. Despite the numerous studies that have been conducted, debate continues about the relation between women’s participation in athletics and the development of pathogenic weight control behaviors (e.g., purging, taking diet pills, laxative abuse). This chapter begins with a review of the existing literature that establishes collegiate women athletes are not immune to the development of disordered eating. The focus then shifts to potential risk factors that contribute to disordered eating among these women.
Specifically, the general literature on disordered eating identifies social pressure for thinness and body image dissatisfaction as two components of a multi-dimensional framework that are related to disordered eating (e.g., Tylka & Subich, 2004). These two constructs seem to be especially important to explore with women participating in athletics given the focus on achieving and maintaining a physically fit body. There is also indication in the literature that pressure for thinness may be experienced from sources specific to women athletes (i.e., coaches and team members). This additional perceived demand, when combined with typical cultural pressures, may account for an increased risk of developing disordered eating for these individuals. What follows, then, is a review of the literature pertaining to disordered eating among women athletes, a discussion of three constructs related to disordered eating (i.e., body image dissatisfaction, social pressure for thinness, and athletic pressure for thinness), and a proposed model that depicts the relationships between these variables.

Disordered Eating and Collegiate Women Athletes

Prevalence of Disordered Eating Among Women Athletes

Although the present research focuses on women athletes, much of the disordered eating prevalence literature for athletes examines women along with men. It is clear from this literature that determining the prevalence of eating disorders and disordered eating behavior in the athletic population has been rather difficult. Prevalence research conducted with athletes has been even less rigorous than similar research done in the general population; many studies have been conducted with small, non-representative samples, using measures with questionable psychometric properties (Brownell & Rodin, 1992). In addition, some authors choose to measure symptoms, and others attempt to
diagnose the participants. At times, it is even unclear what constructs are being measured. Furthermore, the secretive nature of disordered eating behaviors contributes to the difficulty in determining the prevalence of disordered eating; athletes may feel threatened if they admit to these practices and may fear removal from the team or other consequences.

Finally, prevalence estimates are influenced by the changing criteria used to define eating disorders (Garner & Rosen, 1991). For example, the *DSM-IV* (APA, 2000) criteria for anorexia and bulimia are quite different from earlier versions of these criteria (Walsh & Garner, 1997). Further, the category of eating disorder not otherwise specified (EDNOS) recently has been developed and sometimes has been used synonymously with subclinical, partial syndrome, and anorexia athletica. “Anorexia athletica” is a term introduced by Sundgot-Borgen (1993) to identify athletes with symptoms of eating disorders who do not meet all the criteria for anorexia or bulimia. Indeed, most women athletes will not have a diagnosis of anorexia or bulimia, but many may have a clinically significant problem associated with dissatisfaction with their body size/shape or may fit the *DSM-IV* (APA, 2000) criteria for EDNOS. Research on these subclinical patterns is important because body image dissatisfaction, drive for thinness, and preoccupation with weight are important risk factors for the development of eating disorders in women athletes (Byrne & McLean, 2002; Davis, 1992; Petrie, 1996). It is these subclinical patterns that are described by the term “disordered eating,” and the term “eating disorder” is used to indicate conditions that meet the *DSM* criteria for a diagnosis.

Nevertheless, despite these difficulties with the research, the female athlete triad is commonly discussed in the literature as an important and potentially dangerous issue
that needs to be addressed with all women athletes. The triad, which consists of disordered eating, amenorrhea, and osteoporosis, often occurs among competitive women athletes and can cause irreparable damage if left untreated (Brownell, Rodin, & Wilmore, 1992; Sagenis et al., 2005). Disordered eating is the pivotal factor, in that dietary restriction and low body weight contribute to the loss of menstruation and of bone density, leading to stress fractures. Sanborn, Horea, Siemers, and Dieringer (2000) reviewed the literature and reported that prevalence estimates of women athletes who suffered from amenorrhea ranged up to 66%, as compared to 2% to 5% in nonathletes. Although many coaches and players believe that loss of menstruation is typical when training hard, this dramatic change in hormone levels can cause harm to the athletes’ bodies (Brownell et al.; Thompson & Sherman, 1993, 1999).

In one of the earliest studies examining prevalence of disordered eating among athletes, Rosen, McKeag, Hough, and Curley (1986) surveyed 182 women who were college athletes from various sports and found that potentially dangerous weight control behaviors were common: 14% of the total sample reported engaging in self-induced vomiting, and 16% indicated they used laxatives. Looking specifically at one group of athletes, Rosen and Hough (1988) studied 42 collegiate women who were gymnasts and found that 26% had used self-induced vomiting and all were actively trying to diet.

In another early study, Burckes-Miller and Black (1988) surveyed 695 college athletes (382 women from eight sports and 313 men from seven sports) using a questionnaire developed for their study, Eating Habits of Athletes, based on DSM-III (APA, 1980) criteria for anorexia and bulimia. The athletes were from 22 Midwest colleges and universities. Twenty-one athletes (3%) met the criteria for anorexia,
including 16 women and 5 men. One hundred ninety five athletes (21.5%) met the criteria for bulimia, including 150 women and 45 men. The prevalence of eating disorders reported in this study was higher than that reported for other college students (e.g., Pyle et al., 1985) and for the general population (e.g., Hart & Ollendick, 1985). Table 1 reviews the studies that estimated the prevalence of disordered eating in women athletes.

A few years later, Stoutjesdyk and Jevne (1993) examined the prevalence of eating disorders among 191 high-performance men and women athletes (104 women and 87 men) from 14 universities and 12 clubs throughout Canada. Each participant completed the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979). Overall, 11 women (10.6%) and 4 men (4.6%) scored in the anorexic range (over 30) on the EAT. This prevalence for women athletes was comparable to what had been reported in other studies of university populations, but the prevalence for men was higher than respective reports from other studies examining college students (e.g., Button & Whitehouse, 1981; Garner & Garfinkel, 1979).

In 1993, Petrie specifically focused on collegiate women gymnasts. Participants included 204 gymnasts from Division I universities. Among other measures, they completed the Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) in order to be classified into one of seven disordered-eating categories designed from DSM-III-R (APA, 1987) criteria and previous research (Mintz & Betz, 1988): bulimic, normal, binger, purger, dieter/restricter, excessive exerciser, subthreshold bulimic. One hundred twenty five (61.3%) of the athletes were classified as having an intermediate form of disordered eating, and an additional 34 women were classified as
<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkees-Miller &amp; Black (1988)</td>
<td>695 college athletes</td>
<td>382 women (volleyball, basketball, softball, cross country/track, gymnastics, swimming, tennis, cheerleading)</td>
<td>Original questionnaire (EHA) based on DSM-III criteria for anorexia and bulimia</td>
<td>16 women (4.2%) met criteria for anorexia. 150 women (39%) met criteria for bulimia.</td>
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<td>313 men (basketball, baseball, cross country/track, swimming, tennis, wrestling, cheerleading)</td>
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<tr>
<td>Stoutjesdyk &amp; Jevne (1993)</td>
<td>191 athletes from universities and clubs</td>
<td>107 women athletes 87 men athletes</td>
<td>EAT</td>
<td>11 women (10.6%) scored in anorexic range (over 30).</td>
</tr>
<tr>
<td>Petrie (1993)</td>
<td>204 college athletes</td>
<td>204 women gymnasts</td>
<td>BULIT-R</td>
<td>125 (61.3%) women had an intermediate form of disordered eating; a further 34 (16.6%) were classified as bulimic.</td>
</tr>
<tr>
<td>Johnson, Powers, &amp; Dick (1999)</td>
<td>1445 Division I college athletes</td>
<td>562 women athletes 883 men athletes (included 11 sports)</td>
<td>Original questionnaire (SAQ)</td>
<td>141 women (25%) were “at-risk” for anorexia; 326 (58%) of women were “at-risk” for bulimia. Of these:</td>
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<td>16 women (2.9%) had “clinically significant” symptoms of anorexia; 51 women (9.2%) had “clinically significant” symptoms of bulimia.</td>
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<td></td>
<td>0 women met criteria for anorexia; 6 women (1.1%) of women met criteria for bulimia.</td>
</tr>
</tbody>
</table>
Table 1.

Research focusing on prevalence of disordered eating among athletes (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sundgot-Borgen &amp; Torstveit (2004)</td>
<td>1259 Norwegian elite athletes</td>
<td>572 women athletes 687 men athletes</td>
<td>Original questionnaire;</td>
<td>121 women athletes (21%) and 81 women nonathletes (14%) were classified &quot;at-risk&quot; for an eating disorder.</td>
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<tr>
<td></td>
<td>1203 Norwegian nonathletes</td>
<td>(included 68 sports)</td>
<td>EDE interview</td>
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<tr>
<td></td>
<td></td>
<td>574 women nonathletes 629 men nonathletes</td>
<td></td>
<td>20% of women athletes met the criteria for subclinical or clinical eating disorder.</td>
</tr>
</tbody>
</table>

*Note.* BULIT-R = Bulimia Test – Revised; EAT = Eating Attitudes Test; EDE = Eating Disorder Examination; EHA = Eating Habits of Athletes; SAQ = Student Athlete Questionnaire.
bulimic (16.6%). This number was similar to the results of Mintz and Betz’s (1988) study of undergraduate women; however, a smaller percentage of gymnasts was classified as normal, nondisordered eaters (22% vs. 33%) and a larger percentage was found to have bulimia (16.6% vs. 3.1%).

In a broad spectrum study, Johnson, Powers, and Dick (1999) surveyed 1445 student athletes (562 women and 883 men) from 11 Division I schools across 11 different sports. This study was conducted in collaboration with the National Collegiate Athletic Association (NCAA). The Student Athlete Questionnaire that was developed for this study included a variety of items, including three subscales from the Eating Disorder Inventory-II (EDI-II; Garner, 1991) - Body Dissatisfaction, Drive for Thinness, and Bulimia. The authors classified athletes into four categories: meeting the criteria for DSM-IV diagnosis, clinically significant, self-identified, and at risk. When examining the diagnosis of anorexia, no women or men met the DSM-IV criteria. For bulimia, six women (1.1%) and no men met the DSM-IV criteria. When using less stringent criteria, 16 women (2.85%) and no men were classified as having “clinically significant” symptoms of anorexia, but 51 women (9.2%) and one man (.005%) had “clinically significant” symptoms of bulimia. These numbers greatly increased in the “at risk” category, into which 141 women (25%) and 84 men (9.5%) were placed for anorexia and 326 women (58%) and 336 men (38%) were placed for bulimia. These categories were not mutually exclusive; for example, the 326 women “at risk” for bulimia included those who had “clinically significant” symptoms along with those who met the DSM-IV criteria for this disorder.
It should be noted that because the NCAA was involved with the implementation of the research, this may have affected the results and influenced athletes to minimize their difficulties. Nevertheless, the authors concluded that “female athletes in Division I programs are at significant risk for developing eating-disordered thoughts and behaviors” (Johnson et al., 1999, p. 187).

Most recently, Sundgot-Borgen and Torstveit (2004) conducted a large scale investigation of the entire population of Norwegian men and women who were elite athletes. A total of 572 women athletes, 687 men athletes, 574 women nonathletes, and 629 men nonathletes participated in the study by initially completing a detailed questionnaire that included subscales of the Eating Disorder Inventory-II (EDI-II; Garner, 1991) and questions about DSM-IV symptoms of eating disorders. Based on the responses to the questionnaire, certain individuals were classified as “at-risk” and asked to participate in a clinical interview. This interview was conducted in order to determine the number of individuals who met the DSM-IV criteria for eating disorders. A total of 121 women and 61 men who were athletes (n = 182; 14.5%) and 81 women and 22 men who were nonathletes (n = 103; 8.6%) were classified as “at-risk” for the development of an eating disorder.

Results from the clinical interviews (Eating Disorder Examination – EDE; Cooper, Cooper, & Fairburn, 1989) indicated a significant difference between the at-risk athletes and the at-risk nonathletes, in that 13.5% of athletes and 4.6% of nonathletes met the diagnostic criteria for a subclinical or clinical eating disorder (i.e., bulimia, anorexia, EDNOS, anorexia athletica). Additionally, more women athletes (20%) than men athletes (8%) met the diagnostic criteria, and the prevalence of eating disorders and disordered
eating was higher in women athletes (20%) than in women nonathletes (9%). Further, a higher percentage of athletes (8.5%) met the criteria for subclinical eating disorders than the percentage of athletes who met the criteria for clinical eating disorders (5.1%).

In the previously reviewed studies, it is important to note the various measures that have been used to determine prevalence. Researchers have surveyed preoccupation with food, obsessive preoccupation with weight, disturbed body image, or the use of pathogenic weight control methods, rather than using a consistent definition of disordered eating. Because of the variability in the measures employed and the specific constructs examined, it is difficult to reach definitive conclusions about prevalence of disordered eating among women athletes. Prevalence estimates for disordered eating and eating disorders among athletes in the above studies ranged from 3% (e.g., Burckes-Miller & Black, 1988) to 61% (e.g., Petrie, 1993), depending on how the dependent variable was defined. It should be noted as well that this research primarily is based on self-report data, and Sundgot-Borgen (1994) found that the self-report data collection method resulted in considerable under-reporting of disordered eating symptoms in elite athletes. Further, few of the existing studies on the prevalence of eating disorders in athletes have clearly defined the population being investigated, making it difficult to compare them. The inconsistency of many of the variables in the preceding studies demonstrates the need for more research on disordered eating in this population.

Comparing Women Athletes’ and Nonathletes’ Eating Behaviors

Several studies (which can be found in Table 2) have attempted to understand disordered eating among women athletes by examining their risk relative to nonathletes.
Table 2.

Research comparing athletes and nonathletes on disordered eating behavior

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilkins, Boland, &amp; Albinson (1991)</td>
<td>177 college athletes</td>
<td>78 women athletes (included 20 sports)</td>
<td>Binge Scale; EAT-26; DT subscale of EDI; Restraint Scale; Negative Self-Image Scale</td>
<td>Women athletes scored significantly lower as a group than women nonathletes using an aggregate score of disordered eating.</td>
</tr>
<tr>
<td></td>
<td>117 college nonathletes</td>
<td>99 men athletes</td>
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<tr>
<td></td>
<td></td>
<td>78 women nonathletes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>39 men nonathletes</td>
<td></td>
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<tr>
<td>Davis (1992)</td>
<td>99 high-performance athletes</td>
<td>99 women athletes</td>
<td>EDI; Neuroticism scale of EPI; SBS</td>
<td>Women athletes did NOT score significantly higher than women nonathletes on weight and diet concerns.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(basketball, diving, field hockey, figure skating, gymnastics, downhll skiing, synchronized swimming, sprinting, volleyball)</td>
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<tr>
<td></td>
<td>111 university nonathletes</td>
<td>111 women nonathletes</td>
<td></td>
<td>15 (15.2%) athletes were classified as “excessively weight-occupied” as compared to 5 (4.3%) nonathletes.</td>
</tr>
<tr>
<td>Sundgot-Borgen (1993)</td>
<td>522 Norwegian women athletes</td>
<td>522 elite women athletes from 35 sports (technical, endurance, aesthetic, weight dependent, ball-game, power)</td>
<td>EDI; clinical interview (which included DSM-III-R criteria)</td>
<td>A significantly higher number of women athletes ($n = 94$; 18%) than women nonathletes ($n = 23$; 5%) had an eating disorder.</td>
</tr>
<tr>
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<td>448 Norwegian women nonathletes</td>
<td>448 women nonathletes</td>
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<tr>
<td>Hausenblas &amp; Carren (1999)</td>
<td>10,878 men and women athletes</td>
<td>92 studies</td>
<td>Meta-analysis</td>
<td>Women athletes reported significantly more bulimic and anorexic symptoms than did women in comparison groups.</td>
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<td></td>
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<td>38 sports divided into sport-specific categories (aesthetic, endurance, ball game, weight-dependent, power, technical)</td>
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<tr>
<td>Smolak, Murnen, &amp; Ruble (2000)</td>
<td>2459 women athletes</td>
<td>34 studies; lean and nonlean sports (specific sports not reported)</td>
<td>Meta-analysis</td>
<td>Women athletes reported significantly more eating problems than did comparison group women.</td>
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</tbody>
</table>
Table 2.

Research comparing athletes and nonathletes on disordered eating behavior (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
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<th>Subgroups/Sports Included</th>
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<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byrne &amp; McLean (2002)</td>
<td>263 Australian elite athletes</td>
<td>108 men athletes 155 women athletes</td>
<td>CIDI; DT; BD &amp; B subscales of EDI-II; BULIT-R; Restriment subscale of Three Factor Eating Questionnaire</td>
<td>Women athletes scored significantly higher on eating disorder symptoms than did women nonathletes.</td>
</tr>
<tr>
<td></td>
<td>263 Australian nonathletes</td>
<td>263 men and women nonathletes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kirk, Singh, &amp; Getz (2001)</td>
<td>206 Division I college athletes</td>
<td>206 women athletes 197 women nonathletes</td>
<td>EAT-26</td>
<td>NO significant difference between women athletes' and nonathletes' eating disorder symptoms: 22 (10.7%) of women athletes and 30 (15.2%) of women nonathletes scored over 20 (indicating risk for an eating disorder).</td>
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<tr>
<td></td>
<td>197 Division I college nonathletes</td>
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<tr>
<td>Marten DiBartolo &amp; Shaffer (2002)</td>
<td>94 Division III college athletes</td>
<td>94 women athletes (basketball, volleyball, field hockey, soccer, Alpine skiing, squash, crew, cross-country, track &amp; field)</td>
<td>EAT-26; BD subscale of EDI; IHS; Reasons-for-Exercise Scale</td>
<td>Women nonathletes reported significantly more pathological attitudes about eating than women athletes.</td>
</tr>
<tr>
<td></td>
<td>115 Division III nonathletes</td>
<td>115 women nonathletes</td>
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<tr>
<td>Hausenblas &amp; McNally (2004)</td>
<td>216 high school, university, and elite athletes; 193 nonathletes</td>
<td>76 men track &amp; field athletes 140 women track &amp; field athletes 98 men nonathletes 95 women nonathletes</td>
<td>EDI-II; QEDD; LTEQ</td>
<td>Athletes did NOT report a significantly higher prevalence of disordered eating than nonathletes.</td>
</tr>
</tbody>
</table>
Table 2.

Research comparing athletes and nonathletes on disordered eating behavior (continued)

<table>
<thead>
<tr>
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<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinking &amp; Alexander (2005)</td>
<td>146 Division I college women</td>
<td>84 women athletes (basketball, volleyball, soccer, field hockey, softball, swimming, cross-country)</td>
<td>EDI-II</td>
<td>NO significant difference between athletes and nonathletes on Drive for Thinness (used to identify those at risk for disordered eating).</td>
</tr>
</tbody>
</table>

Note. B = Bulimia Subscale of EDI; BD = Body Dissatisfaction Subscale of EDI; BIS = Body Image Survey; CIDI = Composite International Diagnostic Interview; DT = Drive for Thinness Subscale of EDI; EAT-26 = Eating Attitudes Test 26; EDI = Eating Disorder Inventory; EDI-II = Eating Disorder Inventory – II; EPI = Eysenck Personality Inventory; LTEQ = Leisure Time Exercise Questionnaire; QEDD = Questionnaire for Eating Disorder Diagnosis; SBS = Subjective Body Shape.
A comparison of men and women university athletes and nonathletes on eating disorder indices was undertaken by Wilkins, Boland, and Albinson (1991). Ninety-nine men and 78 women athletes (i.e., those who were actively competing at or beyond the intercollegiate level of competition), and 39 men and 78 women nonathletes (i.e., those who did not compete beyond the intramural level of competition) completed several questionnaires. The eating disorder scales included The Binge Scale (Hawkins & Clement, 1980) and the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) to examine symptoms commonly associated with anorexia, the Eating Disorder Inventory – Drive for Thinness subscale (EDI; Garner & Olmsted, 1984) to provide an indication of excessive concern with dieting and a preoccupation with weight, the Restraint Scale (Herman & Polivy, 1975; Herman, Polivy, & Silver, 1979) to measure desire to control overeating or severity of dieting, and the Negative Self-Image Scale (Hawkins & Clement, 1980, 1984) to assess the degree of body image dissatisfaction.

Other questionnaires measuring self-esteem, depression, and personality also were completed.

Responses on the eating disorder scales were combined with responses to questions about exercise, ideal weight discrepancy, and subjective pressure to maintain a lean body weight in order to compile an “eating disorder index.” Using this index, results indicated that women athletes scored significantly lower as a group than did their nonathletic comparison sample. That is, a lower prevalence of indices of eating disorders was found among athletes than nonathletes. The group effect from a hierarchical multiple regression accounted for a small (4%), but significant, percentage of the variance in disordered eating ($p < .001$). Further, athletes expressed significantly greater satisfaction
with their bodies than did nonathletes. The authors, however, did not report the sports from which the athletes were drawn, and this may have had some impact on the responses. Additionally, an unconventional “index score” of disordered eating was used.

Davis (1992) conducted a study of weight preoccupation among 99 Canadian high performance women athletes from nine different sports and 111 university women who were not athletes (i.e., students who were not older than 30 and were not participating in sport/exercise more than twice a week for more than 30 minutes per session). The women in both groups completed the Eating Disorder Inventory (EDI; Garner, Olmsted, & Polivy, 1983) to assess weight and diet concerns (the composite score of the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales was used). Other measures included the Neuroticism scale of the Eysenck Personality Inventory, Form A (Eysenck & Eysenck, 1968), the Subjective Body Shape instrument (SBS; Myers, Zivian, Kirkland, & Zager, 1985), body mass index (BMI), and several questions related to dieting behavior. Results indicated that when all three subscales of the EDI were combined to form a measure of weight and diet concerns, the athletes as a group did not score significantly higher than the nonathletes. However, based on a Drive for Thinness score of 15 or above on the EDI, a significantly greater proportion of athletes \( (n = 15; 15.2\%) \) were classified as “excessively weight-preoccupied,” as compared to nonathletes \( (n = 5; 4.5\%) \). Based on this latter finding, the author concluded that “as a group, female athletes are in a high-risk category for developing eating pathologies” (p. 189).

The conclusion that women athletes are at high risk was echoed in the results reported by Sundgot-Borgen (1993) and Byrne and McLean (2002). Sundgot-Borgen examined the prevalence of eating disorders in 522 Norwegian elite women athletes from
35 sports and 448 nonathletes by using questionnaires and interviews. A significantly higher number of athletes (18%) than nonathletes (5%) were found to suffer from an eating disorder. Similarly, Byrne and McLean surveyed and interviewed 263 Australian elite men and women athletes, along with a comparison group of 263 nonathletes. Results of a MANOVA indicated that women athletes obtained significantly higher scores than did women nonathletes on all the measures of specific eating disorder symptoms (e.g., drive for thinness, dietary restraint, bulimic behaviors).

Kirk, Singh, and Getz (2001) compared the prevalence of disordered eating between collegiate women who were athletes and those who were nonathletes. Two hundred six women athletes from 10 varsity sports and one nonvarsity dance team at a Division I school were compared to 197 women nonathletes (i.e., full-time students living on all-women dormitory floors). All women completed the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982), which was used to measure levels of behavior related to eating disorders rather than to diagnose eating disorders. A score of 20 or above was used as the cutoff point for indicating disordered eating behaviors. In the athlete group, 22 (10.7%) women scored 20 or greater, and 30 (15.2%) of the nonathletic women scored a total of 20 or above. The chi square analysis showed no significant difference in the proportion of those individuals who were considered at risk for eating disorders in the two groups. This finding was similar to that of Wilkins and colleagues (1991) and Hausenblas and McNally (2004). Thus, this study did not support the hypothesis that women who are college athletes have a higher risk of disordered eating.

More recently, Marten DiBartolo and Shaffer (2002) compared college women athletes and nonathletes from a Division III women’s liberal arts college on eating

30
attitudes and a variety of other psychological variables. One hundred fifteen nonathletes (i.e., students from psychology classes) and 94 athletes (who were participating in fall or winter sports at the time the data were collected) from nine sports completed several instruments including the Eating Attitudes Test-26 (EAT-26; Garner et al., 1982) to measure attitudes and beliefs about food that are associated with anorexia, the Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner & Olmsted, 1984) to assess degree of satisfaction with various body parts, the Body Image Survey (BIS; Fallon & Rozin, 1985) to assess body satisfaction, the Reasons-for-Exercise Scale (RFES; DiBartolo, Lin, & Shaffer, 2001) to assess motivation for exercise, and three other measures.

Multivariate analyses of variance for the measures of disordered eating and body image were conducted to examine group differences between athletes and nonathletes and revealed a significant difference between these two groups (Wilks Lambda = .88, \( p < .001 \)). Follow-up univariate tests revealed nonathletes indicated significantly more pathological attitudes about eating (as evidenced by the EAT responses \( F(1, 207) = 16.26, p < .001 \)) and more disturbed body image than did athletes (as measured by the BIS \( F(1, 207) = 7.59, p < .001 \) and EDI-BD \( F(1, 207) = 20.71, p < .01 \)). A limitation of this study is that there was no mention of assessing the nonathletes’ level of exercise. It is possible that these same women could have been involved in athletics outside of fall or winter sports. Additionally, the fact that the sample was taken from a Division III women’s college may have influenced the results. At Division III universities, there may be less pressure on athletes, as there are no athletic scholarships.
Hausenblas and McNally (2004) examined the prevalence and symptoms of eating disorders for 412 high school, university, and elite athletes and nonathletes. The athletic group was composed of 217 men and women who were track and field athletes, and the nonathletic group was composed of 195 men and women who were not athletes. Participants completed the Eating Disorder Inventory-II (EDI-II; Garner, 1991), the Questionnaire for Eating Disorder Diagnosis (QEDD; Mintz, O’Holloran, Mulholland, & Schneider, 1997), and only the nonathletes completed the Leisure-Time Exercise Questionnaire (LTEQ; Godin, Jobin, & Bouillon, 1986). The group of nonathletes was further divided into categories of higher-active and lower-active based on their responses on the LTEQ.

Findings showed that, based on responses to the QEDD, 16 (7.4%) athletes, 18 (14.2%) higher-active nonathletes, and 7 (8.4%) lower-active nonathletes met the criteria for the eating disorder/symptomatic category (these two categories were combined because of the low number of participants in each: less than five). These findings contradicted the authors’ hypothesis that athletes would report a significantly higher prevalence of disordered eating than the nonathletes. Further, both the higher-active and lower-active nonathletes scored significantly higher than did the athletes on the Body Dissatisfaction subscale of the EDI-II. These results are similar to those of Wilkins and colleagues (1991) and Marten DiBartolo and Shaffer (2002). Limitations to this research include the fact that the authors combined high school, college, and elite athletes, and only one sport was studied - track and field.

In a more recent attempt to compare the prevalence of disordered eating among athletes and nonathletes, Reinking and Alexander (2005) surveyed 146 collegiate women
at a Division I school. Eighty-four women athletes and 62 women nonathletes completed the EDI-II (Garner, 1991) and a demographic questionnaire. The authors used a pre-established cutoff score of 14 on the Drive for Thinness subscale to identify those women at risk for disordered eating. Using this cutoff, 7.1% (n = 6) of the athletes and 12.9% (n = 8) of the nonathletes met this criteria. The authors concluded that women athletes do not exhibit greater disordered-eating symptoms than women who do not participate in sports, which was not consistent with meta-analysis by Smolak and colleagues (2000). Only on two subscales (Body Dissatisfaction and Ineffectiveness) was a significant difference found between the two groups. The athletes reported significantly lower body image dissatisfaction than did nonathletes, a finding that is consistent with Smolak and colleagues.

Thus, it seems that results of the previous studies have varied as to the risk exhibited for women athletes. Several studies concluded that women athletes are at no greater risk for disordered eating than women who are not athletes, but a few studies indicated that women athletes are at greater risk than nonathletes. It appears the findings depend upon the population being studied, the research design, the measures chosen, and the analyses employed. This suggests the importance of a closer examination of the athletic population to establish a clearer picture of the prevalence of disordered eating.

**Beyond Comparing Athletes vs. Nonathletes**

Moving beyond simple comparisons of athletes and nonathletes, researchers also have examined disordered eating behaviors by breaking down the athlete group further into various sub-groups based on sport type (see Table 3).
Table 3.

Research comparing various groups of athletes on disordered eating

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis &amp; Cowles (1989)</td>
<td>190 college women</td>
<td>64 thin-build women athletes&lt;br&gt;(gymnastics, synchronized swimming, diving, figure skating, long-distance running, ballet)&lt;br&gt;62 normal-build women athletes&lt;br&gt;(field hockey, basketball, sprinting, downhill skiing, volleyball)&lt;br&gt;64 women nonathletes</td>
<td>EDI, EPI, Edwards&lt;br&gt;Personal Preference Schedule; Lifestyle Questionnaire</td>
<td>Women athletes in thin-build sports reported more body image dissatisfaction, greater drive for thinness, and more assiduous dieting than those women in normal-build sports.&lt;br&gt;Women nonathletes reported significantly more body image dissatisfaction than did those women athletes in normal-build sports.</td>
</tr>
<tr>
<td>Warren, Stanton, &amp; Blessing (1990)</td>
<td>116 Division 1 college women</td>
<td>72 women athletes&lt;br&gt;(gymnastics, cross-country, golf, volleyball, swimming, tennis)&lt;br&gt;52 women nonathletes</td>
<td>EDI, EAT</td>
<td>NO significant differences were found among teams on eating attitudes or weight preoccupation.</td>
</tr>
<tr>
<td>Stoutjesdyk &amp; Jevne (1993)</td>
<td>191 athletes from universities and clubs</td>
<td>107 women athletes&lt;br&gt;87 men athletes&lt;br&gt;Nonlean sports (n = 46 women, 45 men) volleyball, lightweight rowing&lt;br&gt;Lean sports (n = 26 women, 20 men) gymnastics, diving&lt;br&gt;Weigh-in sports (n = 32 women, 22 men) lightweight rowing, judo</td>
<td>EAT</td>
<td>Women athletes from lean and weigh-in sports had significantly higher EAT scores than other women athletes.&lt;br&gt;The highest percentage of women athletes scoring in the anorexic range was from lean sports (gymnastics 17.6%, diving 22.2%).</td>
</tr>
</tbody>
</table>
Table 3.

Research comparing various groups of athletes on disordered eating (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
</table>
| Petrie (1996)         | 300 Division I college athletes | 113 women athletes  
Lean sports (n = 20) diving, cross-country, gymnastics  
Nonlean sports (n = 93) volleyball, softball, fencing, tennis, basketball, golf, rifle/pistol, track & field, field hockey | EDI              | Women lean sport athletes had significantly higher Drive for Thinness scores (were significantly more weight preoccupied) than the nonlean sport women athletes. |
|                       | 480 Division I college nonathletes | 187 men athletes  
250 women nonathletes  
230 men nonathletes                                                                 |                  |                                                                                        |
| Ashley, Smith, Robinson, & Richardson (1996) | 145 Division I college women athletes | Lean sport athletes (n = 47) cheerleading, dance team, cross-country, track & field, gymnastics  
Other sports athletes (n = 98) volleyball, basketball, soccer, swimming & diving, tennis, golf  
14 nonathletes with a mean GPA of 3.3 | EDI-II           | NO significant differences were found between groups on the EDI-II subscale scores. |
|                       | 14 Division I college women nonathletes |                                                                              |                  |                                                                                        |
| Zucker, Womble, Williamson, & Perrin (1999) | 131 college women athletes and nonathletes | 33 women athletes from refereed sports (tennis, basketball, volleyball, track)  
37 women athletes from judged sports (diving, cheerleading, gymnastics)  
62 women nonathletes | IDED, BDDE; BSQ; DT, RD, & B subscales of EDI-II, BIA | NO significant differences between frequency of eating disorder diagnoses across groups. |
Table 3.
Research comparing various groups of athletes on disordered eating (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
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<tr>
<td>Picard (1999)</td>
<td>38 Division I college women athletes</td>
<td>33 lean athletes (cross-country, lightweight crew) 45 nonlean athletes</td>
<td>EDI-II; EAT-26; original questionnaire</td>
<td>Division I athletes scored significantly higher on the EAT and EDI scales than did the Division III athletes. Regardless of division, lean sport athletes had significantly higher scores on the EAT and EDI than did the nonlean sport athletes and nonathletes. NO significant differences were found on the EAT and EDI between nonlean sport athletes and nonathletes.</td>
</tr>
<tr>
<td></td>
<td>40 Division III college women athletes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31 women nonathletes from Divisions I &amp; III</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kirk, Singh, &amp; Getz (2001)</td>
<td>206 Division I college athletes</td>
<td>206 women athletes Lean sports (n = 70) cheerleading, high-tech dance, cross country, track &amp; field Nonlean sports (n = 136) volleyball, soccer, tennis softball, lacrosse, swimming/diving, basketball 197 women nonathletes</td>
<td>EAT-26</td>
<td>NO significant differences were found when comparing mean differences between individual sports or between lean and nonlean sports.</td>
</tr>
<tr>
<td></td>
<td>197 Division I college nonathletes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byers &amp; McLean (2002)</td>
<td>263 Australian elite athletes</td>
<td>108 men athletes 155 women athletes Thin-build sports: (n = 55 men, 94 women) ballet, gymnastics, lightweight rowing, long distance running, diving, swimming Normal build sports: (n = 108 men, 155 women) basketball, hockey, tennis, volleyball 263 men and women nonathletes</td>
<td>CIDI; DT, BD &amp; B subscales of EDI-II; BULIT-R; Restraint subscale of Three Factor Eating Questionnaire</td>
<td>Women athletes in thin-build sports scored significantly higher on eating disorder symptoms than did women athletes in normal build sports. For women, 15% of thin-build athletes, 2% of normal build athletes, and 1% of nonathletes met criteria for anorexia or bulimia. For women, a further 16% of thin-build athletes, 7% of normal build athletes, and 5% of nonathletes met the criteria for EDNOS.</td>
</tr>
</tbody>
</table>
Table 3.
Research comparing various groups of athletes on disordered eating (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Reinking &amp; Alexander (2005)</td>
<td>146 Division I college women</td>
<td>68 Nonoin sport athletes (basketball, volleyball, soccer, field hockey, softball) 16 Lean sport athletes (swimming, cross-country) 62 women nonathletes</td>
<td>EDI-II</td>
<td>Lean-sport athletes reported significantly higher body image dissatisfaction than did nonlean sport athletes</td>
</tr>
<tr>
<td>Hausenblas &amp; Carron (1999)</td>
<td>10,878 men and women athletes</td>
<td>92 studies 58 sports divided into sport-specific categories (aesthetic, endurance, ball game, weight-dependent, power, technical)</td>
<td>Meta-analysis</td>
<td>Women aesthetic sport athletes reported higher drive for thinness than did ball-game sport athletes; women aesthetic sport athletes reported significantly more anorexic symptoms than endurance and ball-game sport women athletes. NO significant differences were found in bulimic behavior by sport type.</td>
</tr>
<tr>
<td>Smolak, Murnen, &amp; Ruble (2000)</td>
<td>2459 women athletes</td>
<td>34 studies; lean and nonlean sports (specific sports not reported)</td>
<td>Meta-analysis</td>
<td>Athletes in dance/performance sports reported significantly more eating problems than did comparison groups.</td>
</tr>
</tbody>
</table>

Note. B = Bulimia Subscale of EDI; BD = Body Dissatisfaction Subscale of EDI; BDDE = Body Dysmorphic Disorder Examination; BIA = Body Image Assessment; BSQ = Body Shape Questionnaire; BULIT-R = Bulimia Test – Revised; CDI = Children’s Depression Inventory; DT = Drive for Thinness Subscale of EDI; EAT = Eating Attitudes Test; EAT-26 = Eating Attitudes Test 26; EDI = Eating Disorder Inventory; EDI-II = Eating Disorder Inventory – II; EPI = Eysenck Personality Inventory; IDED = Interview for Diagnosis of Eating Disorders.
In one of the earliest studies, Davis and Cowles (1989) investigated concerns about weight, diet, and appearance in 190 women undergraduates. The participants were grouped into three categories: 64 athletes in sports where a thin-body-build was advantageous (e.g., gymnastics, synchronized swimming, diving, figure skating, long-distance running, and ballet), 62 athletes in sports where a thin-body-build was not advantageous (e.g., field hockey, basketball, sprinting, downhill skiing, and volleyball), and 64 women who were not engaged in sports beyond the recreational level. The women completed four surveys including the Eating Disorders Inventory (EDI; Garner & Olmsted, 1984), the Eysenck Personality Inventory, Form A (Eysenck & Eysenck, 1968), the Achievement Motivation items of the Edwards Personal Preference Schedule (Edwards, 1959), and chosen items from the Lifestyle Questionnaire (Canadian Federal Ministry of Fitness and Amateur Sport, 1982). A series of one-way analyses of variance was conducted, and Newman-Keuls post hoc comparison results revealed that those athletes in the “thin-build” sports reported more body image dissatisfaction (\(F(2, 186) = 12.17, p < .001\)), greater drive for thinness (\(F(2, 186) = 4.42, p < .05\)), and more assiduous dieting (\(\chi^2 = 8.34, p < .05\)) than did those athletes in the “normal build” sports. Additionally, nonathletes indicated significantly more body image dissatisfaction than did those athletes in “normal build” sports (\(F(2, 186) = 12.17, p < .001\)).

Warren, Stanton, and Blessing (1990) examined disordered eating patterns in women who were competitive athletes and specifically in those women competing in sports in which low weight was important for performance. Seventy-four women who were college athletes from Division I programs in seven sports (e.g., gymnastics, cross-country, basketball, golf, volleyball, swimming, and tennis) and 52 college women who
were not competitive athletes completed the Eating Disorders Inventory (EDI; Garner, Olmsted, & Polivy, 1983) and the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979). Body mass index (BMI) also was computed. Because an ANOVA found several group differences between the cross-country runners and gymnasts (sports in which low body weight was central to performance) and the rest of the athletes, the participants were re-examined according to identification as cross-country runners \((n = 12)\), gymnasts \((n = 15)\), remaining athletes \((n = 47)\), and nonathletes \((n = 52)\).

When BMI was used as a covariate, the nonathletes reported more body image dissatisfaction than did the cross-country runners and the remaining athletes. Additionally, gymnasts were found to have significantly higher Drive for Thinness scores than were the other three groups. Using a cutoff of 30 or more on the EAT to indicate disturbance in eating attitudes, 20% of gymnasts, 17% of the remaining athletes, 12% of nonathletes, and no runners were identified as having disturbed eating attitudes. No significant differences emerged between the groups. Similar results were found when using a score of 15 on the EDI Drive for Thinness scale to indicate weight preoccupation. Twenty percent of gymnasts, 10% of nonathletes, 4% of the remaining athletes, and no runners evidenced weight preoccupation. Because of the differences in responses between cross-country runners and gymnasts, the authors concluded that participation in a sport for which low body weight is important to performance does not invariably confer risk for disordered eating. However, there were only a small number of athletes in each group, calling into question the representativeness of the groups and the power of the statistical analyses.
In 1993, Stoutjesdyk and Jevne attempted to explore differences between athletes who do not experience an explicit demand to be lean \( (n = 91; \) volleyball and heavyweight rowing), athletes who do experience the demand to be lean \( (n = 46; \) gymnastics and diving), and those athletes whose sport requires them to weigh in before competition \( (n = 54; \) lightweight rowing and judo). A total of 191 men and women collegiate and club athletes from Canada were included and completed the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979). When examining differences between the women athletes, those athletes participating in activities emphasizing leanness and those participating in weigh-in activities had significantly higher EAT scores than did athletes in nonweight-restricting activities, indicating more disturbed eating attitudes. The highest percentage of women athletes scoring in the anorexic range \((>30 \text{ on the EAT})\) was from sports emphasizing leanness \((\text{gymnastics } 17.6\%, \text{ diving } 22.2\%)\).

Petrie (1996) conducted an in-depth study examining differences between lean and nonlean sport athletes and nonathletes on behavioral and psychological indices of eating disorders. Two hundred thirty men and 250 women nonathletes \((\text{i.e., students who had not competed at the varsity level or other organized competitive sport activity})\), and 187 men and 113 women varsity athletes from a Division I school completed the Eating Disorder Inventory \((\text{EDI}; \text{Garner, Olmsted, & Polivy, 1983})\). Athletes were classified into lean sport \((\text{i.e., sports that demanded a low or specific weight or where appearance/build was potentially related to success})\) and nonlean sport \((\text{i.e., sports in which there is no set weight requirement and/or appearance plays a less central role in determining success})\) categories.
An analysis of co-variance indicated the three groups of women (lean sport athletes, nonlean sport athletes, and nonathletes) significantly differed on their Drive for Thinness scores \(F(2, 359) = 6.25, p < .005\). This conclusion was reached after controlling for the effects of actual physical size. Tukey post-hoc analyses revealed that women athletes in lean sports \(n = 20\) were found to be more weight preoccupied and concerned about dieting than were nonlean sport women athletes \(n = 93\) \(ES = .74\) and nonathletes \(ES = .42\). The scores of the women competing in nonlean sports did not differ from nonathlete women’s scores on this subscale.

That same year, Ashley, Smith, Richardson, and Richardson (1996) examined eating pathology among women collegiate athletes. These athletes were from 12 sports that included those that emphasized leanness and those that did not. One hundred forty-five Division I women athletes were compared to a nonathletic group of 14 women enrolled in an advanced program of study (i.e., their mean GPA was 3.3). All participants completed the Eating Disorders Inventory-II (EDI-II; Garner, 1991). Analysis of variance was used to compare differences between groups on the subscale scores as well as to identify differences between athletes in lean sports (e.g., cheerleading, dance team, cross-country running, track and field, and gymnastics), athletes in other sports (e.g., volleyball, basketball, soccer, swimming and diving, tennis, and golf), and the nonathletic group. Results indicated no significant differences between those in the nonathletic group, athletes in lean sports, and athletes in other sports on the EDI-II subscale scores. The authors concluded that neither athletics in general nor a particular type of athletics (lean sports or other sports) predispose one to exhibit attitudes associated with disordered eating.
There are, however, several limitations to this study. The nonathletic group was specifically chosen to have a similar degree of perfectionism and high achievement as the athletes (this limited information was all that was provided by the authors), making it a different kind of comparison group than had been used in other research sampling sedentary college students. Additionally, each member of the nonathletic group reported they regularly exercised, up to five hours a week. Finally, the small sample size in the nonathletic group may have contributed to the lack of significant differences between groups.

Zucker, Womble, Williamson, and Perrin (1999) examined differences in risk level for the development of disordered eating among women college athletes in refereed and judged sports and nonathletes. One hundred thirty-one college women participated in the study: 62 nonathletes (i.e., those who were not participating in an organized athletic activity), 33 athletes in refereed sports (e.g., tennis, basketball, volleyball, and track), and 37 athletes in judged sports (e.g., diving, cheerleading, and gymnastics). The Interview for the Diagnosis of Eating Disorders, 4th Edition (IDED-IV; Kutlesic, Williamson, Gleaves, Barbin, & Murphy-Eberenz, 1998) was utilized to establish a diagnosis of anorexia, bulimia, or eating disorder not otherwise specified. The participants completed other questionnaires including the Body Dysmorphic Disorder Examination (BDDE; Rosen & Reiter, 1996); the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) to assess preoccupation with weight and body shape; the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the Eating Disorder Inventory-II (EDI-II; Garner, 1991); and the Body Image Assessment Procedure (BIA; Williamson,
Davis, Bennett, Goreczny, & Gleaves, 1989) to measure current and ideal body size and shape. Other surveys completed pertained to depression and personality.

Results of a chi-square test indicated no significant differences when comparing the frequency of eating disorder diagnoses across groups (as determined by the IDED-IV). The judged sports had the largest percentage of eating disorder diagnoses ($n = 5; 13.5\%$), followed by the nonathletic students ($n = 2; 3.2\%$) and finally the athletes participating in refereed sports ($n = 1; 3.0\%$). Further, women in judged sports reported a stronger drive for thinness than did athletes participating in refereed sports.

Taking another viewpoint, Picard (1999) surveyed 109 college women in a study examining disordered eating among lean and nonlean athletes and nonathletes, looking specifically at the role of the level of athletic competition. Fifty-four participants were from a Division I school, and 55 were from a Division III school. Thirty-one nonathletes (i.e., women not participating in any sport at or above varsity level), 33 lean athletes (i.e., women from cross-country running and lightweight crew), and 45 nonlean athletes (i.e., women from basketball and hockey) participated. Completed measures included the Demographic and Health Questionnaire designed for this study (including a question about the pressure to maintain a lean body weight), the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982), and the Eating Disorders Inventory-II (EDI-II; Garner, 1991).

The results of analyses of variance revealed that Division I athletes in both lean and nonlean sports scored significantly higher on both the EAT ($F(1, 108) = 4.38, p < .05$) and EDI ($F(1, 108) = 7.31, p < .01$) scales than did the Division III athletes, indicating a higher prevalence of disordered eating, preoccupation with thinness, and fear
of gaining weight among students from the larger school. Further, regardless of division, athletes in lean sports had significantly higher scores on both the EAT ($F(2, 108) = 17.45, p < .001$) and EDI ($F(2, 108) = 20.29, p < .001$) than did the nonlean athletes and nonathletes. This supported the findings of Petrie (1996), who reported that women who were lean sport athletes had a higher drive for thinness and were more weight preoccupied than were nonlean sport athletes. Further, no significant differences were found on the EDI and EAT scores between nonlean sport athletes and nonathletes. This result echoed Ashley and colleagues’ (1996) finding of no significant differences between nonathletes and athletes in other (i.e., nonlean) sports on the EDI-II subscale scores. Picard (1999) concluded that athletes in nonlean sports are no more at risk for disordered eating than their non-athletic peers, but because those in lean sports demonstrated higher scores on tests of eating behaviors and the tendency toward eating disorders, they may be more vulnerable. A unique feature of this study was the author’s examination of these issues across levels of competition. Higher levels of disordered eating attitudes and behaviors were demonstrated in the more competitive atmosphere of the Division I university.

Kirk, Singh, and Getz (2001) surveyed women who were athletes competing in sports with a higher emphasis on body leanness (e.g., cheerleading, high-tech dance, cross-country, and track and field) and athletes competing in sports with a lower emphasis on body leanness (e.g., volleyball, soccer, tennis, softball, lacrosse, swimming/diving, and basketball). After running a two-tailed independent sample t-test, the authors found no significant difference in EAT-26 scores between the two groups. Further, the results of an analysis of variance also indicated no significant differences
when comparing mean differences between individual sports. These findings contradicted
the results of Picard (1999), who found athletes in lean sports had significantly higher
scores on both the EAT and EDI than did nonlean athletes.

As mentioned previously, in 2002, Byrne and McLean studied 263 Australian
elite athletes (108 men and 155 women) representing 10 different sports, who were
matched with a comparison group of 263 nonathletes. The sports were chosen to provide
a comparison between “thin-build” sports that place a strong emphasis on leanness (e.g.,
ballet, gymnastics, light-weight rowing, long distance running, diving, and swimming)
and “normal-build” sports that place less emphasis on leanness (e.g., basketball, hockey,
tennis, and volleyball). Among the women athletes, 15% of the thin-build athletes, 2% of
the normal-build athletes, and 1% of the nonathletes met the criteria for anorexia or
bulimia. A further 16% of thin-build athletes, 7% of the normal-build athletes, and 5% of
the nonathletes met the criteria for EDNOS. Subsequent MANOVAs indicated that both
men and women athletes competing in thin-build sports reported significantly higher
scores than did athletes competing in normal-build sports on all the measures of specific
eating disorder symptoms. However, a weakness of this study is that no specific statistics
were reported separately for men and women. These results are consistent with those of
Sundgot-Borgen and Torstveit (2004), who found recently that among Norwegian elite
women athletes the prevalence of eating disorders is higher among those competing in
leanness-dependent and weight-dependent sports than in other sports.

Finally, of the 84 Division I collegiate women athletes that Reinking and
Alexander (2005) surveyed, those in lean sports ($n = 16$) were at greater risk for
disordered eating (as defined as a score of 14 or greater on Drive for Thinness subscale)
than both nonlean sport athletes ($n = 68$) and nonathletes ($n = 62$). However, this difference was small and nonsignificant. Within the athlete group, 2.9% ($n = 2$) of the nonlean sport athletes and 25% ($n = 4$) of the lean sport athletes were at risk for disordered eating. Athletes in lean sports (e.g., swimming and cross-country), though, reported significantly higher body image dissatisfaction than did athletes participating in nonlean sports (e.g., basketball, volleyball, soccer, field hockey, softball).

Therefore, after reviewing several studies focused on various subtypes of women athletes, it seems as though athletes competing in sports that emphasize leanness or a thin build in some cases may be more at risk for disordered eating than are athletes not competing in that type of sport; that is, they have been found to have higher drive for thinness, to be more weight preoccupied, and report more dietary restraint (e.g., Byrne & McLean, 2002; Davis & Cowles, 1989; Petrie, 1996; Picard, 1999; Stoutjesdyk & Jevne, 1993; Sundgot-Borgen & Torstveit, 2004). It should be noted, though, that the magnitude of the effects reported in several studies has been small (i.e., the $F$ values of the previous studies ranged from 4.38 to 20.71). Additionally, a few studies found no difference in eating disorder symptoms between lean and nonlean sport athletes who were women (e.g., Ashley et al., 1996; Kirk et al., 2001; Warren et al., 1990; Zucker et al., 1999), pointing to the need for further research in this area.

**Meta-Analyses**

In an attempt to clarify the mixed results obtained in the literature on disordered eating and athletes, two meta-analyses have been conducted. These analyses focused on comparing athletes and nonathletes, as well as various groups of athletes based on sport type. In 1999, Hausenblas and Carron meta-analyzed the literature on bulimia indices,
anorexia indices, and drive for thinness. Ninety-two studies that included 10,878 athletes and generated 560 effect sizes, and that met the following criteria were included: (a) participants were either men or women athletes; (b) the study included either a “control” group or used normative values for comparison; (c) the dependent variable was anorexic symptomatology, bulimic symptomatology, or drive for thinness symptomatology; (d) there was sufficient information to compute an effect size. Over 58 sports were examined and were divided into six categories based on their similar sport-specific demands (e.g., aesthetic, endurance, ball game, weight-dependent, power, and technical).

Overall, results indicated that athletes reported significantly more eating disorder symptoms than did individuals in the comparison groups, though the effect size was small ($ES = .12, SD = .22$). Women and men athletes were then analyzed separately. Women athletes self-reported significantly more bulimic ($ES = .16, SD = .23$) and anorexic symptomatology ($ES = .12, SD = .21$) than did women in the comparison groups. When examining drive for thinness, a significant difference was not found between women athletes and women in the comparison groups ($ES = -.01, SD = .23$). However, an examination of the average effect size across sport type was significant. Post hoc analysis revealed a significant difference in that aesthetic sport athletes reported greater drive for thinness ($ES = .09; SD = .26$) than did ball-game sport athletes ($ES = -.14; SD = .23$).

A similar significant result was found when looking at sport type and anorexic symptomatology. Post hoc analyses showed that the average effect size for aesthetic-sport women athletes ($ES = .38; SD = .21$) was significantly greater than that for endurance ($ES = -.04; SD = .23$) and ball-game sport women athletes ($ES = -.17; SD = .19$). There were no significant differences in bulimic behavior by sport type. In sum, although the effect
sizes were small, the authors concluded that women athletes reported greater bulimia and anorexia indices than nonathletic women comparison groups.

A year later, Smolak, Murnen, and Ruble (2000) conducted a meta-analysis with a smaller number of studies that examined eating problems among women athletes and nonathletes from high school, from college, and with elite status. Studies were included in the analyses if: (a) they utilized a group of women athletes and had a comparison group of women nonathletes or used normative values for comparison, and (b) the results included either percentages, means and standard deviations, t tests, F values, or r values for the relevant variables. Data from 34 studies were included in the analyses. Results indicated that athletes showed significantly more eating problems than did comparison group women; however, the effect was extremely small ($d = .07$) and marked by substantial heterogeneity. The effect size was based on 2,459 athletes and 8,858 comparison women. When examining only the college student samples, the difference between athletes and comparison groups was larger and statistically significant ($d = .15$), though still marked by heterogeneity. No significant difference was found when comparing only the high school samples to the comparison groups ($d = -.06$).

Analyses also compared athletes participating in lean sports as well as those in nonlean sports to comparison groups. The only significant difference found was among athletes participating in various forms of dance/performance sports (e.g., ballet, aerobics instructors, and cheerleaders); these women showed significantly more eating problems than did comparison groups ($d = .42$). Athletes competing in elite lean sports were found to be at greatest risk ($d = .52$). Finally, athletes indicated significantly less body image dissatisfaction than did comparison groups ($d = -.31$). The authors concluded that in some
circumstances, participation in sport by women could be a risk factor; however, in other situations, athletic participation may be protective against eating problems. This was demonstrated by the fact that participants in nonelite, nonlean sports and non-elite high school athletes reported significantly fewer eating problems than did elite, lean sport athletes or high school elite athletes or nonathletes.

Although the literature is not completely clear, it seems that women athletes have at least at the same risk for disordered eating than are women who are not athletes, and several empirical studies (including these two meta-analyses) indicate that women’s athletic participation at the college level may be associated with special risk for disordered eating. Further, participating in sports that emphasize leanness appears in some cases to place women athletes at an increased risk for developing disordered eating. Indeed, participation in appearance-focused, lean sports has been shown to relate to body shame (Parsons & Betz, 2001), body image dissatisfaction (Reinking & Alexander, 2005), higher drive for thinness scores (Engel et al., 2003), as well as disordered eating behaviors (Reinking & Alexander, 2005; Smolak et al., 1999).

Yet, it is difficult to make comparisons between studies when researchers use varied measures and different cutoff points to sort individuals into categories (e.g., a cutoff point of 20 on the EAT was used in some research and a cutoff of 30 was used in others). Many of the studies reviewed previously only gathered data from a single site, so the generalizability of the findings may be limited. An additional limitation of much of the research is that the nonathlete group often was not asked about their level of exercise, which may have influenced the results. Overall, the previous findings make a case for the relevance of further investigation into the area of disordered eating among women
athletes and closer examination of contributing risk factors, including body image

dissatisfaction and social pressure for thinness.

Body Image Dissatisfaction

Much of the previously reviewed literature on athletes and disordered eating
addressed in some manner body image dissatisfaction. Regardless of whether women
athletes differ from women who are not athletes in their level of body image
dissatisfaction, this construct remains of interest in research with women athletes as it is
widely recognized as important in the general literature on disordered eating (e.g.,
Brookings & Wilson, 1994; Mazzeo, 1999; Mintz & Betz, 1988). Throughout the
literature, however, body image dissatisfaction has been defined variably. For example,
some authors define body image as the internal representation of an individual’s outer
appearance (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Mintz and Betz
(1988) defined this variable as the direction and strength of women’s feelings toward
their various body parts. Further, Garner and colleagues (1983) defined body image
dissatisfaction as an individual’s level of discontent with her shape. Body image
dissatisfaction, then, can vary from generalized displeasure, such as dislike for the entire
body shape or size, to obsession with a specific part. From a sociocultural perspective,
body image dissatisfaction occurs when an individual internalizes a culturally determined
body ideal and then, upon self-comparison, determines her body to be discrepant from
that ideal (Phelps, Johnston, & Augustyniak, 1999). Regardless of its definition within
the literature, the relation of body image dissatisfaction to eating disorders has been
supported.
For example, Brookings and Wilson (1994) studied 137 college women’s body image dissatisfaction and disordered eating behavior. Using the Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner & Olmsted, 1984) and the Eating Attitudes Test – 26 (EAT-26; Garner et al., 1982), the authors found that body image dissatisfaction was related to eating disorder symptomatology. Further, Ackard, Croll, and Kearney-Cooke (2002) examined the relations between dieting frequency, disordered eating, body image dissatisfaction, and related factors in a study of 345 women college students. Results revealed that dieting frequency was associated positively with higher body image dissatisfaction (as measured by the Body Dissatisfaction subscale of the EDI-II and the Body Image Assessment).

Numerous other studies have shown that body image dissatisfaction is related positively to eating disorder symptoms among women (e.g., Mazzeo, 1999; Mintz & Betz, 1988; Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Striegel-Moore, Silberstein, & Rodin, 1986; Tylka & Subich, 1999). Stice, Mazotti, Krebs, and Martin (1998) found that body image dissatisfaction not only correlated with dieting among adolescent women, but predicted an increase in dieting over a 9-month period. Body image dissatisfaction showed a unique relation to dieting, over and above the effects of the other risk factors, including pressure to be thin, binge eating, and body mass.

Other authors also have shown that body image dissatisfaction is a significant predictor of disordered eating behaviors (e.g., Attie & Brooks-Gunn, 1989; Button, 1990; Cattarin & Thompson, 1994; Cooper, Taylor, Cooper, & Fairburn, 1987; Leon, Fulkerson, Perry, & Cudeck, 1993; Molinari, 1995; Phelps, Johnston, & Augustyniak, 1999; Stice & Agras, 1997; Stice, Shaw, & Nemeroff, 1998) and of severity of eating difficulties
(Striegel-Moore, Silberstein, & Rodin, 1986, 1993). Further, previous research has documented that a reduction in body image dissatisfaction results in lowered participation in disordered eating behaviors (Stice & Shaw, 2004).

**Body Image Dissatisfaction and Women Athletes**

When examining body image dissatisfaction specific to women who are athletes, a variety of studies have been published. Unfortunately, the majority of the empirical research in this area has simply compared women athletes’ and nonathletes’ body image dissatisfaction without specifically examining the link between body image dissatisfaction and disordered eating symptoms. Additionally, few studies have taken a multidimensional approach and linked this variable to other variables known to predict disordered eating. Hausenblas and Symons Downs (2001) argued that it is important to examine body image dissatisfaction because of its serious negative outcomes, including adverse behaviors (e.g., excessive dieting and exercising, purging), cognitions (e.g., distorted thought processes) and attitudes (e.g., increased depression, lower self-esteem).

In one of the earliest body image studies employing athletes, Snyder and Spreitzer (1976) used data collected from high school women who were athletes and nonathletes to examine the relation between body image dissatisfaction and sports involvement according to the type of sport. Results indicated that the attitudes of the athletes toward their body build tended to be more positive than did those of nonathletes. Basketball players, however, reported more negative feelings toward their waists and body profiles than did other athletes and nonathletes.

Ten years later, Prakasa Rao and Overman (1986) attempted to compare the perceptions of body image and psychological well-being between Black women who
were athletes and nonathletes. Data were collected from Black women from several 
colleges, both two and four year schools. A total of 79 athletes and 117 nonathletes 
participated. The independent variable of “body image” was operationalized using 32 
items that measured the participants’ attitudes toward various body parts, and t-tests 
revealed significant differences between athletes and nonathletes for 13 items of the body 
image scale. Athletes expressed positive attitudes toward 31 body items, but nonathletes 
expressed positive attitudes toward only 24 body image items. This tendency for athletes 
to express more positive attitudes toward various body parts was consistent with the 
results of a cross-national study of women in India, Australia, and the United States by 
Snyder and Kivlin (1975b, p. 104) who concluded “the female athletes clearly indicated 
more positive feelings toward their bodies than the nonathletes…” This study and the 
examples that follow examining body image dissatisfaction in women athletes and 
nonathletes can be found in Table 4.

Burckes-Miller and Black (1988) surveyed 695 college athletes (382 women from 
eight sports and 313 men from seven sports) using a questionnaire developed for their 
study, Eating Habits of Athletes; it was based on DSM-III criteria for anorexia and 
bulimia. Of the athletes, one-seventh reported having a distorted body image in that they 
thought they were fat even though they had lost weight and were not overweight. 
Another ten years elapsed before Ryujuin, Breaux, and Marks (1999) used a small sample 
of men and women from a Division II school to investigate differences in eating disorder 
symptomatology between athletes and nonathletes. Thirty-three women and 27 men from 
the track and field team were compared to 35 women and 42 men from psychology 
classes. The participants completed the Eating Disorder Inventory-II (EDI-II; Garner,
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<tr>
<th>Author and Date</th>
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<th>Instruments Used</th>
<th>Main Research Findings</th>
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<tbody>
<tr>
<td>Prakash Rao &amp; Overman (1986)</td>
<td>196 Black college women athletes and nonathletes</td>
<td>79 women athletes 117 women nonathletes</td>
<td>32 items measuring attitudes toward various body parts</td>
<td>Significant difference between athletes and nonathletes: athletes expressed positive attitudes toward 31 body items, nonathletes expressed positive attitudes toward 24 body items.</td>
</tr>
<tr>
<td>Ryujiu, Breaux, &amp; Marks (1999)</td>
<td>137 Division II college men and women athletes and nonathletes</td>
<td>33 women track &amp; field athletes 27 men track &amp; field athletes 35 women nonathletes 42 men nonathletes</td>
<td>EDI-II</td>
<td>Women athletes reported more body satisfaction than did women nonathletes.</td>
</tr>
<tr>
<td>Zucker, Womble, Williamson, &amp; Perrin (1999)</td>
<td>131 college women athletes and nonathletes</td>
<td>33 women athletes from refereed sports (tennis, basketball, volleyball, track) 37 women athletes from judged sports (diving, cheerleading, gymnastics) 62 women nonathletes</td>
<td>IDED; BDDE; BSQ; DT, BD, &amp; B subscales of EDI-II; BIA</td>
<td>Judged sport athletes reported significantly more body image dissatisfaction and greater concern with body size than did refereed sport athletes.</td>
</tr>
<tr>
<td>Smolak, Murnen, &amp; Ruble (2000)</td>
<td>2459 women athletes</td>
<td>34 studies; lean and nonlean sports (specific sports not reported)</td>
<td>Meta-analysis</td>
<td>Athletes indicated significantly less body image dissatisfaction than did comparison groups.</td>
</tr>
<tr>
<td>Hausenblas &amp; Symons Downs (2001)</td>
<td>13,037 men and women athletes</td>
<td>78 studies; 55 sports</td>
<td>Meta-analysis</td>
<td>Athletes reported significantly more body image satisfaction than nonathletes and other comparison groups.</td>
</tr>
<tr>
<td>Reel &amp; Gill (1996)</td>
<td>157 women athletes</td>
<td>73 Division I college cheerleaders 84 high school cheerleaders</td>
<td>EDI; SPAS; original questionnaire (CHEER)</td>
<td>Body image dissatisfaction accounted for significant variance in disordered eating behavior.</td>
</tr>
</tbody>
</table>
Table 4.

Research examining body image dissatisfaction in athletes and nonathletes (continued)

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berry &amp; Howe (2000)</td>
<td>46 women varsity athletes</td>
<td>Field hockey, swimming, soccer, rowing, basketball</td>
<td>RSES; SCAT; BSQ; DBQ; questions regarding social and peer influence on dieting behavior</td>
<td>Athletes who showed high restrained and high emotional eating reported high body image dissatisfaction. Body image dissatisfaction accounted for significant variance in restrained eating; significant variance in emotional eating was explained by body image dissatisfaction.</td>
</tr>
<tr>
<td>Williamson et al., (1995)</td>
<td>98 college women athletes</td>
<td>Swimming, tennis, basketball, volleyball, gymnastics, track, cheerleading, dance</td>
<td>SCAT; BSQ; Perceived pressure, self-appraisal of athletic achievement questions; IDED</td>
<td>Overconcern with body size and shape mediated the influence of pressure for thinness, anxiety about athletic performance and negative appraisal of athletic achievement on disordered eating.</td>
</tr>
</tbody>
</table>

Note. B = Bulimia Subscale of EDI; BD = Body Dissatisfaction Subscale of EDI; BDDE = Body Dysmorphic Disorder Examination; BIA = Body Image Assessment; BSQ = Body Shape Questionnaire; DBQ = Dutch Eating Behavior Questionnaire; DT = Drive for Thinness Subscale of EDI; EDI = Eating Disorder Inventory; EDI-II = Eating Disorder Inventory – II; IDED = Interview for Diagnosis of Eating Disorders; SCAT = Sport Competition Anxiety Test; SPAS = Social Physique Anxiety Scale.
1991). Results of the t-tests were interpreted as indicating that the women who were athletes showed fewer symptoms of eating disorders than did the comparison sample. Specifically, it was stated that the women athletes reported more satisfaction with their bodies than did their nonathlete counterparts. These findings were echoed in the results reported by several other authors, including Smolak and colleagues (2000), Hausenblas and McNally (2004), Marten DiBartolo and Shaffer (2002), Petrie (1996), and Wilkins and colleagues (1991).

As mentioned previously, Zucker and colleagues (1999) examined body image dissatisfaction and risk for developing an eating disorder among 131 college women. On three measures of body image dissatisfaction, participants in refereed sports scored significantly lower than did participants in judged sports and nonathletic participants; the latter two groups did not differ from one another on these measures. Athletes participating in judged sports also reported greater concern with body size than did athletes participating in refereed sports. Therefore, the authors concluded it is possible that participation in refereed sports may serve as a protective factor for the development of overconcern with body size in that participation in refereed sports might promote less concern with body size and shape.

Hausenblas and Symons Downs (2001) published a meta-analysis in an attempt to reach a synthesis of the data comparing body image dissatisfaction of athletes versus nonathletes. These authors argued that there are three main methodological reasons the literature examining body image disturbances between athletes and nonathletes is confusing: (a) The term “body image” has not been operationally defined in a consistent manner and has often not been explicitly explained (Bane & McAuley, 1998); (b) Several
body image measures exist that vary as to which aspect of body image disturbance is being assessed; and (c) Many studies fail to examine the moderating effects of competitive level, age, body composition, sport type, and ethnicity.

With these issues in mind, Hausenblas and Symons Downs (2001) conducted a meta-analysis of 78 studies of 13,037 athletes from over 55 different sports at a variety of competition levels. Inclusion criteria were: (a) the study’s participants consisted of men athletes, women athletes, or both; (b) the study had a comparison group of individuals not involved in competitive sport or normative data were available; (c) the dependent variable was a body image variable; and (d) there was sufficient information to calculate an effect size. The majority of the effect sizes (56.8%) were obtained from the Body Dissatisfaction subscale of the Eating Disorder Inventory-II (EDI-II; Garner, 1991), followed by the Body Cathexis Scale (4.2%; Secord & Jourard, 1953). An overall significant effect for group membership was found ($ES = -.27$), with athletes found to have a more positive body image compared to nonathletes and members of other comparison groups. The magnitude of this effect was categorized as small. The authors hypothesized this may be because of the possibility that athletes, as a result of their high physical activity levels, may more closely resemble the current aesthetic ideal of a thin/fit/lean physique than the nonathletes.

In addition, several analyses were conducted to examine possible moderating effects. Body mass index and age did not moderate the effect size. Both the published and unpublished research indicated the athletes had a more positive body image than did the comparison groups (published $ES = -.29$; unpublished $ES = -.44$). A moderate effect size was found when normative data were used ($ES = -.48$), as compared to a small effect.
from studies in which individuals representing the “population in general” were employed ($ES = -0.28$). Further, there was great variability in the comparison groups, as definitions ranged from nonathletes, to nonexercisers, to sedentary controls, to students. It is certainly possible that some of the individuals in the comparison groups could have been former athletes or exercisers. Sport-type (as defined as endurance, aesthetic, and ball game) did not moderate body image concerns, and college athletes were found to have a more positive body image ($ES = -0.41$) than club/recreational athletes ($ES = -0.13$). It is also important to note that 19.2% of the comparisons involved men athletes, and effect sizes may have been different if only women athletes had been examined.

Only a few studies of women athletes (which are reviewed in detail later in the chapter) have explored the role of body image dissatisfaction as a predictor of disordered eating by itself or in conjunction with other variables. For example, a study by Reel and Gill (1996) concluded that body image dissatisfaction predicted disordered eating in a sample of college and high school cheerleaders. Further, the results of a study by Berry and Howe (2000) of collegiate women athletes indicated that body image dissatisfaction predicted restrained and emotional eating. Finally, Williamson and colleagues (1995) found concern with body size mediated the influence of other risk factors on the development of eating disorder symptoms in a sample of university athletes who were women.

Thus, the emergent picture of the relation between body image dissatisfaction and disordered eating for women athletes suggests the need for additional clarification. Why, though results from the above studies indicate that athletes tend to report less body image dissatisfaction than their nonathlete counterparts, do they still report as many (if not more
at times) symptoms of disordered eating? It seems as though other variables may be coming into play. This question provides support for the inclination that examining the role of body image dissatisfaction in conjunction with other factors may be a fruitful direction for inquiry.

Social Pressure for Thinness

One such additional variable to examine is social pressure for thinness. American culture clearly places an emphasis on slenderness as the ideal of female beauty, and research has shown that this standard of thinness has become more extreme over the past few decades (i.e., with the declining average weight of Miss America contestants and models) (Garner, Garfinkel, Schwartz, & Thompson, 1980). It is generally accepted that sociocultural pressure for an unrealistic thin ideal plays a major role in the development of eating disorders among women (Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Tiggemann & Pickering, 1996; Wiseman, Gray, Mosimann, & Ahrens, 1992).

The family may play a key role in perpetuating pressure to be thin and to conform to the ideal-body stereotype. Direct parental pressure to be thin appears to be correlated with broader measures of weight concern, dieting behavior, and other forms of disordered eating. When Levine, Smolak, and Hayden (1994) asked a sample of middle school girls about how concerned they perceived their parents to be about them being thin, this measure (labeled “parental investment in daughter’s slenderness”) correlated positively with the girl’s score on a children’s version of the Eating Attitudes Test (ChEAT; Maloney, McGuire, Daniels, & Specker, 1989). In another study, Australian high school girls who reported that their parents encouraged them to diet were more likely to diet, regardless of body mass (Paxton et al., 1991).
It also appears that women talk with other women about weight and eating behaviors, and these conversations may contribute to unhealthy attitudes and behaviors in regard to body shape, eating, and weight loss (Nichter & Vuckovic, 1994). Levine and colleagues (1992) found that 41.5% of the middle school girls they surveyed reported talking with their friends about weight, shape, and dieting at least sometimes. Results showed that higher levels of these peer interactions were significantly correlated with higher scores on the ChEAT (Maloney et al., 1989). In addition, in research that took a multiple case study approach, 37% of women with bulimia reported learning from a friend how to vomit to control their weight (Chiodo & Latimer, 1983). Crandall (1988) argued that social factors (i.e., group influences) as they relate to eating and dieting behaviors have been left unexamined for too long. He used a longitudinal design to study several university sororities and found that the degree of binge eating among an individual’s most intimate peer group was predictive of that individual’s degree of binge eating.

Moving beyond day-to-day interactions, Fabian and Thompson (1989) surveyed girls aged 10 through 15 and found that the self-reported frequency of teasing was significantly correlated with low scores on a body esteem scale and high scores on the Drive for Thinness subscale of the Eating Disorders Inventory (EDI; Garner & Olmsted, 1984). Consistent with this study, Levine, Smolak, and Hayden (1994) surveyed 385 adolescent girls in sixth through eighth grade and found that their experience of weight/shape-related teasing and criticism by family members contributed modestly but significantly to variation in body image dissatisfaction, investment in thinness, weight
management behavior, and eating disturbance. There was also a strong relation between peer teasing and body image dissatisfaction.

Various research studies indicate that media, parents, and peers each may contribute to unhealthy attitudes and behaviors in regard to weight, body shape, and eating. This social pressure from peers and family members as well as the media’s depiction of the perfect body type may be antecedents for weight dissatisfaction and disordered eating. For example, Stice, Mazotti, Krebs, and Martin (1998) examined the correlates and prospective predictors of dieting in a community sample of 320 adolescent girls. Results indicated that pressure to be thin not only correlated with dieting among adolescent women, but also predicted an increase in dieting over a 9-month period. Other studies also have shown that perceived pressure to be thin from family, friends, dating partners, and the media correlates with dieting (Stice et al., 1998; Striegel-Moore, Schreiber, Pike, Wilfley, & Rodin, 1995; Thelen & Cormier, 1995) and is related to increases in body image dissatisfaction (Stice, 2002). The majority of women with bulimia profiled in two case study projects reported that they began their bulimic behavior following pressure from family or friends to lose weight (Mitchell, Hatsukami, Pyle, & Eckert, 1986; Pyle, Mitchell, & Eckert, 1981). Another study found that perceived pressure to be thin from family, friends, and media related positively to bulimic symptomatology (Irving, 1990). More recently, Stice, Maxfield, and Wells (2003) reported that exposure to social pressure to be thin increased body image dissatisfaction.

Thompson and Heinberg (1993) examined body image disturbance, social comparison, and negative verbal commentary in college women. One hundred forty six college women completed measures of eating disturbance (Drive for Thinness and
Bulimia subscales of the Eating Disorder Inventory – EDI; Garner & Olmsted, 1984), body image dissatisfaction (Body Dissatisfaction subscale of the Eating Disorder Inventory – EDI; Garner & Olmsted, 1984 and Feel-Ideal Discrepancy – FID; Stunkard, Sorenson, & Schulsinger, 1983), self-esteem (Rosenberg Self-Esteem Scale – RSE; Rosenberg, 1965), depression (Self-Rating Depression Scale – SDS; Zung, 1965), history of being teased about physical appearance (Physical Appearance Related Teasing Scale – PARTS; Thompson, Fabian, Moulton, Dunn, & Altabe, 1991), frequency of appearance comparison (Physical Appearance Comparison Scale - PACS; Thompson, Heinberg, & Tantleff, 1991), and importance of various individuals as appearance comparison targets (Comparison Target Importance Rating - CTIR; Heinberg & Thompson, 1992). A series of multiple regression analyses was performed with body image dissatisfaction and eating disturbance measures serving as criterion variables.

As presented in Table 5, results indicated that both teasing history and social comparison accounted for a significant amount of variance associated with both body image dissatisfaction and eating disturbance even with a general distress component (e.g., depression and self-esteem) removed from analyses. Specifically, general distress accounted for 9% of the variance associated with one measure of body image dissatisfaction (FID), and the block of the four variables measuring teasing history and social comparison explained an additional 12% of variance in body image dissatisfaction. When the Body Dissatisfaction subscale from the EDI was used as the criterion variable, the block of four variables accounted for an additional 23% above and beyond the variance explained by general distress (8%). Further, when the drive for thinness and the bulimia subscales of the EDI served as criterion variables, the block of variables
Table 5.

Research focusing on social pressure for thinness among nonathletes

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<tr>
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<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
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</thead>
<tbody>
<tr>
<td>Thompson &amp; Heinberg (1993)</td>
<td>146 college women</td>
<td></td>
<td>EDI; RSES; SDS; PARTS; PACS; CTIR</td>
<td>Body weight/size teasing and the importance of comparison targets accounted for significant variance associated with body image dissatisfaction and eating disturbance.</td>
</tr>
<tr>
<td>Pike (1995)</td>
<td>410 adolescent girls</td>
<td>9th - 12th grade</td>
<td>BULIT; Weight &amp; Dieting History; FACES III; Friendship Questionnaire; Social Pressure to Diet; Self-Consciousness Scale-Revised; EDI; Marlowe-Crowne Scale of Social Desirability; SCL-90-R</td>
<td>Rates of bulimic symptoms and actual eating disorders among the friendship network accounted for significant variance in bulimic symptoms. When family and friendship systems were studied in conjunction with personality variables, the power for accounting for variance in symptoms of bulimia increased.</td>
</tr>
<tr>
<td>Veron-Guidry, Williamson, &amp; Netemeyer (1997)</td>
<td>148 girls</td>
<td>Aged 8-13</td>
<td>SITM; Piers-Harris Children's Self-Concept Scale; CDI; BIA; ChEAT</td>
<td>Social pressure for thinness, self-esteem and depression were related to eating disorder symptoms.</td>
</tr>
<tr>
<td>Griffiths &amp; McCabe (2000)</td>
<td>111 girls</td>
<td>Aged 11-13</td>
<td>E &amp; M-III; BD subscale of EDI-II and modified version; self-esteem scales; Locus of Control Scale; BES</td>
<td>Body image dissatisfaction mediated the effect of the above three risk factors on eating disorder symptoms. Impact of significant others significantly improved the prediction of body image dissatisfaction but did not significantly improve the prediction of disordered eating. Impact of significant others on disordered eating was mediated by body image dissatisfaction and other variables.</td>
</tr>
</tbody>
</table>
Table 5.

Research focusing on social pressure for thinness among nonathletes (continued)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Stice, Nemeroff, &amp; Shaw (1996)</td>
<td>257 college women</td>
<td></td>
<td>PSP, Ideal-Body Stereotype Scale; BES; Diet factor of EAT-26; Weight control subscale of BULIT-R; BDI; VAMS</td>
<td>Pressure for thinness was directly related to body image dissatisfaction, ideal-body internalization, and dietary restraint, as well as indirectly related to negative affect and bulimic symptomatology (partial mediation). Social pressure for thinness accounted for substantially more variance in dietary restraint than did either body image dissatisfaction or body mass.</td>
</tr>
</tbody>
</table>

Note. BD = Body Dissatisfaction Subscale of EDI; BDI = Beck Depression Inventory; BES = Body Esteem Scale; BIA = Body Image Assessment; BULIT-R = Bulimia Test – Revised; CDI = Children’s Depression Inventory; ChEAT = Children’s Eating Attitudes Test; CTIR = Comparison Target Importance Rating; EAT-26 = Eating Attitudes Test 26; EDI = Eating Disorder Inventory; EDI-II = Eating Disorder Inventory – II; E & M-III = Eating and Me; FACES III = Family Adaptability and Cohesion Evaluation Scale III; PACS = Physical Appearance Comparison Scale; PARTS = Physical Appearance Related Teasing Scale; PSP = Perceived Sociocultural Pressure; RSSE = Rosenberg’s Self-Esteem Scale; SCL-90-R = Symptom Checklist – Revised; SDS = Self-Rating Depression Scale; SITM = Sociocultural influence or Thinness Measure.
measuring teasing history and social comparison accounted for an additional 17% and
12% above and beyond the 25% and 12% explained by general distress, respectively.
These findings supported previous research that suggested a developmental history of
size/weight teasing is a possible cause of future body image disturbance and eating
dysfunction (Thompson, 1990, 1991, 1992). The significant role of these two constructs
is especially important to the current study given the social comparison that
occurs among teammates on a sports team (Davis, 1992; Petrie, 1996) and the negative
verbal commentary from some coaches that has been documented (Sundgot-Borgen,

In an attempt to study these variables in a more complex manner, Pike (1995)
tested the explanatory power of an integrated sociocultural and personality model in
accounting for variance in bulimic symptomatology using regression. Family, peer, and
personality factors were assessed at three levels of analysis. A total of 410 adolescent
girls in ninth through twelfth grade completed questionnaires assessing numerous
variables, including symptoms of bulimia and social pressure to diet. Family, peer, and
personality factors each independently explained variance in symptoms of bulimia above
and beyond social desirability and psychological distress (5%, 15%, 10%, respectively),
but results of the regression models revealed increased power in accounting for this
variance when family and friendship systems are studied in conjunction with personality
variables (25%). Examples of the peer factors included rates of bulimic symptomatology
and actual eating disorders among the friendship network. The author concluded that a
better understanding of bulimic symptomatology can be reached by considering personal
factors in conjunction with social variables such as family and friendship influences,
providing support for the approach that was taken in the current study. One strength of Pike’s approach is that the influence of friendships was assessed more comprehensively than in previous investigations.

In another study, Veron-Guidry, Williamson, and Netemeyer (1997) conducted a structural equation modeling analysis of body image dissatisfaction, pressure for thinness, and eating disorder symptoms in preadolescent girls. A total of 148 girls aged 8 to 13 completed several questionnaires: Sociocultural Influence on Thinness Measure (a variation of a measure used with adult populations; Netemeyer, Burton, & Lichtenstein, 1995; Richins, 1991); Piers-Harris Children’s Self-Concept Scale (Piers & Harris, 1969); Children’s Depression Inventory (CDI; Kovacs & Beck, 1977); Body Image Assessment Procedures (modification of the BIA developed by Williamson et al., 1989); and Children’s Eating Attitudes Test (ChEAT; Maloney et al., 1989; modification of the EAT). A strength of this study was that although many modified measures were used, the validity and reliability data provided demonstrated adequate psychometrics.

Results supported the hypothesized model that three risk factors (social pressure for thinness, self-esteem and depression) were related to eating disorder symptoms, with body image dissatisfaction acting as a mediating variable. Results showed 49% of the variance in body image dissatisfaction was accounted for by social pressure for thinness, self-esteem, and depression. Further, 16% of the variance in eating disorder symptoms was accounted for by the body image dissatisfaction variable. Social pressure for thinness also was significantly associated with self-esteem and depression in this research; that is, as social pressure increased, self-esteem worsened and depression increased.
That social pressure for thinness was associated with body image dissatisfaction is in accord with the findings of Griffiths and McCabe (2000) and Stice and colleagues (1996). Further, as in many other studies, as body image dissatisfaction increased, eating disorder symptoms increased (Stice, 2002). Thus, a crucial variable for developing disordered eating may be the presence of body image dissatisfaction, and that dissatisfaction may be linked closely to social pressures. This finding is consistent with the hypotheses of Rosen (1992) and Slade (1982) that body image disturbance mediates the influence of other variables on symptoms of an eating disorder. Both the study by Veron-Guidry and colleagues (1997) and that of Williamson and colleagues (1995) found that eating disorder symptoms were influenced significantly by the interaction of social pressure for thinness, negative affect, and negative self-appraisal. In both of these studies, as well as in research by Griffiths and McCabe (2000), the relations of risk factors to eating disorder symptoms were mediated by body image dissatisfaction.

Griffiths and McCabe (2000) investigated several variables (including views of society, parents, and peers regarding weight) associated with disordered eating and body image dissatisfaction among early adolescent girls. A total of 111 girls aged 11 to 13 participated in the study and completed a variety of questionnaires including: Eating and Me Scale (E & MIII; Tricker & McCabe, 1999) to measure disordered eating patterns and attitudes; Body Dissatisfaction subscale of the Eating Disorders Inventory-II (EDI-II; Garner, 1991); self-esteem scales from the Harter (1985) questionnaire “What am I like?”; Locus of Control Scale (Levenson, 1974); a modified version of the Body Esteem Scale (BES; Franzoi & Shields, 1984); and a modified version of the Body Dissatisfaction subscale of the EDI-II in which respondents were asked to rate each body
part and process according to the attitudes they believed society, their parents, and their closest boyfriend and girlfriend held for their body (four separate completions of the scale). Resulting correlations indicated that respondents who placed more importance on appearance tended to report higher scores on the disordered eating scales. Significant, yet weak, correlations also were found between measures of disordered eating and societal impact, as well as between disordered eating and the impact of girlfriends. Further, significant moderate to strong correlations were present between all measures of disordered eating and body image dissatisfaction.

A series of hierarchical regressions then was performed to determine whether the impact of significant others explained variance in disordered eating beyond that explained by the other psychological and developmental variables, such as self-esteem, locus of control, importance of appearance, BMI, and menarche. The results of the hierarchical regressions indicated that the impact of significant others accounted for a significant amount of variance in body image dissatisfaction (accounting for an additional 8%), but alone did not explain a significant amount of variance in disordered eating. The impact of significant others on disordered eating was mediated by body image dissatisfaction and other variables; that is, significant others appeared to have an indirect impact on disordered eating. Limitations of this study include the lack of information provided about the psychometrics of the modified measures the authors used. Indeed, the information that was provided indicated that internal consistency reliabilities for some subscales were low (e.g., alpha for the 4 items of the bulimic subscale = .60 and for the 2 items of the food restriction subscale = .50).
Similarly supporting the importance of sociocultural pressures for thinness for understanding body image dissatisfaction and disordered eating, Stice and colleagues (1996) tested an integrative model of bulimia that incorporated perceived sociocultural pressure, body mass, ideal-body internalization, and body image dissatisfaction. In this case, participants were asked specifically about the sociocultural pressure they perceived from family, friends, and dating partners. Using data from 257 undergraduate women, the authors employed structural equation modeling and found the model including the above factors accounted for 71% of the variance in bulimic symptomatology. Specifically, perceived pressure for thinness was directly related to body image dissatisfaction, ideal-body internalization, and dietary restraint, as well as indirectly related to negative affect and bulimic symptomatology. Thus, sociocultural pressure may be hypothesized to lead to bulimic symptoms by increasing body image dissatisfaction and restrained eating.

The fact that perceived social pressure exerted an indirect influence on symptoms of bulimia but a direct, as well as indirect, influence on dietary restraint in the analyses reported by Stice and colleagues (1996) emphasizes the power and complexity of social pressures. This was one of the first studies to examine possible mediating factors between sociocultural pressure and disordered eating. The authors hypothesized that the relation between perceived social pressure and restraint would be fully mediated by ideal-body internalization and body image dissatisfaction; in fact, the findings suggested that this effect was only partially mediated by these variables. Further, Stice et al. found that perceived social pressure accounted for substantially more variance in restraint than did either body image dissatisfaction or body mass. This finding highlights the powerful influence perceptions of pressure by significant others have on an individual’s dietary
restraint. Further, a large proportion of the effect of perceived pressure on bulimic behavior was mediated through restrained eating, accounting for nearly 18% of the variance in bulimic symptoms. These results support the assertion that sociocultural pressure is related directly to restraint and indirectly to symptoms of bulimia.

Reviews of the previous studies have indicated that social pressure for thinness does exist and stems from several different sources, such as family, friends, and the media. This perceived pressure appears to have a direct and indirect impact on women’s likelihood of dieting, body image dissatisfaction, and disordered eating behaviors. It follows, then, that perceived pressures that exist within the athletic realm from sources such as coaches and teammates may have an equally powerful impact on the women competing in this arena. Therefore, further exploration into the special role this pressure may play within athletics seems warranted.

Pressure for Thinness in Athletics

The causes of eating disorders are multi-determined, and there are factors that predispose, precipitate, and perpetuate the disorder (Garfinkel & Garner, 1982). In an athletic setting, predisposing factors (e.g., culture, individual, family) may set the stage for an eating disorder. The disorder itself may be triggered by a precipitating factor such as a comment about an individual’s weight, and may be maintained by perpetuating factors (e.g., approval by coach, initial success).

Societal pressures for thinness may be exacerbated by the athletic environment, where not only is there pressure on a woman to maintain the ideal female body, but also to maintain a weight that is considered “optimal” for her sport. Risk factors specific to athletes include pressure to lose weight quickly through restricted eating and/or frequent
weight cycling and the impact of coaching behavior (Sagenis et al., 2005). Women athletes are under constant pressure to improve their performance and conform to the specific aesthetic requirements of their sport (Wilmore, 1991). For example, a cheerleader’s stunt partner serves as an additional pressure for losing weight because it is easier to perform a difficult skill with a lighter partner (Reel & Gill, 1996).

Many athletes are not only concerned with how weight might affect their performance (e.g., gymnasts, ballerinas, figure skaters, and divers), but also have their performance and appearance rated by judges. Further, many athletes believe low weight is associated with having a competitive advantage (e.g., runners, swimmers), and most coaches and athletes recognize the important relationship between weight and optimal performance (Brownell, Rodin, & Wilmore, 1992; Thompson & Sherman, 1993, 1999). Although often an initial loss of weight will lead to a better performance, this early success can mislead the athlete into continuing to lose weight and slipping into an eating disorder (Sagenis et al., 2005). In fact, in addition to losing fat, muscle mass is also lost during extreme dieting and performance might actually deteriorate. Further, poor nutrition also leads to electrolyte imbalances, depression, anemia, and fatigue, which can all contribute to poor performance and impaired health (Sagenis et al., 2005). Despite this knowledge, the relationship between decreased body fat and increased performance often has been treated as indisputable in certain segments of the athletic community (Thompson & Sherman, 1993a). Consequently, when an athlete is not performing as well as the coach believes that she should, it has become common to see weight loss or a decrease in body fat as the solution to the problem. Too often, this recommendation by a coach or trainer is not accompanied with direction and/or a structured plan to assist the
athlete in doing this in a healthy manner (Swoap & Murphy, 1995; Thompson & Sherman, 1993a).

Coaches have a powerful influence over the thinking and behavior of their athletes. It is not uncommon for athletes to have been told to lose weight by coaches and trainers. Sundgot-Borgen (1994) found that 67% of athletes with disordered eating reported that they were dieting on the advice of their coach. In a U.S. Olympics Study (Franseen & McCann, 1996), the majority of the 215 elite women athletes from 18 different sports reported that the pressure to lose weight came most often from coaches, followed by parents, teammates, media, and magazines. Other studies also have indicated that athletes started dieting after coaches advised a reduction in weight (Smith, 1980). For example, Rosen and Hough (1988) found that two thirds of the gymnasts they surveyed reported they had been told by their coach that they were too heavy and should lose weight. Given that many athletes are young and impressionable, such a recommendation could be seen as necessary to achieve success.

Few studies have examined the coach’s role in more detail. Although most researchers agree that coaches do not cause disordered eating in athletes, inappropriate coaching could trigger or exacerbate the problem in vulnerable individuals (Wilmore, 1991). In a study surveying 274 junior high and high school coaches, the authors found that coaches tended to make subjective evaluations of their athletes’ weights; that is, they made their judgments on appearance rather than more objective indicators (Griffin & Harris, 1996). They also found that coaches tended to rate women as needing to lose weight and men as needing to gain weight. It has been recommended that the coach’s
influence be examined further as a possible contributing factor to disordered eating in athletes (Berry & Howe, 2000).

The sport environment explanation for disordered eating among athletes suggests that both task (i.e., competitive demands, attempts to achieve a certain weight for optimal performance) and social (i.e., coach and teammate influences) pressures within the athletic arena may encourage unhealthy eating and weight management behaviors (Powers & Johnson, 1996; Sossin, Gizis, Marquart, & Sobal, 1997; Taub & Blinde, 1992). Competition among teammates to lose weight and the reinforcement of pathological eating behaviors have been identified as potential factors affecting the onset of disordered eating (Chopak & Taylor-Nicholson, 1991). A study by Rosen and colleagues (1986) documented teammates’ encouragement of one another to engage in unhealthy weight-loss methods, such as laxatives, diet pills, vomiting, and diuretics.

Byrne and McLean (2001) highlighted the need to devise and test methods of measuring perceived pressure to be thin. When the development of a comprehensive measure of perceived intensity of pressure occurs, they stated, “this…could lead to a more thorough understanding of the relationship between sociocultural pressure and eating disorders” (p. 155).

In an attempt to develop such a measure in one specific sport, Reel and Gill (1996) conducted a study on eating disorders and social pressures within cheerleading. Seventy-three college (Division I) and 84 high school women who were cheerleaders participated and completed the Eating Disorder Inventory (EDI; Garner & Olmsted, 1984), Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rejeski, 1989), and the CHEER questionnaire (developed specifically for this study to examine pressures specific
to the sport of cheerleading with an alpha of .71). The CHEER questionnaire included questions that assessed the frequency of pressures such as weight limits, weigh-ins, and pressure from one’s stunt partner, coach, peers, and family. Results indicated that 84% of participants responded “yes” when asked if they thought there were pressures associated with cheerleading to lose weight or maintain a below average weight. Further, 69.8% of college cheerleaders strongly agreed or agreed with the item, “Body weight and appearance are important to my coach.” For all participants, 40.1% strongly agreed or agreed with the statement, “My cheerleading performance would improve if I lost at least 5 pounds.” Finally, when examining the influence of peers on the importance of body weight, 49.7% of all participants strongly agreed or agreed with the statement, “Body weight and appearance are important to my friends outside of cheerleading.”

Stepwise multiple regression was used in an attempt to explain variance in anorexic and bulimic behavior by examining SPAS, CHEER, body image dissatisfaction, and perfectionism scores. Limited information was provided about these results, but it seems the analyses were performed on both college and high school cheerleaders combined. Body image dissatisfaction was shown to account for a significant amount of variance in disordered eating behavior, but CHEER scores (a measure of sport pressures) did not explain a significant amount of variance. The authors did not report specific amounts of variance explained. Although college cheerleaders in this study had lower scores on psychosocial predictors of eating disorders, both high school and college participants reported the existence of pressures associated with body weight. These results can be found in Table 6. Reel and Gill broke new ground by designing a useful instrument of perceived pressure unique to a specific sport. However, caution should be
Table 6.

Research focusing on perceived pressure for thinness among athletes

<table>
<thead>
<tr>
<th>Author and Date</th>
<th>Sample</th>
<th>Subgroups/Sports Included</th>
<th>Instruments Used</th>
<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reel &amp; Gill (1996)</td>
<td>157 women athletes</td>
<td>73 Division 1 college cheerleaders, 84 high school cheerleaders, 62 women athletes (rugby, synchronized swimming, figure skating, track &amp; field, volleyball), 69 men athletes (volleyball, wrestling, hockey, track &amp; field)</td>
<td>EDI; SPAS; original questionnaire (CHEER)</td>
<td>Sport pressure did not account for significant amount of variance in eating behavior.</td>
</tr>
<tr>
<td>Hausenblas &amp; Carron (2000)</td>
<td>131 college athletes</td>
<td></td>
<td>Qualitative</td>
<td>35.5% of women athletes reported that their teammates had a positive influence on their eating and dieting behaviors.</td>
</tr>
<tr>
<td>Byrne &amp; McLean (2002)</td>
<td>263 Australian elite athletes</td>
<td>108 men athletes, 155 women athletes (Thin-build sports: (n = 55 men, 94 women) ballet, gymnastics, lightweight rowing, long distance running, diving, swimming), Normal build sports: (n = 108 men, 155 women) basketball, hockey, tennis, volleyball</td>
<td>CIDI; DT, BD &amp; B subscales of EDI-II; BULIT-R; Restraint subscale of Three Factor Eating Questionnaire</td>
<td>Women athletes from thin-build sports perceived the most pressure to be thin and showed higher rates of eating problems.</td>
</tr>
<tr>
<td></td>
<td>263 Australian nonathletes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engel et al., (2003)</td>
<td>1445 Division 1 college athletes</td>
<td>562 women athletes, 883 men athletes (included 11 sports)</td>
<td>DT &amp; BD subscales of EDI-II; RSES</td>
<td>Parallel relationship between women athletes’ self-reports of their eating and purging behaviors and their perceptions of teammates’ behaviors.</td>
</tr>
</tbody>
</table>

*Note.* B = Bulimia Subscale of EDI; BD = Body Dissatisfaction Subscale of EDI; BULIT-R = Bulimia Test – Revised; DT = Drive for Thinness Subscale of EDI; EDI = Eating Disorder Inventory; EDI-II = Eating Disorder Inventory – II; RSES = Rosenberg’s Self-Esteem Scale; SPAS = Social Physique Anxiety Scale.
used when interpreting these findings; the authors acknowledged that further exploration of the utility of this measure is needed. Future research could possibly modify it for use with other sports.

Hausenblas and Carron (2000) conducted a qualitative study in an attempt to examine the influence of teammates on an individual’s eating and dieting behaviors. A total of 131 varsity athletes (62 women and 69 men) from nine different sports participated. Athletes completed a survey with two open-ended questions that assessed if members of their team ever had a positive/negative influence on their eating behaviors. If so, the participants were asked to fill in the five blank spaces provided with the influence the teammates had had and the nature of the influence. Results indicated that 22 (35.5%) of the women athletes and 20 (28.9%) of the men athletes reported that the group had a positive influence on their eating and dieting behaviors, and 7 (11.3%) of the women athletes and 6 (8.7%) of the men athletes reported that the group had a negative influence.

Further examination of the themes that emerged from these results suggested that some of the “positive” influences reported by the athletes may have, in fact, led to negative behaviors. For example, 7.4% of women reported that a positive influence of teammates is that they “support me in losing weight” and 3.7% said they work out together. It was unclear in this study whether these behaviors were pathogenic in nature. Similarly, some of the reported “negative” influences may be encouraging positive eating behaviors, such as 41.7% said they influence them to “eat too much” (which was not defined). Because teammates spend a considerable amount of time together, their behaviors and attitudes can influence one another and could be used in a powerful way to encourage positive group norms. These results seem to suggest that the group can have a
positive effect on eating and dieting behaviors of an athlete, but the possible negative influences cannot be excluded based on these results.

As mentioned previously, in 2002, Byrne and McLean attempted to study the effects of the pressure to be thin among a group of elite athletes. They surveyed 263 Australian elite athletes (108 men and 155 women) matched with a comparison group of 263 nonathletes. The athletes represented 10 different sports that were categorized as “thin-build” or “normal-build” sports depending on whether they placed a strong emphasis on leanness. Participants were matched on gender, age, ethnic group, and level of education. The sample was a mix of high school students, college students, and community members. Nonathletes were excluded if they trained for more than eight hours each week in a particular sport or if they were competing at an elite level in a sport not represented in this study.

In the first phase of the study, all participants were interviewed using the Composite International Diagnostic Interview (CIDI; World Health Organization, 1989) to identify those who met DSM-IV (APA, 2000) criteria for an eating disorder. A measure of sociocultural pressure was also obtained during Phase 1. Participants were asked to rate, on a scale from 0 to 10, the intensity of the perceived pressure to be thin or lean, either in their particular sport (for athletes) or in their social group (for nonathletes). Phase two involved the completion of a number of self-report measures including the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the Eating Disorders Inventory – II (EDI-II; Garner, 1991), the Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991), and the Restraint subscale of the Three Factor Eating Questionnaire (Stunkard & Messick, 1985).
This was the first study that provided comparisons between two groups of athletes on the intensity of perceived pressure. Results indicated, for both men and women, that athletes from sports that emphasized leanness (thin-build sports) perceived the most pressure, followed by sports that did not emphasize leanness (normal-build sports), and then the nonathletes. No effect sizes were reported by the authors. The groups who perceived themselves to be subject to increased pressure to achieve a lean body shape also showed higher rates of eating problems. This finding has implications for the current study because it not only suggested a relationship between perceived pressure and the prevalence of eating disorders, but also indicated that this pressure does not work in isolation to affect eating attitudes or behavior. For example, normal-build women athletes perceived significantly more pressure to be thin than did normal-build women nonathletes, yet there was only minimal difference between normal-build athletes (2%) and nonathletes (1%) in regard to the rates of eating disorders. Therefore, the question remains as to what other factors may be having an effect. A limitation of this study is that the measure of sociocultural pressure was obtained by asking the participants only one question about pressure perceived in their sport or in their social group.

Engel and colleagues (2003) investigated the role that teammates’ behaviors may have on the development of disordered eating in elite Division I athletes. Five hundred sixty two women and 883 men athletes from 11 schools and 11 different sports participated by completing surveys of five dependent measures, including the Drive for Thinness and Body Dissatisfaction subscales of the Eating Disorder Inventory-II (EDI-II; Garner, 1991), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and questions pertaining to restricting, purging, and binge eating. The following variables were
included in the hierarchical multiple linear regressions that were conducted: demographic variables, athletic involvement variables, perceptions of teammates, coach variables, academic variables, and personality variables. The stepwise model accounted for 40.5% of the variance in Drive for Thinness scores. The entire model accounted for 46.4% of the variance in Body Dissatisfaction scores. Further, when examining food restriction, the entire model significantly explained 44% of the variance, while it accounted for 18.2% of the variance in purging, and 4.9% of the variance in binge eating.

An interesting finding was noted in that there was a parallel relationship between women athletes’ self-reports of their own eating and purging behaviors and their perceptions of their teammates’ behaviors. Restriction of eating was significantly associated with a woman athlete’s perception that other members of the team were excessively dieting to control their weight; a similar pattern was found between women athletes’ self-reports of their behavior and their perceptions of teammates’ binge eating and purging. Indeed, it seems that perceptions of teammates’ behavior are strongly related to athletes’ own eating behavior. This study was by far the most comprehensive study of elite athletes’ eating behaviors and the influences on them in the United States because of its large sample and geographic representativeness.

Overall, it appears that women nonathletes and women athletes alike are affected by pressure for thinness (e.g., Byrne & McLean, 2002; Reel & Gill, 1996; Sagenis et al., 2005). Some research with women who were not athletes (e.g., Griffiths & McCabe, 2000; Veron-Guidry et al., 1997) concluded that the impact of social pressure for thinness on disordered eating was mediated by body image dissatisfaction, and at least one study
(Stice et al., 1996) found that the social pressure had a direct and indirect influence on disordered eating.

Further, the literature indicates that there are specific variables within the athletic arena that may potentially place additional pressure on women athletes. Athletes perceive pressure from sources such as coaches and teammates to lose weight or to maintain a below normal weight (e.g., Rosen & Hough, 1988; Sagenis et al., 2005, Sundgot-Borgen, 1994). Research also suggests that perceived pressure varies according to the type of sport one plays. That is, those women athletes in thin-build sports may perceive the most pressure and evidence the highest rates of eating problems (e.g., Byrne & McLean, 2002).

Multivariate Studies of Women Athletes’ Disordered Eating

Up to this point, most of the reviewed studies have examined the variables of disordered eating, body image dissatisfaction, and pressure for thinness among women athletes in a univariate manner; that is, most investigations have examined these constructs separately, without an explicit focus on how the three may interact. Several of the previous studies investigated variables that could be easily categorized into the model proposed by Tylka and Subich (2004). A few looked at such sociocultural variables as the influence of the coach and teammates, as well as competition among teammates to lose weight. Some others looked at these sociocultural variables in addition to personal variables such as body image dissatisfaction, perfectionism, self-esteem, and other personality factors, without specifically testing how the various constructs influenced each other. Such unidimensional examinations discount the well-established fact that eating disorders and their predictors are multidimensional (Garfinkel & Garner, 1982; Stice et al., 1996; Tylka & Subich, 2004).
This prior research has been helpful in laying a foundation for further examinations, but the relations among these variables need additional study. In fact, it is becoming the norm in the eating disorder literature to take a multivariate approach to examining contributing factors in a predictive manner rather than simply noting correlates of eating disorders. Mazzeo and Espelage (2002) suggested that models are needed to explain how specific variables interact with each other in women to predict disordered eating. The following two studies are examples of investigations that attempted a more complex and sophisticated examination of the relations among these multiple constructs with collegiate women athletes and can be found in Table 7.

Berry and Howe (2000) examined social pressure for thinness, self-esteem, competition anxiety, and body image dissatisfaction as risk factors in the development of disordered eating patterns in 46 women who were varsity athletes from five different sports. Questionnaires that were completed included the Rosenberg Self-Esteem Scale (Rosenberg, 1965), Marten’s Sport Competition Anxiety Test (SCAT; Martens, 1977), the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987), and the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986). An additional demographic questionnaire included items concerning the participant’s experience and goals in her sport, as well as questions regarding social and peer influence on dieting behavior. The latter questions were adapted from Neumark-Sztainer and colleagues (1995), who conducted a nonathletic study of eating disorders and asked participants to rate the extent to which their parents, girlfriends, and boyfriends would pressure them to lose weight in a hypothetical situation of being overweight.
Table 7.

**Multivariate studies of women athletes’ disordered eating**

<table>
<thead>
<tr>
<th>Author and Date</th>
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<th>Subgroups/Sports Included</th>
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<th>Main Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berry &amp; Howe</td>
<td>46 women</td>
<td>Field hockey, swimming, soccer, rowing, basketball</td>
<td>RSES; SCAT; BSQ; DEBO; questions regarding social and peer influence on dieting behavior</td>
<td>Athletes who showed high restrained and high emotional eating reported high body image dissatisfaction and high social pressure. Body image dissatisfaction and social pressure accounted for a significant amount of variance in restrained eating; a significant amount of variance in emotional eating was explained by body image dissatisfaction.</td>
</tr>
<tr>
<td>(2000)</td>
<td>varsity athletes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Williamson et al.,</td>
<td>98 college</td>
<td>Swimming, tennis, basketball, volleyball, gymnastics, track, cheerleading, dance</td>
<td>SCAT; BSQ; Perceived pressure, self-appraisal of athletic achievement questions; IDED</td>
<td>Overconcern with body size and shape mediated the influence of pressure for thinness, anxiety about athletic performance and negative appraisal of athletic achievement on disordered eating.</td>
</tr>
<tr>
<td>(1995)</td>
<td>women athletes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* BSQ = Body Shape Questionnaire; DEBO = Dutch Eating Behavior Questionnaire; IDED = Interview for Diagnosis of Eating Disorders; RSES = Rosenberg’s Self-Esteem Scale; SCAT = Sport Competition Anxiety Test.
Results indicated that those athletes who showed high restrained eating and high emotional eating also reported high body image dissatisfaction and high social pressure. Regression analysis showed that body image dissatisfaction and social pressure significantly accounted for variance in restrained eating (though the specific amounts were not reported), supporting previous research. Body image dissatisfaction also explained a significant amount of variance in emotional eating. Finally, MANOVAs showed no significant effect of sport team membership on disordered eating, indicating that the potential exists for athletes from a wide range of sports to show symptoms of disordered eating. In summary, all of the risk factors (self-esteem, competition anxiety, social pressure, and body image dissatisfaction) were significantly correlated with indicators of unhealthy diet practices.

Similarly, Williamson and colleagues (1995) examined the relation of several variables, including body image dissatisfaction and social pressure for thinness, to symptoms of bulimia and anorexia in college women who were athletes. A sample of 98 college women athletes from eight different sports completed the following questionnaires: Martens’ Sport Competition Anxiety (SCAT; Martens, 1977); the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987); five items designed to measure social influence for thinness that assessed the degree to which the woman perceived pressure about body weight or size from coaches and teammates; and five items designed to measure the woman’s self-appraisal of her athletic achievement. Women also participated in the Interview for Diagnosis of Eating Disorders (IDED; Williamson, 1990) to assess the presence and severity of eating disorder symptoms.
This was the first study to investigate these factors using structural equation modeling, and the authors hypothesized that overconcern with body size and shape would be a mediating variable for the three risk factors (i.e., pressure for thinness, anxiety about athletic performance, and negative appraisal of athletic achievement) in determining the symptoms of anorexia and bulimia. Analysis supported the hypothesized model, which suggested that the effects of the risk factors on symptoms of eating disorders were mediated by concern about body size and shape. That is, excessive concern with body size mediated the influence of social pressure for thinness from coaches and peers, anxiety about athletic performance, and negative self-appraisal of athletic achievement on eating disorder symptoms.

Thus, pressure for thinness and body image dissatisfaction accounted for a significant amount of variance in restrained eating among women athletes in one study (i.e., Berry & Howe, 2000) and the effect of social pressure on disordered eating was mediated by overconcern with body size in another study (i.e., Williamson et al., 1995). Although these studies furthered research in this area by taking a multivariate approach to the prediction of eating disorders, clear limitations still exist. Both studies included little information about the measures employed, especially about those items assessing social and peer influence on dieting behavior, leading to questions about reliability and validity. Indeed, even when information was provided, support for the measures was modest; for example, the coefficient alpha reported for the five social pressure for thinness items was .69 (Williamson et al., 1995). Additionally, the sample size of both investigations was small for the analyses performed, especially given the decision to split one of the samples for cross validation (e.g., Williamson et al.).
These two studies also could be viewed in the framework proposed by Tylka and Subich (2004). The more sophisticated statistical analyses and approach taken in each support taking multi-dimensional view by exploring the interactions among personal factors (i.e., body image dissatisfaction, self-esteem, competition anxiety) and sociocultural factors (i.e., pressure for thinness in sport). However, room for improvement still exists in terms of conducting multidimensional investigations of disordered eating among women athletes in college.

Summary

A review of the literature has revealed that the incidence of disordered eating among collegiate women athletes appears to be at least as high as that among college women who are not athletes. In a few cases, studies have suggested that women athletes may be even more at risk for disordered eating than women nonathletes (e.g., Byrne & McLean, 2002; Davis, 1992; Sundgot-Borgen, 1993). The literature reviewed in this chapter, then, has shown that an exploration of possible risk factors that contribute to the development of disordered eating among collegiate women athletes is warranted.

It is well supported that body image dissatisfaction and social pressure for thinness are related to disordered eating reported by women in general (e.g., Brookings & Wilson, 1994; Griffiths & McCabe, 1999; Mazzeo, 1999; Mintz & Betz, 1988; Stice et al., 1996), and the current investigation seeks to further existing research by exploring how these variables might contribute to disordered eating in collegiate women athletes. Several previous studies have found body image dissatisfaction to be related to eating disorder symptoms in nonclinical samples of young women and adolescent girls (e.g., Attie & Brooks-Gunn, 1989; Leon et al., 1993). This conclusion also was reached by
Reel and Gill (1996) and Berry and Howe (2000) with a group of college women athletes; that is, their findings supported the idea that body image dissatisfaction related to symptoms of disordered eating such as restrained and emotional eating. Similarly, this concern with body size was strongly associated with eating disorder symptoms in women athletes surveyed by Williamson and colleagues (1995).

Additionally, research indicates that the pressure on women in general from family, friends, and the media to lose weight and meet society’s expectations for a thin body contributes to unhealthy eating behaviors (Crandall, 1988; Levine et al., 1994; Stice et al., 1998). Women who are athletes have been observed to experience similar social pressures for thinness, but also to experience high levels of sport-related pressure to meet weight restrictions and to conform to an ideal body type - from peers, trainers, and coaches as well as the judging criteria used in certain sports (Beals & Manore, 1994). This general societal pressure and sport-specific pressure may combine to increase risk for disordered eating among women who are athletes. Indeed, Engel et al. (2003) found athletes’ perceptions of others’ frequency of binge eating and purging was significantly associated with the athletes’ own eating behaviors.

Finally, initial research has indicated that the relation between pressure for thinness and symptoms of disordered eating in women athletes (e.g., Berry & Howe, 2000) is mediated by body image dissatisfaction (Williamson et al., 1995). Support for this relation is limited at present. Further, women competing in sports that emphasize leanness or low body weight have been suggested to be at greater risk for symptoms of disordered eating than are women athletes competing in sports that do not emphasize leanness or low body weight (e.g., Byrne & McLean, 2002; Davis & Cowles, 1989;
Petrie, 1996; Stoutjesdyk & Jevne, 1993), and Byrne and McLean (2002) recommended that “there is a need to look more closely at the degree of pressure to be thin or lean…exerted in different sporting contexts and to examine the relationship between this pressure and the prevalence of eating disorders” (p. 81).

These patterns of research results suggest the importance of studying disordered eating among women athletes using a sophisticated and multivariate approach. Despite the growing trend in eating disorder research in general to examine relevant variables in a multidimensional manner (Striegel-Moore & Cachelin, 2001), only a few studies of women athletes have done so, and thereby provided information about the complex connections among these variables in collegiate women athletes (i.e., Berry & Howe, 2000; Williamson et al., 1995). The current investigation attempted to improve on prior research with its design; it explores the direct and indirect relations between body image dissatisfaction, perceived pressure for thinness, and disordered eating. Only one existing study (Williamson et al., 1995) has attempted to investigate these variables with women athletes in a mediation model, even though previous research with nonathletes has provided support for this approach (Griffiths & McCabe, 2000; Stice et al., 1996; Veron-Guidry et al., 1997).

The current study also extends research in this area by examining the separate and possibly additive effects of pressure for thinness from within the athletic environment. Existing research has not assessed this specific perceived athletic pressure separately from perceived social pressure for thinness outside of the athletic realm. An attempt was made to determine how women athletes’ perceptions of pressure to be thin from within
the athletic environment work in conjunction with other typical societal pressures to maintain a thin body to predict disordered eating.

This distinction between the types of pressure constitutes an improvement on existing research. Several prior studies assessed social pressure for thinness in women athletes by simply asking the participants one question about the level or intensity of perceived pressure; this did not allow for a very thorough or specific assessment of the pressure. The most thorough assessment of this variable was provided by Williamson et al. (1995), who addressed this issue with five questions, although Reel and Gill (1996) developed an entire questionnaire focused on pressures associated specifically with cheerleading. For the current study, however, two separate measures of social pressure were employed. A modified version of the original instrument to assess perceived social pressure for thinness utilized by Stice and colleagues (1996) was used along with the original measure to address specific sport-related pressures within the athletic arena. By modifying an existing measure that has demonstrated evidence of reliability and validity, more confidence can be placed in the utility of the new instrument.

This investigation also is clear about the population being examined and provides relevant information about demographics and sports surveyed. An attempt was made to gather data from a wide range of sports because although some research indicates athletes in certain sports may be at higher risk than others for disordered eating (e.g., Sundgot-Borg, 1993), other research has shown that the risk is not significantly different across individual sports (e.g., Berry & Howe, 2000). Finally, the relation of sport type to the variables of interest was examined in an exploratory analysis. Figure 1 provides a representation of the predicted associations among the variables.
Hypotheses

**Hypothesis 1**
Body image dissatisfaction was expected to account for a significant amount of variance in participants’ scores on a measure of disordered eating behaviors, because research supports body image dissatisfaction being significantly related to eating disturbances (e.g., Brookings & Wilson, 1994; Mazzeo, 1999; Veron-Guidry et al., 1997).

**Hypothesis 2**
Perceived social pressure for thinness outside the athletic environment was expected to account for a significant amount of variance in participants’ scores on a measure of disordered eating behaviors, because research supports social pressure for thinness as explaining a significant amount of variance in eating disturbances (e.g., Stice & Agras, 1998; Stice, Nemeroff, & Shaw, 1996).
Hypothesis 3

Perceived pressure for thinness within the athletic environment (i.e., from coaches and peers) was expected to account for a significant amount of variance in participants’ scores on a measure of disordered eating behaviors, because research supports pressure for thinness within the athletic environment as explaining a significant amount of variance in eating disturbances among women athletes (e.g., Berry & Howe, 2000).

Hypothesis 4a

The effect of social pressure on eating disturbances was expected to be mediated by body image dissatisfaction, because research supports concern with body size as a mediator of the relation between social pressure for thinness and eating disturbance among women athletes and nonathletes (e.g., Veron-Guidry et al., 1997; Griffiths & McCabe, 2000).

Hypothesis 4b

The effect of athletic pressure on eating disturbances was expected to be mediated by body image dissatisfaction, because research supports concern with body size as a mediator of the relation between pressure for thinness from coaches and teammates and eating disturbance among women athletes (e.g., Williamson et al., 1995).

Exploratory analyses

In addition, the following questions were examined in an exploratory manner, as there was no guidance in the literature to suggest the outcome. The effect of athletic pressure for thinness was analyzed for a possible additive effect (in addition to the social
pressure for thinness) on accounting for significance variance in disordered eating. Further, for groups whose sample size allowed, these variables were compared for women athletes in various sports.
CHAPTER III

METHODS

Participants

This study sampled college women athletes from two large, Midwestern, Division I universities. Division I schools were chosen because athletes at these schools often have the additional pressure of scholarships and higher competition standards, which sets them apart from Division II and III (Picard, 1999). Only women athletes were studied because eating disturbances are more common in women, and most of the existing research pertains to women (Petrie & Rogers, 2001). Because research suggests that the potential exists for disordered eating in all sports (Berry & Howe, 2000), participants were recruited from a wide variety of women’s athletic teams, including both those sports that emphasize appearance and those that do not. A power analysis revealed 200 participants were needed to achieve power of .80 when alpha was set at .05 for the test of Hypothesis 4, which is the test of mediation. This analysis was used to set the sample size as it has the most stringent power demands and would yield a small effect size of .25.

Of the 206 women who completed the surveys, five did not indicate their race. One hundred seventy-six women described themselves as Caucasian/White (85.4%); 13 described themselves as African American/Black (6.3%); 4 described themselves as Hispanic American (1.9%); and 1 stated she was an International Student (.5%). A total
of 4 women endorsed “other” (1.9%). The mean age of the women in the sample was 19.6 years old ($SD = 1.3$), with the range being from 18 to 24 years old. When asked if they received funding for participating in their sport, 171 women (83%) responded “yes” and 32 women (15.5%) responded “no.” Three women did not respond.

A total of 64 women in the sample identified as being in their first year of college (31.1%); 47 identified as sophomores (22.8%); 42 women reported being juniors (20.4%); 39 reported being in their senior year (18.9%); 4 individuals identified as being in their fifth year (1.9%); and one person said she was a graduate student (.5%). Nine women did not report their year in school.

Measures

**Eating Disorder Inventory - 3 (EDI-3; Garner, 2004)**

The EDI-3 was used to assess a participant’s current level of disordered eating. The EDI-3 is a 91-item self-report measure designed to assess psychological characteristics and symptoms common to anorexia and bulimia. It has 12 primary scales, consisting of three eating-disorder-specific scales and nine general psychological scales that are highly relevant to, but not specific to, eating disorders. The scales are Drive for Thinness, Bulimia, Body Dissatisfaction, Low Self-Esteem, Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, Interoceptive Deficits, Emotional Dysregulation, Perfectionism, Maturity Fears, and Asceticism. It also yields six composite scores, one that is eating-disorder specific (i.e., Eating Disorder Risk) and five that are general integrative psychological constructs (i.e., Ineffectiveness, Interpersonal Problems, Affective Problems, Overcontrol, General Psychological Maladjustment).
The three eating disorder specific subscales (i.e., Bulimia, Drive for Thinness, Body Dissatisfaction) are combined to form the Eating Disorder Risk composite score. For this particular study, only the Bulimia and Drive for Thinness subscale were combined, given the fact that Body Dissatisfaction was examined separately. The summed total score from the Drive for Thinness and Bulimia subscales was used as a measure of eating disorder symptoms, and then each of the subscales was examined separately. The Drive for Thinness items assess a preoccupation with restrictive dieting, concern about dieting, and fears about weight gain. Examples of items on this subscale include, “I am preoccupied with the desire to be thinner” and “I am terrified of gaining weight.” The items on the Bulimia subscale assess the tendency to think about and engage in episodes of uncontrollable overeating. Examples of items on the Bulimia subscale include, “I eat when I am upset” and “I have gone on eating binges where I felt that I could not stop.”

Each EDI-3 item is written in the first person (e.g., “I feel satisfied with the shape of my body”), and participants are asked to rate whether the statement “always,” “usually,” “often,” “sometimes,” “rarely,” or “never” applies to them. Garner (2004) recommended that the responses “never true of me” and “rarely true of me” receive a score of 0, and the responses “sometimes true of me,” “often true of me,” “usually true of me,” and “always true of me” receive scores of 1, 2, 3, and 4, respectively. According to the EDI-3 manual, the items for each subscale are summed; higher scores are indicative of more eating disorder symptoms.

This scoring system is a change from that was recommended for previous versions of the EDI. Earlier versions of the EDI used the same 6-point, forced-choice
format, but assigned the scores 0, 0, 0, 1, 2, 3 (Garner, 1991). According to the EDI-3 manual, this new scoring system was adopted “because it retains the heuristic value of the original scoring format but expands the range of scores, which improves the psychometric qualities of the EDI-3 primarily for nonclinical populations” (Garner, 2004; p. 23).

The EDI-3 demonstrates evidence of reliability. For the three Eating Disorder Risk scales (i.e., Drive for Thinness, Bulimia, Body Dissatisfaction), internal consistency reliabilities were reported to be in the high .80s to low .90s across three normative groups, including a U.S. adult clinical sample, an international adult clinical sample, and a U.S. adolescent clinical sample (Garner, 2004). The internal consistency reliability for the Eating Disorder Risk Coefficient ranged from .90 to .97 across the same groups. Alpha coefficients for the Psychological scales ranged from .75 to .89, with the median internal consistency reliabilities being .84, .74, and .85 for the U.S. adult clinical sample, international adult clinical sample, and U.S. adolescent clinical sample, respectively. Alphas for the composite coefficients ranged from .85 to .96 across the same groups.

The median test-retest coefficient for the three Eating Disorder Risk scales after one week was .95 for a sample of 34 women who had undergone past eating disorder treatment and for the psychological scales it was .93. Further, the Eating Disorder Risk Composite test-retest stability coefficient for those seven days was .98.

Because of the recent development of the EDI-3, little published research exists about reliability and validity information beyond what is provided in the manual. No prior studies with athletes were found that employed the EDI-3. However, given that the revised scales correlate strongly to the original scales, prior psychometric information can
be used as supporting evidence. The reliability of EDI-II has been examined with samples of eating disordered clients and non-eating disordered men and women. For example, Garner (1991) reported internal consistency reliability estimates for the original eight scales of the EDI-II ranging from .72 to .92 and test-retest reliability ranging from .67 to .95 for a one week in non-patient samples. Additionally, internal consistency for the eight scales in the 219 men and women community members surveyed by Berman (2005) ranged from .72 to .87. The internal consistency reliability estimates for the EDI-3 subscales used in present study are presented and discussed in Chapter IV.

The EDI-II also has been used in several previous studies of eating problems in athletes (Hausenblas & McNally, 2004; Johnson, Powers, & Dick; 1999; Picard, 1999; Sundgot-Borgen & Torstveit, 2004; Zucker, Womble, Williamson, & Perrin, 1999). Specifically, Hausenblas and McNally (2004) surveyed a sample of high school and college women and men who were athletes and nonathletes and reported internal consistency reliabilities ranging from .69 to .85 for the analyzed subscales.

Garner (2004) investigated the relationship between the EDI-3 and the EDI-II in a mixed sample of 864 adult women and 295 adolescent women. The EDI-3 demonstrated evidence of validity in that the Drive for Thinness and Body Dissatisfaction subscales were highly correlated (.96 and .97) with their EDI-II subscales for both the U.S. adult clinical and U.S. adolescent clinical samples. The EDI-3 subscales all have the highest correlation with their corresponding EDI-II subscale, ranging from .73 to .97. In a different study of 49 women with anorexia, correlations of clinicians’ ratings and EDI-II self-reports ranged from .53 to .78 for all scales (Garner, 1991). Expected correlations have been found between the EDI-3 and other eating disorder measures, including the
EAT-26 (using a clinical sample of 210 adult women and 110 adolescent women), the BULIT-R (using a nonclinical group of 543 women), and the Dutch Eating Behavior Questionnaire (using a group of 362 adult women without an eating disorder and 305 with an eating disorder) supporting its convergent validity (Garner, 2004).

Further, according to a confirmatory factor analysis performed by Garner (2004), the EDI-3 composite scores were supported as theoretically distinct constructs. Doninger, Enders, and Burnett (2005) reported a strong, significant correlation between the DT subscale of the EDI-II and the DT subscale of the EAT-26 \( r = .88 \), supporting its convergent validity. Finally, the Drive for Thinness and Bulimia subscales have been found to correctly classify eating disorders among non-clinical participants (Joiner & Heatherton, 1998; Schoemaker, Verbraak, Breteler, & van der Staak, 1997).

The Body Dissatisfaction subscale of the EDI – 3 (Garner, 2004) was used to assess a participant’s level of satisfaction with her body. This subscale contains 10 questions that assess attitudes and behaviors concerning weight and shape. Specifically, this subscale reflects the belief that specific parts of the body (i.e., buttocks, thighs, stomach, hips) are too large. Examples of items on the Body Dissatisfaction subscale include, “I feel satisfied with the shape of my body” and “I think that my stomach is too big.” Respondents are instructed to rate each item according to a six-point scale ranging from “always true of me” to “never true of me.” The responses “never true of me” and “rarely true of me” received a score of 0, and the responses “sometimes true of me,” “often true of me,” “usually true of me,” and “always true of me” received scores of 1, 2, 3, and 4, respectively. Items from this subscale were summed to provide a total body
image dissatisfaction score, with higher scores being indicative of greater body image dissatisfaction.

The Body Dissatisfaction subscale was derived from the work of specialists in eating disorders, demonstrating evidence of content validity (Garner, 1991). The BD subscale of the EDI-3 correlated at .97 with the same scale from the EDI-II. This suggests that researchers and clinicians can assume equivalence between the EDI-II and the EDI-3. It has demonstrated validity as a measure of the body image dissatisfaction construct (Cash & Deagle, 1997). Supporting this subscale’s convergent validity, scores on the BD subscale were related to body preoccupation among college women \( (r = .83, \text{Tylka} \& \text{Subich, 2004}) \) and to therapist-consultant ratings of client’s body image dissatisfaction \( (r = .44, \text{Garner, 1991}) \), and to its corresponding subscale of the EAT-26 \( (r = .65, \text{Doninger, et al., 2005}) \).

The alpha coefficients for the BD subscale of the EDI-3 ranged from .88 to .96 across three normative groups, including a U.S. adult clinical sample, an international adult clinical sample, and a U.S. adolescent clinical sample (Garner, 2004). The test-retest reliability estimate for the BD subscale of the EDI-II was .97 over a three-week period in a sample of 70 men and women college students (Wear & Pratz, 1987). Alpha coefficient estimates for the BD subscale of the EDI-II ranged from .91 to .93 among college women (Brookings & Wilson, 1994; Tylka & Subich, 1999). In a similar sample of college students who were women, reported internal consistency reliability coefficients ranged from .83 to .93 (Garner, Olmstead, & Polivy, 1983).

In more recent studies, alphas have been shown to be acceptable as well. Specifically, in one study of 202 college women by Engeln-Maddox (2005), Cronbach’s
alpha was .87. In 2006, Coughlin and Kalodner surveyed 135 women college students and reported an internal consistency reliability coefficient for the BD subscale of EDI-II of .93. For another sample of 67 women college students, coefficient alpha for the BD subscale of the EDI-II was .92 (Maner et al., 2006). The Body Dissatisfaction subscale of the EDI-II is highly correlated with scores on the Body Shape Questionnaire in bulimia patients ($r = .78$, Cooper & Taylor, 1988) and restrained and unrestrained eaters ($r = .82$, Eldredge, Wilson, & Whaley, 1990).

**Perceived Sociocultural Pressure Scale (PSPS; Stice, Ziemba, Margolis, & Flick, 1996)**

This measure was used to assess a participant’s level of perceived pressure for thinness. It is an eight item scale used to measure the amount of pressure perceived from family, friends, dating partners, and the media to have a thin body (e.g., “I’ve perceived a strong message from my family to have a thin body”). Participants report the amount of pressure they perceive on a 5-point scale ranging from “no pressure” to “a lot of pressure.” The five available choices range from: none (scored as 1), some (scored as 3), and a lot (scored as 5). Four subscales can be calculated: family pressure, media pressure, friend pressure, and dating partner pressure, in addition to an overall score. For the present study, the overall perceived pressure score was used because the subscales have only two items each. The total score was obtained by summing the items and then dividing by the total number of items. Overall pressure scores can range from 1 to 5. Higher scores represent greater perceived sociocultural pressure to be thin.

In a sample of high school and college women, the full scale demonstrated good internal consistency (alpha = .88). The alphas for the subscales were .91, .72, .92, and .73 for family, friends, partners, and media subscales respectively (Stice, Ziemba, et al.,
The internal consistency reliability in a sample of 463 college women was .83 (Tylka & Subich, 2004). Data from a pilot study (n = 27) revealed strong test-retest reliability for the full scale over two weeks (r = .93) and stability coefficients of .96, .91, .75, and .85 for family, friends, dating partners, and media, respectively (Stice, 2001; Stice, Presnell, & Spangler, 2002; Stice et al., 1996). The internal consistency reliability estimate for the present study is presented and discussed in Chapter IV.

Strong correlations were found between PSPS scores and retrospective reports by college women of parental pressure to lose weight during childhood (average r = .51) (Thelen & Cormier, 1995). Evidence for construct validity was demonstrated in that the Perceived Sociocultural Pressure Scale related as expected to body image dissatisfaction (r = .51, Stice, Ziemba, Margolis, & Flick, 1996), in addition to the predictive validity demonstrated by Stice and Agras (1998) when examining the onset of binge eating.

**Perceived Athletic Pressure Scale (PAPS)**

The eight-item PSPS was modified to measure pressure from sources within the athletic environment: coaching staff, teammates, fans/spectators, and training staff. The same format and scoring system was used as with the original scale. Participants reported the amount of pressure they perceive on a 5-point scale ranging from “no pressure” to “a lot of pressure.” Examples of modified items on the athletic pressure for thinness scale include, “I've felt pressure from my coach to lose weight” and “I've noticed a strong message from my teammates to have a thin body.”

The reason for this modification is that no current measure of pressure within the athletic environment exists; that is, items used in existing studies were designed by the authors specifically for their research. Several of the studies that have assessed pressure...
for thinness in women athletes did so by simply asking the participants a single question about the level or intensity of perceived pressure and thereby obscuring from what sources the athletes perceive the pressure. The only multi-item questionnaire found focused on pressures specific to the sport of cheerleading (e.g., Reel & Gill, 1996), and assessed the frequency of particular pressures in cheerleading such as weight limits, weigh-ins, and pressure from one’s stunt partner, coach, peers, and family. By modifying in accord with the literature on athletics a more general existing measure of sociocultural pressure that has demonstrated evidence of reliability and validity, greater confidence can be placed in the utility of the new instrument. The internal consistency reliability estimate was calculated for this modified scale prior to analyzing the hypotheses and is presented and discussed in the next chapter. The items from the original and modified scales were randomly combined to form one scale consisting of 16 items. The final scale can found in Appendix C.

Demographics. See Appendix D

Participants completed a demographic sheet with questions pertaining to their current sport, relationship with others on the team, and coach’s sex.

Procedures

Ethical approval was obtained from both schools’ Institutional Review Board for the Protection of Human Subjects. Participants were then recruited from the women’s athletic departments at both institutions. Contact was made with appropriate personnel in the athletic department (i.e., trainers, advisors, coaches) to obtain permission to administer the questionnaires in a group setting at team practices and/or meetings. Participants completed the surveys in small groups or individually. The athletes were
informed that their coaches will have no knowledge of their individual responses. They were given an informed consent sheet to read. After reading the informed consent, they then completed the questionnaires, beginning with the EDI-3 and then the combined measure of perceived social and athletic pressure. Because disordered eating was the dependent variable of interest, the athletes completed that survey first. The participants finished by completing a demographic sheet.

Upon completion of the questionnaires, participants were given a list of contact information for local counseling clinics in case they experienced any distress when filling out the surveys or wanted to pursue information on eating disorders. An estimated time of 20 minutes was necessary for completion of the surveys. Athletes wrote their name and contact information on a separate sheet of paper in order to be entered in a drawing for a $50 gift card at a local store. One winner was chosen from school B, after the investigator was informed that the athletes at school A were not eligible to participate in such a drawing.
CHAPTER IV
RESULTS

Two hundred and six women completed the questionnaire packet in which the EDI-3 was placed first, followed by the Pressure scales, and finally the demographic sheet. Missing data points within cases in the data set were examined and dealt with by substituting the participant’s mean subscale score for the missing value. According to the EDI-3 manual (2004), when one item or less has been omitted for each of the subscales, subscale scores can be prorated based on the mean for completed items on that scale. The same procedure was used for the Pressure for Thinness scales. A total of 1% \((n = 2)\) of individuals left one item blank on the Pressure for Thinness scales, and a total of 10% \((n = 20)\) of individuals left at least one item blank on the EDI-3. Out of the total 22,042 data points, 28 points were missing (.1%). For the Bulimia subscale, one data point was missing; for Body Dissatisfaction, two data points were missing; for Drive for Thinness, three data points were missing; for the Athletic Pressures scale, one data point was missing; and for the Social Pressures scale, one data point was missing. No participant omitted more than one item per subscale and no more than three items total, so no cases were removed from the final data set due to missing data. Thus, the final sample size was 206. Table 8 illustrates the number of athletes from each sport representing each school.
Table 8.

Frequency of sport by school

<table>
<thead>
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<th>Sport</th>
<th>School A</th>
<th>School B</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Basketball</td>
<td>10</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>Cross-Country</td>
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</tr>
<tr>
<td>Diving</td>
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<td>2</td>
<td>3</td>
</tr>
<tr>
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<td>21</td>
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<tr>
<td>Rifle</td>
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<td>3</td>
</tr>
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<tr>
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<td><strong>87</strong></td>
<td><strong>206</strong></td>
</tr>
</tbody>
</table>

The relations between year in school, age, and race to the dependent variables were examined. Three significant correlations were found: between year in school and body image dissatisfaction \((r = .19)\), between age and body image dissatisfaction \((r = .19)\), and between age and athletic pressure \((r = .16)\). Although significant at \(p < .05\), the strength of these correlation coefficients was not high enough to be considered as covariates in subsequent analyses (Tabachnick & Fidell, 1996).

**Descriptive and Preliminary Analyses**

The frequencies, means, standard deviations, and intercorrelations of all the primary variables of interest were computed and are displayed in Table 9.
Table 9.
Summary statistics and intercorrelations among primary variables of interest

<table>
<thead>
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<td></td>
<td></td>
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<td>1. Disordered Eating</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Bulimia</td>
<td>.83**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Drive for Thinness</td>
<td>.92**</td>
<td>.54**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Body Dissatisfaction</td>
<td>.75**</td>
<td>.51**</td>
<td>.77**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Pressures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Social Pressure</td>
<td>.61**</td>
<td>.44**</td>
<td>.61**</td>
<td>.54**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Athletic Pressure</td>
<td>.44**</td>
<td>.35**</td>
<td>.42**</td>
<td>.35**</td>
<td>.72**</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>11.51</td>
<td>4.17</td>
<td>7.35</td>
<td>12.33</td>
<td>1.98</td>
<td>1.60</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>10.52</td>
<td>4.90</td>
<td>7.03</td>
<td>8.83</td>
<td>.81</td>
<td>.75</td>
</tr>
<tr>
<td>Cronbach’s Alpha</td>
<td>.90</td>
<td>.82</td>
<td>.90</td>
<td>.89</td>
<td>.86</td>
<td>.90</td>
</tr>
</tbody>
</table>

Note.  
**N** = 206. EDI-3 = Eating Disorder Inventory – 3; Disordered Eating = Sum total of Drive for Thinness & Bulimia subscales; Social Pressure = Perceived Sociocultural Pressure Scale (PSPS); Athletic Pressure = Perceived Athletic Pressure Scale (PAPS).  
**p < 0.01.

When comparing the means and standard deviations of participants’ summed scores on the EDI-3 subscales from the current study to those numbers reported in prior literature sampling athletes and nonathletes, it must be noted that EDI-3 scores cannot be directly compared to EDI-2 scores from other studies. This is because the EDI-3 has more potential for higher scores given the change in scoring. Additionally, an extra item was added to the Bulimia and Body Dissatisfaction subscales in the change from the EDI-2 to EDI-3 (Garner, 2004). Illustrating this point, the mean of participants’ summed scores for bulimia (\(M = 4.17, SD = 4.90\)) in this study was higher than any reported in other studies (\(Ms \text{ ranged from } .7 \text{ to } 2.21, SDs \text{ from } .81 \text{ to } 3.56\)). For drive for thinness, the mean and standard deviation of participants’ summed scores (\(M = 7.35, SD = 7.03\)) fell in the
higher end of the range of other reported scores ($M$s ranged from 3.02 to 9.62, $SD$s from 3.79 to 7.0). Finally, for body dissatisfaction, the mean of participants’ summed scores was 12.33 ($SD = 8.83$) for this sample, as compared to means that ranged from 5.35 to 13.2 ($SD$s from 5.44 to 8.5) in previous literature. The mean score for social pressure for thinness was 1.98 ($SD = .81$), which fell in the middle of the range of scores reported by other samples of women ($M$s ranged from 1.82 to 2.30, $SD$s from .81 to .90) in previous studies. For athletic pressure for thinness, the mean was 1.60 ($SD = .75$).

Data were screened for outliers using stem leaf plots, boxplots, and examining extreme values. No outliers were noted on the Body Dissatisfaction subscale, four were noted for the Drive for Thinness subscale (score of 25 or above), 14 were noted for the Bulimia subscale (score of 14 or above), six were noted for the Athletic Pressure subscale (score of 3.8 or above), and five were noted for the Social Pressure subscale (score of 4.1 or above). When examining the outlying scores, all raw scores were within the possible range for each subscale, and no individual score was more than three points higher than any other individual’s score. To take a closer look at the outliers, internal consistency reliabilities were conducted on the data after removal of the outlying scores. On the Bulimia subscale, Cronbach’s alpha decreased from .82 to .61. Further, other analyses including correlations, means, standard deviations, and hypothesis testing resulted in virtually identical results as when conducted on the entire data set, other than slight decreases that would be expected with lowered variability. Thus, in order to maintain optimal measurement reliability, the outliers were treated as natural fluctuations in the data set, and so were ignored (Pedhazur & Schmelkin, 1991).
Tabachnick and Fidell (1996) recommended examination of the correlations between variables to make sure they are not multicollinear (i.e., \( r \) above or equal to .90). The only correlation greater than .90 (\( r = .92 \)) was between drive for thinness and the disordered eating variable (which includes drive for thinness as one of its subscales). As can be seen in Table 9, many variables are significantly correlated.

Independent sample t-tests were conducted on the relevant scales to test for differences between the two schools. These tests indicated no significant differences between students from School A (\( n = 119 \)) and students from School B (\( n = 87 \)) for either of the pressure scores or the disordered eating score (all \( p's > .05 \)). For the body dissatisfaction score, however, a significant difference was found (\( t (204) = -2.9, p < .01 \)). In order to test the importance of this difference, a regression analysis was conducted for Hypothesis 1 using “school” as a covariate and entering body image dissatisfaction at the second step to predict disordered eating. The resulting change in \( R^2 \) at step 2 was significant (\( R^2_{inc} = .55, F (2, 203) = 130.81, p < .001 \)) indicating that the relation between the variables was not entirely a function of school. Looking further into this difference, it was noted that 21 gymnasts participated from School A and zero gymnasts participated from School B. This could account for the difference in body image dissatisfaction as literature has suggested gymnastics is a “lean” sport with a great deal of emphasis on body shape and size (Brownell, et al., 1992; Petrie, 1993). Finally, the correlation matrix for each school was examined, and it was determined that the correlations were comparable. These three analyses provided a rationale for combining data from the two schools in subsequent analyses.
Sixty-eight of the athletes (33%) reported having a coach who was a man, and the remaining 138 (67%) reported having a coach who was a woman. An independent samples t-test was conducted to examine differences on the various dependent variables. The only significant difference that was found was on the variable of athletic pressure ($t(108) = 2.92, p < .05, d = .44$), with those athletes who were coached by a man perceiving more athletic pressure for thinness than those who were coached by a woman.

The athletes also responded to three Likert-type questions on the demographic sheet regarding their relationship with their teammates and the importance of low weight to their sport. These descriptive data can be found in Table 10.

Table 10.

<table>
<thead>
<tr>
<th>Sport</th>
<th>How important is achieving a low weight to your primary sport? a</th>
<th>My teammates and I are a close-knit group. b</th>
<th>To what extent does your relationship with your team affect your performance? c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball</td>
<td>2.46 (1.06)</td>
<td>3.83 (.92)</td>
<td>3.42 (.78)</td>
</tr>
<tr>
<td>Cross-Country</td>
<td>3.11 (1.54)</td>
<td>4.67 (.50)</td>
<td>3.78 (.83)</td>
</tr>
<tr>
<td>Diving</td>
<td>4.00 (.00)</td>
<td>3.33 (2.08)</td>
<td>3.33 (1.16)</td>
</tr>
<tr>
<td>Golf</td>
<td>2.50 (1.07)</td>
<td>4.00 (.54)</td>
<td>3.75 (.89)</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>3.85 (.99)</td>
<td>5.00 (.00)</td>
<td>4.80 (.41)</td>
</tr>
<tr>
<td>Rifle</td>
<td>3.00 (.00)</td>
<td>3.67 (.58)</td>
<td>3.00 (1.00)</td>
</tr>
<tr>
<td>Soccer</td>
<td>2.50 (.89)</td>
<td>4.33 (.96)</td>
<td>4.25 (.90)</td>
</tr>
<tr>
<td>Softball</td>
<td>1.95 (.88)</td>
<td>4.36 (.93)</td>
<td>4.26 (.94)</td>
</tr>
<tr>
<td>Swimming</td>
<td>2.81 (.92)</td>
<td>4.44 (.64)</td>
<td>4.48 (.64)</td>
</tr>
<tr>
<td>Tennis</td>
<td>2.86 (.90)</td>
<td>2.14 (.90)</td>
<td>2.29 (.76)</td>
</tr>
<tr>
<td>Track</td>
<td>3.35 (1.15)</td>
<td>4.43 (.95)</td>
<td>3.39 (.94)</td>
</tr>
<tr>
<td>Volleyball</td>
<td>2.69 (1.18)</td>
<td>3.92 (.95)</td>
<td>3.77 (1.10)</td>
</tr>
<tr>
<td>All sports</td>
<td>2.75 (1.15)</td>
<td>4.25 (.97)</td>
<td>3.98 (1.00)</td>
</tr>
</tbody>
</table>

Note: $N = 206$.

a = range 1-5, 1 = not at all important, 5 = extremely important
b = range 1-5, 1 = strongly disagree, 5 strongly agree
c = range 1-5, 1 = no effect, 5 = strong effect
Internal Consistency Reliability of the Measures

Each subscale was evaluated independently to assure that its items evidenced acceptable internal consistency reliability. All resulting values were in the acceptable range, and the lowest alpha calculated for a subscale was .82. These alphas can be found in Table 9. Overall, Cronbach’s alpha for the entire EDI-3 scale was .96. According to the EDI-3 manual, the internal consistency reliabilities of the three Eating Disorder Risk scales (i.e., Drive for Thinness, Bulimia, Body Dissatisfaction) ranged from the high .80s to low .90s across three normative groups. In the current study, the alphas for these three subscales were .90, .82, and .89, respectively. The alpha for the subscale indicative of disordered eating (Drive for Thinness + Bulimia) was .90. Previous studies reported internal consistency reliabilities for the Body Dissatisfaction subscale of the EDI-II ranging from .83 to .93 (e.g., Brookings & Wilson, 1994; Engeln-Maddox, 2005; Maner et al., 2006; Tylka & Subich, 1999). Previously reported internal consistency reliabilities for the Perceived Sociocultural Pressures Scale ranged from .83 (e.g., Tylka & Subich, 2004) to .88 (Stice, Ziemba et al., 1996). In the present study, the alpha was .86. No previous data have been reported on the Perceived Athletic Pressures Scale; the alpha for this study was .90.

Test of Hypotheses

A series of linear regressions were used to test the hypotheses. In each of the first three hypotheses, the total score for disordered eating (i.e., DT + B) served as the dependent variable. Initially, analyses were conducted for each of the hypotheses with and without “school” as a covariate. These analyses resulted in virtually identical numbers, so only those without “school” as a covariate are reported herein.
Hypothesis 1 stated that body image dissatisfaction was expected to explain a significant amount of variance in symptoms of disordered eating. This hypothesis was tested using hierarchical regression. A significant amount of variance in symptoms of disordered eating was accounted for by body image dissatisfaction, $R^2 = .56$, $F(1, 204) = 259.97$, $p < .001$. As presented in Table 11, body image dissatisfaction accounted for 56% of the variance in disordered eating scores. This offered support for Hypothesis 1. The tests of Hypotheses 2 and 3 followed this same format.

Hypothesis 2 stated that perceived social pressure was expected to explain a significant amount of variance in symptoms of disordered eating. This hypothesis was also tested using hierarchical regression. A significant amount of variance in symptoms of disordered eating was accounted for by social pressure, $R^2 = .37$, $F(1, 204) = 121.13$, $p < .001$. As presented in Table 11, social pressure accounted for 37% of the variance in disordered eating scores. This offered support for Hypothesis 2.

Table 11.

Regression results reported by dependent variable

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Hypothesis</th>
<th>Independent Variable</th>
<th>Final $\beta$</th>
<th>Total $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disordered Eating</td>
<td>1</td>
<td>Body Dissatisfaction</td>
<td>.75**</td>
<td>.56</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Social Pressure</td>
<td>.61**</td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Athletic Pressure</td>
<td>.44**</td>
<td>.19</td>
</tr>
<tr>
<td>Bulimia</td>
<td>1</td>
<td>Body Dissatisfaction</td>
<td>.51**</td>
<td>.26</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Social Pressure</td>
<td>.44**</td>
<td>.19</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Athletic Pressure</td>
<td>.35**</td>
<td>.12</td>
</tr>
</tbody>
</table>
Table 11.

Regression results reported by dependent variable (continued)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Hypothesis</th>
<th>Independent Variable</th>
<th>Final $\beta$</th>
<th>Total $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive for Thinness</td>
<td>1</td>
<td>Body Dissatisfaction</td>
<td>.77**</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Social Pressure</td>
<td>.61**</td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Athletic Pressure</td>
<td>.42**</td>
<td>.17</td>
</tr>
</tbody>
</table>

Note. $N = 206$. Disordered eating = Sum total of Drive for Thinness and Bulimia subscales; Social Pressure = Perceived Sociocultural Pressure Scale; Athletic Pressure = Perceived Athletic Pressure Scale. Regression coefficients are those from the final model in each case. * $p < .05$, ** $p < .01$

The same procedure (using perceived athletic pressure scores) was used to test Hypothesis 3, which stated that perceived athletic pressure was expected to explain a significant amount of variance in symptoms of disordered eating. Hierarchical regression was used, and a significant amount of variance in symptoms of disordered eating was accounted for by athletic pressure, $R^2 = .19$, $F(1, 204) = 49.18, p < .001$. As presented in Table 11, athletic pressure accounted for 19% of the variance in disordered eating scores. This offered support for Hypothesis 3.

Hypotheses 4a and 4b stated that the effects of perceived social and athletic pressure, respectively, on symptoms of disordered eating would be mediated by body image dissatisfaction. These hypotheses were tested with Baron and Kenny’s (1986) method of testing for mediator effects. In order to test for mediation, the independent variable and the mediating variable each need to be correlated with the dependent variable; in the present data these variables were significantly correlated. In accordance
with their method, for each of these hypotheses, variance in women’s disordered eating scores was accounted for by body image dissatisfaction scores at Step 1. As seen in Table 12, body image dissatisfaction accounted for a significant amount of variance in disordered eating, $R^2 = .56$, $F (1, 204) = 259.97$, $p < .001$. For Hypothesis 4a, then, the perceived social pressure score was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .06$, $F_{inc} (2, 203) = 32.10$, $p < .001$. For Hypothesis 4b, the athletic pressure score was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .04$, $F_{inc} (2, 203) = 18.53$, $p < .001$. This indicated that both types of pressure still explained a significant amount of variance in disordered eating, above and beyond that accounted for by body image dissatisfaction.

Table 12.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Hypothesis</th>
<th>Independent Variable by Step</th>
<th>Final $\beta$</th>
<th>Total $R^2$</th>
<th>Adj. $R^2$</th>
<th>$R^2_{inc}$</th>
<th>$F_{inc}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disordered Eating</td>
<td>4a</td>
<td>1 Body Dissatisfaction</td>
<td>.59**</td>
<td>.56</td>
<td>.56</td>
<td>.56</td>
<td>259.97**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Social Pressure</td>
<td>.29**</td>
<td>.62</td>
<td>.62</td>
<td>.06</td>
<td>32.10**</td>
</tr>
<tr>
<td></td>
<td>4b</td>
<td>1 Body Dissatisfaction</td>
<td>.68**</td>
<td>.56</td>
<td>.56</td>
<td>.56</td>
<td>259.97**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Athletic Pressure</td>
<td>.21**</td>
<td>.60</td>
<td>.60</td>
<td>.04</td>
<td>18.53**</td>
</tr>
<tr>
<td>Bulimia</td>
<td>4a</td>
<td>1 Body Dissatisfaction</td>
<td>.38**</td>
<td>.26</td>
<td>.25</td>
<td>.26</td>
<td>69.88**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Social Pressure</td>
<td>.24**</td>
<td>.30</td>
<td>.29</td>
<td>.04</td>
<td>11.43**</td>
</tr>
<tr>
<td></td>
<td>4b</td>
<td>1 Body Dissatisfaction</td>
<td>.44**</td>
<td>.26</td>
<td>.25</td>
<td>.26</td>
<td>69.88**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Athletic Pressure</td>
<td>.20*</td>
<td>.29</td>
<td>.28</td>
<td>.04</td>
<td>9.90*</td>
</tr>
</tbody>
</table>
Table 12.

Mediation analyses reported by dependent variable (continued)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Hypothesis</th>
<th>Independent Variable by Step</th>
<th>Final β</th>
<th>Total R²</th>
<th>Adj. R²</th>
<th>Rinc²</th>
<th>Finc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive for Thinness</td>
<td>4a</td>
<td>1 Body Dissatisfaction</td>
<td>.62**</td>
<td>.59</td>
<td>.59</td>
<td>.59</td>
<td>292.62**</td>
</tr>
<tr>
<td></td>
<td>4b</td>
<td>2 Social Pressure</td>
<td>.27**</td>
<td>.64</td>
<td>.64</td>
<td>.05</td>
<td>29.28**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Body Dissatisfaction</td>
<td>.71**</td>
<td>.59</td>
<td>.59</td>
<td>.59</td>
<td>292.62**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Athletic Pressure</td>
<td>.17**</td>
<td>.61</td>
<td>.61</td>
<td>.03</td>
<td>12.97**</td>
</tr>
</tbody>
</table>

**Note.** N = 206. Disordered eating = Sum total of Drive for Thinness and Bulimia subscales; Social Pressure = Perceived Socio-cultural Pressure Scale; Athletic Pressure = Perceived Athletic Pressure Scale. Regression coefficients are those from the final model in each case. *p < .05, **p < .01

The results of these analyses suggest that body image dissatisfaction operates as a partial mediator of the relation between social pressure and disordered eating and the relation of athletic pressure and disordered eating. That is, in the test of Hypothesis 4a, social pressure accounted for an additional 6% of the variance in disordered eating above and beyond the 56% explained by body image dissatisfaction. Previously, in the test of Hypothesis 2, social pressure alone accounted for 37% of the variance in disordered eating. Therefore, there was a decrease in the amount of variance explained by social pressure when body image dissatisfaction was included in the equation. Similarly, in the test of Hypothesis 4b, athletic pressure accounted for an additional 4% of the variance in disordered eating above and beyond the 56% explained by body image dissatisfaction. In the test of Hypothesis 3, athletic pressure alone accounted for 19% of the variance in
disordered eating. Again, there was a decrease in the amount of variance explained by athletic pressure when body image dissatisfaction was included.

The final step in the test of these hypotheses was to conduct the Sobel (1982) test to assess the significance of the mediator’s effect on the dependent variable. When disordered eating (DT + B) served as the dependent variable, with social pressure as the independent variable and body image dissatisfaction as the mediator, the test of partial mediation was significant ($t = 7.24, p < .001$). A similar significant result was found when athletic pressure was the dependent variable ($t = 4.95, p < .001$). This indicates that body image dissatisfaction is a partial mediator of the relation between social or athletic pressure and disordered eating. The revised model can be found in Figure 2.

Figure 2.

Revised model

*Note.* Predicted relationships are depicted with solid arrows and the added paths are depicted with dashed arrows.
In sum, partial support was garnered for Hypotheses 4a and 4b. The hypotheses suggested that body image dissatisfaction would completely mediate the relationship between each of the pressures and disordered eating. For this hypothesis to be supported, the increment to $R^2$ would have to be nonsignificant, indicating that no additional variance was being accounted for when each pressure variable was added. Given that the increment to $R^2$ was, in fact, significant in both equations, as were the results of the Sobel test, partial mediation (rather than full) was supported.

**Exploratory analyses**

Extending the results of these tests for Hypotheses 4a and 4b, the perceived social pressure and athletic pressure scores were added together as a block at Step 2 to predict disordered eating after accounting for body image dissatisfaction. For this regression, the increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .06, F_{inc} (3, 202) = 16.41, p < .001$. This indicated these two variables as a block accounted for a significant amount of variance in women’s disordered eating scores. Only the final regression coefficient for social pressure, however, was significant ($\beta = 3.25, p < .001$). The final regression coefficient for athletic pressure was nonsignificant ($\beta = .75, p > .05$).

**Dependent Variable Operationalized in Various Ways**

Next, each of the hypotheses was conducted operationalizing eating disorder symptoms in a slightly different manner; the drive for thinness and bulimia scores were disaggregated. Results from these analyses can also be found in Table 11. For Hypothesis 1, a significant amount of variance in symptoms of bulimia was accounted for by body image dissatisfaction, $R^2 = .26, F (1, 204) = 69.88, p < .001$, and a significant amount of variance in drive for thinness scores was also accounted for by body image
dissatisfaction, $R^2 = .59$, $F (1, 204) = 292.62$, $p < .001$. As presented in Table 11, body image dissatisfaction accounted for 26% of the variance in bulimia and 59% of the variance in drive for thinness. This offered additional support for Hypothesis 1. The tests of Hypotheses 2 and 3 followed this same format.

For the tests of Hypothesis 2, a significant amount of variance in bulimia was accounted for by social pressure, $R^2 = .19$, $F (1, 204) = 49.10$, $p < .001$, and a significant amount of variance in drive for thinness was accounted for by social pressure, $R^2 = .37$, $F (1, 204) = 118.38$, $p < .001$. As presented in Table 11, social pressure accounted for 19% of the variance in bulimia and for 37% of the variance in drive for thinness scores. This offered support for Hypothesis 2.

Regression was used to test Hypothesis 3 with these disaggregated dependent variables as well, and a significant amount of variance in bulimia was accounted for by athletic pressure, $R^2 = .12$, $F (1, 204) = 28.59$, $p < .001$. A significant amount of variance in drive for thinness was accounted for by athletic pressure as well, $R^2 = .17$, $F (1, 204) = 42.41$, $p < .001$. As presented in Table 11, athletic pressure accounted for 12% of the variance in bulimia and for 17% of the variance in drive for thinness scores. This offered support for Hypothesis 3.

Focusing on the Bulimia subscale, Hypotheses 4a and 4b stated that the effects of perceived social and athletic pressure, respectively, on bulimia would be mediated by body image dissatisfaction. As seen in Table 12, at Step 1, body image dissatisfaction accounted for a significant amount of variance in bulimia, $R^2 = .26$, $F (1, 204) = 69.88$, $p < .001$. For Hypothesis 4a, then, the perceived social pressure score was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .04$, $F_{inc} (2, 203) = 11.43$, $p < .001$. 

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For Hypothesis 4b, the athletic pressure score was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .04$, $F_{inc}(2, 203) = 9.90$, $p < .05$. These analyses indicated both of the pressure variables explained a significant amount of variance in bulimia, above and beyond that accounted for by body image dissatisfaction.

The results of these analyses suggest that body image dissatisfaction operates as a partial mediator of the relation between social pressure and bulimia and the relation of athletic pressure and bulimia. That is, in the test of Hypothesis 4a, social pressure accounted for an additional 4% of the variance in bulimia above and beyond the 26% explained by body image dissatisfaction. Previously, in the test of Hypothesis 2, social pressure alone accounted for 19% of the variance in bulimia. Therefore, there was a decrease in the amount of variance explained by social pressure when body image dissatisfaction was included in the equation. Similarly, in the test of Hypothesis 4b, athletic pressure accounted for an additional 4% of the variance in disordered eating above and beyond the 26% explained by body image dissatisfaction. In the test of Hypothesis 3, athletic pressure alone accounted for 12% of the variance in bulimia. Again, there was a decrease in the amount of variance explained by athletic pressure when body image dissatisfaction was included.

Further, when the Sobel test was employed in order to test the significance of the mediator effect, using bulimia as the dependent variable and body image dissatisfaction as the mediator, a significant result was found for both social and athletic pressure ($t = 4.55, p < .001; t = 3.98, p < .001$, respectively).

Extending the results of these tests for Hypotheses 4a and 4b in the same manner as was done in the original hypothesis tests, the perceived social pressure and athletic
pressure scores were added together as a block at Step 2 to predict bulimia after accounting for body image dissatisfaction. For this regression, the increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .05$, $F_{inc}(3, 202) = 6.46, p < .05$. This indicated the two social pressure variables as a block accounted for a significant amount of variance in women’s bulimia scores. Neither of the final regression coefficients, however, was significant (social pressure $\beta = .97, p > .05$; athletic pressure $\beta = .67, p > .05$).

Next, Hypotheses 4a and 4b were tested with drive for thinness as the criterion variable. As seen in Table 12, at Step 1, body image dissatisfaction accounted for a significant amount of variance in drive for thinness, $R^2 = .59$, $F(1, 204) = 292.62, p < .001$. For Hypothesis 4a, then, perceived social pressure was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .05$, $F_{inc}(2, 203) = 29.28, p < .001$. For Hypothesis 4b, athletic pressure was added at Step 2. The increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .03$, $F_{inc}(2, 203) = 12.97, p < .001$. This indicated these variables explained a significant amount of variance in drive for thinness scores above and beyond body image dissatisfaction.

The results of these analyses suggest that body image dissatisfaction operates as a partial mediator of the relation between social pressure and drive for thinness and the relation of athletic pressure and drive for thinness. That is, in the test of Hypothesis 4a, social pressure accounted for an additional 5% of the variance in drive for thinness above and beyond the 59% explained by body image dissatisfaction. Previously, in the test of Hypothesis 2, social pressure alone accounted for 37% of the variance in drive for thinness. Therefore, there was a decrease in the amount of variance explained by social pressure when body image dissatisfaction was included in the equation. Similarly, in the
test of Hypothesis 4b, athletic pressure accounted for an additional 3% of the variance in drive for thinness above and beyond the 59% explained by body image dissatisfaction. In the test of Hypothesis 3, athletic pressure alone accounted for 17% of the variance in drive for thinness. Again, there was a decrease in the amount of variance explained by athletic pressure when body image dissatisfaction was included.

The Sobel tests of whether body image dissatisfaction operated as a mediator of the relation between each of the pressures scores and drive for thinness were also significant \( t = 7.39, p < .001; t = 4.99, p < .001 \), supporting partial mediation.

Again, extending the results of these further tests for Hypotheses 4a and 4b, the perceived social pressure and athletic pressure scores were added together as a block at Step 2 to predict drive for thinness after accounting for body image dissatisfaction. For this regression, the increment to \( R^2 \) at Step 2 was significant, \( R^2_{\text{inc}} = .05, F_{\text{inc}}(3, 202) = 14.58, p < .001 \). This indicated these two variables as a block accounted for a significant amount of variance in women’s drive for thinness scores. Only the final regression coefficient for social pressure was significant (\( \beta = 2.28, p < .001 \)). For athletic pressure, the final regression coefficient was nonsignificant (\( \beta = .09, p > .05 \)).

**Unique Variance From Social and Athletic Pressure**

When examining the above analyses, it is apparent that social pressure accounted for more variance in each of the dependent variables than did athletic pressure. One of the questions in prior studies has been whether there are unique pressures in the athletic environment to which athletes are exposed. Because this study modified a standardized social pressure measure in order to measure athletic pressure, it made sense to see if the new measure of athletic pressure was tapping into unique pressures beyond those
accounted for in the social pressure measure. Thus, exploratory analyses were conducted in an attempt to see if athletic pressure accounted for additional variance above and beyond that explained by social pressure. This was done by performing a series of regressions. These results can be found in Table 13.

Table 13.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable by Step</th>
<th>Final ß</th>
<th>Total R²</th>
<th>Adj. R²</th>
<th>R²inc</th>
<th>Finc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disordered Eating</td>
<td>1 Social Pressure</td>
<td>.61**</td>
<td>.37</td>
<td>.37</td>
<td>.37</td>
<td>121.13**</td>
</tr>
<tr>
<td></td>
<td>2 Athletic Pressure</td>
<td>.01</td>
<td>.37</td>
<td>.37</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>1 Athletic Pressure</td>
<td>.01</td>
<td>.19</td>
<td>.19</td>
<td>.19</td>
<td>49.18**</td>
</tr>
<tr>
<td></td>
<td>2 Social Pressure</td>
<td>.61**</td>
<td>.37</td>
<td>.37</td>
<td>.18</td>
<td>57.70**</td>
</tr>
<tr>
<td>Bulimia</td>
<td>1 Social Pressure</td>
<td>.39**</td>
<td>.19</td>
<td>.19</td>
<td>.19</td>
<td>49.10**</td>
</tr>
<tr>
<td></td>
<td>2 Athletic Pressure</td>
<td>.07</td>
<td>.20</td>
<td>.19</td>
<td>.00</td>
<td>.65</td>
</tr>
<tr>
<td></td>
<td>1 Athletic Pressure</td>
<td>.07</td>
<td>.12</td>
<td>.12</td>
<td>.12</td>
<td>28.59**</td>
</tr>
<tr>
<td></td>
<td>2 Social Pressure</td>
<td>.39**</td>
<td>.20</td>
<td>.19</td>
<td>.07</td>
<td>18.61**</td>
</tr>
<tr>
<td>Drive for Thinness</td>
<td>1 Social Pressure</td>
<td>.63**</td>
<td>.37</td>
<td>.36</td>
<td>.37</td>
<td>118.38**</td>
</tr>
<tr>
<td></td>
<td>2 Athletic Pressure</td>
<td>-.04</td>
<td>.37</td>
<td>.36</td>
<td>.00</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td>1 Athletic Pressure</td>
<td>-.04</td>
<td>.17</td>
<td>.17</td>
<td>.17</td>
<td>42.41**</td>
</tr>
<tr>
<td></td>
<td>2 Social Pressure</td>
<td>.63**</td>
<td>.37</td>
<td>.36</td>
<td>.20</td>
<td>62.90**</td>
</tr>
</tbody>
</table>

Note. N = 206. Disordered eating = Sum total of Drive for Thinness and Bulimia subscales; Social Pressure = Perceived Sociocultural Pressure Scale; Athletic Pressure = Perceived Athletic Pressure Scale. Regression coefficients are those from the final model in each case. * p < .05, ** p < .01
When disordered eating (DT + B) served as the dependent variable, at Step 1, social pressure accounted for a significant amount of variance, $R^2 = .37$, $F (1, 204) = 121.13$, $p < .001$. Then, the perceived athletic pressure score was added at Step 2. The increment to $R^2$ at Step 2 was not significant, $R^2_{inc} = .000$, $F_{inc} (2, 203) = .01$, $p > .05$. This indicated athletic pressure did not explain a significant amount of variance beyond that accounted for by social pressure. When the steps were reversed and athletic pressure was entered first, results differed. At Step 1, athletic pressure accounted for a significant amount of variance, $R^2 = .19$, $F (1, 204) = 49.18$, $p < .001$. When the perceived social pressure score was added at Step 2, however, the increment to $R^2$ at Step 2 was significant, $R^2_{inc} = .18$, $F_{inc} (2, 203) = 57.70$, $p < .001$. This indicated social pressure did, in fact, explain a significant amount of variance (18%) beyond that accounted for by athletic pressure.

The same procedure was used substituting bulimia and drive for thinness as the dependent variables. Similar results were found. When bulimia served as the dependent variable, at Step 1, social pressure accounted for a significant amount of variance, $R^2 = .19$, $F (1, 204) = 49.10$, $p < .001$. When the perceived athletic pressure score was added at Step 2, the increment to $R^2$ was not significant, $R^2_{inc} = .00$, $F_{inc} (2, 203) = .65$, $p > .05$. Similarly, for drive for thinness, at Step 1, social pressure accounted for a significant amount of variance, $R^2 = .37$, $F (1, 204) = 118.38$, $p < .001$. When the athletic pressure score was added at Step 2, the increment to $R^2$ was not significant, $R^2_{inc} = .00$, $F_{inc} (2, 203) = .23$, $p > .05$. These results indicated athletic pressure did not explain a significant amount of variance in either dependent variable beyond that accounted for by social pressure.
Mirroring the results obtained with disordered eating as the criterion, when the order of the predictors was reversed a different pattern was noted. When bulimia served as the dependent variable, at Step 1, athletic pressure accounted for a significant amount of variance, $R^2 = .12, F(1, 204) = 28.59, p < .001$, and perceived social pressure too resulted in a significant increment to $R^2$ at Step 2, $R^2_{inc} = .07, F_{inc}(2, 203) = 18.61, p < .001$. When drive for thinness served as the dependent variable, at Step 1, athletic pressure accounted for a significant amount of variance, $R^2 = .17, F(1, 204) = 42.41, p < .001$, and perceived social pressure, too, resulted in a significant increment to $R^2$ at Step 2, $R^2_{inc} = .20, F_{inc}(2, 203) = 62.90, p < .001$. This indicated social pressure did, in fact, explain a significant amount of variance (7% and 20%, respectively) beyond that accounted for by athletic pressure.

**Differences Among Individual Sports**

Many of the previous studies reviewed in Chapter 2 examined differences between individual sports (e.g., Ashley et al., 1996; Berry & Howe, 2000), so additional exploratory analyses included testing for significant differences between sports on the various dependent variables. Only the sport groups that had more than 20 athletes were included in the MANOVA: basketball ($n = 24$), gymnastics ($n = 21$), soccer ($n = 24$), softball ($n = 42$), swimming ($n = 27$), and track ($n = 24$). These six group means were compared on the dependent variables of body image dissatisfaction, drive for thinness, bulimia, athletic pressure, and social pressure. The Wilks’ Lambda value of .63 was significant ($F(25, 566) = 3.04, p < .001$), indicating a multivariate effect. Subsequent ANOVAs revealed significant differences between groups on the Bulimia ($F(5, 156) =$
3.54, $p < .05$, partial eta squared $= .10$) and Athletic Pressure subscale scores ($F(5, 156) = 4.82, p < .001$, partial eta squared $= .13$).

Post hoc Tukey tests were performed to clarify which groups significantly differed from each other on these two dependent variables. These differences can be found in Table 14. When bulimia served as the dependent variable, significant differences emerged between basketball and swimming ($p < .05$) and between softball and swimming ($p < .05$). In each case, the mean for swimmers’ scores was significantly greater (indicative of more bulimic symptoms) than the mean for the other group. When athletic pressure served as the dependent variable, significant differences emerged between track and basketball ($p < .05$), track and soccer ($p < .05$), track and softball ($p < .05$), and gymnastics and softball ($p < .05$). In each comparison involving track, those athletes reported significantly greater perceived pressure for thinness from within the athletic environment. The gymnasts also indicated significantly greater athletic pressure than did the softball athletes.

Table 14.

Means and standard deviations of individual sports included in MANOVA by variable

<table>
<thead>
<tr>
<th>Sport</th>
<th>N</th>
<th>Body Image Disatisfaction</th>
<th>Drive for Thinness</th>
<th>Bulimia</th>
<th>Athletic Pressure</th>
<th>Social Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball</td>
<td>24</td>
<td>10.75 (8.66)</td>
<td>4.46 (5.58)</td>
<td>2.58 (3.79)$_a$</td>
<td>1.46 (.63)$_a$</td>
<td>1.80 (.99)</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>21</td>
<td>11.19 (6.98)</td>
<td>8.29 (5.65)</td>
<td>3.29 (2.70)</td>
<td>1.92 (.52)$_d$</td>
<td>1.89 (.51)</td>
</tr>
<tr>
<td>Soccer</td>
<td>24</td>
<td>12.67 (9.03)</td>
<td>6.88 (7.39)</td>
<td>3.17 (4.32)</td>
<td>1.36 (.51)$_h$</td>
<td>1.87 (.65)</td>
</tr>
<tr>
<td>Softball</td>
<td>42</td>
<td>13.74 (9.47)</td>
<td>7.48 (7.25)</td>
<td>2.74 (3.30)$_h$</td>
<td>1.36 (.57)$_ad$</td>
<td>1.89 (.78)</td>
</tr>
<tr>
<td>Swimming</td>
<td>27</td>
<td>14.48 (8.60)</td>
<td>8.30 (7.38)</td>
<td>6.48 (5.35)$_{ab}$</td>
<td>1.62 (.75)</td>
<td>2.13 (.89)</td>
</tr>
<tr>
<td>Track</td>
<td>24</td>
<td>12.44 (8.41)</td>
<td>8.83 (6.81)</td>
<td>5.63 (7.13)</td>
<td>2.06 (1.06)$_{abc}$</td>
<td>2.20 (.85)</td>
</tr>
</tbody>
</table>

Note. $N = 206$. Social Pressure = Perceived Sociocultural Pressure Scale (PSPS); Athletic Pressure = Perceived Athletic Pressure Scale (PAPS). Means having the same subscript in each column differ significantly at $p < .05$. 

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Differences Between Type of Sport

Much of the previous literature has also examined differences among athletes depending on whether the sport emphasized a lean/thin build (e.g., Byrne & McLean, 2002; Davis & Cowles, 1989; Kirk, et al., 2001; Petrie, 1996; Picard, 1999). Thus, the athletes were classified into two categories (lean or nonlean), based on whether the sport in which they participated had a focus on maintaining a lean body. The previous literature was consulted in making these classifications, and because of occasional inconsistencies, Parsons and Betz (2001) was also referenced to provide additional rationale.

The following sports were considered lean sports: cross-country, gymnastics, diving, swimming, and track ($n = 85$). The remaining seven sports were considered nonlean ($n = 121$). An independent samples t-test was conducted to test for differences on the following dependent variables: drive for thinness, bulimia, body image dissatisfaction, athletic pressure, and social pressure. Significant differences emerged between the lean and nonlean sports on two of these variables: bulimia: $t(148) = -2.42, p < .05, d = .35$ and athletic pressure: $t(144) = -3.78, p < .001, d = .55$. In both cases, lean sport athletes reported significantly higher scores than did nonlean sport athletes. These results can be found in Table 15.
Table 15.

Means and standard deviations of lean and nonlean sports by variable

<table>
<thead>
<tr>
<th>Sport</th>
<th>N</th>
<th>Body Image Dissatisfaction</th>
<th>Drive for Thinness</th>
<th>Bulimia</th>
<th>Athletic Pressure</th>
<th>Social Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean</td>
<td>85</td>
<td>11.84 (8.39)</td>
<td>8.21 (6.93)</td>
<td>5.19 (5.60)</td>
<td>1.84 (.85)</td>
<td>2.06 (.81)</td>
</tr>
<tr>
<td>Nonlean</td>
<td>121</td>
<td>12.69 (9.14)</td>
<td>6.74 (7.07)</td>
<td>3.45 (4.23)</td>
<td>1.43 (.62)</td>
<td>1.92 (.81)</td>
</tr>
</tbody>
</table>

Note. N = 206. Social Pressure = Perceived Sociocultural Pressure Scale (PSPS); Athletic Pressure = Perceived Athletic Pressure Scale (PAPS).
Lean sports = cross-country, diving, gymnastics, swimming, and track
Nonlean sports = basketball, golf, rifle, soccer, softball, tennis, and volleyball
Means having the same subscript in each column differ significantly at p < .05.

Summary

In sum, support was garnered for the first three hypotheses. That is, the independent variables of body image dissatisfaction, social pressure for thinness, and athletic pressure for thinness each uniquely accounted for variance in disordered eating (i.e., a sum of DT + B). Each of the independent variables also uniquely accounted for variance in the dependent variable when it was operationalized as the Drive for Thinness subscale score and as the Bulimia subscale score. Hypotheses 4a and 4b were partially supported, in that body image dissatisfaction functioned as a partial mediator in the relationship between social pressure for thinness and disordered eating, as well as in the relationship between athletic pressure for thinness and disordered eating. The same statement was true when substituting drive for thinness and bulimia for disordered eating as the criterion variable in the analyses.
Additional exploratory analyses indicated that athletic pressure did not, in fact, account for additional variance in disordered eating (operationalized in all three ways) above and beyond that accounted for by social pressure for thinness. Further, significant differences emerged on the variables of bulimia and athletic pressure for thinness when comparing individual sports and when comparing lean vs. nonlean sports.
It is well-accepted that disturbances in eating behavior are best conceptualized as multidimensional constructs (Garfinkel & Garner, 1982; Stice et al., 1996; Striegel-Moore & Cachelin, 2001). One proposed method of examining potential contributors to disturbed eating is to categorize potential contributing variables into personal, sociocultural, and relational factors (Tylka & Subich, 2004). The current study adapted this framework and focused on the personal factor of body image dissatisfaction and the sociocultural factor of perceived pressure for thinness. It also extended the concept of pressure for thinness into the realm of athletics. Previous research had shown that the athletic environment may provide an additional type of pressure with its focus on achieving and maintaining a physically fit body (Reel & Gill, 1996; Sagenis et al., 2005; Wilmore, 1991). It then followed to examine the influence of the combination of these three factors on disordered eating behaviors: body image dissatisfaction, social pressure for thinness, and athletic pressure for thinness. Limited research has applied such a multidimensional approach with women athletes (Berry & Howe, 2000; Williamson et al., 1995).

More specifically, the purpose of this study was to examine the relations between symptoms of disordered eating, level of body image dissatisfaction, and perceived
pressure to be thin in women athletes. It was predicted that body image dissatisfaction and perceived pressure to be thin (conceptualized as stemming from two different sources: social and athletic) each would account for a significant amount of variance in symptoms of disordered eating. Also hypothesized was a mediator effect, such that degree of body image dissatisfaction was expected to mediate the relation between perceived pressure and disordered eating symptoms. The present study extended current models of eating disturbance in nonathletes (e.g., Stice et al., 1996; Tylka & Subich, 2004) and prior research on perceived pressure and disordered eating in athletes (e.g., Berry & Howe, 2000; Reel & Gill, 1996; Williamson et al., 1995) by examining pressures specific to the sporting environment and by examining proposed mediator effects.

The participants were 206 woman athletes from two Division I universities in the Midwest. The athletes represented 12 different sports. The appropriate personnel were contacted to receive permission for the athletes to participate during a practice or team meeting. During those times, the athletes completed a questionnaire about eating habits, one about pressures they perceive from within and outside the athletic environment, and a demographic form. All athletes’ responses were confidential and anonymous, and the coaches had no knowledge of their responses.

When the data were examined, the strong, positive correlation between body image dissatisfaction and eating disorder symptoms was comparable to that of previous research (e.g., Phan & Tylka, 2006; Williamson et al., 1995), as was the relation between perceived pressure for thinness and disordered eating (e.g., Stice et al., 1996; Veron-Guidy et al., 1997).
When considering comparisons of EDI-3 scores to previous literature, it is important to note the change in the scoring system and the increase in subscale items in the EDI-3 from the EDI-2. There is an expectation that the mean of the women’s summed EDI-3 scores on each subscale would be higher as the ceiling has been raised from earlier versions of the EDI. Specifically, the highest summed score a participant could report on the Bulimia subscale of the EDI-2 was 21, and for the same subscale on the EDI-3 it was 32. For the Body Dissatisfaction subscale on the EDI-2, the largest summed score a woman could report would be 27; for the EDI-3, it would be 40 (Garner, 2004).

However, comparable to prior work with college women athletes, the mean of the participants’ summed scores on body image dissatisfaction reported in this study \((M = 12.33)\) was similar to that reported by Byrne and McLean (2002), Reinking and Alexander (2005), and Warren and colleagues (1990). Results from their samples of college student women athletes reported mean levels of body image dissatisfaction, respectively, as follows: 11.16, 13.2, and 12.07. The mean of the participants’ summed scores on drive for thinness from the present study \((M = 7.35)\) closely mirrored that found in studies by Byrne and McLean, Davis and Cowles (1989), and Reinking and Alexander, who reported means of 8.15, 6.97, and 6.9, respectively, from their samples of collegiate women athletes. Put in perspective with the new scoring system, this seems to indicate the athletes sampled in this study reported less severity on these two scales than did women in previous research. In contrast, the mean of the athletes’ summed scores for bulimia \((M = 4.17)\) in this study was higher than any reported in other studies of women athletes \((Ms \text{ ranged from} .7 \text{ to } 2.21)\).
Regarding perceived pressure for thinness scores, the mean score reported by Stice and Whitenton (2002) in a sample of 496 adolescent girls was 1.82. Similarly, a study by Stice, Presnell, and Spangler (2002) reported a mean pressure score of 2.16 in their sample of adolescent girls. Further, in sample of 319 college women, the mean perceived pressure score was 2.30 (Tylka, 2006). For the present study, the mean score was 1.98.

**Interpretation of Results**

Results from the regression and mediation analyses provided support for several of the hypotheses. First, the present study added to the research literature in that it found the extent to which a woman athlete is satisfied with her body seems to strongly influence her use of unhealthy weight control behaviors. Other researchers consistently have found that body image dissatisfaction is significantly related to disordered eating in athletes (e.g., Berry & Howe, 2000; Reel & Gill, 1996; Williamson et al., 1995) and nonathletes (e.g., Mazzeo, 1999; Stice et al., 1994; Tylka & Subich, 1999; Veron-Guidry et al., 1997). Results indicated that the greater a woman’s dissatisfaction about various parts of her body, the greater her chance of using unhealthy behaviors in an attempt to change her body.

Next, it is suggested from the results of the present study that perceived social pressure for thinness may be related to whether a woman collegiate athlete develops disordered eating. That is, the more messages she perceives from the media, family, friends, and dating partners about how she needs to change her body, the greater her chance of developing disordered eating. This relationship indicates that as the athlete perceives increased messages about how her body is supposed to look, the likelihood that
she adjusts her eating habits in an attempt to change her body increases as well. Several other authors found a similar result when examining samples of nonathletes (e.g., Pike, 1995; Stice et al., 1996; Thompson & Heinberg, 1993). Additionally, Berry and Howe’s (2000) results with a sample of athletes were also consistent with this finding.

Not only do these messages about thinness seem to relate directly to disordered eating behavior, it appears that they also may relate indirectly to this behavior. This indirect effect occurs when another factor, body image dissatisfaction, is examined simultaneously. The results of the statistical analyses demonstrate that the level of dissatisfaction a woman athlete experiences about her body might account for much of the relationship between perceived pressure for thinness and disordered eating symptoms. Specifically, some of the messages she receives about her body may contribute to her feeling increasingly unhappy with how her body looks. Then, as a result of being displeased with her body, she might use pathogenic weight control behaviors. It seems, though, that not all of the messages she perceives are translated into body image dissatisfaction. The finding in the present research of partial mediation is consistent with the premise that there is still a direct effect from perceived pressure for thinness to disordered eating; it is simply decreased when the factors are examined in a multivariate model that includes body image dissatisfaction. The finding of partial mediation supports the conclusion of Stice and colleagues (1996) that sociocultural pressure for thinness was related directly and indirectly to symptoms of bulimia in their study of nonathletes.

Further, athletic pressure for thinness operated similarly through body dissatisfaction in its relation to disordered eating among women collegiate athletes. Previous literature indicated that athletes have reported receiving messages from within
the athletic environment about needing to lose weight and to change their body size/shape in order to perform better (Rosen & Hough, 1988; Sundgot-Borgen, 1994; Wilmore, 1991). These messages often come from coaches, teammates, trainers, and fans/spectators. The results of the present study indicated that the more of these messages a woman athlete perceives about the desirability of low weight, the more likely she is to engage in pathogenic weight control behaviors, supporting the findings of Berry and Howe (2000). That is, the data are consistent with the idea that the likelihood that she will use unhealthy eating behaviors is directly associated with the frequency at which she perceives that she is being told that her body should be thinner by those in the athletic realm.

Similar to the messages received from society in general, receiving these messages from within athletics appears to relate to unhealthy eating at least partially through the level of contentment the athlete has with her body. The level of dissatisfaction she has with her body relates to her use of pathogenic weight control behaviors. Again, body image dissatisfaction does not completely account for variance in reported use of these behaviors; rather, athletic pressure continues to account for unique variance in this use.

Similarities and differences can be identified between the results of the present study and those of prior research. Many instances were noted above where the present results mirror previous work, and this provides confidence in the validity of the interpretations of the present data. It follows, then, to explore why complete mediation was not supported in this study as it was in prior studies (and as was predicted). Several factors may have contributed to this finding.
First, the explanatory power of the independent variables in the current study was much greater than those in prior studies. That is, larger amounts of variance were accounted for in disordered eating by each of the independent variables in the current study. This may help explain why body image dissatisfaction only partially mediated the relationship between social pressure for thinness and disordered eating (and also the relationship between athletic pressure for thinness and disordered eating), rather than completely accounting for those relationships, as was predicted.

The mediation effect in this research, thus, may not have been as complete as it was in previous studies, where smaller amounts of variance were explained. Said in another way, it may be that the relationship between social pressure and disordered eating was so strong (with social pressure alone accounting for 37% of the variance in disordered eating, more than had been reported in previous studies), that the effect of body image dissatisfaction was not strong enough to completely discount the effect of social pressure (because it still accounted for an additional 6% of variance above and beyond body image dissatisfaction). Likewise, perhaps because athletic pressure alone accounted for 19% of the variance in disordered eating, the effect of body image dissatisfaction did not cause the relationship between athletic pressure and disordered eating to become nonsignificant (athletic pressure accounted for an additional 4% above and beyond body image dissatisfaction).

Perhaps the measures or procedures used in this research to assess pressure for thinness encompassed a broader definition of this construct than had been true in past research and, as such, captured elements not related to body dissatisfaction. This would help explain why each type of pressure still retained its unique explanatory power, even
when examined in conjunction with body image dissatisfaction. According to Tabachnick and Fidell (1996), often when several variables are combined in one design, such as in mediation analyses, the independent variables may share common variance. It may be that the measures used in this study helped parcel out some of that overlapping variance.

Further, the measurements used in the present study differed from those that had been used previously. The Pressure for Thinness scales were both used for the first time in an athletic population. Specifically, athletic pressure was measured in a novel way by adapting a measure already in existence. This measure of athletic pressure was more comprehensive (by including eight questions) than any that had been used in prior studies, with the exception of Reel and Gill (1996), who created a measure specifically for pressures related to cheerleading. These authors found that sport specific pressure did not have a significant impact on the development of disordered eating.

Finally, the sample for the present study was larger and included a wider range of sports than did those conducted previously. For example, although previous studies found support for complete mediation (e.g., Griffiths & McCabe, 2000; Veron-Guidry et al., 1997), each conducted their research on nonathletes who were girls aged 8-13. Further, although Williamson and colleagues (1995) reported full mediation when looking at a sample of women athletes, only 98 women from eight sports were included.

Overall, the results from this study indicate that discomfort with one’s body may play a large part in the development of unhealthy eating behaviors in collegiate women athletes. These results add to the existing research in that level of body image dissatisfaction is an important factor when examining symptoms of disordered eating specifically in women athletes. Additionally, perceived pressure for thinness (social and
athletic) had both a direct, and indirect, effect on symptoms of disordered eating. These findings support the idea that messages from significant others, family, friends, and the media all contribute to the development of disordered eating symptoms. Although not as powerful for athletes sampled in this study, the same is true about messages received from coaches, trainers, teammates, and fans/spectators. Athletes are affected by perceived pressure for thinness from multiple sources. Therefore, those women athletes from Division I universities who are dissatisfied with their body shape and perceive that they are being pressured to achieve/maintain a thin figure from those within and outside of the athletic environment may be at risk for developing symptoms of disordered eating.

Exploratory Findings

Of interest in the present findings is that when bulimia served as the dependent variable, much smaller amounts of variance were accounted for by each of the independent variables. For example, for Hypothesis 1, the amount of variance explained by the independent variable of body image dissatisfaction was 56%, 26%, and 59% when the dependent variable was defined as disordered eating (DT + B), bulimia, and drive for thinness, respectively. A similar pattern was demonstrated for the remaining hypotheses. In contrast, the amount of variance accounted for in drive for thinness, when it served as the dependent variable, either equaled or surpassed that accounted for when disordered eating (DT + B) was the dependent variable. It may be that the analyses performed capitalized on the relations of other variables to the drive for thinness variable because of those relations being stronger. Thus, the variables examined in this study seemed to be strongly related to drive for thinness, but it may be that other variables (not explored in this study) might better explain variance in bulimic symptoms.
The conclusions of the exploratory analyses that compared athletes from different sports are somewhat difficult to place in the context of previous literature because of numerous inconsistencies that exist in terms of athletic teams sampled and classifications of various sports. It is possible that differing results from the current study to prior studies could stem from these inconsistencies. For example, some authors classified “swimming and diving” as lean sports (i.e., Kirk et al., 2001), and others considered the same sports to be nonlean sports (i.e., Stoutjesdyk & Jevne, 1993). Additionally, Davis and Cowles (1989) categorized “sprinting” as a normal-build sport and separated it from “long distance running,” which they considered a thin-build sport.

That being said, when examining differences among sports (which only included those six sports that were represented by at least 20 athletes), exploratory analyses from the present study indicated that significant differences existed on the dependent variable of bulimia between basketball and swimming, and between softball and swimming. In these cases, women swimmers reported significantly greater symptoms of bulimia. This finding differed from that of Berry and Howe (2000), and of Kirk and colleagues (2001), who concluded there were no differences between teams on symptoms of disordered eating.

Significant differences also emerged when comparing sports on the variable of athletic pressure. These differences existed between the sports of track and basketball, track and soccer, track and softball, and gymnastics and softball. The gymnasts and track athletes reported significantly greater athletic pressure than did the other groups, indicating they perceived more messages from those within the athletic realm to achieve and maintain a thin body. One reason for these findings may be that gymnastics and track
are both sports in which a participant wears rather revealing attire and has a great deal of attention focused on her body. Specific body stereotypes exist for these sports, and these sports are among those in which “performance thinness” is emphasized (Powers & Johnson, 1996). This refers to the fact that in these sports excess weight can inhibit speed, endurance, and agility, whereas lower weight and lower percentage of body fat often enhance performance. These sports are also both examples of those in which only one individual athlete from each team is the focus at any given time, and this solitary performance contributes to the overall team score. Thus, the athlete may feel as though she must maintain the appropriate body shape/size in order to perform at her best in order to not let her teammates down. Finally, one cannot rule out site-specific explanations for some of these differences; that is, given that all of the gymnasts were from the same school and had the same coach, there may be something specific about their team environment that led to an increase in pressure they reported perceiving.

These findings were echoed in subsequent exploratory analyses of lean and nonlean sports. Gymnastics, track, and swimming can all be considered “lean” sports. As such, these sports have been shown to have athletes who might be at greater risk to perceive a greater amount of pressure for thinness and have reported greater symptoms of disordered eating (Byrne & McLean, 2002).

When comparing differences between lean and nonlean sports, these same two variables (bulimia and athletic pressure) revealed significant differences. In both cases, lean sport athletes reported significantly higher scores than did nonlean sport athletes, which supported the findings of numerous authors (e.g., Byrne & McLean, 2002; Picard, 1999; Smolak et al., 2000; Stoutjesdyk & Jevne, 1993). However, the meta-analysis
conducted by Hausenblas and Carron (1999) concluded there was no significant
difference between sport types on a measure of bulimia. This could be because the meta-
analysis included six different groups of sports (not just simply lean or nonlean), such as
ball-game, endurance, and aesthetic. By including multiple groups in such a manner, this
may have allowed increased dispersion of the bulimic symptomatology, decreasing the
chance of significant differences being found.

Yet another reason the results of these exploratory analyses conflict with previous
findings could because of smaller samples in other studies that were less representative of
a wide range of sports. One other thing to consider is that there was more variation within
bulimic scores reported in the present study than in previous studies, which may have
increased the chances of finding significant differences. Finally, one cannot rule out site-
specific explanations for these differences; that is, there could be something unique about
the swimmers (26 out of 27 were from School B); it is plausible that a “contagion effect”
occurred among those particular athletes at that particular school.

Also important to note is the elevated scores on the Bulimia subscale found in this
sample. The mean of the participants’ summed scores was higher than that reported in
prior research, suggesting there was something unique about the particular group of
women who participated in this study. Or, perhaps, this was also a function of using the
EDI-3, which has not been used in other studies. One of the changes from the EDI-2 to
the EDI-3 was to add an item to the Bulimia subscale and to the Body Dissatisfaction
subscale (Garner, 2004). Therefore, prior studies’ reports of mean summed scores on the
Bulimia subscale were based on seven items, not eight, as in the current study. As
mentioned previously, the new scoring system recommended for the EDI-3 makes it
difficult to compare the scores from the present study to those that utilized previous versions of the EDI and the older scoring system.

Overall, this study provides support for a multidimensional model of the development of disordered eating among women athletes, one that includes both personal and sociocultural variables. Variance in disordered eating symptoms was best explained when taking into account both the personal factor of body image dissatisfaction, and the sociocultural factors of perceived pressure for thinness (social and athletic).

Limitations

When reflecting on the limitations of the present study, an important one is the fact that a survey method was employed. Self-report depends on the participants to be honest about the symptoms they endorse. There is always the danger that respondents will not present their responses truthfully because of a fear of consequences based on their answers. Specifically, because the athletes reported what sport they represented on the demographic sheet, they may have been reluctant to be completely honest about any athletic pressures they perceived from their particular teammates and coach(es). A social desirability measure was not included in the survey instruments because of concerns about survey length and its effect on participation, and in retrospect, inclusion of one may have helped to evaluate the magnitude of this concern. The fact that the internal consistency reliability estimates were comparable to previous researchers’ estimates lends support to the idea that participants paid attention to item content and did not respond in a random manner. Yet the extent to which participants may have been motivated to present in a particular manner cannot be determined.
Limited generalizability is a second limitation. Although the sample included a cross-section of diverse college women athletes in terms of sports, the data may not be representative of all women athletes from Division I schools. The two schools sampled were both Midwestern universities. The majority of the participants were Caucasian and traditional-aged college women. Had the sample included Division I schools from different locations, such as in the South or in the coastal areas, different results may have been found. Additionally, although attempts were made to sample a variety of sports, there were some sports teams that did not participate or from whose teams only a limited number of women participated. As a result of this, some of the sports could not be included in the analyses that explored sport differences on the dependent variables; only six of the 12 sports were included in that analysis.

Third, when conducting exploratory analyses for Hypothesis 4, it became clear that perceived athletic pressure did not account for a significant amount of variance in disordered eating above and beyond that accounted for by perceived social pressure. This could be attributed to a measurement issue. It is possible that the questions on the two pressure measures overlapped and were not clear enough to the participant. For example, when responding to the statement: “I have felt pressure from my friends to lose weight,” the athlete may have thought about friends inside and outside of the athletic realm, when it was the intent of the researcher for the participant to only think about friends outside of her sport when responding to this particular item. Using a new measure was a limitation that could not be avoided because of the dearth of quality measures that examine perceived pressures for thinness in the athletic environment. Perhaps this limitation could be addressed in the future as additional studies examine the present measure. It is
important to remember when viewing the results of the present study that the athletic pressure variable is one that is somewhat new in the literature and has not been researched comprehensively. It is possible, then, given the results of the exploratory analyses in which the order of entry of the two pressure variables was reversed, that athletic pressure for thinness could be subsumed by social pressure for thinness and not, in fact, stand alone as a predictor variable. Future studies would do well to continue examining how this construct may contribute to the development of disordered eating in women athletes.

A related limitation has to do with the setting in which the athletes completed the surveys. Because they were often surrounded by their teammates (and often dressed in their practice clothes) while responding to the questionnaires, athletic factors could have been more salient to them than if they had answered the items in a different setting, such as a classroom with other students who were not teammates. This could have contaminated the social pressure measurement with athletic influences.

Next, no prior studies were reviewed that utilized the EDI-3, including no studies with athletes using the EDI-3. Therefore, there is no reliability or validity information to which to compare the current results. Yet, the reliability data from this study support that this instrument adequately measured disordered eating symptoms. Additionally, it is worth noting that the EDI-3 did not include any items related to exercise. By not assessing the participant’s typical amount of exercise, especially in addition to what is required for her sport, an important symptom may have been ignored. Including questions pertaining to excessive exercise might have captured a broader range of unhealthy behaviors.
It should be noted that previous researchers have suggested the need to develop a measure specifically for athletes (Brownell et al., 1992; Doninger et al., 2005; Hinton & Kubas, 2005) as no such measure has been developed and validated on large samples. Psychological testing research emphasizes how important it is to pay attention to context and specificity when assessing psychological constructs (Hinton & Kubas). For example, it may be unclear what the athletes were thinking about when responding to the body image dissatisfaction items. As noted in some of the quotations provided by the women, several reported feeling pressure to conform to the thin-ideal of society in order to be viewed as “attractive” by society’s standards. This pressure of achieving the ideal body type may directly conflict with the pressure to maintain the type of athletic, muscular body they need in order to be optimally successful in their sport. Therefore, perhaps in the future, questions measuring body image dissatisfaction could attempt to differentiate the reason behind the women’s unhappiness with their bodies; that is, whether they are unhappy because they are not meeting the demands of the athletic environment or of society in general.

Finally, even though this study examined personal and sociocultural factors in the development of disordered eating, it should not be considered comprehensive. Several other personal, relational, and sociocultural variables have been identified and have been supported in relation to the development of disordered eating (i.e., self-esteem, depression, perfectionism, internalization of ideal-body image). These other variables should not be ignored and could also be included in future investigations. For example, previous studies have reported that many athletes exhibit a high degree of perfectionism (e.g., Thompson & Sherman, 1993a; Yates et al., 1992), in addition to a strong desire to
please others and to be accepted (Brownell et al., 1992). How these factors influence their eating behaviors would be worth examining. Finally, though the present study provided valuable information about the relations among the aforementioned variables, it should be noted that the research design did not provide the ability to infer causation.

Implications for Practice

Practical implications are evident from the current study. The results from this study’s EDI-3 scores add to the body of data indicating that on a college campus, there are a significant number of women who report using unhealthy eating behaviors. Therefore, it is possible they may present to the counseling center with either symptoms of disordered eating or with a clinical eating disorder. Each of the eating disorder subscales of the EDI-3 were examined to see what score would place a woman in the “typical clinical range,” a range of scores that would be considered common for a woman who would meet the criteria for an eating disorder. The scores of 30 women fell into this range for Body Image Dissatisfaction (14.6%), 31 for Drive for Thinness (15%), and 60 for Bulimia (29.1%). Clearly, counselors need to be aware of the prevalence of disordered eating and be prepared to identify and work with these young women.

The same is true for athletic personnel, especially coaches and trainers. Given the data reported by athletes in this study, there is a high likelihood that there will be women on all teams who experience some form of disordered eating. Each university’s athletic administration needs to be aware of this possibility and be proactive to develop the appropriate systems for dealing with this issue. For example, athletic personnel should be aware of to whom to refer an athlete (for both medical and psychological issues) if there is concern about the young woman. Important decisions such as the athlete’s ability to
continue in practice and competition will need to be made in some situations. In such cases, a multidisciplinary treatment team has been shown to be effective, a system that involves comprehensive psychological, nutritional, and medical care (Thompson & Sherman, 1999).

Education of coaching personnel about how much influence they may have over their athletes is paramount, in addition to helping them become aware of how prevalent disordered eating symptoms are within this population, the dangerousness of such behaviors, and warning signs for which to look. Anyone who works with student athletes on an everyday basis, such as physicians, physical therapists, and athletic trainers should also be included in this education. Topics should include such things as how to promote body image acceptance, awareness of the impact of comments made to players (or about other players) about their size/shape, as well as how to educate players about ways to safely lose weight, build muscle, and increase endurance without crossing over into a dangerous diet and exercise cycle (Berry & Howe, 2000). Athletic personnel need to be provided information about nutrition, eating disorders, and weight control through such means as consultation with mental health and medical providers, workshops, and written materials that they can also distribute to their athletes (Griffin & Harris, 1996).

In order to reduce and prevent body image dissatisfaction among women athletes (which accounted for the most variance in symptoms of disordered eating), the focus of coaches and trainers should be on promoting acceptance of all body shapes and sizes to counter the pressure to be thin that these women experience. Specifically within the athletic environment, any attempts at reducing weight should be carefully monitored and thoroughly understood by the athlete. Training programs should be focused on health, not
weight, and as such, individualized nutritional information should be provided to the women athletes to help them reach and maintain their optimal physical shape. Group weigh-ins and any sort of humiliating/shaming behaviors related to weight need to be eliminated (Thompson & Sherman, 1999). Coaches should receive education about how to determine if an athlete needs to lose weight. Reliance on visual observation of an athlete’s physical appearance alone could promote dangerously low weight goals (Rosen & Hough, 1988) and a belief that appearance is the most important goal for an athlete (Davis, 1992). Ways to improve performance can be explored through other means (i.e., strength training, agility, flexibility, skill development) (Petrie & Rogers, 2001).

Further, prior to beginning competition, athletes could be screened for disordered eating symptoms and assessed periodically throughout their collegiate career. This would help identify those at risk before their symptoms worsen. Additionally, the present finding that symptoms of bulimia and perceived pressure from the athletic environment were higher in women who are engaged in sports that have a focus on leanness suggests that it may be especially important when coaching or working with women athletes in these sports to be very aware of how these two factors may be affecting the athletes. A counselor may find that a young woman who engages in disordered eating behaviors also feels a great deal of pressure to have a thin body from those both within and outside of the athletic realm. Likewise, a trainer working with an individual might do well to assess from where the athlete may be receiving messages about weight loss and size (Petrie & Sherman, 1999).

Finally, campus outreach efforts and consultation relationships are important in order to educate and intervene with collegiate women athletes who choose not to seek out
counseling but who also may suffer from these symptoms. Outreach efforts can specifically target the socially constructed definition of beauty, assist college women in understanding that the ideal body does not exist, and help them become critical viewers of the media. Staff at the college counseling centers could consult directly with the athletic coaches to establish a relationship between the counseling center and the athletic department. By doing so, the coaches might then feel more comfortable referring an athlete to counseling, as well as consulting with an on-campus mental health provider when he or she is concerned about an athlete. The fact that partial mediation was supported in the present study lends support to those prevention models that take a multivariate approach, in that focusing solely on any one area may be inadequate. Prevention efforts should not solely focus on body image improvement, but also should address the influence of society’s messages about thinness (Thompson & Sherman, 1993).

Recommendations for Future Research

Although the present research provided some information about relations among perceived social and athletic pressure, body image dissatisfaction, and disordered eating, many additional factors still remain unexplored in the realm of eating disorder development and maintenance. Replication of this study with another sample would be useful to see what variability may be found depending on the athletes surveyed.

It would be useful to conduct future studies using the Perceived Athletic Pressures Scale in order to gain a better understanding of the pressure women athletes feel and how separate these pressures are from those perceived from society in general. The high internal consistency reliability estimate that resulted from the data in this study lends
credence to the use of this measure in the future with other women athlete samples. However, future research needs to examine its validity and take a closer look at the potential overlap between social pressures and athletic pressures. Those friends who are also teammates, for example, might have the most potential to be a source of pressure. It may be useful, as well, to administer the survey in a non-athletic realm to try to control for the influence of teammates while answering the questions.

It would also be interesting to conduct longitudinal studies examining college women athletes’ levels of perceived pressure to be thin and body image dissatisfaction prior to beginning competition at the Division I level and periodically throughout their career. By doing so, more information could be gathered about the difference (if any) in athletic pressure for thinness from high school to competing at the college level. If an athlete, for example, experiences little pressure to be thin prior to beginning collegiate competition, yet reports an increase in that pressure later in her career, it would be interesting to see if her reported symptoms of body image dissatisfaction and/or disordered eating would increase as well. Additionally, examining the effects of winning and losing seasons in relation to these variables would be valuable.

Surveying athletes at other Division I schools, including different sports, may yield different results. Various geographical locations and variations among conferences in various parts of the country may result in universities valuing one sport over another or being more well-known for a specific sport. Byrne and McLean (2001) recommended that it would be valuable to gather a large sample from various schools to more fully encompass the broad range of women’s athletics. In the process of doing so, it may be important to ask what specific position the athletes hold on their team. For example,
many of the research studies (including the current one) have combined all track athletes together, without differentiating if the woman participates in running events or in throwing events. Which event she participates in may have implications for her ideal body size and weight. Further, surveying women athletes at schools from a variety of divisions might be interesting to see if there are varying levels of perceived athletic pressure, as was done in the study by Picard (1999). These varied levels of pressure, which may or may not relate to scholarships that are provided in different divisions, could lead to varied levels of body image dissatisfaction and disordered eating.

Additionally, factors such as increased television exposure at the Division I level might contribute to pressure that an athlete experiences.

Also worth exploring in a qualitative manner are the exact pressures women athletes perceive; that is, giving them the opportunity to identify these pressures, either from a predetermined list or having them generate them individually, such as suggested by Krane and colleagues (2001). Pressures that could be discussed include: how I look in my uniform, the judges’ rating of my performance, my stunt partner’s reaction, and maintaining the perfect balance between looking muscular and looking feminine.

Supporting this suggestion are several quotations generated by the athletes in this study in relation to these issues. One such quote was: “I feel trapped between wanting to be slim and wanting to be strong so I can be better at my sport. I want to be athletic, but still thin/feminine and I feel that it is hard.” Additional quotes can be found in Appendix I.

The model examined in the present study was based on that proposed in previous literature (e.g., Griffiths & McCabe, 2000; Stice et al., 1996; Veron-Guidry et al., 1997; Williamson et al., 1995); however, it would be possible to examine these variables in
multiple ways. One such way to explore these constructs could be to examine perceived pressure for thinness as the mediator in these relationships, using body image dissatisfaction as the independent variable. This would provide information about how much variance in disordered eating is accounted for by body image dissatisfaction above and beyond perceived pressure for thinness. Using this design, one may be able to conclude whether body image dissatisfaction might have both a direct and indirect effect (through pressure for thinness) on disordered eating, or if complete mediation might occur. Alternatively, the mediation design could be employed using a variety of other personal or sociocultural variables, such as self-esteem, perfectionism, and social support that may also play a part in the development of disordered eating. Social physique anxiety (i.e., the anxiety that results from the social evaluation of one’s physique) is one such variable that others have begun to examine among athletes involved in sports that require revealing attire, such as diving, cross-country, and gymnastics (Hausenblas & Mack, 1999; Krane et al., 2001).

Finally, these same variables could be further examined in a sample of collegiate men athletes. Most of the research on eating disturbances has focused on women, even though it is well-established that several sports in particular (i.e., wrestling, horse-racing) have well-documented cases of disordered eating and pressure to maintain a certain body size and appearance (Thompson & Sherman, 1993). This population has been somewhat ignored in the literature and/or combined with research on women athletes; thus, it has been recommended that researchers take a closer look at this population (Byrne & McLean, 2001). It would be worth exploring whether the mediation model supported in the present research would hold true for a sample of collegiate athletes who are men.
Concluding Remarks

The present study has extended the existing body of research specific to women athletes and disordered eating. A variety of sports were included in this cross-sectional sample, whose participants attended two different Division I universities. Not only has it supported previous studies by demonstrating a unique relationship between body image dissatisfaction and disordered eating, social pressure for thinness and disordered eating, and athletic pressure for thinness and disordered eating, it has also provided additional information in regard to how all of these variables affect one another through mediation analyses. Specifically, body image dissatisfaction acted as a significant partial mediator in the relationship between social pressure for thinness and disordered eating, and also in the relationship between athletic pressure for thinness and disordered eating. Further, significant differences emerged on the variables of bulimia and athletic pressure for thinness when comparing individual sports and when comparing lean vs. nonlean sports.

The results of this study lend support to the idea that athletic personnel, including trainers and coaches, should be educated about the prevalence of disordered eating among women athletes and also about how much their messages about size and shape influence these women. Consulting and working together with mental health providers, nutritionists, and physicians is of utmost importance in order to raise awareness and provide a safe environment for collegiate women athletes. Future research would do well to continue focusing on the athletic pressure for thinness variable to achieve more clarity about the impact it has on the development of disordered eating in this population. Additionally, sampling women athletes from various colleges across the country, from a variety of sports and divisions would provide useful information on a broader scale.
REFERENCES


APPENDICES
APPENDIX A

HUMAN SUBJECTS APPROVAL FORM – SCHOOL A

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

DATE: June 5, 2006

TO: Jill Mallin
CC: Dr. Catalina D’Achiardi

FROM: Institutional Review Board
       Office of Research Assurances

SUBJECT: IRB ID Number: 06-275

Approval Date: June 1, 2006 Date for Continuing Review: May 31, 2007

The Chair of the Institutional Review Board Chair of Iowa State University has reviewed and approved the protocol entitled: “Social Pressures and Body Image as Contributors to Eating Habits Among Collegiate Women Athletes.” The protocol has been assigned the following ID Number: 06-275. Please refer to this number in all correspondence regarding the protocol.

Your study has been approved for a period of one year from June 1, 2006 to May 31, 2007. The continuing review date for this study is no later than May 31, 2007. As a courtesy to you, you will receive a reminder of the approaching review date approximately one month prior to this date. Please submit a continuing review form with sufficient time prior to this date for the IRB to review and approve continuation of the study. Failure to complete and submit the continuing review form will result in expiration of IRB approval on the continuing review. A new application for IRB approval may be required to reactivate the study. In addition, all research related activities involving the participants must stop on the continuing review date, until approval can be re-established, except when necessary to eliminate immediate hazard to research participants.

Please remember that any changes in the protocol or consent form may not be implemented without prior IRB review and approval, using the “Continuing Review and/or Modification” form. Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office of Research Assurances website or available by calling (515) 294-4566, www.compliance.iastate.edu.

You must promptly report any of the following to the IRB: (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

Upon completion of the project, please submit a Project Closure Form to the Office of Research Assurances, 1138 Pearson Hall, to officially close the project.
APPENDIX B

HUMAN SUBJECTS APPROVAL FORM – SCHOOL B

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
(330) 972-7608 Office
(330) 972-0931 Fax

May 22, 2006

Jill Malin
2604 Aspen Road, #5
Arlington, TX 76010

Ms. Malin:

The University of Akron's Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled "Social Pressure and Body Image as Contributors to Eating Habits among Collegiate Women Athletes". The IRB application number assigned to this project is 20060503.

The protocol was reviewed on May 19, 2006 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) Information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects' financial standing, employability or reputation

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research. In addition, your request for a waiver of documentation of informed consent, as permitted under 45 CFR 46.117(c), is also approved.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study's design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

Please retain this letter for your files. If the research involves conducting a master's thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McKinster
Interim Director

Cc: Linda Subich, Advisor
    Department Chair
    Phil Allen, IRB Chair

The University of Akron is an Equal Opportunity and Employment Institution
APPENDIX C
PERCEIVED PRESSURES SCALE

Please circle the response that best captures your own experience:

<table>
<thead>
<tr>
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<th>none</th>
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<th>a lot</th>
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<tbody>
<tr>
<td>1.</td>
<td>I've felt pressure from my friends to lose weight.</td>
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<tr>
<td>2.</td>
<td>I've noticed a strong message from people I've dated to have a thin body.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>3.</td>
<td>I've noticed a strong message from the fans/spectators to have a thin body.</td>
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<tr>
<td>4.</td>
<td>I've felt pressure from the training staff to lose weight.</td>
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<tr>
<td>5.</td>
<td>I've noticed a strong message from my teammates to have a thin body.</td>
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<tr>
<td>6.</td>
<td>I've felt pressure from people I've dated to lose weight.</td>
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<td>7.</td>
<td>I've felt pressure from the coaching staff to lose weight.</td>
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<td>8.</td>
<td>I've noticed a strong message from my friends to have a thin body.</td>
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<tr>
<td>9.</td>
<td>I've felt pressure from my family to lose weight.</td>
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<td>10.</td>
<td>I've felt pressure from the media (e.g., TV, magazines) to lose weight.</td>
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<td>11.</td>
<td>I've noticed a strong message from the coaching staff to have a thin body.</td>
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<td>12.</td>
<td>I've felt pressure from the fans/spectators to lose weight.</td>
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<td>13.</td>
<td>I've noticed a strong message from the media to have a thin body.</td>
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<td>14.</td>
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<td>15.</td>
<td>I've felt pressure from my teammates to lose weight.</td>
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<td>16.</td>
<td>I've noticed a strong message from the training staff to have a thin body.</td>
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APPENDIX D

DEMOGRAPHIC FORM

Please provide the following information. All information will remain confidential.

<table>
<thead>
<tr>
<th>Year in school:</th>
<th>Race:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>African American/Black</td>
</tr>
<tr>
<td>Sophomore</td>
<td>Asian American</td>
</tr>
<tr>
<td>Junior</td>
<td>Caucasian/White</td>
</tr>
<tr>
<td>Senior</td>
<td>Native American</td>
</tr>
<tr>
<td>Fifth Year</td>
<td>Hispanic American</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>Other: __________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head coach’s sex: Male Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary sport you participate in:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Number of years you have been competing in that sport:</th>
</tr>
</thead>
</table>

Do you receive any funding for your participation in this sport: Yes No

<table>
<thead>
<tr>
<th>Height: __________</th>
<th>Weight: __________</th>
</tr>
</thead>
</table>

**Please circle your response to the following statements:**

1) How important is achieving a low weight to your primary sport?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Somewhat</td>
<td>Moderately</td>
<td>Extremely</td>
</tr>
<tr>
<td>Important</td>
<td>Important</td>
<td>Important</td>
<td>Important</td>
<td>Important</td>
</tr>
</tbody>
</table>

2) My teammates and I are a close-knit group.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Somewhat Disagree</td>
<td>Neutral</td>
<td>Somewhat Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

3) To what extent does your relationship with your team affect your performance?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Effect</td>
<td>Little Effect</td>
<td>Some Effect</td>
<td>Moderate Effect</td>
<td>Strong Effect</td>
</tr>
</tbody>
</table>
4) Please share any comments related to the issues raised in this study.
APPENDIX E

DEBRIEFLING FORM – SCHOOL A

Social Pressure and Body Image as Contributors to Eating Habits Among Collegiate Women Athletes

Overview: We would like to thank you for your participation in this study. Research has shown that collegiate women athletes are at risk for developing disordered eating. Some of the factors that could be contributing to this risk include pressures from inside and outside of the athletic environment to achieve and maintain a thin body. By tapping into the experiences of women athletes, we hope to gain a better understanding of what those pressures are, where they come from, and how they relate to body image dissatisfaction and disordered eating behaviors. The ultimate goal of this study is increased awareness and understanding of the development of eating disorder symptoms in collegiate women athletes so that the risk can be minimized and preventative measures can be implemented.

Method: All participants’ responses are anonymous. Any information provided to athletic personnel will be disclosed in aggregate form (everyone’s responses will be averaged together).

Important Reminders: We have informed you at this time in order that you might learn something about the topic and methods used. We believe that by informing people about what we are doing and why, including why they should not tell others about the study, people are more likely to cooperate. If you have any questions feel free to talk to the investigator Jill Mallin (mallinj@uw.edu) or the supervising faculty, Dr. Catalina D’Achiardi, in Student Counseling Service (catadn@iastate.edu).

It is important that you not reveal anything about this project to other students who may participate. Prior knowledge of the purpose of the project may bias participants’ responses and would invalidate the study, and therefore your time here today would be wasted. If completing the questionnaires caused you any concern, you may wish to contact one of the following two agencies. You can initiate contact by phone or in person.

Student Counseling Service
Student Services Building, 3rd Floor
515-294-5056 (Free for ISU students)

The Richmond Center
125 S. 3rd Street, Suite 200
515-232-5811
APPENDIX F

DEBRIEFING FORM – SCHOOL B

Social Pressure and Body Dissatisfaction as Contributors to Eating Habits in Collegiate Women Athletes

Overview: We would like to thank you for your participation in this study. Research has shown that collegiate women athletes are at risk for developing disordered eating. Some of the factors that could be contributing to this risk include pressures from inside and outside of the athletic environment to achieve and maintain a thin body. By tapping into the experiences of women athletes, we hope to gain a better understanding of what those pressures are, where they come from, and how they relate to body image dissatisfaction and disordered eating behaviors. The ultimate goal of this study is increased awareness and understanding of the development of eating disorder symptoms in collegiate women athletes so that the risk can be minimized and preventative measures can be implemented.

Method: All participants’ responses are anonymous. Any information provided to athletic personnel will be disclosed in aggregate form (everyone’s responses will be averaged together).

Important Reminders: We have informed you at this time in order that you might learn something about the topic and methods used. We believe that by informing people about what we are doing and why, including why they should not tell others about the study, people are more likely to cooperate. If you have any questions feel free to talk to the investigator Jill Mallin (jw@uakron.edu) or call the faculty advisor, Dr. Linda Subich, in the Department of Psychology (phone 330-972-8379).

It is important that you not reveal anything about this project to other students who may participate. Prior knowledge of the purpose of the project may bias participants’ responses and would invalidate the study; therefore your time here today would be wasted. If completing the questionnaires caused you concern, you may wish to contact one of the following three agencies. You can initiate contact by phone or in person.

Counseling, Testing, and Career Center
Student Affairs Building, Simmons Hall, Rooms 304-306, 330-972-7082
(Free for UA students)

Department of Psychology Counseling Clinic
Arts & Science Building, Third Floor, Room 342, 330-972-6714
(Free for UA students and community members; limited hours in the summer)

Portage Path Behavioral Health
340 S. Broadway St., 330-253-4118
(reduced rates for Summit County residents)
APPENDIX G

INFORMED CONSENT – SCHOOL A

Title of Study: Social Pressures and Body Image as Contributors to Eating Habits Among Collegiate Women Athletes

Investigator: Jill Mallin, M.A.

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to increase understanding about the development of disordered eating in collegiate women athletes by examining pressure for thinness and body image satisfaction. You are being invited to participate in this study because you are a woman who is a college athlete.

DESCRIPTION OF PROCEDURES

If you agree to participate in this study, your participation will last for 20 minutes. During the study you may expect the following study procedures to be followed. You will be asked to complete two surveys pertaining to eating habits, body image satisfaction, and pressure for thinness. You will then complete a demographic form. You may skip any question that you do not wish to answer or that makes you feel uncomfortable.

RISKS

While participating in this study you may experience the following risks: you may experience some psychological discomfort if the questions cause you to reflect on things about which you are anxious. You will receive a list of mental health resources in the area should you desire to speak with a counselor after completing the questionnaires.

BENEFITS

If you decide to participate in this study there will be no direct benefit to you. It is hoped that the information gained in this study will benefit society by providing increased understanding about the development of disordered eating in collegiate women athletes.
COSTS AND COMPENSATION

You will not have any costs from participating in this study. By choosing to participate in this research, your name will be entered in a drawing for a gift certificate from a sporting goods store. Your name will not be connected in any way to the questionnaires you have completed. At the end of the study, one name will be drawn, and the winner will be contacted to receive the gift certificate.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken. Your name will not be associated with your responses in any way. Data will be stored in a locked filing cabinet that will only be accessed by the principal investigator and the research assistants. After seven years, the data will be destroyed. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study. A copy of the consent will be provided for participants upon request.

- For further information about the study contact Jill Mallin, 262-472-1305, mallinj@uww.edu.

- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, austingr@iastate.edu, or Diane Ament, Director, Office of Research Assurances (515) 294-3115, dament@iastate.edu.

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INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

__________________________________________________________________________  ______________________________________________________________________
(Signature of Person Obtaining Informed Consent)  (Date)
Title of Study: Social pressure and body image as contributors to eating habits among collegiate women athletes

Introduction: You are invited to participate in a research project being conducted by Jill Mallin, a graduate student in the Department of Psychology at The University of Akron, and Dr. Linda Subich, faculty member in the Department of Psychology at The University of Akron.

Purpose: The purpose of this study is to gain a greater understanding of the role body image dissatisfaction and pressure for thinness play in the development of disordered eating in collegiate women athletes. About 200 women college athletes are being asked to participate in this study.

Procedures: Your participation in this study will require approximately 20 minutes to complete a series of questionnaires.

Risks and Discomforts: While participating in this study you may experience the following risk: because you are answering questions about yourself and your presenting symptoms, you could experience some discomfort if the questions cause you to reflect on facets of yourself that are unpleasant to you. Referral information for counseling services will be provided to you in case you wish to talk with someone further about these issues. There are no anticipated physical risks.

Benefits: You will receive no direct benefit from your participation in this study, but your participation may help us better understand the role that body image dissatisfaction and pressure for thinness play in the development of disordered eating in women college athletes.

Payments to Participants: By choosing to participate in this research, your name will be entered in a drawing for a gift certificate from a sporting goods store. Your name will not be connected in any way to the questionnaires you have completed. At the end of the study, one name will be drawn, and the winner will be contacted to receive the gift certificate.

Right to refuse or withdraw: Your participation in this research is voluntary and you may refuse to participate, or may discontinue participation at any time, without penalty or loss of benefits to which you are otherwise entitled.

Anonymous Data Collection: No identifying information will be collected in the data you provide, and your anonymity is further protected by not asking you to sign and return the informed consent form.

Confidentiality of Records: All collected data will be kept in a locked filing cabinet and will only be accessed by the principal investigators and research assistants. Data will be shredded after seven years.
Who to contact with questions: If you have any questions about this study, you may call Dr. Linda Subich at 330-972-8379. This project has been reviewed and approved by The University of Akron Institutional Review Board. If you have any questions about your rights as a research participant, you may call the IRB at (330) 972-7666 or 1-888-232-8790.

Acceptance:
I have read the information provided above and all of my questions have been answered. I voluntarily agree to participate in this study. My completion and return of these questionnaires will serve as my consent. I have been given a copy of this consent form for future reference.
A tennis player wrote the following: “I feel trapped between wanting to be slim and wanting to be strong so I can be better at my sport. I want to be athletic, but still thin/feminine and I feel that it is hard.” A gymnast wrote: “I never felt pressure to lose a lot of weight until this year’s new coaching staff made weight and losing it a very important issue.” Another gymnast wrote: “I have never felt pressure from my teammates or friends, only from ‘authority’ figures.”

One volleyball athlete wrote: “I think that issues athletes have with weight get overlooked. People don’t realize that athletes fight the same issues with weight as normal people – bulky muscles in girls aren’t the ‘in’ thing.” A softball player wrote: “Sometimes I feel ashamed of having an athletic body and am often worried that guys won’t like me because of it.”