PSYCHOSOCIAL PREDICTORS OF EATING DISORDER CLASSIFICATION: LONGITUDINAL AND CROSS-SECTIONAL ANALYSES

Bailey Tackett, M.S.

Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2018

APPROVED:

Trent A. Petrie, Major Professor
C. Ed Watkins, Committee Member
Adriel Boals, Committee Member
Vicki Campbell, Chair of the Department of Psychology
David Holdeman, Dean of the College of Liberal Arts and Social Sciences
Victor Prybutok, Dean of the Toulouse Graduate School

Tackett, Bailey. *Psychosocial Predictors of Eating Disorder Classification: Longitudinal and Cross-Sectional Analyses*. Doctor of Philosophy (Counseling Psychology), August 2018, 85 pp., 3 tables, 1 figure, references, 213 titles.

There is growing concern for eating pathology and body dissatisfaction in sports; particularly, in sports that emphasize a lean body type. In 325 female collegiate swimmers/divers and gymnasts, we examined psychosocial well-being (i.e., perception of weight pressures, levels of internalization, body satisfaction, dietary intent, negative affect) at the beginning and end of an athletic season and predict their eating disorder classification at the end of their athletic season. Logistic regressions revealed that a model containing all 14 predictors at the beginning and end of an athletic season significantly predicted eating disorder classification at the end of an athletic season. Specifically, in the longitudinal logistic regression, with every one unit of increase on a measure of the pressure felt within the sport environment regarding their weight and every unit increase on a measure of their intentions to diet, respectively, the female athletes were 49% and 89% more likely to be classified in the subclinical/clinical group at the end of their sport season. Surprisingly, with every one unit of increase on a measure of sociocultural pressure to exercise, female athletes were 43% less likely to be classified in the subclinical/clinical group six months later. The cross-sectional logistic regression found that only dietary restraint was significant. Specifically, with every one unit of increase on a measure of their intentions to diet the female athletes were 3.6 times more likely to be classified in the subclinical/clinical group at the end of their sport season. The implications of this study may emphasize the importance of body healthy sport systems to reduce sport specific pressures and dieting among female collegiate athletes. Limitations of this study include self-report measures and longitudinal timeframe was only across one athletic season.

TABLE OF CONTENTS

Page

LIST OF TABLES AND FIGURES

Page

Tables

Figures

CHAPTER 1

INTRODUCTION

Collegiate and elite female athletes have been identified as a population at-risk for the development of eating disorders (ED; Petrie & Greenleaf, 2012). Because female athletes, like nonathletes, are exposed to general societal expectations and ideals about body, weight and appearance, their increased risk may be due to the weight, body, and performance pressures that emanate specifically from the sport environment (Reel, Petrie, SooHoo, & Anderson, 2013). According to Petrie and Greenleaf (2012), these unique pressures within the sport environment negatively influence female athletes' satisfaction with their bodies, experience of negative emotions, and dietary intentions, which in turn, lead to the development of ED symptoms. Although researchers have examined the relationship of such psychosocial variables to eating disorder symptoms in female athletes (e.g., Anderson, Petrie, Neumann, 2011; Byrne & McLean, 2002; Hinton & Kubas, 2005; Petrie, Greenleaf, Reel, & Carter, 2009a), their methodologies have been cross-sectional, thus limiting what they can conclude about the variables' effects. Studies have examined these relationships across time (Anderson, Petrie, & Neumann, 2012; Doughty & Hausenblas, 2005; Krentz & Warshburger, 2013; Shanmugam, Jowett, & Meyer, 2014; Voelker, Petrie, Neumann, & Anderson, 2016), demonstrating that longitudinal research with female athletes is possible. Unfortunately, few such studies have been completed and more are needed to delineate which psychosocial variables are risk factors for the development of EDs and thus should be the target of prevention programming.

Sociocultural Model of Eating Disorders

Petrie and Greenleaf (2007, 2012) adapted sociocultural models of eating disorders for nonathletes to the experiences of male and female athletes. Their model incorporated key

sociocultural constructs – general societal pressures, internalization of appearance ideals, body dissatisfaction, dietary intention, and negative affect – but emphasized the unique, and powerful, effects the sport environment has on how athletes think and feel about themselves and their bodies. They proposed that general, and sport-specific, pressures about weight, body size/shape, eating/dieting and appearance increase athletes' body dissatisfaction, negative affect (e.g., anger, guilt), and dietary restraint, and it is these variables that lead to the development of eating disorders, such as bulimic symptomatology.

The unique pressures in the sport environment are many, and include an unhealthy focus on weight and body shape as they relate to performance, performing while wearing physique revealing uniforms, self-weighing and team weigh-ins, and comments from coaches and teammates about shape and weight, to name a few (Thompson & Sherman, 2010). These sport environment pressures, in conjunction with those communicated by family, friends and the media, are hypothesized to lead athletes to internalize messages about the importance of having a perfect body, what it means to be feminine, and the role appearance plays in being successful (Petrie & Greenleaf, 2012). Although research has supported the connection between general societal pressures and internalization (e.g., Brownell, 1991; Stice, Chase, Stormer, & Appel, 2001; Stice, Ziemba, Margolis, & Flick, 1996), findings regarding the influences of sport specific pressures have been equivocal. For example, at the bivariate level, sport pressures were related to higher levels of internalization, but when considered with general societal pressures the relationship became nonsignificant (Anderson et al., 2011). Thus, sport pressures' effects may not be mediated through internalization, like general societal pressures are, but rather direct to body dissatisfaction, dietary restraint, and bulimic symptomatology (Anderson et al., 2012; Reel et al., 2013). In a longitudinal study that spanned a five month athletic season, Anderson et al.

(2012) found that sport pressures about weight and appearance at the beginning of a season predicted decreases in the female athletes' satisfaction with body size and shape at the end of their season, even after controlling for initial body satisfaction.

Internalization is hypothesized to lead directly to higher levels of body dissatisfaction. As athletes make comparisons between their actual bodies and the societal appearance ideals they have internalized, they realize that they fall short of these expectations and blame themselves and their bodies for doing so (Petrie & Greenleaf, 2012). Using a cross sectional methodology with a diverse sample of female collegiate athletes, Greenleaf, Petrie, Reel, and Carter (2010) found that the athletes who reported higher levels of internalization of societal ideals also were more dissatisfied with their bodies. Similarly, in a cross-sectional examination of female collegiate swimmers and gymnasts, the athletes who internalized society's ideals about the way a woman's body should appear reported being more dissatisfied with their current body size and shape (Anderson et al., 2011). Thus, internalization appears to play a role in the overall development of EDs in female athletes.

Similar to female nonathletes, the effects of body dissatisfaction on female athletes' eating disorder symptoms can be direct, or mediated through dietary restraint and negative affect (e.g., Anderson et al., 2011; Brannan, Petrie, Greenleaf, Reel, & Carter, 2009; Greenleaf et al., 2010; Harriger, Witherington, & Bryan, 2014; Hinton & Kubas, 2005). According to the dual-pathway model (Stice, 2001), in response to their body dissatisfaction, female athletes will experience negative emotions (e.g., sadness, anger) as well as restrict their caloric intake (Petrie & Greenleaf, 2012; Poilvy, Herman, & McFarlane, 1994). By dieting, athletes hope to drastically change the size and shape of their bodies to more closely align with internalized ideals (Stice, Schupak-Neuberg, Shaw, & Stein, 1994). Unfortunately, instead of weight loss, their dieting may

lead to episodes of binge eating as their cognitive restraint (to restrict food intake) is overwhelmed by their physiology (i.e., hunger; Mitchell, Laine, Morley, & Levine, 1986). Negative affect also contributes to binge eating as female athletes eat for emotional, rather than physical, reasons. Once caught in the cycle of binging, athletes may experience even more negative emotions (e.g., guilt, shame) and persistent thoughts about food and eating, which can lead to more emotional, or binge, eating (Stice, 2001). When athletes become overwhelmed by the reality of their caloric intake during binges, they may resort to purging strategies (e.g., exercising, vomiting) to expel the unwanted food and to control their negative feelings towards the self.

Research supports these hypothesized relationships among body dissatisfaction, dietary restraint, negative affect, and EDs in female athletes. For example, in a large sample of female collegiate athletes, Anderson et al. (2011) found direct, and indirect, relationship between body dissatisfaction and bulimic symptomatology. The female athletes' who were more dissatisfied with their body size and shape, and who restricted their food intake and/or endorsed greater negative affect (i.e., sadness, anger, fear) as a result of this dissatisfaction, endorsed higher levels of bulimic symptomatology. Together these three variables accounted for 55% to 58% of the ED variance. Similarly, in a mixed-sport sample of female collegiate athletes, negative affect, in particular guilt ($\beta = 0.26$), dietary restraint ($\beta = 0.32$), and body satisfaction ($\beta = -0.19$) accounted for a significant amount of the variance in the athletes' scores on a measure of bulimic symptomatology (Greenleaf et al., 2010).

Although compelling, these and other studies (e.g., Byrne & McLean, 2002; Hinton & Kubas, 2005; Petrie, et al. 2009a) have relied on cross sectional methodologies, which limits what can be concluded about the temporal nature of the relationships between these proposed

psychosocial predictors and subsequent eating disorder symptomatology. Even for the few longitudinal studies that have been conducted with samples of female athletes (e.g., Doughty & Hausenblas, 2005; Krentz & Warschburger, 2013; Shanmugam, et al. 2014; Voelker, et al. 2016), there have been limits in the number (and type) of psychosocial variables included as well as how the variables have been analyzed in relation to an eating disorder outcome. For example, although Anderson et al. (2012) found that sport pressures predicted increases in body dissatisfaction over the course of an athletic season, they only examined four variables (i.e., sport pressures, body dissatisfaction, dietary restraint, and negative affect) from the Petrie and Greenleaf (2012) model and did not include an eating disorder outcome. Doughty and Hausenblas (2005), on the other hand, established that female collegiate athletes' body dissatisfaction and drive for thinness in female collegiate gymnasts' remained relatively stable across a five-month season, but they did not examine whether these variables predicted athletes' symptoms of disordered eating over time. Finally, Krentz and Warschburger (2013) found that only the female athletes' desire to be leaner to improve their sports performance predicted ED symptomatology over a one-year period; social pressures from the sport environment, sports-related body dissatisfaction, and emotional distress resulting from missed exercise sessions did not play a role. Given these limits, research that longitudinally examines the relative contribution of the psychosocial variables in the Petrie and Greenleaf (2012) model in the prediction of subsequent eating disorder classification is needed to better understand what factors place athletes at-risk for the development of an ED.

Purpose

In the current study, I examined the extent to which proposed eating disorder risk factors (i.e., general sociocultural and sport specific pressures, general and sport specific internalization, body dissatisfaction, dietary intent, and negative affect) were related to eating disorder classification. In my study, I measured the psychosocial variables at the beginning and end of a five-month sport season and then related each set to how the athletes were classified in terms of their ED diagnosis at the end of the season. This approach allowed me to examine the longitudinal effects of the variables, but also determine if the same variables related differently to the ED outcome when assessed at the same point in time. Regardless of when the psychosocial variables were assessed, either Time 1 (at the beginning of the season) or Time 2 (at the end of the season), I hypothesized that higher levels of general and sport specific weight pressures, greater internalization, more body dissatisfaction, stronger intention to restrict caloric intake, and higher levels of negative affect would be related to the increased likelihood of being classified in the disordered eating category. Further, I hypothesized that, of the psychosocial predictors, dietary intentions would have the strongest relationship to ED classification.

CHAPTER 2

METHOD

Participants

Participants were 325 NCAA, Division I, female collegiate swimmers and divers (*n* = 106; 6 programs) and gymnasts (*n* = 219; 20 programs) drawn from an existing data set that represents 26 universities across all regions of the U.S. Mean age of the athletes is 19.25 years (*SD* = 1.14). The sample includes 103 (31.6%) freshman, 97 (29.8%) sophomores, 75 (23.1%) juniors, and 50 (15.5%) seniors. In terms of race/ethnicity, 276 (84.9%) identified as Caucasian, 14 (4.3%) as Hispanic, 14 (4.3%) as Asian-American, 13 (4.0%) as African-American, and 1 (.3%) as American Indian; 7 (2.2%) identified as "Other." The majority reported living with teammates (*n* = 214, 65.9%) or living with someone other than teammates (*n* = 102, 31.4%); 4 (1.2%) lived at home and 5 (1.5%) did not respond. Mean body mass index (BMI) was 23.16 kg/m^2 (*SD* = 2.08). According to The Centers for Disease Control and Prevention (The Centers for Disease Control and Prevention [CDC], 2010) guidelines, 0.6% (*n* = 2) of the athletes were underweight (BMI < 18.5 kg/m^2), 262 (80.6%) normal weight (BMI = 18.5 – 24.99 kg/m^2), and 18.8% (*n* = 61) overweight (BMI > 25.00 kg/m^2).

Measures

Demographics

Participants provided information about their age, current academic status (e.g., freshman, sophomore), race/ethnicity, current living arrangements (e.g., dormitory w/NO teammate), height and weight.

General Sociocultural Pressures

Based on the work of Stice and his colleagues (e.g., Stice & Agras, 1998), a 35-item Perceived Sociocultural Pressures Scale (PSPS) assessed the amount of pressure experienced in seven different areas, including (1) have a thin body, (2) lose weight, (3) exercise, (4) be more attractive, (5) have the perfect body, (6) diet, and (7) change one's appearance. Within each area, individuals rated the pressure they experienced from four different sources— family, female friends, romantic/dating partners, and the media—using a 5-point scale, that ranged from 1, *never*, to 5, *always*. Total scores were calculated for each area (e.g., lose weight) by taking the mean of the ratings across the sources; higher scores indicate more perceived pressure. Cronbach's alphas were .79 (Thin Body), .81 (Lose Weight), .81 (Exercise), .85 (Attractive), .85 (Perfect Body), .82 (Diet), and .85 (Appearance) across the full sample. Two-week test–retest reliability coefficients have ranged from .75 to .96 in a sample of female undergraduates (Stice & Agras, 1998). Stice and colleagues (Stice, 2001; Stice, Shaw, & Nemeroff, 1998) have provided extensive information regarding the validity of the original scale.

Sport Weight Pressures

The Weight Pressures in Sport Scale-Females (WPS-F) assesses the presence of pressures female athletes experience in their sport environment to diet, change their body size/shape, and/or achieve a certain physical look for their performances (Reel, et al., 2013). The WPS-F includes 11 items such as "My coach encourages me and/or my teammates to maintain a below average weight," participants rated how often they experienced each pressure on a 6-point scale, ranging from 1, *never*, to 6, *always*, with higher scores indicating more sport weight pressure. The measure yields two subscale scores, including pressure from coaches and sport about weight

and pressures regarding appearance and performance Reel et al. (2013) reported a Cronbach's alpha of 0.90 (weight) and 0.86 (appearance) and provided extensive information regarding the validity of the scale. In the current study, Cronbach's alpha was 0.90 and for weight and 0.86 for appearance.

Internalization

The nine-item Internalization-General factor from the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3; Thompson, Van den Berg, Roehrig, Guarda, & Heinberg, 2004) assesses the extent to which individuals have internalized general societal messages about beauty, attractiveness, and body size/shape. On items such as "I would like my body to look like the people who are in the movies," the athletes rated their agreement using a 5-point scale that ranged from 1 (*completely disagree*) to 5 (*completely agree).* Total score is the mean of the nine items; higher scores indicate greater internalization. Thompson, et al. (2004) reported a Cronbach's alpha of 0.96 and 0.92 in two independent samples of college women; alpha was 0.93 in the current sample. Cashel, Cunningham, Landeros, Cokley, & Muhammad (2003) reported significant correlations with the Eating Disorder Inventory (EDI; Garner, 1991) subscales that ranged from 0.45 to 0.61. Thompson et al. (2004) also provided additional evidence regarding the scale's validity.

The five-item Internalization-Athlete factor from the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3; Thompson et al., 2004) assesses the internalization of athletic or sports figures. On items such as "I wish I looked as athletic as sports stars," the athletes rated their agreement using a 5-point scale that ranged from 1 (*completely disagree*) to 5 (*completely agree).* Total score is the mean of the five items; higher scores indicate greater

internalization. Thompson et al. (2004) reported a Cronbach's alpha of 0.95 and 0.89 in two independent samples of college women; alpha was .85 in the current sample. The SATAQ-3 Internalization-General and Internalization-Athlete subscales were supported by confirmatory factor analysis (Markland & Oliver, 2008). For Internalization-General, all nine items also loaded most highly on the primary factor (range: 0.56–0.78), and four of the five Internalization-Athlete items loaded on the primary factor (range: 0.67–0.85), however one item from this scale loaded higher on Internalization-General (0.55) than its relevant factor (0.29). Further, the General and Athlete Internalization scales demonstrated strong construct discrimination and convergent validity with measures of internalization (Thompson, et al., 2004).

Body Satisfaction

The seven-item body factor from the Body Parts Satisfaction Scale—Revised (BPSS-R; Petrie, Tripp, & Harvey, 2002) assesses satisfaction with one's body size and shape by focusing on specific body parts that are typically associated with dissatisfaction in women (e.g., hips, thighs). For each item, the athletes rated their level of satisfaction from 1 (*extremely dissatisfied)* to 6 (*extremely satisfied).* Total score is the mean of the seven items; higher scores indicate more satisfaction. Among female undergraduates, Petrie et al. (2002) reported Cronbach's alphas of 0.90; Cronbach's alpha was .92 in the current sample. Petrie et al. (2002) also provided extensive information concerning the scale's validity.

Dietary Restraint

The nine-item Dietary Intent Scale (DIS; Stice et al., 1998) measures self-reported caloric restriction and dieting behaviors. On items such as "I skip meals in an effort to control my

weight," the athletes rated each dietary behavior from 1 (*never),* to 5 (*always).* Total score is the mean of the nine items; higher scores indicate more restraint in eating. Greenleaf et al. (2010) reported a Cronbach's alpha of .91 in a mixed-sport sample of female collegiate athletes; alpha was .93 in the current sample. Regarding validity, Stice and Shaw (1994) reported that the DIS correlated with the Dutch Retrained Eating Scale (r = .92; Van Strien, Frijters, Bergers, & Defares, 1986), a behavioral measure of fat consumption (r = – .32), and body dissatisfaction (r = .48). Further, the DIS has been shown to predict lower caloric intake and reduced consumption of fat grams (Stice, Fisher, & Lowe, 2004).

Negative Affect

Twenty-three items from the Positive and Negative Affect Schedule—Expanded Form (PANAS-X; Watson & Clark, 1992) were used to assess levels of Fear (six items), Sadness (five items), Anger (six items), and Guilt (six items). Athletes rated each mood state from 1 (*very slightly or not at all)* to 5 (*extremely).* A total score for each mood is the mean of those items; higher scores indicate stronger negative affect. Cronbach's alphas have ranged between .54 and .98, and 2-month test–retest reliabilities between .64 and .71 in samples of male and female undergraduates (Bagozzi, 1993).; alphas were .89 (Fear), .93 (Sadness), .87 (Anger), and .93 (Guilt) in the current study. Watson and Clark (1992) have provided extensive validity information, demonstrating good convergent and discriminant validity (mean coefficient = 0.40).

Eating Disorder Classification

The 50-item Questionnaire for Eating Disorder Diagnosis (Q-EDD; Mintz, O'Halloran, Mulholland, & Schneider, 1997) assesses eating disorder classification based on criteria from the

Diagnostic and Statistical Manual-IV-TR (DSM-IV-TR; American Psychiatric Association [APA], 2000). Participants respond to questions regarding eating disorder behaviors, such as the frequency and duration of binge eating, the use (frequency and duration) of purging behaviors, and concerns and satisfaction with body. Based on their responses, participants are classified as eating disordered (i.e., anorexia, bulimia, or EDNOS), symptomatic (displaying some eating disorder symptoms but do not meet a clinical diagnosis), or asymptomatic (no eating disorder symptoms). Mintz et al. (1997) provided extensive support for the measure's validity and reliability. For example, convergent validity was demonstrated by significant correspondence between Q-EDD diagnoses and scores on the BULIT-R and the EAT. Test-retest reliabilities found were stable over a two-week period.

Procedure

Following Institutional Review Board approval, NCAA Division I gymnastic and swimming/diving head coaches were contacted to solicit their athletes' participation. The coaches were notified initially by e-mail regarding the study; follow-up contact was made via phone and e-mail. The coaches were told that the study was funded by an NCAA grant and the study's purpose was to examine the physical and psychological well-being of collegiate female student athletes. To participate, coaches had to provide permission for their teams to complete the questionnaires at the beginning of their athletic season in the fall and again at the end of the season during the subsequent spring; they also had to identify a contact person (e.g., athletic trainer) who would administer the surveys at each time. Of the 26 schools, surveys were distributed by athletic trainers (n = 9), team managers (n = 1), assistant coaches (n = 3), and head coaches (n =13). For their assistance, each team contact was paid $150.00 after the completion of

the data collection.

A few weeks before each of the two data collections, which occurred during the last 2 weeks of September and again the last two weeks of the subsequent February, team contacts were e-mailed to schedule their administration dates. Contacts were then mailed (1) specific number of surveys needed for that team, (2) standardized instruction, and (3) researcher's contact information. The lead researcher, who was in charge of data collection, called contacts before each data collection to answer any questions they might have.

At the first data collection, each athlete received an unsealed envelope that contained the consent form and the survey questionnaire. Athletes did not put their names or any other identifying information on the questionnaires. Team contacts read instructions and then had the athletes sign the consent form; athletes turned the consent forms into the team contacts prior to beginning the questionnaires. Participation was voluntary, though no athlete refused to complete the questionnaires. Team contacts left the area so the athletes could complete the questionnaires in private. When they had finished, which took approximately 25 minutes, athletes sealed the questionnaires in the envelope, and then wrote an X across the flap for privacy. The team contact collected the sealed envelopes, and returned them (and the consent forms) to the lead researcher in the provided postage-paid mailing carton. Inspection of the envelopes revealed that none had been tampered with before being returned. With the exception of the consent form, the same data collection procedure was followed at Time 2. The athletes received no direct compensation for their participation.

CHAPTER 3

RESULTS

Data Analysis

At Time 1, 414 female student athletes provided complete data on the questionnaires. At Time 2, of the original 414 student athletes, 325 completed the questionnaire for a response rate of 79%. These 325 student athletes comprise the sample for the current study. Data were checked for missingness and none were found for the sample. The distributional properties of the measures also were examined (e.g., outliers, skewness) and found to be within normal limits. Because of the relatively small number of athletes who were classified with a clinical eating disorder and the similarity between athletes who are clinical and subclinical (Greenleaf, et al., 2009), the clinical and subclinical groups were combined into a larger "symptomatic" classification.

To determine whether the Time 1 psychosocial variables predicted Time 2 eating disorder classification, a logistic regression analysis was conducted. The psychosocial measures taken at Time 1 – general sociocultural pressures (PSPS), sport weight pressures (WPS), general and athletic internalization (SATAQ-3), body satisfaction (BPSS-R), negative affect (PANAS-X), and dietary restraint (DIS) –served as the independent variables. Eating disorder classification (Q-EDD) taken at Time 2 served as the dependent variable. For the current sample (n = 325), alpha set at .05, and a medium effect size (.15), power would 0.98 (G*Power 3; Faul, Erdfelder, Lang, & Buchner, 2007).

To determine whether the Time 2 psychosocial variables predicted Time 2 eating disorder classification, a logistic regression analysis was conducted. The psychosocial measures taken at Time 2 – general sociocultural pressures (PSPS), sport weight pressures (WPS), general and

athletic internalization (SATAQ-3), body satisfaction (BPSS-R), negative affect (PANAS-X), and dietary restraint (DIS) – served as the independent variables. Eating disorder classification (Q-EDD) taken at Time 2 served as the dependent variable. For the current sample (n = 325), alpha set at .05, and a medium effect size (.15), power would 0.98 (G*Power; Faul et al., 2007).

Descriptive Statistics

Based on their QEDD responses, 250 (76.9%) female athletes were asymptomatic, 51 (15.7%) were symptomatic (i.e., subclinical), and 24 (7.4%) were classified with a clinical eating disordered (ED) at Time 2. Consistent with previous research (Cohen & Petrie, 2005), the eating disorder group was combined with the symptomatic group to form a clinical/subclinical ED group (n = 75) for the subsequent analysis.

Longitudinal Logistic Regression

The regression model was significant, χ^2 (14, N = 325) = 95.977, p < .001, and accounted for a moderate amount of variance in QEDD group status, Nagelkerke R^2 = .39. This finding indicates that the psychosocial variables measured at Time 1 (the beginning of the season) significantly distinguished between the athletes who were classified as either asymptomatic or subclinical/clinical at the end of their athletic season. The predictor variables, were able to correctly classify 84.9% of all athletes, 94.4% of the asymptomatic athletes, and 53.3% of the symptomatic athletes. Although the classification of the subclinical/clinical athletes was moderate, it is higher than the prior probabilities for the group based on actual cell sizes (.00).

Table 1 contains the regression coefficients, Wald test statistic, and odds ratios (ORs; plus 95% confidence interval) for each variable. Based on the ORs, sociocultural pressures to

exercise (OR = .57; 95% CI = -0.34; -0.97), sport pressures about weight (OR = 1.49; 95% CI = 1.04; 2.15), and dietary intent (OR = 1.89; 95% CI = 1.16; 3.06) were significant. Specifically, with every one unit of increase on the PSPS exercise measure, the female athletes were 43% less likely to be classified in the subclinical/clinical group six months later. However, with every one unit of increase on a measure of the pressure they feel within the sport environment regarding their weight and every unit increase on a measure of their intentions to restrict their caloric intake, respectively, the female athletes were 1.49 and 1.89 times more likely to be classified in the subclinical/clinical group at the end of their sport season.

Time 2 Cross-Sectional Logistic Regression

The regression model was significant, χ^2 (14, N = 325) = 132.252, p < .001, and accounted for a moderate amount of variance in QEDD group status, Nagelkerke R^2 = .51. This finding indicates that the psychosocial variables measured at Time 2 (end of the season) significantly distinguished between the athletes who were classified as either asymptomatic or subclinical/clinical classifications at Time 2. The predictor variables, were able to correctly classify 86.8% of all athletes, 95.6% of the asymptomatic athletes, and 57.3% of the symptomatic athletes. Although the classification of the subclinical/clinical athletes was moderate, it is higher than the prior probabilities for the group based on actual cell sizes (.00).

Table 2 contains the regression coefficients, Wald test statistic, and odds ratios (ORs; plus 95% confidence interval) for each variable. Based on the ORs, only dietary intent (OR = 3.60; 95% CI = 2.01; 6.46) was significant. Specifically, with every one unit of increase on a measure of their intentions to diet the female athletes were 3.6 times more likely to be classified in the subclinical/clinical group at the end of their sport season.

CHAPTER 4

DISCUSSION

Based on Petrie and Greenleaf (2012), we examined, longitudinally and cross-sectionally, the extent to which variables in the model (e.g., internalization, dietary intent) predicted eating disorder classification (i.e., subclinical/clinical vs. asymptomatic). Three of the Time 1 variables (i.e., sport pressures to lose weight, dietary intent, pressure to exercise outside of the sport environment) significantly predicted the athletes' ED classification at Time 2, accounting for 39% of the variance. Of the variables from Time 2, only dietary intent was significant, explaining 51% of the ED classification variance at Time 2. The Time 1 and Time 2 psychosocial variables correctly classified 84.9% and 86.8%, respectively, of the athletes into their ED groups at Time 2.

Consistent with previous research (e.g., Anderson et al., 2011; Greenleaf et al., 2010; Hinton & Kubas, 2005), dietary intent was the strongest predictor of ED group classification across the two time points. Specifically, for every one unit increase on the measure of dietary intent, the athletes were 1.89 to 3.6 times more likely to be classified in the subclinical/clinical group. For example, Greenleaf et al. (2010) used a mixed-sport sample of female collegiate athletes to cross-sectionally examine the relationship of psychosocial variables (e.g., body dissatisfaction, dieting, negative affect) to levels of bulimic symptomatology. They found that dietary intent was the strongest significant predictor ($\beta = 0.32$). Similarly, in testing the entire Petrie and Greenleaf (2012) model, Anderson et al. (2011) found that self-reported dietary restraint was a significant predictor of bulimic symptomatology in their sample of female college athletes. Combined with body dissatisfaction and negative affect, these three variables explained 55% to 58% of the variance. Thus, research supports the immediate, as well as long-term,

relationship of self-reported dietary intent to eating disorder outcomes, validating its role as a risk factor in their development.

Dietary intent assesses self-reported intentions to reduce caloric intake and follow other rigid rules around eating. Such intentions may lead female athletes to behaviors associated with an increased preoccupation with food (e.g., cutting out food groups, reducing portion sizing, eating only at specific times of the day) as well as with body weight and shape (e.g., frequent weighing, body checking, body measuring). When female athletes restrict or change their food intake, they may initially experience positive emotions related to the belief that their behaviors will lead to desired changes in their body shape, size, or weight. However, given the high caloric expenditure associated with elite level sports, dieting may result in caloric deficits and physiological levels of hunger that override cognitive restraints (Polivy, Zeitlin, Herman, & Beal, 1994; Ruderman & Besbeas, 1992; Stice, 2001; Stice, et al., 1998). In such situations, athletes may binge, or over, eat, which is a precursor to the development of more severe eating pathology. Moy, Petrie, Dockendorf, Greenleaf and Martin (2013) found that self-reported intentions to diet to lose weight were associated with increased constraints in what individuals allowed themselves to eat and an increased likelihood that they would eat in response to negative emotions (as opposed to because they were physically hungry). Over time, intentions to diet seem to interfere with normal intuitive eating processes, which can set up individuals to develop unhealthy (and pathogenic) approaches to food and eating.

Consistent with recent research (Anderson et al., 2012; Kerr & Dacyshyn, 2000; Petrie et al., 2009a; Reel et al., 2013), perceiving pressure from coaches and teammates to lose weight at the beginning of the season increased the athletes' risk (OR = 1.49) of being classified in the disordered eating group at the end of their season. For example, in a sample of female collegiate

athletes, Reel et al. (2013) found that even after controlling for general societal pressures about weight and dieting, sport pressures regarding weight and appearance uniquely explained the athletes' bulimic symptomatology, body dissatisfaction, and intention to diet. Similarly, in a qualitative study exploring the retirement experiences of elite, female gymnasts, Kerr and Dacyshyn (2000) found that five out of seven gymnasts reported developing a long-lasting preoccupation with weight and body image because of the pressure in their sport environment to lose weight (e.g., coaching staff strictly monitoring weight, daily weigh-ins, fat tests). Moreover, out of these five gymnasts, two reported currently struggling with an eating disorder despite leaving the sport environment between 6 months to 5 years prior. Sport pressures regarding body weight appear to have both short, and long, term influences on female athletes disordered eating, increasing their risk significantly.

The effects of sport weight pressures may raise eating disorder risk through the extent to which they increase female athletes' body dissatisfaction and intentions to diet (Anderson et al., 2011, 2012). At the beginning of a collegiate sport season, after having had several months "off" from formal training during the summer, female athletes may experience increased pressure to get "back in shape," to lose weight, and to look good in their uniforms, being increasingly exposed to comments from coaches and teammates about body shape, weight, and/or appearance. Returning to a collegiate sport environment that is defined by such messages may make the athletes become more conscious of their bodies and dissatisfied with their current weight and shape, and lead them to believe that they need to diet to achieve the physique ideal that is being communicated to them. If, in response to these pressures, female athletes focus on extreme dieting as opposed to eating nutritiously and improving fitness levels, they will increase

their likelihood of engaging in behaviors that would increase their chances of being classified as disordered in their eating.

Experiencing a general pressure to exercise at the beginning of the athletic season predicted a decreased in the likelihood of the athletes being classified as subclinical/clinical at the end of season (OR = .57). Petrie, Greenleaf, Reel, & Carter (2009b) found that although female athletes' primary reason for exercising was to improve health and fitness (i.e., an internal motivation), only exercising to improve appearance increased their risk of being classified with an eating disorder. Similarly, DiBartolo and Shaffer (2002) noted that female collegiate athletes were significantly more motivated to exercise for reasons of health than were non-athlete counterparts. Exercising provides a healthy alternative to dieting for female athletes to take care of their bodies, increase their strength, and improve sport performance. Additionally, if athletes are exercising regularly and achieving desired levels of fitness, they may feel positively about their bodies (e.g., their bodies can do what is needed physically in their sports) and thus be less likely to engage in dieting or other pathogenic weight control behaviors in pursuit of an unhealthy body ideal. Thus, athletes' motivations for engaging in exercise does seem to matter with respect to the development of eating disorder symptomatology. Exercising for reasons of health and fitness appear to have salutary effects, whereas doing so to improve appearance or lose weight may be less healthy.

Limitations

Despite the longitudinal design and geographically diverse sample, several methodological limitations existed that warrant discussion. First, all data were collected via self-report. Thus, athletes may have underreported their symptoms to appear healthier in their

responses. Further, because of the geographical diversity of the sample, we were unable to implement structured interviews to determine diagnostic classification. However, the QEDD has high levels of sensitivity and specificity (Mintz et al., 1997), and has been used extensively to validly diagnose female athlete samples. Second, the athletes were drawn from two weight sensitive sports and primarily were White/Nonhispanic. Thus, generalizability is limited to similar groups of athletes. In future studies, researchers might examine female athletes from other sports and attempt to obtain a more racially and ethnically diverse sample to understand how such dimensions may relate to eating disorder symptomatology (e.g., Brown, Cachelin, & Dohm, 2009). Third, our longitudinal timeframe was only across one athletic season (i.e., 5 months), thus we do not know how prediction might have changed as the athletes either moved into their offseason or into a second or third collegiate season. Researchers could plan studies that collect data across longer periods of time including into athletic retirement to determine how prediction might vary over time.

Implications

Our findings have implications for sports medicine professionals who work with female athletes, coaching staffs, and female athletes' support systems. Given the temporal connection found in this study, if athletes are perceiving pressures about weight or are intending to diet, mental health professionals may want to inquire about the extent and severity of their body and eating related attitudes and behaviors. For those athletes who are struggling with the effects of sport pressures, mental health professionals could provide them with tangible skills (e.g., mindfulness, thought logs), group based interventions specific to female athletes (e.g., Smith & Petrie, 2008), and emotional support. Further, female athletes who currently are dieting could be

referred to nutritionists to ensure that they are making healthy food choices and adequately fueling their bodies for their sports, hopefully leading to a decrease in their intentions to severely (and unhealthfully) restrict their caloric intake.

Second, sport psychologists may want to provide support, education, and guidance to coaches, athletic department personnel, and sports medicine staff (e.g., athletic trainers) to create a "body healthy" environment (Petrie & Greenleaf, 2012). In a body healthy environment, coaching, sports medicine, and strength and conditioning staffs assist female athletes in building the body strength and fitness that is functional for their sport participation rather than arbitrarily focusing on body weight, shape, and size. Further, weighing is done, if at all, only for medical reasons (e.g., when practicing in humid conditions) and conducted by sports medicine staff, such as athletic trainers. Choosing to decrease or eliminate weigh-ins could further dispel the belief that there is a relationship between weight loss and improvements in performance. Sport psychologists can help coaches and team members increase their awareness of how comments and behaviors that focus on body shape, size, and weight creates a culture that may increase the risk of developing unhealthy eating behaviors (Anderson et al., 2012). Developing a sport environment that focuses on developing healthy and strong bodies may decrease the pressures female athletes experience to lose weight and ultimately lead to improvements in their sport performances.

I examined, longitudinally and cross-sectionally, the extent to which variables in the Petrie and Greenleaf (2012) model (i.e., perception of general and sport specific weight pressures, general and sport specific internalization, body satisfaction, dietary intent, negative affect) predicted eating disorder classification (i.e., subclinical/clinical vs. asymptomatic) in a sample of female collegiate gymnasts and swimmers across a five-month athletic season. Of the

variables, dietary intent was the strongest predictor of eating disorder classification, both in the short, and long, term. Sport weight pressures also increased risk, whereas pressures to exercise from family, friends, partners, and the media decreased the likelihood the athletes would be classified as eating disordered. Promoting a body healthy environment within athletic departments and individual teams may decrease risk of disordered eating and, ultimately, improve athletic performance and overall health and well-being. Research on risk factors of eating disorders in female athletes may be extended by examining psychosocial and personality variables over a period of time longer than a single athletic season, such as from one season to the next or into athletic retirement.

Table 1

*Longitudinal Logistic Regression Analysis of QEDD Eating Group Classification as a Function of Psychosocial Variables (*N = *325)*

Variables		B	Wald test	OR	95% CI
PSPS					
	Lose weight	0.32	1.02	1.37	0.74, 2.55
	Exercise	-0.56	4.34*	0.57	0.34, 0.97
	Be more attractive	0.19	0.61	1.21	0.75, 1.93
WPS					
	Weight	0.40	4.63*	1.49	1.03, 2.15
	Appearance	0.22	2.54	1.25	0.95, 1.64
SATAQ					
	Sociocultural Internalization	0.25	1.36	1.28	0.85, 1.94
	Sport Specific Internalization	0.18	0.57	1.19	0.75, 1.90
BPSS					
	Satisfaction with Body	0.15	0.36	1.16	0.71, 1.90
	Satisfaction with Face	-0.17	0.56	0.84	0.54, 1.23
DIS					
	Dietary Intent	0.64	6.69*	1.89	1.16, 3.06
PANAS					
	Fear	0.06	0.65	1.06	0.66, 1.71
	Anger	-0.21	0.50	0.81	0.46, 1.44
	Guilt	0.30	1.14	1.35	0.77, 2.36
	Sadness	0.03	0.02	1.03	0.67, 1.58

Note. OR – Odds Ratio, 95% CI – 95% Confidence interval for the odds ratio with lower and upper limits. PSPS = Perceived Sociocultural Pressures Scale; WPS = Weight-Pressures in Sport – Female; SATAQ = Sociocultural Attitudes Toward Appearance Questionnaire; BPSS = Body Parts Satisfaction Scale; DIS = Dietary Intent Scale; PANAS = Positive and Negative Affect Schedule

* $p < .05$

Table 2

*Cross-Sectional Time 2 Logistic Regression Analysis of QEDD Eating Group Classification as a Function of Psychosocial Variables (*N = *325)*

Variables		B	Wald test	OR	95% CI
PSPS					
	Lose weight	0.25	0.43	1.30	0.60, 2.82
	Exercise	-0.31	0.01	0.97	0.54, 1.74
	Be more attractive	0.19	0.01	1.02	0.59, 1.76
WPS					
	Weight	0.23	2.00	1.25	0.92, 1.72
	Appearance	0.37	3.43	1.45	0.98, 2.14
SATAQ					
	Sociocultural Internalization	0.01	0.01	1.00	0.65, 1.57
	Sport Specific Internalization	0.34	1.39	1.40	0.80, 2.44
BPSS					
	Satisfaction with Body	-0.20	0.54	0.82	0.48, 1.39
	Satisfaction with Face	0.34	1.82	1.41	0.86, 2.31
DIS					
	Dietary Intent	1.28	18.46*	3.60	2.01, 6.46
PANAS					
	Fear	-0.03	0.01	0.97	0.57, 1.65
	Anger	-0.04	0.01	0.81	0.47, 1.94
	Guilt	0.07	0.05	1.07	0.60, 1.91
	Sadness	0.31	1.86	1.36	0.88, 2.10

Note. OR – Odds Ratio, 95% CI – 95% Confidence interval for the odds ratio with lower and upper limits. PSPS = Perceived Sociocultural Pressures Scale; WPS = Weight-Pressures in Sport – Female; SATAQ = Sociocultural Attitudes Toward Appearance Questionnaire; BPSS = Body Parts Satisfaction Scale; DIS = Dietary Intent Scale; PANAS = Positive and Negative Affect Schedule

* $p < .05$

Table 3

*Cross-Sectional Time 2 (top right) and Longitudinal (bottom left) Correlations of Psychosocial Variables and QEDD Eating Group Classification (*N = *325)*

	PSPS W	PSPS Ex	PSPS A	WPS W	WPS A	SATAQ G	SATAQ A	BPSS B	BPSS F	DIS	PANAS F	PANAS A	PANAS G	PANAS S	ED Class	M	SD
PSPS W	-	.74	.73	.56	.26	.53	.38	-.55	-.28	.50	.23	.30	.45	.23	.37	1.77	.77
PSPS Ex	.74	-	.70	.47	.20	.43	.33	-.43	-.26	.43	.28	.31	.40	.23	.31	1.94	.94
PSPS A	.67	.66	-	.47	.18	.49	.35	-.43	-.39	.38	.23	.29	.45	.26	.31	1.90	.96
WPS W	.54	.47	.44	-	.54	.46	.47	-.60	-.31	.59	.25	.27	.45	.25	.48	2.81	1.30
WPS A	.33	.29	.26	.56	-	.26	.20	-.30	-.10	.51	.27	.15	.27	.15	.39	3.29	1.28
SATAQ G	.54	.42	.50	.26	.40	-	.48	-.44	-.31	.44	.16	.23	.33	.22	.31	2.66	.93
SATAQ A	.29	.27	.31	.20	.42	.36	-	-.34	-.23	.45	.15	.15	.22	.16	.31	3.49	.84
BPSS B	-.49	-.40	-.37	-.35	-.58	-.43	-.31	-	.58	-.55	-.24	-.36	-.40	-.31	-.40	4.01	1.03
BPSS F	-.24	-.17	-.29	-.08	-.15	-.33	-.11	.48	-	-.26	-.16	-.21	-.33	-.21	-.15	4.32	.88
DIS	.52	.40	.39	.51	.62	.41	.34	-.52	-.22	-	.29	.22	.44	.23	.52	2.13	.87
PANAS F	.26	.20	.23	.20	.23	.19	.06	-.23	-.20	.25	-	.57	.52	.49	.22	2.16	.82
PANAS A	.33	.29	.33	.24	.29	.26	.06	-.28	-.18	.25	.56	-	.68	.62	.23	1.85	.73
PANAS G	.48	.37	.44	.31	.45	.38	.16	-.48	-.38	.46	.58	.64	-	.61	.37	1.84	.91
PANAS S	.31	.26	.34	.18	.24	.20	.06	-.27	-.21	.26	.55	.61	.68	-	.24	2.13	1.04
ED Class	.34	.19	.29	.35	.42	.32	.23	-.30	-.19	.44	.18	.18	.35	.18	-		
M	1.84	2.04	2.03	3.41	2.86	2.77	3.68	3.93	4.26	2.20	2.19	1.87	1.92	2.16			
SD	.83	.96	.97	1.39	1.32	0.99	0.83	.99	.86	.87	.82	.78	.96	1.04			

Note. Correlations among all the psychosocial variables are Pearson Product Moment correlations. Correlations between ED Class and Psychosocial variables are Point Biserial correlations. PSPS = Perceived Sociocultural Pressures Scale Subscales (scores range from 1, *never*, to 5, *always*), W = pressure to lose weight, Ex = pressure to exercise, A = pressure to be more attractive; WPS = Weight-Pressures in Sport – Female Subscales (scores range from 1, *never*, to 6, *always)*, W = pressure about weight, A = pressure about appearance; SATAQ = Sociocultural Attitudes Toward Appearance Questionnaire Factors (scores range from 1, *completely disagree,* to 5, *completely agree)*, G = general sociocultural internalization, A = sport specific internalization; BPSS = Body Parts Satisfaction Scale (1, *extremely dissatisfied,* to 6, *extremely satisfied*, B = satisfaction with body, F = satisfaction with face; DIS = Dietary Intent Scale (scores range from 1, *never,* to 5, *always)*; PANAS = Positive and Negative Affect Schedule Subscales (scores range from 1, *very slightly or not at all,* to 5, *extremely)*, F = fear, A = anger, G = guilt, S = sadness; ED Class = Symptomatic (0) vs. Asymptomatic (1).

* Correlations > .15 or < -.15 are significant $p < .01$.

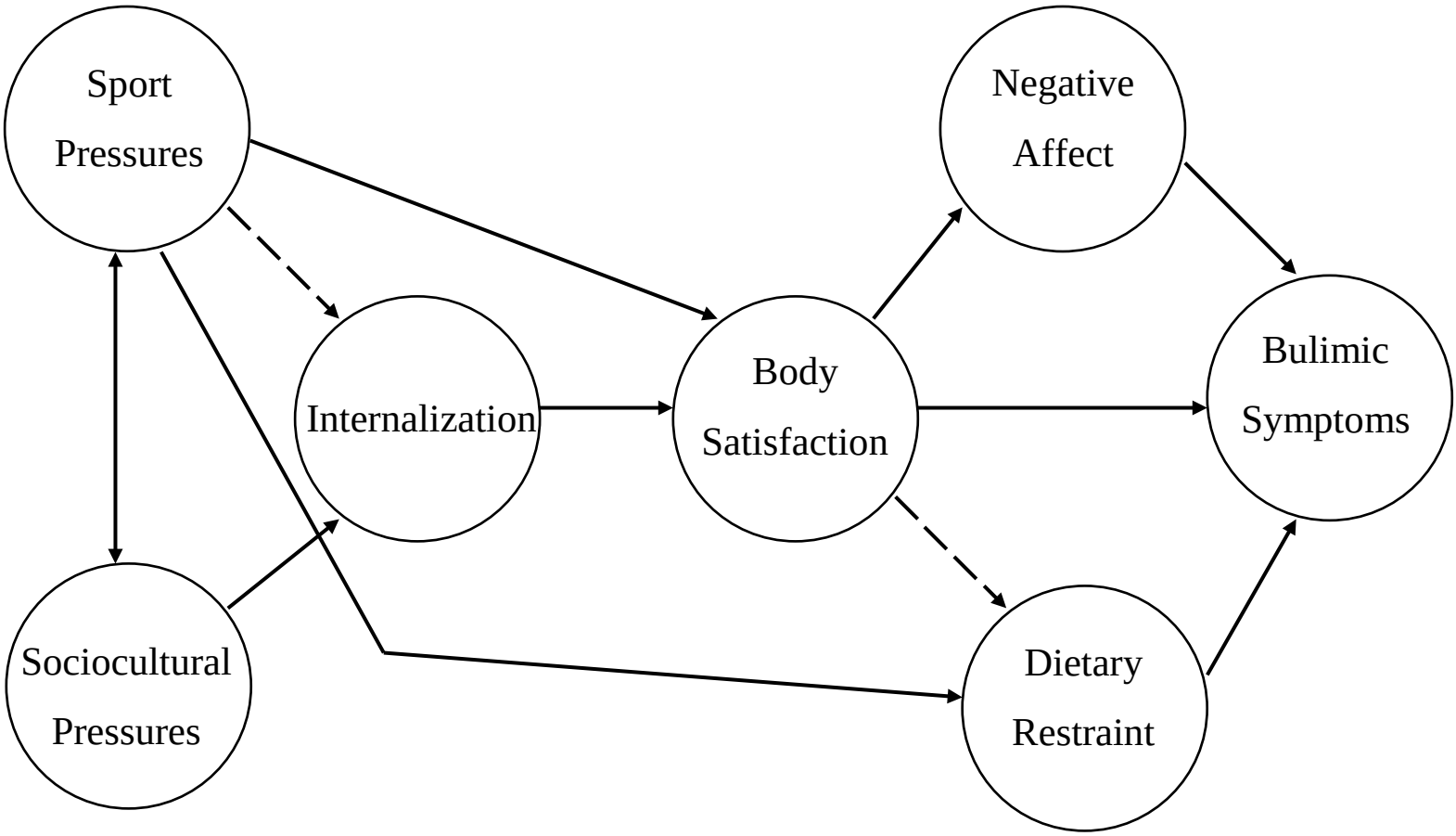

Figure 1. A sociocultural model for the development of bulimic symptomatology for female athletes.

APPENDIX A

REVIEW OF LITERATURE

Collegiate and elite female athletes have been identified as an at-risk population for disordered eating and pathogenic weight management practices (Berry & Howe, 2000; Byrne & McLean, 2002; Greenleaf, Petrie, Carter, & Reel, 2009; Sundgot-Borgen & Torstveit, 2004; Torstveit, Rosenvinge, & Sundgot-Borgen, 2008; Williams, Sargent, & Durstine, 2003). Female athletes not only face general societal pressures regarding body weight, shape, size, and appearance, they also experience unique pressures from their sport environment, such as unhealthy focus on weight and body shape as they relate to performance, revealing uniforms, self-weighing, and comments from coaches and teammates, to name a few (Anderson, Petrie, & Neumann, 2012; Byrne & McLean, 2002; Carrigan, Petrie, & Anderson, 2015; Krane, Choi, Baird, Aimar, & Kauer, 2004; Monsma & Malina, 2004; Reel, Petrie, SooHoo, & Anderson, 2013; Tackett, Petrie, & Anderson, 2016). In response to these general and sport-specific pressures, as well as the concomitant body image concerns, female athletes may experience negative emotions and engage in unhealthy eating and weight control to try to change their physique to more closely approximate the internalized ideals. All of these behaviors and reactions may result in the development and maintenance of eating disorder symptoms.

As such, perception of weight pressures in the general and sport environment, internalization of the thin ideal, body image concerns, restrained eating, and negative affect could be used to predict female athletes' development of eating disorder symptoms. Unfortunately, most ED-athlete research has been cross-sectional, which has precluded researchers from being able to examine if psychosocial functioning predicts eating pathology over time. Further, research has yet to examine all the aforementioned psychosocial variables across an athletic season, a time when athletes may be experiencing sociocultural and sport pressures simultaneously and may be at increased risk of eating disorder symptomatology. Thus,

the proposed study will examine if psychosocial ill-being at the beginning of an athletic season predicts eating disorder symptomatology at the end of an athletic season).

Prevalence of Eating Disorders in the General Population

According to *The Diagnostic and Statistical Manual* 5th Edition (American Psychiatric Association [APA], 2013), individuals diagnosed with Anorexia Nervosa (AN) maintain a significantly low body weight for age and height, have a distorted body image, and engage in excessive dieting that leads to severe weight loss with a pathological fear of becoming fat or gaining weight. The intensity of concern about weight gain may increase as weight falls and many individuals may not recognize or acknowledge their fear of weight gain. In terms of body image, self-esteem is often closely tied to their perception of body shape and weight. Weight loss is often viewed as an achievement and an indication of discipline, and weight gain is viewed as an unacceptable loss of self-control. Extreme weight loss can lead to severe medical complications (e.g., vital sign abnormalities, reproductive dysfunction, loss of bone mineral density; APA, 2013) and psychological disturbances (e.g., depression, anxiety; APA, 2013).

The lifetime prevalence of AN (DSM-IV) among males and females in the general population is between 0.5% -0.9% (APA, 1994; Hudson, Hiripi, Pope & Kessler, 2007). Research indicates that rates of AN are higher in male and female adolescents and young to middle adults (Currin, Schmidt, Treasure, & Jick 2005), constituting approximately 40% of all cases (van Son, Hoeken, Bartelds, Furth, & Hoek, 2006). Prevalence also is higher among girls and women than boys and men (Ackard, Fulkerson, & Neumark-Sztainer, 2007; Isomaa, Isomaa, Marttunen, Kaltiala-Heino, & Bjorkqvist, 2009). For example, in a review of literature, Hoek and Hoeken (2003) found incidence rates of AN (DSM-IV) to be highest for girls, ages 15-19 years (point prevalence rate of 0.3%), compared to 0.0% for similarly aged boys. Further, et a. (2007)

found prevalence of full (DSM-IV) criteria AN to be .4% in girls, and 0% boys. In terms of adult women, researchers have reported a lifetime prevalence of AN (DSM-IV) ranging from 0.9%-2.0%, whereas the prevalence for adult men has been 0.3% (Favaro, Ferrara, & Santonastaso, 2003; Hudson, et al., 2007).

Despite a relatively low prevalence, AN has the highest mortality rate of all psychological disorders, being 12 times higher than healthy controls, four times higher than clinical depression, three times higher than bipolar, and two times higher than schizophrenia (Miller, Grinspoon, Ciampa, Hier, Herzog, & Klibanski, 2005; Arcelus, Mitchell, Wales, & Nielsen, 2011). Franko, Keshaviah, Eddy, Krishna, Davis, Keel, & Herzog's (2013) longitudinal study followed 246 women who had been diagnosed (DSM-IV) with an eating disorder and found that 7.5% of the participants died due to complications with AN, including suicide, cardiac arrest, respiratory failure, gastrointestinal hemorrhage, anoxic brain injury, and pneumonia. Further, individuals diagnosed with AN may experience damage to the brain (e.g., cerebral atrophy, enlargement of the cortical sulci and cisterns) and bone tissue (e.g., osteopenia) as well as the organ systems of the body (Rome & Ammerman, 2003). Similarly, individuals with AN (DSM-IV) are at-risk for a wide range of medical complications (e.g., cardiovascular, gastrointestinal, renal, hematological, skeletal, endocrine, metabolic, and dermatological) and recovery from complications is difficult for individuals (e.g., long term consequences of reproductive, cardiovascular, skeletal system; Meczekalski, Podfigurna-Stopa, & Katulski, 2013).

Bulimia nervosa (BN) involves a cycle of binge-eating (at least one time per week for three months) followed by compensatory weight management practices (i.e., vomiting, excessive exercise, use of diuretics and/or laxatives, etc.), and self-evaluations based on weight or shape

(APA, 2013). Binge eating is associated with a sense of loss of control, marked distress, and secrecy. Individuals with BN are commonly within, or slightly above, normal weight ranges for age and height, and these individuals are preoccupied with appearance and weight (APA, 2013).

The lifetime prevalence of BN (DSM-IV) ranges from 1% to 4.6% in women (APA, 1994; Favaro et al, 2003; Hoek & Hoeken, 2003; Hudson et al, 2007; Kjelsas, Bjornstrom, & Gotestam, 2004). Favaro et al. (2003) conducted individual diagnostic interviews with 1306 women between the ages of 18 to 25 years and found a lifetime prevalence of 4.6% using DSM-IV criteria. In their review of eating disorder prevalence and incidence research, Hoek and Hoeken (2003) reported a lifetime prevalence of BN (DSM-IV) to be 1% for young women aged 18-25 years. Kjelsas et al. (2004) and Hudson et al. (2007) found the lifetime prevalence of BN (DSM-IV) in young women aged 18-25 years to be 1.2% and 1.5% respectively.

Similar to AN, individuals diagnosed with BN often experience serious psychological and physiological complications. Such complications may include infertility, cardiopulmonary symptoms, hypotension, dry skin, “Russell’s sign” (a thickening or scarring over the back of the hand caused by self-induced vomiting and friction of the hand against the teeth), Parotid gland swelling (face may appear swollen or “fat”), erosion of dental enamel, sensitive teeth, tachycardia (increased heart rate), hair loss, gallstones, constipation, esophageal problems, and edema (Mehler, Birmingham, Crow, & Jahraus, 2010). Additional complications related to a diagnosis of BN include an increased risk for dental cavities, the occurrence of skeletal myopathies, and may experience menstrual irregularities (in women), and fluid and electrolyte imbalances (APA, 2013). Additionally, individuals who are suffering from BN (DSM-IV) are at increased risk for experiencing malnutrition, weight cycling, changes in mood, body dissatisfaction, and lowered self-esteem (Comerci, 1990; Mitchell, Specker, & de Zwaan, 1991),

though the risk of death is lower than has been found among individuals suffering from AN (e.g., standardized mortality ratio is 2.33 for BN and 4.37 for AN; Franko et al., 2013).

In order to more accurately capture individuals' eating concerns and reduce the size of the DSM-IV-TR diagnostic category, Eating Disorders Not Otherwise Specified, DSM-V included Binge Eating Disorder (BED) as its own category. Individuals with BED experience recurrent episodes of binge eating, but do not experience pathological compensatory behavior (APA, 2013). The binge-eating episodes in BED include at least three of the following symptoms: eating much more rapidly than normal, eating until feeling uncomfortably full, eating large amounts of food when not feeling physically hungry, eating alone because of feeling embarrassed by how much one is eating, and feeling disgusted with oneself, depressed, or very guilty after the binge (APA, 2013). Complications of BED include obesity and possible death (Hudson, et al., 2007)

Although limited data are available concerning BED, lifetime prevalence rates are available from several large population samples in Europe (Preti, de Girolamo, Vilagut, Alonso, de Graaf, Bruffaerts, et al., 2009) and the US (Hudson, et al., 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). In six European countries (Belgium, France, Germany, Italy, the Netherlands, and Spain) using DSM-IV-TR criteria (i.e., symptoms present for 6 months), Preti et al. (2009) examined 4,139 adult men and women aged 18 years or older. They found an overall lifetime estimated prevalence of 0.72%, and women (1.9%) were more likely than men (0.3%) to meet criteria for BED. Using DSM-V criteria (i.e., symptoms present for 3 months), Hudson, et al. (2007) found higher lifetime prevalence in a sample of adults from the United States (women 3.5%; men 2.0%). Additionally, Swanson et al. (2011) found that adolescent girls were more likely to meet criteria for BED than adolescent boys (girls 2.3%; boys 0.8%). Lastly,

according to the DSM, point prevalence of BED among female adults, age 18 or older, is 1.6% (APA, 2013).

Individuals more often experience the symptoms of an eating disorder, but do not meet full criteria of any of the aforementioned diagnoses. In such cases where these symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning, individuals can be diagnosed with Other Specified Feeding or Eating Disorder (OSFED). Examples of OSFED include atypical AN (characterized by AN behavioral criteria and the individual's weight is within or above the normal range), BN of low frequency and/or limited duration (characterized by BN criteria except the binge eating and compensatory behaviors occur, on average, less than once a week and/or for less than three months), binge-eating disorder of low frequency and/or limited duration (characterized by criteria for binge-eating disorder except that the binge occurs, on average, less than once a week and/or for less than three months), purging disorder (characterized by recurrent purging in attempts to influence one's weight or shape without the use of binge eating), and night eating syndrome (characterized by recurrent night eating that causes significant distress and/or impairment in functioning, not better explained by external influences) (APA, 2013). This category was previously identified as EDNOS (Eating Disorder Not Otherwise Specified) in *The Diagnostic and Statistical Manual*, and prevalence rates will be discussed in EDNOS terms (APA, 1994).

Lifetime prevalence of EDNOS in women has been found to range from 2.4% to 14.6% (Kjelsas et al., 2004; Machado, Machado, Gonçalves, & Hoek, 2007; Ravaldi, Vannacci, Bolognesi, Mancini, Faravelli, & Ricca, 2006). In a sample of 2,028 female students between the ages of 12 and 13 years, Machado, et al. (2007) found a point prevalence of 2.4% of EDNOS using self-report. Higher rates were found in a sample of 59 female students, Ravaldi et al (2006)

found a point prevalence of 8.5% via self-report measures. Similarly, with a sample of 1026 adolescent girls, Kjelsas et al. (2004) found a lifetime prevalence of 14.6%.

Medical complications experienced by individuals with EDNOS are similar to individuals suffering from full-threshold disorders (Peebles, Hardy, Wilson, & Lock, 2010; van Son, Hoek, Hoeken, Schellevis, & Van Furth, 2012). Specifically, individuals with EDNOS are at-risk for high or low blood pressure, slowed heart rate, amenorrhea, osteoporosis, kidney damage, tooth decay, organ failure, depression, and decreased self-esteem (van Son, et al., 2012).

Eating patterns can be conceptualized based on a continuum, from clinical disorders at one end to subclinical manifestations to normal eating at the other end. Disordered eating behaviors and related attitudes that occur at a lower frequency or duration than behaviors and attitudes for any one clinical eating disorder, including OSFED, are described as "subclinical" symptoms (Bunnell, Shenker, Nussbaum, Jacobson, Cooper, & Phil, 1990; Mintz, O'Halloran, Mulholland, & Schneider, 1997; Peck & Lightsey, 2008; Scarano & Kalodner-Martin, 1994; Tylka & Subich, 1999). The differentiation between individuals with clinical vs. subclinical eating disorders is based on the degree to which they experience symptoms. For example, using self-report measures, Peck and Lightsey (2008) found levels of perfectionism, self-esteem, and body dissatisfaction, ineffectiveness, and interoceptive awareness differed across groups (e.g., eating disorder, subclinical, asymptomatic) in a sample of female undergraduates.

Subclinical symptoms occur at a greater rate than clinical diagnoses (Cohen & Petrie, 2005; Tylka, 1999; Tylka & Subich, 2002). Tylka (1999) examined undergraduate women and found that 45% of her sample could be classified as symptomatic (subclinical) based on their responses to the Questionnaire for Eating Disorder Diagnosis (QEDD; Mintz, et al., 1997). Tylka and Subich (2002) found that 78% of their female undergraduate sample used some form of

maladaptive weight control technique (e.g., vomiting, using laxatives, using appetite suppressants, caloric restriction, enemas, increased exercise, etc.) and viewed those techniques as effective methods for healthy weight loss. Additionally, in a sample of 334 female undergraduates, Cohen and Petrie (2005) found that 38.9% of the women endorsed subclinical symptoms, which was higher than those who were classified in the clinical eating disorder group (9.6%).

The personality and psychological problems often found in the clinical eating disorder population also occur with individuals with subclinical eating disorders. For example, adolescent girls who were classified as having a subclinical eating disorder were more likely to suffer from comorbid psychological disorders (i.e., major depression, dysthymia, separation anxiety, and generalized anxiety disorders) than those who were classified as non-eating disordered (Touchette, Henegar, Godart, Pryor, Falissard, Tremblay, & Cote, 2011). Similar to clinical eating disorders, adolescent girls who were subclinical reported greater dissatisfaction with weight, use of pathogenic weight control strategies, view of their own bodies as fat, and weight fluctuation than adolescent girls without eating problems (Melve & Baerheim, 1994). Furthermore, female undergraduates who had been classified as having a subclinical eating disorder were similar to those with clinical eating disorders on measures of negative affect, negative thinking, body image concerns, and internalization of societal ideals; both groups scored higher than the women who were asymptomatic (Cohen & Petrie, 2005). Although less severe than the life threatening medical conditions of those with clinical eating disorders, those with subclinical eating disorders experience chronic fatigue, increased susceptibility to infection, poor or delayed healing and recovery from injury, anemia, electrolyte imbalances, cardiovascular changes, menstrual dysfunction, decreased bone-mineral density, and premature osteoporosis

(Beals & Manore,1994; Brownell & Steen,1992; Brownell, Steen, & Wilmore, 1987; Eichner, 1992; Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997; Pomeroy & Mitchell, 1992).

Research has found the prevalence of clinical eating disorders in girls and women to range from .3% to 14.6%; higher rates are associated with diagnoses of BN, EDNOS, and BED rather than AN. Subclinical eating behaviors are experienced at even higher rates, ranging up to 45%. Women with clinical and subclinical eating disorders experience various medical and psychological symptoms, such as electrolyte imbalance, cardiovascular changes, menstrual dysfunction, and decreased bone-mineral density, and are more similar to each other than to women who are asymptomatic.

Prevalence of Eating Disorders in Female Athletes

Sundgot-Borgen and Torstveit (2004) used the Eating Disorder Inventory-2 self-report measure (EDI-2; Garner, 1991) and follow-up clinical interviews using the Eating Disorder Examination (EDE) diagnostic interview (Cooper, Cooper, & Fairburn, 1989) with a sample of 660 female elite athletes representing eight sport types (technical, endurance, aesthetic, weight class, ballgame, power, antigravitation, and motor). They found a point prevalence of 2.0% for AN in their total sample; the highest rate occurred in aesthetic sports (12%) compared to 0.0% for the athletes from technical, weight class, ballgame, power, and anti-gravitational sports. In a study examining female elite athletes from a variety of sports, Byrne and McLean (2002) used the Composite International Diagnostic Interview (CIDI; World Health Organisation, 1989) and found higher prevalence of AN (5%) among thin-build female elite athletes (i.e., gymnastics, ballet, light-weight rowing, diving, swimming, and long distance running) compared to the athletes who participated in normal-build sports (i.e., tennis, volleyball, hockey, and basketball;

0%). In a sample of 522 who represented the population of elite female athletes in Norway, Sundgot-Borgen (1994) found 1.3% met criteria for DSM-IV AN using the EDI-2.

Studies of female collegiate athletes from NCAA Division I universities have found point prevalence rates of 0% (Johnson, Powers, & Dick, 1999; Carter & Rudd, 2005; Greenleaf, et al., 2009), even in sports (i.e., gymnastics and swimming/diving) that have been considered at increased risk for AN (Anderson & Petrie, 2012). For example, Johnson et al. (1999) examined 1,445 male and female collegiate athletes (football, basketball, track, swimming, gymnastics, wresting, cross-country, crew, tennis, Nordic skiing, volleyball) and found 0% of women met criteria for DSM-IV criteria of AN when using the EDI-2; 11 female athletes, however, self-reported having AN.

BN occurs more frequently than AN in female athletes (Byrne & McLean, 2002; Sundgot-Borgen, Klungland, Torstveit, & Rolland, 1999; Sundgot-Borgen & Torstveit, 2004). In large sample of elite female athletes drawn from the Norwegian Confederation of Sports, including all elite sports in Norway, 8% of the athletes met criteria for BN according to DSM-IV criteria (Sundgot-Borgen, et al., 1999). Within a sample of female elite level athletes from varied sport types, Sundgot-Borgen and Torstveit (2004) reported an overall prevalence of 6% using the EDE and the EDI-2. Rates varied across sport types, including ballgame (4%), technical (4%), endurance (10%), weight class (11%), and aesthetic (12%). Similarly, Byrne and McLean (2002) reported variation in prevalence using the CIDI across thin-build (ballet, gymnastics, light-weight rowing, long distance running, diving, and swimming; 10%) and normal-build (basketball, hockey, tennis, and volleyball; 2%) elite female athletes. When examining a sample of 669 female elite athletes, including those who had qualified for a national team at either a junior or senior level or were members of a recruiting squad for that team, Torstveit et al. (2008)

identified 8.1% as bulimic, in comparison to 4.2% of non-athlete controls using the EDE diagnostic interview.

Among female collegiate athlete samples, initial research documented prevalence rates that did not exceed 5% for BN according to DSM-IV criteria (Johnson et al., 1999; Petrie & Stoever, 1993). For example, in a sample of 1,445 male and female athletes (football, basketball, track, swimming, gymnastics, wresting, cross-country, crew, tennis, Nordic skiing, volleyball), Johnson et al. (1999) found 1.1% females met criteria for DSM-IV criteria BN using the EDI-2. However, 21 female athletes (3.7%) self-reported that they had BN. Additionally, in a sample of 218 female gymnasts from 17 public and 4 private NCAA Division I universities, Petrie and Stoever (1993) reported a 4.1% point prevalence of BN based on athletes' scores that exceeded the established cut-off on the Bulimia Test – Revised (Thelen, Farmer, Wonderlich, & Smith, 1991).

More recent studies with female collegiate athletes that have used the QEDD, a self-report measure designed to make DSM-IV diagnoses of BN and AN. In such studies, researchers have reported BN point prevalence rates of 0% across large, diverse samples (e.g., Anderson & Petrie, 2012; Carter & Rudd, 2005; Greenleaf et. al., 2009). For example, Greenleaf et al. (2009) examined prevalence of eating disorders in 204 female collegiate athletes representing 17 sports across 3 universities. Results indicated no athletes self-reported symptoms consistent with the DSM-IV criteria of BN when using the QEDD. Additionally, Anderson et al., (2012) found that no athletes self-reported symptoms of DSM-IV BN via the QEDD in a large sample of female collegiate, simmers, and divers.

Consistent with prevalence rates in the general public, female athletes experience higher rates of EDNOS than AN or BN (Byrne & McLean, 2002; Carter & Rudd, 2005; Sundgot-

Borgen & Torstveit, 2004). For example, in a sample of 155 elite female athletes who participated in ballet, gymnastics, light-weight rowing, long distance running, diving, swimming, hockey, basketball, tennis, and volleyball, an overall prevalence of 8% for EDNOS was reported; thin-build athletes' rate was 16% in comparison to normal build athletes (6.5%) and non-athletes using the CIDI (4.5%; Byrne & McLean 2002). Comparably, in a sample of Norwegian elite female athletes, 8% were diagnosed with EDNOS when using the EDE and EDI-2 (Sundgot-Borgen & Torstveit, 2004); across sports, rates varied from 5% (endurance sports) to 13% (weight class sports). Torstveit, et al. (2008) used the EDE and found that 19.9% of 669 elite female athletes met the criteria for EDNOS, in comparison to 17.2% for non-athlete controls.

Prevalence of EDNOS has ranged from 2.0% to 6.3%, among female collegiate athlete samples (Anderson & Petrie, 2012; Greenleaf et al., 2009; Johnson et al., 1999; Sanford-Martens, Davidson, Yakushko, Martens, & Hinton, 2005). Greenleaf et al. (2009) used the QEDD and found 2.0% female NCAA Division I college athletes from 17 different sports experienced EDNOS. Anderson and Petrie (2012) examined eating disorder symptomatology in a sample of 414 NCAA female gymnasts and swimmers with the QEDD and found 6.3% (n = 26) met the criteria for EDNOS, which included subthreshold BN (n = 20), non-bingeing bulimia (n = 4), and binge eating disorder (n = 2).

Subclinical prevalence rates are higher than those reported for clinical diagnoses and have ranged from 12.1% to 38%, depending on the sports sampled and how the researchers determined their subclinical category (Carter & Rudd, 2005; Greenleaf, et al., 2009; Johnson, et al., 1999; Sundgot-Borgen, 1994; Williams et al., 2003). For example, Greenleaf et al. (2009) examined disordered eating in 204 female NCAA Division I collegiate athletes from three universities across 17 sports. Using QEDD to classify the athletes' ED status, they found 25.5%

to be symptomatic (or experiencing symptoms at the subclinical level). Carter and Rudd (2005), when assessing an entire athletic department of female athletes using the QEDD across a two-year period, reported subclinical rates that ranged from 17.0% to 19.0%.

Using a different measure of eating disorder symptomatology in a sample of 587 female collegiate student-athletes from nine universities representing 14 different sports, Williams et al. (2003) found that 20.1% were "subclinical" (i.e., meeting or exceeding the pre-existing cut points on the EAT-26, the Body Dissatisfaction [BD] subscale, or the Drive for Thinness [DT] subscale). Sundgot-Borgen, (1994) reported 22.4% of elite female athletes being classified as "at-risk" for developing a clinical disorder (based on responses to the Eating Disorder Inventory [EDI]). According to Johnson et al., 38% (EDI) of female collegiate athletes were considered to be "at-risk" for developing an eating disorder, a categorization that is consistent with subclinical levels of EDs.

Athletes do suffer from clinical eating disorders, though they experience BN and EDNOS with greater frequency than AN (Byrne & McLean, 2002; Carter & Rudd, 2005; Sundgot-Borgen & Torstveit, 2004). This pattern makes sense because severe weight loss through persistent restriction of food (primary criterion of AN) is not conducive to peak athletic performance. Further, revealing uniforms and scrutiny from coaches and athletic trainers would make severe weight loss easily detectable. The rates of subclinical eating problems are even higher than for clinical concerns (Carter & Rudd, 2005; Greenleaf et al., 2009; Greenleaf, Petrie, Reel, & Carter, 2010; Johnson et al., 1999; Sundgot-Borgen, 1994; Williams et al., 2003), which is likely because athletes' disordered behaviors may be easy to hide in the sport environment (e.g., athletes may be praised for their dedication to healthy eating and physical fitness). However, consequences of subclinical eating disorders include reduced athletic performance, considerable

psychological distress, and significant health risks (e.g., chronic fatigue, increased susceptibility to infection, anemia, electrolyte imbalances), which are similar to what occurs with athletes who have clinical concerns.

Sociocultural Models of Disordered Eating

Theoretical models describing the etiology of eating disorders among women are well-established and include biological, psychological, genetic, and sociocultural perspectives (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Moradi, 2010; Polivy & Herman, 2002; Striegel-Moore & Bulik, 2007). Models that highlight sociocultural influences/pressures about body, weight, and appearance - including the sexual objectification of women - have been particularly influential in understanding women's risk for developing an eating disorder (Fitzsimmons-Craft, 2011; Fredrickson & Roberts, 1997; Keel & Forney, 2013; Moradi, 2010; Polivy & Herman, 2002; Stice, 2002; Striegel-Moore & Bulik, 2007). The basic tenet of the sociocultural perspective is that cultural values influence individual values and behaviors. This perspective suggests that the definition and self-perceptions of body attractiveness are contextual (Cash & Pruzinsky, 2002). According to sociocultural approaches, disordered eating results from internalizing unattainable Western societal ideals regarding appearance, body size/shape, weight, and what it means to be feminine (Malkin, Wornian, & Chrisler, 1999, Striegel-Moore et al., 2007; Sypeck, Gray, & Ahrens, 2004). Risk factor literature has identified general weight pressures, modeled behaviors from family and friends, internalization of the thin ideal, body image concerns, restrained eating, and negative affect as variables that potentially would be related to and be able to discriminate among different levels of disordered eating in women (Nevonen & Broberg, 2000; Stice, 1998, 2002; Strong & Huon, 1998; Wade & Lowes, 2002).

The idealization of the thin body type that is promoted by society may lead to body image concerns for women (Keel & Forney, 2013). According to the Tripartite Model of body dissatisfaction and eating disturbance, the sociocultural emphasis on thinness is reinforced and perpetuated by three primary factors: the media (i.e., television, advertisements, and magazines), parents (e.g., parental focus on weight/dieting), and peers (e.g., peer discussions about dieting and weight-based teasing; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Thompson, Schaefer, & Menzel, 2012). In the U.S. and other Western societies, female beauty is defined through thinness, low body weight, and the maintenance of a limited caloric intake (Spettigue & Henderson, 2004). This standard is communicated through the media (e.g., magazines, movies, models), such as when the media presents slender women as successful, in control, happy, and healthy in advertisements (Hesse-Biber, Leavy, Quinn, & Zoino, 2006). The media often glorifies models and celebrities who do not accurately represent the body size, shape, and weight of the majority of women; thus, setting up an impossible ideal for them to attain (Polivy & Herman, 2002).

Messages about societal beauty standards are further reinforced by family and peer groups (Levine, Smolak, & Hayden, 1994; Tylka & Subich, 2004; Stice, Agras, & Hammer, 1999). Specifically, family units that emphasize weight and body image (e.g., teasing, diet talk, modeling) create an environment in which children and adolescents internalize such attributes (Keery, Boutelle, ven den Berg, & Thompson, 2005; Loth, Neumark-Sztainer, & Croll, 2009, Neumark-Sztainer, Falkner, Story, Perry, Hannan, & Mulert, 2002). For example, appearance-related teasing in families has been strongly linked to body dissatisfaction, eating disturbance, weight concerns, drive for thinness, bulimic behaviors, depressive symptoms, and suicidal ideation and attempts (Eisenberg, Neumark-Sztainer, Story, 2003; Fabian & Thompson, 1989;

Keery, et al., 2005; Taylor, Sharpe, Shisslak, Bryson, Estes, Gray, McKnight, Crago, Kraemer, & Kellen, 1998; Wertheim, Koerner, Paxton, 2001). Taylor et al. (1998) found that 28.7% of adolescent girls from across the U.S. reported being teased by at least one family member about weight. Further, these adolescent girls were more likely to engage in unhealthy weight control strategies, binge eating, and eating disturbances, and reported greater body dissatisfaction and investment in thinness than girls who were not teased. Several studies also suggest that weight related teasing may be more harmful to girls as they age (Fabian & Thompson, 1989; Field, Camargo, Taylor, Berkey, Roberts, & Colditz, 2001). Field et al. (2001) found that teasing was a significant predictor of weight control practices in middle, but not elementary, school girls. Further, teasing was significantly associated with body size overestimation in girls who had reached puberty, but not in those who were premenarcheal (Fabian et al., 1989).

Regarding the specific sources of familial teasing, a study of 372 middle school girls found that one-fourth and one-third, respectively, reported being teased about their appearance by a parent or by at least one sibling (Keery et al., 2005). Results also indicated that girls who were teased about their appearance by parents and/or siblings reported higher levels of body dissatisfaction, social comparison, internalization of the thin ideal, eating pathology, depression, and lower self-esteem than those who were not teased. Further, girls who said they were teased by fathers and older brothers also reported the most disturbances on the outcomes (e.g., body dissatisfaction, eating pathology). Similarly, Field et al. (2001) reported on a 1-year follow-up study of 6770 girls and 5287 boys between the ages of 9 and 14 years and found when fathers were perceived to view thinness or lack of fat as important, girls were more likely than their peers to become constant dieters.

Maternal encouragement to lose weight has also been associated with negative outcomes (Armstrong & Janicke, 2012; Benedikt, Wertheim, & Love, 1998; Francis & Birch, 2005; Pike & Rodin, 1991). In a cross sectional study including a sample of 94 mother-child pairs, mothers' encouragement for their daughters to lose weight mediated the daughter's BMI z-score and dietary restriction (Armstrong & Janicke, 2012). In a sample of 173 mother-daughter pairs, mother's encouragement of daughter's weight loss was related to daughters' dietary restraint using a cross-sectional design (Francis & Birch, 2005). The relationship between mother's encouragement and daughter's dietary restraint was mediated by daughter's perception of maternal pressure to lose weight. Neumark-Sztainer, Bauer, Friend, Hannan, Story, & Berge (2010) studied the effects of mothers' dieting-related behaviors on daughters' dietary restraint in a cross-sectional study of 356 overweight adolescent girls. Results of their analyses showed that maternal talk of weight concerns and dieting, as well as engagement in dieting behavior, predicted extreme weight control measures and binge eating among daughters, even after controlling for daughter BMI.

Additionally, mothers may model behaviors related to weight control for their daughters (Levine, et al., 1994), and research suggests that girls who observe their mothers dieting and expressing concern about weight and shape are more likely to utilize unhealthy strategies for weight management (e.g., skipping meals, restricting food groups, binging, purging, excessively exercising) compared to girls who do not witness such behaviors from their mothers (Hill & Franklin, 1998; Neumark-Sztainer, et al., 2010; Pike & Rodin 1991). For example, in a sample of 356 adolescent girls from 12 high schools (Neumark-Sztainer et al., 2010), 45% reported that their mothers encouraged them to diet, which was associated with many disordered eating behaviors (e.g., binge eating). Approximately two-thirds of the participants reported that their

mother dieted or talked about her own weight in front of them. Mother's dieting was associated with greater use of unhealthy weight control behaviors (e.g., fasting, restricting food, using food substitutes, skipping meals), whereas talking about her own weight was related to use of unhealthy weight control behaviors, and binge eating in the daughters.

Peer relationships become increasingly important from childhood to adolescence and adulthood, and are another source of pressure regarding the importance of thinness. Peer influence has long been regarded as a contributor to the development of body image and eating disorders via the modeling of unhealthy behaviors and dieting practices (Levine et al., 1994). Adolescent girls typically insert themselves into peer groups that hold similar beliefs and values to their own; thus girls who are already at-risk for disordered eating and body dissatisfaction will create a social environment in which concerns about their body weight, shape, and the importance of thinness become amplified (Rayner, Schniering, Rapee, Taylor, & Hutchinson, 2013). Women who have internalized the thin ideal are at risk for self-selecting peer groups that reinforce thoughts about the female body and model particular body related behaviors (McGue, Osler, & Christensen, 2010). Reinforcement and modeling of the thin ideal likely increase body dissatisfaction, which then increases the risk of women developing disorder-eating habits.

Huon and Walton (2000) found that female adolescents regularly discuss weight and dieting with their peers. Given that girls often are part of groups that will confirm, rather than challenge, their beliefs about thinness and the body, they are likely to be susceptible to encouragement of unhealthy body attitudes and eating behaviors in talking with their peers. For example, in a longitudinal study, Paxton, Eisenberg, and Neumark-Sztainer (2006) found that exposure to a friend dieting significantly predicted higher body dissatisfaction, use of unhealthy weight management strategies, and binge eating and loss of control of eating in girls five years

later. In a longitudinal study of college women, Keel, Forney, Brown, and Heatherton (2013) found that roommate dieting predicted maintenance of drive for thinness, bulimic symptoms, and purging ten years later, and women whose roommates never dieted or dieted less frequently exhibited the greatest reduction in their own drive for thinness and bulimic symptoms over the same time period.

The sociocultural approach is one explanation of the occurrence of disordered eating and body image concerns among women. Repeated exposure to messages regarding the ideal body from the media, family, and peers may increase the likelihood of a women internalizing societal ideals about beauty, appearance, weight, body and what it means to be feminine. Unfortunately, societal expectations are both unnatural and unattainable for most women's bodies. When there are discrepancies between one's actual body and society's ideal body, body dissatisfaction, negative affect, and restrained eating can emerge leading to an unhealthy cycle of disordered eating behaviors (Polivy, Herman, Hackett, & Kuleshnyk, 1986; Striegel-Moore, Silberstein, & Rodin, 1986). Consequently, pressure to be thin from media, family, and peers can lead to the development of eating disorders.

Internalization of the thin-ideal, or the extent to which an individual 'buys into' socially defined ideals of attractiveness (Heinberg & Thompson, 1995; Heinberg, Thompson, & Stormer, 1995; Levine & Murnen, 2009; Thompson & Stice, 2001), is an important factor in the development of body dissatisfaction (Cafri, Yamamiya, Brannick, & Thompson, 2005; Moradi, Dirks, & Mateson, 2005; Thompson & Stice, 2001). Internalization is one mechanism through which exposure to mass media is linked to the development of eating pathology **(**Haug, Heinnberg, & Guarda, 2001; Thompson, & Gray, 1995).

Internalization of the thin ideal, related values about food, eating, weight, body size/shape, and what it means to be feminine occurs when women subscribe to socially presented messages about appearance and attractiveness, perceiving those messages to be factual and inflexible (Hesse-Biber et al., 2006). Women who actively engage in material promoting the thin ideal (e.g., magazines, media images) report higher levels of internalization than those who do not (Brown & Dittmar, 2005; Dittmar, 2005; Grabe, Ward, & Hyde, 2008; Herman & Polivy, 2004, Levine & Murnen, 2009). For instance, in a meta-analysis regarding mass media as a causal risk factor for negative body image and disordered eating in females, Levine and Murnen (2009) found a small to moderate positive correlation between exposure to mass media (i.e., time spent reading fashion magazines and viewing appearance-related television) and thin ideal internalization (r =.12 to .44). In a separate meta-analysis of both experimental and correlational studies examining the link between media exposure and women's internalization of the thin ideal, body dissatisfaction, and eating attitudes and behaviors, Grabe et al. (2008) found self-reported and manipulated exposure to media images were associated with greater thin-ideal internalization (d = -0.39; negative effect sizes represent more negative outcomes).

If women do internalize culturally prescribed body ideals and make them part of their self-schemas, they develop a standard against which they can compare themselves (Anschutz, Engels, & Van Strien, 2008; Lieberman, Gauvin, Bukowski, & White, 2001; McCabe & Ricciardelli, 2001; Polivy & Herman, 2002; Stice, 2002; Stice, Mazotti, Krebs, & Martin, 1998; Stice, Maxfield, & Wells, 2003; Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Stice, Spangler, & Agras, 2001). Such real-ideal comparisons, and the discrepancies that often result, may lead to heightened and negative disturbances in perceptions of bodies, weight, size, shape, appearance, and physical attractiveness. Specifically, the more discrepancy there is between women's

perceptions of their bodies and selves and what they believe they should be (the ideal), the more dissatisfied they will be with their physiques, appearance, and themselves overall (Higgins, 1987). These real – ideal discrepancies are almost always present for women because societal ideals are unattainable for most.

Empirical evidence supports sociocultural variables as important risk factors for the development of body image dissatisfaction, which is in turn a casual risk factor for eating pathology (Stice, 2002). Research has demonstrated associations between thin-ideal internalization and disordered eating, **(**Cafri, et al., 2005; Clark & Tiggemann 2006; Grabe et al., 2008; Keery, van den Berg, & Thompson, 2004; Levine & Murnen, 2009; McNight, 2003; Stice, 2002; Thompson & Stice, 2001) and interventions that target a reduction in thin-ideal internalization have been shown to reduce body dissatisfaction (Coughlin & Kalodner, 2006; Yamamiya, Cash, Melnyk, Posavac, Posavac, 2005). For example, in a review of the literature regarding internalization in adult women, Thompson and Stice (2001) examined the role of internalization of the thin-ideal in the development of disordered eating attitudes and behaviors, such as body-image, eating disturbance, dieting, and negative affect, and determined that internalization was a risk factor. Specifically, women with higher levels of sociocultural internalization endorsed more symptoms of extreme dieting, negative affect, and negative body image. In a meta-analysis, Grabe et al. (2008) found self-reported and manipulated exposure to media images were associated with greater body dissatisfaction (d = -0.28; negative effect sizes suggest more negative outcomes) and more disordered eating-related attitudes and behaviors (d = -0.30). Further, in a cross sectional study including 325 adolescent girls, Keery et al. (2004) found a direct pathway from internalization to restriction (path coefficient = .17). However, the

strength of this coefficient and lack of substantiated findings suggests that internalization of the thin ideal likely impacts disordered eating primarily through its influence of body image.

In their review of the literature, Polivy & Herman (2002) determined that internalization of the thin-ideal likely increases one's body dissatisfaction, and body dissatisfaction can be regarded as a fundamental antecedent to the development of an eating disorders (Cooley & Torray, 2001; Garner, 2002; Polivy & Herman, 2002; Stice, 2002; Tylka, 2004). Prospective and experimental research pertaining to body satisfaction and eating disorders has been conducted and found that body dissatisfaction temporally precedes eating disordered behaviors and can be considered a risk factor for the development of eating disorders in women (Stice & Shaw, 2002). Body dissatisfaction is thought to lead to eating disorder symptomatology directly, as well as indirectly via negative affect and self-reported dietary intent (Anschutz et al., 2008; Lieberman et al., 2001; McCabe & Ricciardelli, 2001; Polivy & Herman, 2002; Stice, 2002; Stice et al., 2001; Stice, et al., 1998; Thompson & Stice, 2001).

Longitudinal studies with adolescent girls and young adult women have confirmed that initial elevations in body dissatisfaction are directly and indirectly related to the increase of risk for subsequent onset of eating disorder symptoms (Attie & Brooks-Gunn, 1989; Ball & Lee, 2001; Field, Camargo, Taylor, Berkey, & Colditz, 1999; Ghaderi & Scott, 2001; Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Leon, Fulkerson, Perry, Keel, & Klump 1999; Stice, 2001; Stice & Agras, 1998; Stice, Davis, Miller, & Marti, 2008; Stice, Presnell, & Spangler, 2002; Vollrath, Koch, & Angst, 1992). Much of the research examining whether body dissatisfaction influences a change in eating has been conducted in adolescent girls. For example, 496 adolescent girls completed annual interviews and surveys over the course of nine years regarding psychosocial

well-being and symptoms of eating disorders. Researchers found body dissatisfaction was the strongest predictor of risk for onset of any eating disorders (Stice, et al., 2008).

According to the dual pathway model (Stice, 1994; Stice & Agras, 1998; Stice, Nemeroff, & Shaw, 1996; Stice, Shaw, & Nemeroff, 1998), it is through dietary restraint and/or negative affect that body dissatisfaction leads to disordered eating. In the first pathway, dietary restraint is expected to result from body dissatisfaction because women believe they can substantially manipulate their body size and shape by limiting their caloric intake and losing weight (Poilvy, Herman, & McFarlane, 1994). Such weight loss would be expected to lessen the real-ideal body discrepancy and subsequently reduce the dissatisfaction women feel. Further, Stice et al. (1994) proposed that dieting serves the purpose of eliminating feelings of dissatisfaction about one's body by attempting to make one's actual body match an ideal body. Commonly, people believe that extreme dietary restraint leads to weight loss and body changes. Unfortunately, restriction often leads to episodes of binge eating rather than weight loss, which is a precursor to BN (Mitchell, Laine, Morley, & Levine, 1986). In most cases of intentional caloric deprivation, individuals' physiological hunger overcomes their desire to restrict food and increases the likelihood of binge eating (Polivy, Zeitlin, Herman, & Beal, 1994; Ruderman & Besbeas, 1992, Stice, 2001; Stice & Agras, 1998).

This pattern of binging after dieting has been linked to concurrent and excessive thoughts about eating and weight, and research suggests that weight control and caloric deprivation result in an increased fixation with food (Bruch, 1978). As food becomes the spotlight of the dieter's mind and caloric deprivation increases, food becomes harder to resist and the likelihood of eating self-forbidden foods and self-forbidden amounts of food increases. For example, if a dieter believes she is "in control" of her food consumption and diet, she will likely continue to eat

frugally, but when she believes that her diet has been spoiled or she no longer feels in control of her food intake, she may overeat or binge (Herman & Mack, 1975; Herman, Polivy, & Silver, 1979; Spencer & Fremouw, 1979; Woody, Costanzo, Leifer, & Conger, 1981). The dieter's perceived failure of self-control often results in negative affect, and the dieter will utilize strategies, such as different forms of purging (e.g., vomiting), to rid herself of the unwanted food and reduce the negative feelings she has about herself.

In the second pathway, which focuses on the experience of negative affect, body dissatisfaction is thought to lead to intense and persistent states of negative affect, such as shame, guilt, anger, and sadness, because appearance is the central form of evaluation for women in western culture (Stice, 2001). When evaluating themselves, body dissatisfied individuals are likely to experience negative emotions (e.g., disappointment, guilt, embarrassment, frustration, shame) and view their bodies as not good enough. Thus, unhealthy eating behaviors (i.e., binging) may be used as a mechanism to regulate negative emotions and to distract/comfort individuals from what they are feeling (Heatherton & Baumeister, 1991; Stice, 2001). Stice (1998) suggested that individuals may use binging and purging strategies as a way to manage their negative feelings and distract from uncomfortable emotions. For example, Mitchell et al. (1981) found that individuals suffering from BN endorsed feeling depressed before the onset of a binge. Further, Schupak-Neuberg & Nemeroff (1993) found that individuals suffering from BN reported more negative emotions before a binge than individuals without BN. More recently, ecological momentary assessment research has found that women with BN and women with BED endorsed more negative mood prior to a binge eating episode than a regular meal (Hilbert & Tuschen-Caffier, 2007). Further, Hilbert and Tuschen-Caffier (2007) found that women with BN and BED reported increased negative mood rather than feeling "less depressed" following a

binge. Their results suggest that although binge eating may be used as a technique to regulate emotions, it may lead to greater emotional distress. Thus, binge eating leaves some individuals with subsequent feelings of negative affect (e.g., guilt, sadness, anxiety) because of the loss of self-control they experience during the binge. This resulting negative affect is seen as a driving force to eliminate or undo the consumption of food (e.g., vomiting, excessively exercising, caloric restriction, laxatives; Berg, Crosby, Cao, Peterson, Engle, Mitchell, & Wonderlich, 2013; Schupak-Neuberg & Nemeroff, 1993).

The dual pathway model has been tested in samples of adolescent, community, and overweight women (Stice, 2001; Stice, et al., 2008; Stice, et al., 1996; Stice, et al., 1998), and results indicate inconsistent support for the dietary restraint pathway (Gagnon-Girouard, Bégin, Provencher, Tremblay, Boivin, & Lemieux, 2009; Stice, et al., 2008). Gangon-Girouard et al. (2009) tested the dual-pathway model in a sample of weight-preoccupied overweight women and found only partial support dietary restraint pathway. Body dissatisfaction was not significantly related to restraint, but the measure of restraint was positively and significantly associated with bulimia symptomatology in the sample. The women in this sample were not currently dieting and were not calorically deprived at the time of participation (weight was maintained for 2 months prior to the study); however, participants endorsed high scores on measures of restraint. Results suggest that these women may be perceiving caloric restriction rather than behaviorally restricting. Gangon-Girouard et al. (2009) hypothesized that the perception of restriction lead to binge eating. In a longitudinal study including in a sample of 496 adolescent girls followed over 5 years, results indicated those self-reporting elevated dietary restraint showed elevated risk for onset of threshold or subthreshold bulimia nervosa (Stice, et al., 2008). Thus, although support

for the negative affect pathway between body dissatisfaction and bulimia symptomatology varies, research does suggest that dietary restraint predicts bulimia symptomatology.

Research indicates consistent support for the negative affect pathway (Engler, Crowther, Dalton, Sanftner, 2006; Stice, et al., 2008; Stice et al., 1998). In Gangon-Girouard et al. (2009) examination of the dual-pathway model in a sample of weight-preoccupied overweight women found support for the body satisfaction to bulimia symptomatology via negative affect. Further, the association between negative affect and eating disorder symptomatology has been observed in adolescent women, and among clinical samples of women with diagnosed eating disorders (Van Strien, Engels, Leeuwe, & Snoek, 2005). For example, in a sample of female undergraduates, Cohen and Petrie (2005) found that symptomatic and eating-disordered groups reported more sadness, anxiety, guilt, shame, and stress and less happiness, confidence, and self-esteem than did the asymptomatic group. Further, in a sample of overweight women, participants endorsing higher levels of negative affect were found to endorse more severe levels of binge eating severity than those with lower levels of negative affect (Henderson & Huon, 2002). More recently, a randomized trial exploring the efficacy of a cognitive-behavioral intervention in reducing depressive symptoms was found to also lead to decreases in bulimic symptomatology in high school and college women (Stice, Burton, Bearman, & Rohde, 2007).

In Stice's model, he proposes that body dissatisfaction leads to eating disorder symptomatology (e.g., binge eating) via two pathways: restraint pathway and negative affect pathway (Stice, 2001). The restraint theory proposes that caloric restriction has psychological and physiological symptoms that lead to bulimia symptomatology. The negative affect pathway connects body dissatisfaction to experiencing negative emotions to bulimia symptomatology. The theory suggests that body dissatisfaction leads to feeling bad about one's body and negative

emotions are managed with symptoms of bulimia (i.e., binging and purging). Finally, the model also proposes that dieting and negative affect could interact with each other. For example, dieting can lead to negative affect because caloric restriction is not an effective strategy for significantly manipulating body shape, size, and weight. Consequently, in Stice's (2002) review of longitudinal and experimental research, he identified sociocultural pressures, internalization, body dissatisfaction, dietary intent, and negative affect as risk factors, meaning that they preceded and contributed to the development of eating disordered symptoms.

Summary

Sociocultural theories argue that Western cultural values of appearance influence the development of body dissatisfaction. Western cultural emphasizes physical appearance as central to a woman's worth. Women are encouraged to emulate the body ideals presented by mass media and reinforced by family and peer groups. Some women internalize these messages regarding beauty and incorporate them into their own value systems. The societal pressures and possible internalization of the thin ideal can lead to body dissatisfaction, and body dissatisfaction, in turn, is one of the most empirically supported risk factors for the development of eating disorders (Stice, 2002; Wildes, Emery, & Simons, 2001).

Body dissatisfaction can directly and indirectly lead to eating disorder symptomatology. Indirect pathways include dietary restraint and negative affect. Stice (2002) suggests that body dissatisfaction influences both pathways individually, which in turn leads to bulimia symptomatology. Cross-sectional and longitudinal research in diverse non-clinical populations has found inconsistent support for the dietary restraint and consistent support for the negative affect restraint. Ultimately, the dual pathway model suggests that individuals may develop bulimic eating patterns due to intense dieting, negative affect, or a combination of the two (Stice,

2001). However, given the inconsistent findings for the dietary restraint pathway in diverse populations, it is necessary for research to continue testing to dual-pathway model in diverse populations, especially those who demonstrate greater risk for disordered eating (e.g., female collegiate athletes).

Sociocultural Models of Disordered Eating in Sport

Petrie and Greenleaf (2012) adapted existing sociocultural models of eating disorders for male and female athletes (see figure 1). This model acknowledges that female athletes, like non-athletes, experience general sociocultural pressures, but also includes the pressures about body, weight, performance and appearance that exist within the sport environment and are communicated by coaches, teammates, judges, parents, and other sport personnel (de Bruin, Oudejans, Bakker, & Woertman, 2011; Petrie & Greenleaf, 2007; Thompson & Sherman, 2010). Thus, sociocultural models for athletes delineate the two types of pressures female athletes may experience – from general societal sources as well as those specific to the sport environment – and indicate how these pressures may play a role in the development of body image concerns and disordered eating attitudes and behaviors.

In addition to the two sources of pressure, Petrie and Greenleaf's (2012) model incorporates the same constructs used in non-athlete literature -- internalization, body dissatisfaction, negative affect, dietary restraint, and bulimic symptomatology – but also adds the construct of Drive for Muscularity. They proposed that female athletes' body dissatisfaction, negative affect (e.g., anger, guilt, sadness), and dietary restraint (and possibly drive for muscularity) would be the direct and primary precursors of bulimic symptomatology. In the sections that follow, I examine the research on the constructs in the model.

Support for the effects of the general societal pressures on disordered eating attitudes and behaviors have been found in female athletes (e.g., Anderson, Petrie, Neumann, 2011; Petrie, Greenleaf, Reel, & Carter, 2009a; Petrie, Greenleaf, Reel, & Carter, 2009b). For example, in female collegiate athletes representing a wide range of sports, women who were classified as having either subclinical or clinical eating disorders endorsed greater pressure from parents, friends, significant others, and media sources to achieve or maintain a certain body size or weight than women who were asymptomatic (Petrie et al., 2009a). Furthermore, Petrie et al. (2009b) examined female collegiate athletes and found their investment in appearance and motivation to exercise in order to improve their physical appearance were the best predictors of eating disorder classification (i.e., subclinical ED). Finally, Anderson et al. (2011), tested the Petrie and Greenleaf (2007) sociocultural model with a large sample of female Division I collegiate gymnasts, swimmers, and divers. They found that the experience of sociocultural pressures was related to higher levels of internalization of body focused ideals promoted by society (R^2 = .26 to .41).

In the sport environment, there are pressures about body weight, shape, size, appearance, and composition that emanate from teammates, coaches, judges, and fans. Although some slight differences may exist across sports, common sport-environment pressures include: wearing form-fitting (or body revealing) uniforms, perceiving lower body weight as assisting in performance, comments by coaches, teammates and judges about weight and body size and composition, pressure to attain or maintain a certain weight, and sport-participation weigh-ins (Thompson & Sherman, 2010; Petrie & Greenleaf, 2012).

Research on athlete's internalization of sociocultural and athletic ideals and how that relates to eating disorder outcomes is limited and mostly cross-sectional (e.g., Anderson et al.,

2011; Greenleaf, et al., 2010; Petrie, 1993; Petrie et al., 2009a). For example, Petrie (1993) found that female collegiate gymnasts classified with BN reported higher scores on a measure of internalization than did those who were described as normal eaters. Further, in an independent mixed sport sample of female collegiate athletes, Petrie et al. (2009a) found that the women classified with subclinical or clinical eating disorders reported placing greater value on cultural and sport specific ideals (e.g., being physically fit, in shape, attractive, and thin) compared to athletes who were asymptomatic. Additionally, in a diverse sport sample of female collegiate athletes, Greenleaf et al. (2010) found the women who more strongly internalized societal ideals about appearance endorsed higher levels across all psychosocial variables (i.e., body dissatisfaction, negative affect, dietary restraint, bulimic symptomatology).

However, findings from Anderson et al. (2011), did not support the pathway between sport-specific pressures and internalization that was proposed by the Petrie and Greenleaf (2007) model, which is consistent with other studies (de Bruin, Oudejans, & Bakker, 2007; Kerr, Berman, & De Souza, 2006; Petrie et al., 2009a). In Anderson et al.'s (2011) study, which included NCAA Division I female collegiate gymnasts and swimmers/divers, researchers found that sport-specific pressures were directly related to body dissatisfaction and dietary restraint, but not internalization. For these female athletes, the more negative pressure regarding body weight, shape, size, and appearance they felt from their coaches and teammates, the more likely they were to feel dissatisfied with their current body and try to lose weight by severely restricting their diet. Given such results, Petrie and Greenleaf (2012) updated their model to include a tentative link between sport specific pressures and internalization, and additional pathways between sport pressures to body dissatisfaction and dietary restraint. Athletes may not need to actually internalize sport specific weight pressures to experience body dissatisfaction and

behavioral reactivity because they are immersed in sport cultures that promote specific messages about body shape, weight, and size, dieting, and appearance and it is that immersion that may increase their risk.

Similar to non-athletes, body dissatisfaction in female athletes has been linked directly to eating disorder symptomatology and through the influence of negative affect and dieting (e.g., Anderson et al., 2011; Brannan, Petrie, Greenleaf, Reel, & Carter, 2009; Ferrand, Champely, & Filaire, 2009; Greenleaf et al., 2010; Harriger, Witherington, & Bryan, 2014; Petrie 1993; Petrie et al., 2009a). Female athletes who perceive a discrepancy between their actual body size and what they ideally want to look like are hypothesized to respond emotionally (experiencing a range of emotions, such as anger, guilt, shame, sadness; Stice, 2002) and behaviorally (i.e., restricting their caloric intake). For example, Brannan et al. (2009) examined a mixed-sport sample of female collegiate athletes, and found that body dissatisfaction directly accounted for 24% of the variance in bulimic symptomatology after controlling for social desirability and BMI. Similarly, in a study including female gymnasts, swimmers, and divers, Anderson et al. (2011) detected a robust, direct relationship between body dissatisfaction and scores on a measure of bulimia symptomatology (Bulimia Test-Revised). Further, they found an association between body dissatisfaction and negative affect. Anderson et al. (2011) suggested they did not find a unique association between body dissatisfaction and dietary restraint, because the variance was accounted for in the direct pathway between sport pressures and dietary restraint. Petrie et al. (2009a) examined female athletes representing 21 sports and found that athletes categorized as eating disordered and symptomatic endorsed more concerns on five of the six measures of body satisfaction than athletes who were categorized as asymptomatic. Specifically, satisfaction of the face did not differentiate the three groups of athletes.

These findings (Anderson et al., 2011; Brannan, et al., 2009; Ferrand et al., 2009; Greenleaf et al., 2010; Petrie 1993; Petrie et al., 2007, 2009a) suggest that similar to non-athlete women, there is three possible pathways between body dissatisfaction and eating disorder symptomatology. The first pathway is a direct link between body dissatisfaction and eating disorder symptoms. The following two pathways are the indirect pathways including negative affect and dietary restraint. Consequently, Petrie and Greenleaf (2012) added a direct path between body dissatisfaction and BN symptoms. This update to the Petrie and Greenleaf (2007) model suggests body dissatisfaction's influence is indirect, via negative affect and dietary restraint, and there remains a strong relationship between body dissatisfaction and disordered eating.

Several studies with female athletes have connected dietary restraint, negative affect, and eating disorder symptoms (Anderson et al., 2011; Hinton & Kubas, 2005; Greenleaf et al., 2010; Petrie et al., 2009a). For example, in a sample of 204 female collegiate athletes representing 17 sports, Greenleaf et al. (2010) found that higher levels of eating disorder symptomatology were associated with higher levels of guilt, body dissatisfaction, and greater intention to restrict calories. Further, among NCAA, Division-I female collegiate gymnasts (n = 280) and swimmers and divers (n = 134), Anderson, et al. (2011) tested the Petrie and Greenleaf's (2007) sociocultural model of eating disorders for female athletes. Consistent with previous research, body satisfaction, dietary restraint, and negative affect were all associated directly with bulimia symptomatology, accounting for 55-58% of the variance. Results indicated that the female athletes' who restricted their food intake and/or endorsed greater negative affect (i.e., sadness, anger, fear) also endorsed higher levels of bulimic symptomatology. Similarly, in a sample of female collegiate athletes representing 17 different sports, Greenleaf, et al. (2010) examined key

psychosocial variables of Petrie and Greenleaf's (2007) model. Results indicated that negative affect, in particular guilt, and dietary restraint accounted for a significant amount of the variance in bulimic symptomatology. Results are consistent with non-athlete literature suggesting women who experience negative emotions may try to distract themselves from these feelings and comfort themselves through binge eating (Stice, 1998, 2001). Collectively, these results suggest that dieting behaviors and negative emotional states can lead to an increased risk of developing eating disorder symptoms.

Petrie et al. (2009a) examined psychosocial correlates of eating disorders in a mixed sample of female athletes representing 21 sports. They found that female athletes who were classified as eating disordered or symptomatic were not significantly different from each other on measures of negative affect. However, the symptomatic and eating disordered athletes endorsed significantly higher levels of sadness, depression, anxiety, stress, and guilt and shame than athletes who were classified as asymptomatic. Results are consistent with research with non-athlete participants showing women categorized as eating disordered and symptomatic are indistinguishable in terms of their mood, but endorse greater distress, shame, and guilt than women who are asymptomatic (Cohen & Petrie, 2005; Stice et al., 1996). Further, Anderson et al. (2011) found that negative affect (β = .14), dietary restraint (β = .35), and body satisfaction (β = -.43) were associated directly with bulimia symptomatology. Together, these three variables accounted for 58% of the variance. Additionally, Van Durme, Goossens, and Braet (2012) found dietary restraint predicted levels of eating disorder symptomatology using three self-report measures [EDI-2; Children's Eating Disorder Examination-Questionnaire (ChEDE-Q; Decaluwé & Braet, 1999); Dutch Eating Behavior Questionnaire (DEBQ; Van Strien, Frijters, Bergers, &

Defares, 1986)] in female, adolescent, figure skaters and ballet dancers. Specifically, they found "dieting behavior" to be almost directly linked to eating concerns.

The above described studies are all cross-sectional in nature, so they are unable to determine whether the psychosocial variables in the Petrie and Greenleaf (2012) model are true "risk" factors of eating disorders in female athletes. Limitations arise with regard to the cross-sectional research design of the aforementioned studies, such as an inability to determine the temporal nature of the relations among the constructs. Thus, Voelker, Petrie, Neuman, and Anderson (2016) examined self-reported body dissatisfaction, negative affect, dietary restraint, and bulimia symptomatology at the beginning and end of female collegiate gymnasts, swimmers, and divers athletic seasons. Consistent with cross-sectional data among a mixed-sport sample of female collegiate athletes (Greenleaf et al., 2010), body satisfaction at the beginning of the athletic season predicted a reduction negative affect at Time 2. Given research consistently links body dissatisfaction to negative affect, Voelker et al. (2016) proposed body satisfaction at the beginning of an athletic season could serve as a protective factor against negative affect at the end of their athletic season (e.g., sadness, anger, guilt) for women who participate in lean or weight-sensitive sports. Researchers have acknowledged that athletes often place high importance on their physical appearance when determining how they feel about themselves overall (e.g., Marsh, Perry, Horsely, & Roche, 1995; Simmons & Childers, 2013). This point makes sense given many athletes spend a significant amount of time focusing on their body's physical capabilities and appearance. Therefore, Volker et al. suggested that female athletes with a positive view of their body at the beginning of the season may feel better about themselves overall, and in turn, lower the chance of experiencing negative emotions over time. However, self-report scores for body satisfaction, negative affect, and dietary restraint at the beginning of

their athletic season did *not* significantly predict their levels of bulimia symptomatology at the end of their athletic season. Voelker et al. (2016) suggested the non-significant findings could be due to the limited time between data collections (i.e., 5 months). Yet, research suggests that eating disorder behaviors can be difficult to change, even across longer timeframes. For example, levels of disordered eating in adolescent elite athletes have been found to change very little across even a one-year period (Krentz & Warschburger, 2013). Thus, it may require a longer period of time to document significant fluctuations in symptoms. Although a few longitudinal studies have been conducted with samples of female athletes (Anderson et al., 2012; Doughty and Hausenblas, 2005; Krentz and Warshburger, 2013; Shanmugam, Jowett, Meyer, 2014; Voelker, et al., 2016), only one examined body dissatisfaction, dietary restraint, and negative affect in the development of disordered eating (Voelker, et al., 2016).

Voelker et al. (2016) assessed 325 female collegiate gymnasts, swimmers, and divers across their five month athletic seasons on measures of body satisfaction, intentions to engage in dietary restraint, negative affect, and bulimic symptomatology. Results indicated that the athletes' dietary restraint and bulimic symptomatology were stable across the five-month season, with Time 1 scores accounting for 64% to 66% of the variance in the athletes' Time 2 scores. The stability of these two symptoms across an athletic season is consistent with previous research (Krentz et al., 2013). Negative affect and body satisfaction were less stable across the course of the athletic season, 29% and 44% respectively. The instability of these two symptoms across the athletic season could be attributed to the more temporary emotional and attitudinal states represented by these concepts. Meaning, self-reported emotional states and body satisfaction are more global and variable over time depending on other contextual factors.

Further, results from the Voelker et al. study suggest that initial scores on measures of

dietary restrain and bulimic symptomatology are the best predictors of what is experienced by the individual in the future. More plainly, these factors are less receptive to change. The stability in these variables over the 5-month season has been found across multiple longitudinal studies (Anderson et al., 2012; Dougherty et al., 2005; Voelker, et al., 2016). Consistent finding could be due to the fact that female athletes constantly function in an environment where there is a hyper-focus on their bodies, eating, and weight. At the collegiate level, the majority of athlete's train year round despite competitive "seasons." Consequently, this constant exposure to sport specific pressures could explain the persistence of scores on psychosocial measures of dietary restraint and bulimia symptomatology across time.

Interestingly, Voelker et al. (2016) found an inverse association between negative affect and dietary restraint despite cross sectional research indicating a positive relationship between the two (e.g., Greenleaf et al., 2010). Specifically, Time 1 negative affect (e.g., sadness, guilt, anger) predicted a decrease in athletes' Time 2 intention to restrict their diet (after controlling for Time 1 dietary intent). Given the research that indicates bulimic symptomatology is more common in athletes (e.g., Anderson et al., 2012), female athletes may be more likely to engage in binge eating rather than restricting food intake as a result of experiencing negative affect. Further, research also suggests that that college women with bulimic symptomatology often eat for emotional reasons rather than physical hunger (Tylka & Wilcox, 2006). Therefore, it is likely that athletes managed their negative emotions with binging rather than restriction.

Although there are some longitudinal studies regarding relationships among psychosocial variables within the Petrie and Greenleaf (2012) model, there are no longitudinal studies exploring psychosocial correlates prediction of eating disorder classification in female collegiate athletes. Data from cross-sectional studies explores relationships of psychosocial variables and

eating disorder classification, but the research design limits results to defining correlates of eating disorder symptomatology. In order to explore possible risk factors of eating disorders (i.e., temporally precede the development of subsequent variable; Stice, 2002), future research should longitudinally assess psychosocial variables and eating disorder classification.

Eating Disorder Classification

Based on Petrie and Greenleaf's (2012) review of non-athlete and athlete eating disorder literature, general and sport specific weight pressures, internalization of the thin ideal, body image concerns, restrained eating, and negative affect are variables that potentially would be related to, and be able to discriminate among, different levels of disordered eating in female athletes. Specifically, research suggests that the psychosocial variables included in Petrie and Greenleaf's (2012) model differentiate levels of disordered eating disorders, such as between athletes who are asymptomatic from those who are symptomatic or eating disordered (e.g., Cohen & Petrie, 2005; Engler, et al., 2006; Stice, et al., 1996; Tylka & Subich, 1999, 2002). Importantly, these studies also suggest that female athletes who are symptomatic or eating disordered are more similar than different from each other on levels of psychosocial functioning. For example, in a sample of female athletes representing 21 sports, Petrie et al. (2009a) correctly classified 79% of all athletes into their eating disorder classification group via measuring psychosocial variable (i.e., body image, internalization, negative affect, and pressure). In their study, athletes who were asymptomatic of an eating disorder were the group with the highest percentage of correctly classified cases.

Identification of eating disorder risk factors with athletes is less advanced than eating disorder risk factors in the general population. Cross-sectional designs do not allow for determining temporal relationships among the psychosocial variables and eating pathology.

However, cross sectional design research with athletes suggests that similar psychosocial variables (i.e., sociocultural pressures, internalization of the thin ideal, body dissatisfaction, negative affect, dietary intent) and sport specific pressures are related to eating disorders and may increase risk. Clearly, the aforementioned variables are related to the development of eating disorders at a single time point (i.e., correlates), but less is known about whether their psychosocial well-being at the beginning of an athletic season predicts eating disorder classification at the end of an athletic season.

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

DEMOGRAPHIC QUESTIONNAIRE [1]

Please answer the following questions honestly. It is important that you *answer every question*.
There are no "wrong" or "right" answers, so just do the best you can.

Background Information

1. Age:_____ 2. Current G.P.A.: _____

3. Current Academic Status:
   _____ Freshman
   _____ Sophomore
   _____ Junior
   _____ Senior
   _____ 5th year or above

4. Race/Ethnicity:
_____Caucasian/White
_____Hispanic/Latino/Mexican American
_____African-American/Black
_____American Indian
_____Asian American/Pacific Islander
Other (specify:_____)

5. Current Living Arrangements:
_____dormitory w/ NO teammate(s)
_____dormitory w/ teammate(s)
_____apartment w/ NO teammate(s)
_____apartment w/teammate(s)
_____at home
_____sorority house
_____other (specify):_____

Health Information

1. Present weight: _____lbs.
2. Present height: _____feet ____inches

REFERENCES

Ackard, D. M., Fulkerson, J. A., & Neumark-Sztainer, D. (2007). Prevalence and utility of DSM-IV eating disorder diagnostic criteria among youth. *International Journal of Eating Disorders*, *40*(5), 409-417.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Anderson, C., & Petrie, T. A. (2012). Prevalence of disordered eating and pathogenic weight control behaviors among NCAA division I female collegiate gymnasts and swimmers. *Research Quarterly for Exercise and Sport*, *83*(1), 120-124.

Anderson, C. M., Petrie, T. A., & Neumann, C. S. (2012). Effects of sport pressures on female collegiate athletes: A preliminary longitudinal investigation. *Sport, Exercise, and Performance Psychology, 1*, 120-134.

Anderson, C. M., Petrie, T. A., & Neumann, C. S. (2011). Psychosocial correlates of bulimic symptoms among NCAA division-I female collegiate gymnasts and swimmers/divers. *Journal of Sport & Exercise Psychology*, *33*(4), 483-505.

Anschutz, D. J., Engels, R., & Van Strien, T. (2008). Susceptibility for thin ideal media and eating styles. *Body Image, 5,* 70-79.

Arcelus, J., Mitchell, A. J., Wales, J., & Nielsen, S. (2011). Mortality rates in patients with anorexia nervosa and other eating disorders: A meta-analysis of 36 studies. *Archives of General Psychiatry, 68*(7), 724-731.

Armstrong, B., & Janicke, D. M. (2012). Differentiating the effects of maternal and peer encouragement to diet on child weight control attitudes and behaviors. *Appetite*, *59*(3), 723-729.

Attie, I., & Brooks-Gunn, J. (1989). Development of eating problems in adolescent girls: A longitudinal study. *Developmental Psychology, 25*(1), 70-79.

Bagozzi, R. P. (1993). An examination of the psychometric properties of measures of negative affect in the PANAS-X scales. *Journal of Personality and Social Psychology, 65,* 836-851.

Ball, K., & Lee, C. (2001). Psychological stress, coping, and symptoms of disordered eating in a community sample of young Australian women. *International Journal of Eating Disorders, 31,* 71-81.

Beals, K. A., & Manore, M. M. (1994). The prevalence and consequences of subclinical eating disorders in female athletes. *International Journal of Sport Nutrition, 4*(2), 175-195.

Benedikt, R., Wertheim, E. H., & Love, A. (1998). Eating attitudes and weight-loss attempts in female adolescents and their mothers. *Journal of Youth and Adolescence, 27*(1), 43-57.

Berg, K. C., Crosby, R. D., Cao, L., Peterson, C. B., Engel, S. G., Mitchell, J. E., & Wonderlich, S. A. (2013). Facets of negative affect prior to and following binge-only, purge-only, and binge/purge events in women with bulimia nervosa. *Journal of Abnormal Psychology, 122*(1), 111-118.

Berry, T. R., & Howe, B. L. (2000). Risk factors for disordered eating in female university athletes. *Journal of Sport Behavior, 23*(3), 207-219.

Brannan, M., Petrie, T. A., Greenleaf, C., Reel, J., & Carter, J. (2009). The relationship between body dissatisfaction and bulimic symptoms in female collegiate athletes. *Journal of Clinical Sport Psychology, 3*, 103-126.

Brown, M. Cachelin, F. M., & Dohm, F. (2009). Eating disorders in ethnic minority women: A review of the emerging literature. *Current Psychiatry Reviews, 5*(3), 182-193.

Brown, A., & Dittmar, H. (2005). Think" thin" and feel bad: The role of appearance schema activation, attention level, and thin-ideal internalization for young women's responses to ultra-thin media ideals. *Journal of Social and Clinical Psychology, 24*(8), 1088-1113.

Brownell, K. D. (1991). Dieting and the search for the perfect body: Where physiology and culture collide. *Behavior Therapy, 22*, 1–12, doi:10.1016/S0005-7894(05)80239-4.

Brownell, K. D., & Steen, S. N. (1992). Weight cycling in athletes: Effects on behavior, physiology and health. *Eating, Body Weight and Performance in Athletes: Disorders of Modern Society*, 159-171.

Brownell, K. D., Steen, S. N., & Wilmore, J. H. (1987). Weight regulation practices in athletes: Analysis of metabolic and health effects. *Medicine and Science in Sports and Exercise, 19*(6), 546-556.

Bruch, H. (1978). Obesity and anorexia nervosa. *Psychosomatics, 19*(4), 208-212.

Bunnell, D. W., Shenker, I. R., Nussbaum, M. P., Jacobson, M. S., Cooper, P., & Phil, D. (1990). Subclinical versus formal eating disorders: Differentiating psychological features. *International Journal of Eating Disorders, 9*(3), 357-362.

Byrne, S. & McLean, N. (2002). Elite athletes: Effects of the pressure to be thin. *Journal of Science and Medicine in Sport, 5*(2), 80 – 94.

Cafri, G., Yamamiya, Y., Brannick, M., & Thompson, J. K. (2005). The influence of sociocultural factors on body image: A meta-analysis. *Clinical Psychology: Science and Practice, 12*(4), 421-433.

Carrigan, K. W., Petrie, T. A., & Anderson, C. M. (2015). To weigh or not to weigh? Relation to disordered eating attitudes and behaviors among female collegiate athletes. *Journal of Sport and Exercise Psychology, 37*(6), 659-665.

Carter, J. E., & Rudd, N. A. (2005). Disordered eating assessment for college student-athletes. *Women in Sport & Physical Activity Journal*, *14*(1), 62-71.

Cash, T. F., & Pruzinsky, T. (2002). Future challenges for body image theory, research, and clinical, practice. In T. F. Cash & T. Pruzinsky (Eds.), *Body Images: A Handbook of Theory, Research, and Clinical Practice* (pp. 509-516). New York: Guilford Press.

Cashel, M. L., Cunningham, D., Landeros, C., Cokley, K. O., & Muhammad, G. (2003). Sociocultural attitudes and symptoms of bulimia: Evaluating the SATAQ with diverse college groups. *Journal of Counseling Psychology*, *50*(3), 287-296.

Clark, L., & Tiggemann, M. (2006). Appearance culture in nine-to 12-year-old girls: Media and peer influences on body dissatisfaction. *Social Development*, *15*(4), 628-643.

Cohen, D. L. & Petrie, T. A. (2005). An examination of psychosocial correlates of disordered eating among undergraduate women. *Sex Roles*, *52*(1-2), 29-42.

Comerci, G. D. (1990). Medical complications of anorexia nervosa and bulimia nervosa. *The Medical Clinics of North America, 74*(5), 1293-1310.

Cooley, E., & Toray, T. (2001). Body image and personality predictors of eating disorder symptoms during the college years. *International Journal of Eating Disorders*, *30*(1), 28-36.

Cooper Z., Cooper, P. J., & Fairburn, C. G. (1989). The validity of the eating disorder examination and its subscales. *British Journal of Psychiatry, 154*, 807-812.

Coughlin, J. W., & Kalodner, C. (2006). Media literacy as a prevention intervention for college women at low-or high-risk for eating disorders. *Body Image*, *3*(1), 35-43.

Currin, L., Schmidt, U., Treasure, J., & Jick, H. (2005). Time trends in eating disorder incidence. *The British Journal of Psychiatry*, *186*(2), 132-135.

de Bruin, A. K., Oudejans, R. R., & Bakker, F. C. (2007). Dieting and body image in aesthetic sports: A comparison of Dutch female gymnasts and non-aesthetic sport participants. *Psychology of Sport and Exercise*, *8*(4), 507-520.

de Bruin, A. P., Oudejans, R. R. D., Bakker, F. C., & Woertman, L. (2011). Contextual body image and athletes' disordered eating: The contribution of athletic body image to disordered eating in high performance women athletes. *European Eating Disorders Review, 19,* 201 – 215.

Decaluwé, V., & Braet, C. (1999). Dutch translation of the child eating disorder examination, authored by Fairburn C. *Cooper Z, Bryant-Waugh R*.

DiBartolo, M. P., and Shaffer, C. (2002). A comparison of female college athletes and non-athletes: Eating disorders symptomatology and psychological well-being. *International Journal of Sports Nutrition, 7*, 310-317.

Dittmar, H. (2005). Compulsive buying–a growing concern? An examination of gender, age, and endorsement of materialistic values as predictors. *British Journal of Psychology, 96*(4), 467-491.

Doughty, J. H., & Hausenblas, H. A. (2005). A longitudinal examination of disordered eating correlates in collegiate gymnasts. *Women in Sport & Physical Activity Journal, 14*(1), 52.

Eichner, E. R. (1992). Sports anemia, iron supplements, and blood doping. *Medicine and Science in Sports and Exercise, 24*(9), 315-318.

Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine, 157*(8), 733-738.

Engler, P. A., Crowther, J. H., Dalton, G., & Sanftner, J. L. (2006). Predicting eating disorder group membership: An examination and extension of the sociocultural model. *Behavior Therapy, 37*(1), 69-79.

Fabian, L. J., & Thompson, J. K. (1989). Body image and eating disturbance in young females. *International Journal of Eating Disorders, 8*(1), 63-74.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.

Favaro, A., Ferrara, S., & Santonastaso, P. (2003). The spectrum of eating disorders in young women: A prevalence study in a general population sample. *Psychosomatic Medicine Journal of Biobehavioral Medicine, 65*(4), 701-708.

Ferrand, C., Champely, S., & Filaire, E. (2009). The role of body-esteem in predicting disordered eating symptoms: A comparison of French aesthetic athletes and non-athletic females. *Psychology of Sport and Exercise, 10*(3), 373-380.

Field, A. E., Camargo, C. A., Taylor, C. B., Berkey, C. S., Frazier, A. L., Gillman, M. W., & Colditz, G. A. (1999). Overweight, weight concerns, and bulimic behaviors among girls and boys. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(6), 754-760.

Field, A. E., Camargo, C. A., Taylor, C. B., Berkey, C. S., Roberts, S. B., & Colditz, G. A. (2001). Peer, parent, and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent girls and boys. *Pediatrics, 107*(1), 54-60.

Fitzsimmons-Craft, E. E. (2011). Social psychological theories of disordered eating in college women: Review and integration. *Clinical Psychology Review, 31*(7), 1224-1237.

Francis, L. A., & Birch, L. L. (2005). Maternal influences on daughters' restrained eating behavior. *Health Psychology, 24*(6), 548-554.

Franko, D. L., Keshaviah, A., Eddy, K. T., Krishna, M., Davis, M. C., Keel, P. K., & Herzog, D. B. (2013). A longitudinal investigation of mortality in anorexia nervosa and bulimia nervosa. *The American Journal of Psychiatry, 170*(8), 917-925.

Fredrickson, B. L., & Roberts, T. A. (1997). Objectification theory. *Psychology of Women Quarterly, 21*(2), 173-206.

Gagnon-Girouard, M. P., Bégin, C., Provencher, V., Tremblay, A., Boivin, S., & Lemieux, S. (2009). Can we apply the dual-pathway model of overeating to a population of weight-preoccupied overweight women? *International Journal of Eating Disorders, 42*(3), 244-252.

Garner, D. M. (1991). Eating Disorder Inventory – 2: Professional manual. Odessa, Florida: Psychological Assessment Resources.

Garner, D. M. (2002). Measurement of eating disorder psychopathology. *Eating Disorders and Obesity: A Comprehensive Handbook, 2,* 141-146.

Ghaderi, A., & Scott, B. (2001). Prevalence, incidence and prospective risk factors for eating disorders. *Acta Psychiatrica Scandinavica, 104*(2), 122-130.

Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin, 134*(3), 460-476.

Graber, J. A., Brooks-Gunn, J., Paikoff, R. L., & Warren, M. P. (1994). Prediction of eating problems: An 8-year study of adolescent girls. *Developmental Psychology, 30*(6), 823-834.

Greenleaf, C., Petrie, T. A., Carter, J., & Reel, J. J. (2009). Female collegiate athletes: Prevalence of eating disorders and disordered eating behaviors. *Journal of American College Health, 57*(5), 489-495.

Greenleaf, C., Petrie, T., Reel, J., & Carter, J. (2010). Psychosocial risk factors of bulimic symptomatology among female athletes. *Journal of Clinical Sport Psychology, 4,* 177-190.

Harriger, J. A., Witherington, D. C., & Bryan, A. D. (2014). Eating pathology in female gymnasts: Potential risk and protective factors. *Body Image, 11*(4), 501-508.

Haug, N. A., Heinberg, L. J., & Guarda, A. S. (2001). Cigarette smoking and its relationship to other substance use among eating disordered inpatients. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, *6*(3), 130-139.

Hausenblas, H. A., & Carron, A. V. (1999). Eating disorder indices and athletes: An integration. *Journal of Sport & Exercise Psychology, 21*, 230-258.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, *110*(1), 86-108.

Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social and Clinical Psychology*, *14*(4), 325-338.

Heinberg, L. J., Thompson, J. K., & Stormer, S. (1995). Development and validation of the sociocultural attitudes towards appearance questionnaire. *International Journal of Eating Disorders*, *17*(1), 81-89.

Henderson, N. J., & Huon, G. F. (2002). Negative affect and binge eating in overweight women. *British Journal of Health Psychology*, *7*(1), 77-87.

Herman, C. P., & Mack, D. (1975). Restrained and unrestrained eating. *Journal of Personality*, *43*(4), 647-660. doi:10.1111/1467-6494.ep8970396.

Herman, C. P., Polivy, J., & Silver, R. (1979). Effects of an observer on eating behavior: The introduction of 'sensible' eating. *Journal of Personality*, *47*(1), 85-99. doi:10.1111/1467-6494.ep7594181.

Herman, C. P., & Polivy, J. (2004). The self-regulation of eating. In R. F. Baumeister & K. D. Vohs (Eds.), *The handbook of self-regulation: Research, theory, and applications* (pp. 492–508). New York: Guilford Press.

Hesse-Biber, S., Leavy, P., Quinn, C. E., & Zoino, J. (2006). The mass marketing of disordered eating and eating disorders: The social psychology of women, thinness and culture. *Women's Studies International Forum, 29*, 208–224. doi:10.1016/j. wsif.2006.03.007.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319-340.

Hilbert, A., & Tuschen-Caffier, B. (2007). Maintenance of binge eating through negative mood: A naturalistic comparison of binge eating disorder and bulimia nervosa. *International Journal of Eating Disorders*, *40*(6), 521-530.

Hill, A. J., & Franklin, J. A. (1998). Mothers, daughters, and dieting: Investigating the transmission of weight control. *British Journal of Clinical Psychology, 37*, 13–28.

Hinton, P. S., & Kubas, K. L. (2005). Psychosocial correlates of disordered eating in female collegiate athletes: Validation of the ATHLETE questionnaire. *Journal of American College Health, 54*(3), 149-156.

Hoek, H. W., & Van Hoeken, D. (2003). Review of the prevalence and incidence of eating disorders. *International Journal of Eating Disorders, 34*(4), 383-396.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry, 61*(3), 348-358.

Huon G. F., & Walton C. J. (2000). Initiation of dieting among adolescent females. *International Journal of Eating Disorders, 28*, 226–230.

Isomaa, R., Isomaa, A. L., Marttunen, M., Kaltiala-Heino, R., & Björkqvist, K. (2009). The prevalence, incidence and development of eating disorders in Finnish adolescents: A two-step 3-year follow-up study. *European Eating Disorders Review, 17*(3), 199-207.

Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin, 130*(1), 19-65.

Johnson, C., Powers, P. S., & Dick, R. (1999). Athletes and eating disorders: The national collegiate athletic association study. *International Journal of Eating Disorders, 26*(2), 179-188.

Keel, P. K., & Forney, J. K. (2013). Psychosocial risk factors for eating disorders. *International Journal of Eating Disorders, 48*(5), 433-439. doi: 10.1002/eat.22094.

Keel, P. K., Forney, J. K., Brown, T. A., & Heatherton, T. F. (2013). Influence of college peers on disordered eating behaviors in women and men at 10-year follow-up. *Journal of Abnormal Psychology, 122,* 105 – 110.

Keery, H., Boutelle, K., ven den Berg, P., & Thompson, J. K. (2005). The impact of appearance-related teasing by family members. *Journal of Adolescent Health, 37*(2), 120-127.

Keery, H., Van den Berg, P., & Thompson, J. K. (2004). An evaluation of the Tripartite Influence Model of body dissatisfaction and eating disturbance with adolescent girls. *Body Image, 1*(3), 237-251.

Kerr, G., Berman, E., & De Souza, M. J. (2006). Disordered eating in women's gymnastics: Perspectives of athletes, coaches, parent, and judges. *Journal of Applied Sport Psychology, 18,* 28-43.

Kerr G. & Dacyshyn A. (2000). The retirement experiences of elite female gymnasts. *Journal of Applied Sport Psychology, 12,* 115 - 133.

Kjelsas, E., Bjornstrom, C., & Gotestam, K. G. (2004). Prevalence of eating disorders in female and male adolescents (14-15 years). *Eating Behaviors, 5*(1), 13-25.

Krane, V., Choi, P. Y., Baird, S. M., Aimar, C. M., & Kauer, K. J. (2004). Living the paradox: Female athletes negotiate femininity and muscularity. *Sex roles, 50*(5-6), 315-329.

Krentz, E. M., & Warschburger, P. (2013). A longitudinal investigation of sports-related risk factors for disordered eating in aesthetic sports. *Scandinavian Journal of Medicine & Science in Sports, 23*(3), 303-310.

Leon, G. R., Fulkerson, J. A., Perry, C. L., Keel, P. K., & Klump, K. L. (1999). Three to four year prospective evaluation of personality and behavioral risk factors for later disordered eating in adolescent girls and boys. *Journal of Youth and Adolescence, 28*(2), 181-196.

Levine, M. P., & Murnen, S. K. (2009). "Everybody knows that mass media are/are not [pick one] a cause of eating disorders": A critical review of evidence for a causal link between media, negative body image, and disordered eating in females. *Journal of Social and Clinical Psychology, 28*(1), 9-42.

Levine, M. P., Smolak, L., & Hayden, H. (1994). The relation of sociocultural factors to eating attitudes and behaviors among middle school girls. *The Journal of Early Adolescence,* 14, 471-490.

Lieberman, M., Gauvin, L., Bukowski, W. M., & White, D. R. (2001). Interpersonal influence and disordered eating behaviors in adolescent girls: The role of peer modeling, social reinforcement, and body-related teasing. *Eating Behaviors, 2*(3), 215- 236.

Loth, K. A., Neumark-Sztainer, D., & Croll, J. K. (2009). Informing family approaches to eating disorder prevention: Perspectives of those who have been there. *International Journal of Eating Disorders, 42*(2), 146-152.

Machado, P. P. P., Machado, B. C., Goncalves, S., & Hoek, H. W. (2007). The prevalence of eating disorders not otherwise specified. *International Journal of Eating Disorders, 40*(3), 212-217.

Malkin, A. R., Wornian, K., & Chrisler, J. C. (1999). Women and weight: Gendered messages on magazine covers. *Sex Roles, 40*(7-8), 647-655.

Markland, D., & Oliver, E. J. (2008). The sociocultural attitudes towards appearance questionnaire-3: A confirmatory factor analysis. *Body Image, 5*(1), 116-121.

Marsh, H. W., Perry, C., Horsely, C., & Roche, L. (1995). Multidimensional self-concepts of elite athletes: How do they differ from the general population?. *Journal of Sport and Exercise Psychology, 17*(1), 70-83.

McCabe, M. P., & Ricciardelli, L. A. (2001). Parent, peer, and media influences on body image and strategies to both increase and decrease body size among adolescent boys and girls. *Adolescence, 36*(142), 225-240.

McGue, M., Osler, M., & Christensen, K. (2010). Causal inference and observational research the utility of twins. *Perspectives on Psychological Science, 5*(5), 546-556.

McKnight Investigators. (2003). Risk factors for the onset of eating disorders in adolescent girls: Results of the McKnight longitudinal risk factor study. *American Journal of Psychiatry, 160*(2), 248-254.

Meczekalski, B., Podfigurna-Stopa, A., & Katulski, K. (2013). Long-term consequences of anorexia nervosa. *Maturitas, 75*(3), 215-220.

Mehler, P. S., Birmingham, L. C., Crow, S. J., & Jahraus, J. P. (2010). Medical complications of eating disorders. In C. M. Grilo & J. E. Mitchell (Eds.), *The Treatment of Eating Disorders: A Clinical Handbook* (66-80). New York: The Guilford Press.

Melve, K. K., & Baerheim, A. (1994). Signs of subclinical eating disorders in teenage girls. *Scandinavian Journal of Primary Health Care, 12*(3), 197-203.

Miller, K. K., Grinspoon, S. K., Ciampa, J., Hier, J., Herzog, D., & Klibanski, A. (2005). Medical findings in outpatients with anorexia nervosa. *Archives of Internal Medicine, 165*, 561-566.

Mintz, L. B., O'Halloran, M. S., Mulholland, A. M., & Schneider, P. A. (1997). Questionnaire for eating disorder diagnoses: Reliability and validity of operationalizing DSM-IV criteria into a self-report format. *Journal of Counseling Psychology, 44*(1), 63-79.

Mitchell, J. E., Laine, D. E., Morley, J. E., & Levine, A. S. (1986). Naloxone but not CCK-8 may attenuate binge-eating behavior in patients with the bulimia syndrome. *Biological Psychiatry, 21*(14), 1399-1406.

Mitchell, J. E., Specker, S. M., & de Zwaan, M. (1991). Comorbidity and medical complications of bulimia nervosa. *Journal of Clinical Psychiatry, 52*, 13-20.

Monsma, E. V., & Malina, R. M. (2004). Correlates of eating disorders risk among female figure skates: A profile of adolescent competitors. *Psychology of Sport and Exercise, 5*(4), 447 - 460.

Moradi, B. (2010). Addressing gender and cultural diversity in body image: Objectification theory as a framework for integrating theories and grounding research. *Sex Roles, 63*(1-2), 138-148.

Moradi, B., Dirks, D., & Matteson, A. V. (2005). Roles of sexual objectification experiences and internalization of standards of beauty in eating disorder symptomatology: A test and extension of Objectification Theory. *Journal of Counseling Psychology, 52*(3), 420-428.

Moy, J., Petrie, T. A., Dockendorff, S., Greenleaf, C., & Martin, S. (2013). Dieting, exercise, and intuitive eating among early adolescents. *Eating behaviors, 14*(4), 529-532.

Neumark-Sztainer, D., Bauer, K. W., Friend, S., Hannan, P. J., Story, M., & Berge, J. M. (2010). Family weight talk and dieting: How much do they matter for body dissatisfaction and disordered eating behaviors in adolescent girls? *Journal of Adolescent Health, 47*(3), 270 – 276.

Neumark-Sztainer, D., Falkner, N., Story, M., Perry, C., Hannan, P. J., & Mulert, S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *International Journal of Obesity, 26*(1), 123-131.

Nevonen, L., & Broberg, A. G. (2000). The emergence of eating disorders: An exploratory study. *European Eating Disorders Review, 8*(4), 279-292.

Otis, C. L., Drinkwater, B., Johnson, M., Loucks, A., & Wilmore, J. (1997). American College of Sports Medicine position stand. The Female Athlete Triad. *Medicine and Science in Sports and Exercise*, *29*(5), i-ix.

Paxton, S. J., Eisenberg, M. E., & Neumark-Sztainer, D. (2006). Prospective predictors of body dissatisfaction in adolescent girls and boys: A five-year longitudinal study. *Developmental Psychology, 42*(5), 888-899. doi:10.1037/0012-1649.42.5.888.

Peck, L. D., & Lightsey, O. R. (2008). The eating disorders continuum, self-esteem, and perfectionism. *Journal of Counseling and Development, 86*(2), 184-192.

Peebles, R., Hardy, K. K., Wilson, J. L., & Lock, J. D. (2010). Are diagnostic criteria for eating disorders markers of medical severity? *Pediatrics, 125*(5), 1193-1201.

Petrie, T. A. (1993). Disordered eating in female collegiate gymnasts: Prevalence and personality/attitudinal correlates. *Journal of Sport and Exercise Psychology, 15*(4), 424-436.

Petrie, T. A., & Greenleaf, C. A. (2007). Eating disorders in sport. *Handbook of Sport Psychology*, 352-378.

Petrie, T. A., & Greenleaf, C. A. (2012). Eating Disorders in Sport: From Theory to Research to Intervention, in Handbook of Sport Psychology, Third Edition (eds. G. Tenenbaum and R. C. Eklund), John Wiley & Sons, Inc., Hoboken, NJ, USA.

Petrie, T. A., Greenleaf, C., Reel, J., & Carter, J. (2009a). An examination of psychosocial correlates of eating disorders among female collegiate athletes. *Research Quarterly for Exercise and Sport, 80*, 621-632.

Petrie, T. A., Greenleaf, C., Reel, J., & Carter, J. (2009b). Personality and psychological factors as predictors of disordered eating among female collegiate athletes. *Eating Disorders, 17*(4), 302-321.

Petrie, T. A. & Stoever, S. (1993). The incidence of bulimia nervosa and pathogenic weight control behaviors in female collegiate gymnasts. *Research Quarterly for Exercise and Sport, 64*(2), 238-241.

Petrie, T. A., Tripp, M. M., & Harvey, P. (2002). Factorial and construct validity of the body parts satisfaction scale-revised: An examination of minority and nonminority women. *Psychology of Women Quarterly, 26*(3), 213-221.

Pike, K. M., & Rodin, J. (1991). Mothers, daughters, and disordered eating. *Journal of Abnormal Psychology, 100*, 198-204.

Polivy, J., & Herman, C. P. (2002). Causes of eating disorder. *Annual Review of Psychology, 53*, 187-213.

Polivy, J., Herman, C. P., Hackett, R., & Kuleshnyk, I. (1986). The effects of self-attention and public attention on eating in restrained and unrestrained subjects. *Journal of Personality and Social Psychology, 50*(6), 1253.

Polivy, J., Herman, C. P., & McFarlane, T. (1994). Effects of anxiety on eating: Does palatability moderate distress-induced overeating in dieters?. *Journal of Abnormal Psychology*, *103*(3), 505-510.

Polivy, J., Zeitlin, S. B., Herman, C. P., & Beal, A. L. (1994). Food restriction and binge eating: A study of former prisoners of war. *Journal of Abnormal Psychology, 103*, 409-411.

Pomeroy, C., & Mitchell, J. E. (1992). Medical issues in the eating disorders. *Eating, Body Weight and Performance in Athletes: Disorders of Modem Society*, 202-221.

Preti, A., de Girolamo, G., Vilagut, G., Alonso, J., de Graaf, R., Bruffaerts, R., ... & ESEMeD-WMH Investigators. (2009). The epidemiology of eating disorders in six European countries: Results of the ESEMeD-WMH project. *Journal of Psychiatric Research*, *43*(14), 1125-1132.

Ravaldi, C., Vannacci, A., Bolognesi, E., Mancini, S., Faravelli, C., & Ricca, V. (2006). Gender role, eating disorder symptoms, and body image concern in ballet dancers. *Journal of Psychosomatic Research, 61*, 529-535.

Rayner, K. E., Schniering, C. A., Rapee, R. M., Taylor, A., & Hutchinson, D. M. (2013). Adolescent girls' friendship networks, body dissatisfaction, and disordered eating: Examining selection and socialization processes. *Journal of Abnormal Psychology, 122*, 93 – 104.

Reel, J. J., Petrie, P., SooHoo, S., & Anderson, C. (2013). Weight pressures in sport: Examining the factor structure and incremental validity of the weight pressures scale – female athletes. *Eating Behaviors, 14*(2), 137-144.

Rome, E. S., & Ammerman, S. (2003). Medical complications of eating disorders: An update. *Journal of Adolescent Health, 33*(6), 418-426.

Ruderman, A. J., & Besbeas, M. (1992). Psychological characteristics of dieters and bulimics. *Journal of Abnormal Psychology*, *101*(3), 383-390. doi:10.1037/0021-843X.101.3.383

Sanford-Martens, T. C., Davidson, M. M., Yakushko, O. F., Martens, M. P., & Hinton, P. (2005). Clinical and subclinical eating disorders: An examination of collegiate athletes. *Journal of Applied Sport Psychology, 17*(1), 79-86.

Scarano, G. M., & Kalodner-Martin, C. (1994). A description of the continuum of eating disorders: Implications for intervention and research. *Journal of Counseling and Development, 72*(4), 356-361.

Schupak-Neuber, E., & Nemeroff, C. (1993). Disturbances in identity and self-regulation in bulimia nervosa: Implications for a metaphorical perspective of "body as self." *International Journal of Eating Disorders, 13,* 335 – 347.

Shanmugam, V., Jowett, S., & Meyer, C. (2014). Eating psychopathology as a risk factor for depressive symptoms in a sample of British athletes. *Journal of Sports Sciences, 32*(17), 1587-1595.

Simmons, S., & Childers, K. (2013). Effects of intercollegiate athletics and intramural participation on self-esteem and physical self-description: A pilot study. *Recreational Sports Journal, 37*(2), 160-168.

Smith, A., & Petrie, T. (2008). Reducing the risk of disordered eating among female athletes: A test of alternative interventions. *Journal of Applied Sport Psychology, 20*(4), 392-407.

Smolak, L., Murnen, S. K., & Ruble, A. E. (2000). Female athletes and eating problems: A meta-analysis. *International Journal of Eating Disorders, 27*(4), 371-380.

Spencer, J. A., & Fremouw, W. J. (1979). Binge eating as a function of restraint and weight classification. *Journal of Abnormal Psychology, 88*(3), 262-267. doi:10.1037/0021-843X.88.3.262

Spettigue, W., & Henderson, K. (2004). Eating disorders and the role of the media. *The Canadian Academy of Child and Adolescent Psychiatry, 13*(1), 16-19.

Stice, E. (1994). Review of the evidence for a sociocultural model of bulimia nervosa and an exploration of the mechanisms of action. *Clinical Psychology Review, 14*(7), 633-661.

Stice, E. (1998). Model of eating pathology and social reinforcement of the thin-ideal predict onset of bulimic symptoms. *Behavior Research and Therapy, 36,* 931-944.

Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology, 110*(1), 124-135.

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128*(5), 825-848.

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29*, 257-276.

Stice, E., Agras, W. S., & Hammer, L. D. (1999). Risk factors for the emergence of childhood eating disturbances: A five-year prospective study. *International Journal of Eating Disorders, 25*, 375-387.

Stice, E., Burton, E., Bearman, S. K., & Rohde, P. (2007). Randomized trial of a brief depression prevention program: An elusive search for a psychosocial placebo control condition. *Behaviour Research and Therapy*, *45*(5), 863-876.

Stice, E., Chase, A., Stormer, S., & Appel, A. (2001). A randomized trial of a dissonance-based eating disorder prevention program. *International Journal of Eating Disorders*, *29*(3), 247-262.

Stice, E., Davis, K., Miller, N. P., & Marti, C. N. (2008). Fasting increases risk for onset of binge eating and bulimic pathology: A 5-year prospective study. *Journal of Abnormal Psychology*, *117*(4), 941.

Stice, E., Fisher, M., & Lowe, M. R. (2004). Are dietary restraint scales valid measures of acute dietary restriction? Unobtrusive observational data suggest not. *Psychological Assessment*, *16*(1), 51-59.

Stice, E., Maxfield, J., & Wells, T. (2003). Adverse effects of social pressure to be thin on young women: An experimental investigation of the effects of "fat talk". *International Journal of Eating Disorders, 34*(1), 108-117.

Stice, E., Mazotti, L., Krebs, M., & Martin, S. (1998). Predictors of adolescent dieting behaviors: A longitudinal study. *Psychology of Addictive Behaviors, 12*(3), 195-205.

Stice, E., Nemeroff, C., & Shaw, H. E. (1996). Test of the dual pathway model of bulimia nervosa: Evidence for dietary restraint and affect regulation mechanisms. *Journal of Social and Clinical Psychology*, *15*(3), 340-363.

Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology*, *21*(2), 131-138.

Stice, E., Schupak-Neuberg, E., Shaw, H. E., & Stein, R. I. (1994). Relation of media exposure to eating disorder symptomatology: An examination of mediating mechanisms. *Journal of Abnormal Psychology*, *103*(4), 836-840.

Stice, E., & Shaw, H. E. (1994). Adverse effects of the media portrayed thin-ideal on women and linkages to bulimic symptomatology. *Journal of Social and Clinical Psychology, 13*(3), 288-308.

Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, *53*(5), 985-993.

Stice, E., Shaw, H. E., & Nemeroff, G. (1998). Dual pathway model of bulimia nervosa: Longitudinal support for dietary restraint and affect-regulation mechanisms. *Journal of Social Clinical Psychology, 17*, 129-149

Stice, E., Spangler, D., & Agras, W. S. (2001). Exposure to media-portrayed thin-ideal images adversely affects vulnerable girls: A longitudinal experiment. *Journal of Social and Clinical Psychology, 20*(3), 270-288.

Stice, E., Ziemba, C., Margolis, J., & Flick, P. (1996). The dual pathway model differentiates bulimics, subclinical bulimics, and controls: Testing the continuity hypothesis. *Behavior Therapy, 27*, 531-549.

Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American Psychologist, 62*(3), 181-198.

Striegel-Moore, R. H., Silberstein, L. R., & Rodin, J. (1986). Toward an understanding of risk factors for bulimia. *American Psychologist*, *41*(3), 246-263.

Strong, K. G., & Huon, G. F. (1998). An evaluation of a structural model for studies of the initiation of dieting among adolescent girls. *Journal of Psychosomatic Research, 44*(3), 315-326.

Sundgot-Borgen, J. (1994). Risk and trigger factors for the development of eating disorders in female elite athletes. *Medical Science Sports and Exercise, 26*, 414-419.

Sundgot-Borgen, J., Klungland, M., Torstveit, G., & Rolland, C. (1999). Prevalence of eating disorders in male and female elite athletes. *Medicine & Science in Sports & Exercise, 31*(5), S297.

Sundgot-Borgen, J., & Torstviet, M. K. (2004). Prevalence of eating disorders in elite athletes is higher than in the general population. *Clinical Journal of Sport Medicine, 14*(1), 25 – 32.

Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of General Psychiatry, 68*(7), 714-723.

Sypeck, M. F., Gray, J. J., & Ahrens, A. H. (2004). No longer just a pretty face: Fashion magazines' depictions of ideal female beauty from 1959 to 1999. *International Journal of Eating Disorders, 36*(3), 342-347.

Tackett, B. P., Petrie, T. A., Anderson, C. (2016). The frequency of weigh-ins, weight intentionality and management, and eating among female collegiate athletes. *Eating Behaviors, 23*, 82-85.

Taylor, C. B., Sharpe, T., Shisslak, C., Bryson, S., Estes, L. S., Gray, N., ... & Killen, J. D. (1998). Factors associated with weight concerns in adolescent girls. *International Journal of Eating Disorders, 24*(1), 31-42.

Thelen, M. H., Farmer, J., Wonderlich, S. & Smith, M. C. (1991). A revision of the Bulimia Test: The BULIT-R. *Psychological Assessment, 3*, 119-124.

Thompson, M. A., & Gray, J. J. (1995). Development and validation of a new body-image assessment scale. *Journal of Personality Assessment, 64*(2), 258-269.

Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting Beauty: Theory, Assessment, and Treatment of Body Image Disturbance*. American Psychological Association.

Thompson, J. K., Schaefer, L., & Menzel, J. (2012). Internalization of thin-ideal and muscular-ideal. *Encyclopedia of Body Image and Human Appearance. London. Elsevier*, 499-504.

Thompson, J. K., & Sherman, R. T. (2010). *Eating Disorders in Sport.* New York, NY: Routledge.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10*(5), 181-183.

Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, A. S., & Heinberg, L. J. (2004). The sociocultural attitudes towards appearance scale-3 (SATAQ-3): Development and validation. *International Journal of Eating Disorders*, *35*(3), 293-304.

Torstveit, M. K., Rosenvinge, J. H., & Sundgot-Borgen, J. (2008). Prevalence of eating disorders and the predictive power of risk models in female elite athletes: A controlled study. *Scandinavian Journal of Medicine and Science in Sports, 18*, 108-118.

Touchette, E., Henegar, A., Godart, N. T., Pryor, L., Falissard, B., Tremblay, R. E., & Cote, S. M. (2011). Subclinical eating disorders and their comorbidity with mood and anxiety disorders in adolescent girls. *Psychiatry Research, 185*(1-2), 185-192.

Tylka, T. L. (1999). Exploring the construct validity of the eating disorder continuum. *Journal of Counseling Psychology, 46*(2), 268-276.

Tylka, T. L. (2004). The relation between body dissatisfaction and eating disorder symptomatology: An analysis of moderating variables. *Journal of Counseling Psychology*, *51*(2), 178-191.

Tylka, T. L., & Subich, L. M. (1999). Exploring the construct validity of the eating disorder continuum. *Journal of Counseling Psychology, 46*(2), 268-276.

Tylka, T. L. & Subich, L. M. (2002). Exploring young women's perceptions of the effectiveness and safety of maladaptive weight control techniques. *Journal of Counseling and Development, 80*(1), 101-110.

Tylka, T. L., & Subich, L. M. (2004). Examining a multidimensional model of eating disorder symptomatology among college women. *Journal of Counseling Psychology*, 51, 314–328, doi:10.1037/0022-0167.51.3.314.

Tylka, T. L., & Wilcox, J. A. (2006). Are intuitive eating and eating disorder symptomatology opposite poles of the same construct? *Journal of Counseling Psychology*, *53*(4), 474-485.

Van Durme, K., Goossens, L., & Braet, C. (2012). Adolescent aesthetic athletes: A group at risk for eating pathology? *Eating Behaviors, 13*(2), 119-122.

Van Son, G. E., Hoek, H. W., Hoeken, D., Schellevis, F. G., & Van Furth, E. F. (2012). Eating disorders in the general practice: A case-control study on the utilization of primary care. *European Eating Disorders Review, 20*(5), 410-413.

Van Son, G. E., Hoeken, D., Bartelds, A. I., Van Furth, E. F., & Hoek, H. W. (2006). Time trends in the incidence of eating disorders: A primary care study in the Netherlands. *International Journal of Eating Disorders, 39*(7), 565-569.

Van Strien, T., Engels, R. C., Van Leeuwe, J., & Snoek, H. M. (2005). The Stice model of overeating: Tests in clinical and non-clinical samples. *Appetite, 45*(3), 205-213.

Van Strien, T., Frijters, J. E., Bergers, G., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders, 5*(2), 295-315.

Voelker, D. K., Petrie, T. A., Neumann, C. S., & Anderson, C. M. (2016). Psychosocial factors as longitudinal predictors of bulimic symptomatology among female collegiate athletes. *Psychology of Sport and Exercise, 26*, 123-129.

Vollrath, M., Koch, R., & Angst, J. (1992). Binge eating and weight concerns among young adults. Results from the Zurich cohort study. *The British Journal of Psychiatry*, *160*(4), 498-503.

Wade, T. D., & Lowes, J. (2002). Variables associated with disturbed eating habits and overvalued ideas about the personal implications of body shape and weight in a female adolescent population. *International Journal of Eating Disorders, 32*(1), 39-45.

Wertheim, E. H., Koerner, J., & Paxton, S. J. (2001). Longitudinal predictors of restrictive eating and bulimic tendencies in three different age groups of adolescent girls. *Journal of Youth and Adolescence, 30*(1), 69-81.

Watson, D., & Clark, L. A. (1992). Affects separable and inseparable: On the hierarchical arrangement of the negative affects. *Journal of Personality and Social Psychology*, *62*(3), 489-505.

Wildes, J. E., Emery, R. E., & Simons, A. D. (2001). The roles of ethnicity and culture in the development of eating disturbance and body dissatisfaction: A meta-analytic review. *Clinical Psychology Review, 21*(4), 521-551.

Williams, P. L., Sargent, R. G., & Durstine, L. J. (2003). Prevalence of subclinical eating disorders in collegiate female athletes. *Women in Sport & Physical Activity Journal, 12*(2), 1 - 127.

Woody, E. Z., Costanzo, P. R., Leifer, H., & Conger, J. (1981). The effects of taste and caloric perceptions on the eating of restrained and unrestrained subjects. *Cognitive Research and Therapy, 5,* 381–390.

World Health Organization. (1989). Composite International Diagnostic Interview (CIDI), core version 1.0 Geneva: Author.

Yamamiya, Y., Cash, T. F., Melnyk, S. E., Posavac, H. D., & Posavac, S. S. (2005). Women's exposure to thin-and-beautiful media images: Body image effects of media-ideal internalization and impact-reduction interventions. *Body Image, 2*(1), 74-80.