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Practical Screening Methods for Eating Disorders for Collegiate Athletics

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1. Introduction

Eating disorders are distinct severe disturbances in eating behavior (e.g., Anorexia Nervosa, Bulimia Nervosa, and Eating Disorders Not Otherwise Specified; American Psychiatric Association [APA], 2000, pg.583). Sociocultural, biological, and psychological factors are intricate in the development of eating disorders (Beals & Manore, 1999; Beals, 2004); though causation may be multifactoral. Extensive research has been conducted in eating disorders and body image disturbances, and many psychologists (e.g. Daniel & Bridges, 2010; Fredrickson & Roberts, 1997; Mazzeo & Espelage, 2002; Tylka & Subich, 2004) have presented model frameworks that eloquently combine variables to explain eating disorder and body image dissatisfaction symptomology in males and females. In the last decade, eating disorders and body image disturbances in the collegiate athletic population has received increasing attention (Black et al., 2003; Greenleaf et al., 2009; Johnson et al. 1999; Petrie et al., 2008; Sundgot-Borgen & Torstveit, 2004). Older research by Johnson, Powers, and Dick (1999) revealed in a hetergeneous sample of collegiate athletes that both females and males were at risk for eating disorders (males: 38% at risk for Bulimia Nervosa and 9.5% risk for Anorexia Nervosa; females: 38% at risk for Bulimia Nervosa and 34.75% at risk for Anorexia Nervosa). Whereas, more current research has estimated 20% for men (Petrie et al, 2008) and 25.5% for female collegiate athletes (Greenleaf et al., 2009). However, estimated prevalence in these studies have been conducted in an anonymous and controlled research environments; thus no data has been presented while examining eating disorder symptomology in a practical setting (pre-participation physical examinations [PPE]) screening for associated risk factors in collegiate athletes.

The sport context is influential on athletes in positive as well as negative ways, thus it is expected that the sport environment could have a considerable impact on the occurrence of eating disorders. Sports can be perceived as its own culture, with its own rules, customs and traditions, and expectations. A culture bound syndrome, as defined by Prince (1985), is "a collection of signs and symptoms (excluding notions of cause) which is restricted to a limited number of cultures primarily by reason of certain of their psychosocial features" (p.201). In a review, Keel and Klump (2003) suggested that Bulimia Nervosa may be a culture-bound syndrome, influenced by weight concerns, anonymous access to large quantities of food, and a motivation to prevent the effects of binge eating on weight through the use of inappropriate compensatory behavior (e.g. self-induced vomiting, excessive exercise, use of diet pills or laxatives, or fasting). Consequently, if the sport environment is

conceptualized as its own culture, then the incidence of eating disorders, such as Bulimia in athletes would potentially have similar and dissimilar etiology from nonathletic populations. In addition, it is plausible that precursors to binge-eating, which is the disordered eating behavior that can lead to Bulimia, appear to be depression symptoms and low self-esteem.

It was theorized by Koenig and Wasserman (1995) that the high rates of co-morbidity found between eating disorders and depression may, in part, be caused by common features such as negative self-evaluation and general dissatisfaction with one's physical appearance (Muscat & Long, 2008). Therefore, to better understand the etiology of eating disorders, researchers have focused on the role of body image. Theorists agree that perceptions such as body image distortion and dissatisfaction play a crucial role in the development of disordered eating (Henriques et al., 1996; Ackard et al., 2002) and maladaptive weight control behaviors such as dietary restriction, excessive dieting, laxative use, over exercising and purging (Fredrickson & Roberts, 1997; Stice & Agras,1999; Sundgot-Borgen & Torstveit, 2004; Tylka & Subich, 2004). Some theorist (e.g., Fredrickson & Roberts, 1997; Maine, 2000; Pipher, 1994; Thompson et al., 1999) suggested that sociocultural pressures for thinness directly predict perceptions of poor social support and negative affect (e.g., low self-esteem). It is suggested that being pressured to obtain an unrealistic body image (e.g. thin) by others is more likely to lead into feeling unsupported (Pipher, 1994). Similarly, previous research examining athletes have revealed pressures from coaches (Beisecker & Martz, 1999; Griffin & Harris; 1996; Petrie et al., 2009), family members and peers (Field et al. 2001; Petrie et al. 2009; Vincent & McCabe, 1999) in the development of body image concerns and unhealthy weight-loss practices in athletes.

Body image disturbance, depression, and low self-esteem have been shown to have an association with eating disorders; however they are often not included in the screening process for athletes during PPEs. The National Athletic Trainers' Association and the American College of Sports Medicine have developed position statements for assisting clinicians by providing recommendations for screening and diagnosis of eating disorders and the female athlete triad in athletes (Bonci, et al., 2008; Nativi et al, 2007). Although both statements are very thorough, little attention is given to screening other psychological constructs (body image disturbance, depression, and low self-esteem) that are associated with eating disorders. Self-reported psychometric questionnaires such as the Eating Disorder Inventory (EDI; Garner, et al, 1983, pg.173-184), the Eating Disorders Examination (EDE-Q; Fairburn & Cooper, 1993) and the Eating Attitudes Test (EAT; Garner et al., 1982) are commonly used in the athletic population. Although these questionnaires have well established reliability and validity, it is recognized that most test administrators in the athletic setting for PPEs (e.g., athletic trainers) are either relatively unfamiliar with screening tests or have minimal knowledge or background in standardized test administration or psychometrics. Questionnaire can be fee-based or time consuming (e.g., EDI or EDE-Q), therefore with institutions with limited resources may utilize the EAT-26 because it's free, short in nature, and easy to score.

When it comes to examining body image dissatisfaction, both the EDI and the EDE-Q have subscales; however a more practical alternative used in the literature is the Stunkard Figural Stimuli Scale (Stunkard et al., 1983). A common version of the scale involves nine gender-specific BMI-based silhouettes (SILs). Bulik et al. (2001) examined 16,728 females and 11,366 males ranging in age from 18-100 and transformed the nine SILS and associated each pictorial image with a specific BMI increment. One way of understanding body image is

through the use of gender-specific BMI-based SILs is to represent images of actual physique appearance compared to ideal appearance (Stunkard et al., 1983; Bulik et al., 2001). In addition, a recent strategy by Torres-McGehee et al. (2009), undercovered possible sources of negative body image (actual – ideal > 0) by associating SILs scales with reference questions pertaining to daily clothing verses uniform type in aesthetic (Torres-McGehee et al., 2009; Torres-McGehee et al., In Press) and perceptions by others (e.g., friends/peers, parents, cosches; Torres-McGehee & Monsma, n.d); however non-aesthetic sports were not represented in these samples. This strategy is useful for detecting differences from specific social agents.

Due to the large number of athletes at NCAA Division I institutions, screening athletes for potential eating disorder symptomology may be challenging during PPEs. Therefore, this study seeks to examine a retrospective data set compiled from two consecutive years of PPE screening for eating disorder risk and associated symptoms in Division I collegiate athletics. Practitioners utilized reliable and validated instruments commonly used for the general population were used (e.g., EAT-26, Center for Epidemiological Studies Depression Scale, Rosenberg's Self-Esteem Scale, BMI-based silhouette scale, Exercise Dependence Scale). Furthermore, this study will present preliminary findings associated with: (1) estimated prevalence of eating disorder risk, depression, low self-esteem and exercise dependence among female and male athletes; (2) weight pressures, (3) distribution of compensatory behaviors, and (3) body image disturbances associated with clothing type and perceptions of others. Due to the sensitivity of screening for eating disorder symptomology, it is expected that the estimated prevalences among eating disorders risk, associated symtomology, and compensatory behaviors will be lower than estimated prevalence among previous studies (Black & Burckes-Miller, 1988; Carter & Rudd, 2005; Johnson et al.,1999; Greenleaf et al., 2009, Petrie et al., 2008). It is proposed that negative body images thought to be held by others (i.e., actual – ideal), or perceived body ideals from others, are generated in reference to specific social agents (e.g., friends, parents, coaches), with the greatest influence from the coach.

2. Method

2.1 Design and procedure

This study was a retrospective, descriptive and cross-sectional study design. After acquiring appropriate institutional review board approval, two consecutive years of data were obtained from a secure online pre-participation physical examination for eating disorder and mental health screening database used by one NCAA Division I institution. For the protection of the athletes, specific dates of screening is not disclosed; however the two years of data obtained was within the last 5 years. Screening instruments included: (1) Eating Attitudes Test (EAT-26), (2) Center for Epidemiological Studies Depression Scale (CES-D), (3) Rosenberg's Self-Esteem Scale (RSES), (4) BMI-based silhouette scale, (5) Exercise Dependence Scale (EDS), (6) questions regarding weight and pressures in sport and (7) demographic information included athlete's age, gender, and sport, race/ethnicity.

2.2 Participants

One NCAA Division I institution's retrospective data from pre-participation eating disorder and mental health screening was used to examine athletes over a 2 year period (Year 1: n = 355, females: n = 243 and males: n = 112; Year 2: n = 340, females: n = 208, and males n: =

132). Academic background and self-reported physical measurements are represented in Table 1. Total sample of athletes for Years 1 and 2 classified themselves as: 81.8% vs. 82.6% Caucasian, 11.8% vs. 10.3% African American/Black, 1.5% vs. 3.5% Hispanic, 0.6% vs. 0.3% Native American/Indian, 0.3% vs. 0.9% Asian American, and 4.1% vs. 2.4% reported other. Distribution of males for Years 1 and 2 participated in the following sports: baseball, n = 23 vs. n = 23; swimming and diving, n = 27 vs. n = 21; basketball, n = 4 vs. n = 2; cheerleading, n = 8 vs. n = 14; football, n = 8 vs. n = 24; golf, n = 5 vs. n = 1; soccer, n = 12 vs. n = 20; track and field, n = 20 vs. n = 21; and tennis, n = 5 vs. n = 6 respectively. Distribution of females for Years 1 and 2 participated in the following sports: volleyball, n = 9 vs. n = 15; swimming and diving, n = 39 vs. n = 37; basketball, n = 7 vs. n = 5; cheerleading, n = 34 vs. n = 32; cross country, n = 21 vs. n = 11; golf, n = 6 vs. n = 5; soccer, n = 23 vs. n = 27; softball, n = 15 vs. n = 13; track and field, n = 41 vs. n = 25; equestrian, n = 27 vs. n = 34; dance, n = 17 vs. n = 0; and tennis, n = 5 vs. n = 4 respectively.

2.3 Measure

2.3.1 Eating Attitudes Test (EAT-26)

The EAT-26 was administered to screen for eating disorder characteristics and behaviors. Although not diagnostic, the EAT-26 is commonly used as a screening tool to identify early characteristics and behaviors indicating the potential presence of eating disorders (Garner et al.,1982). The EAT-26 is composed of three subscales: dieting, bulimia, and food preoccupation/oral control and followed by five supplemental questions: binge eating; vomiting to control weight or shape; use of laxatives, diet pills or diuretics to lose or to control weight; and exercise more than 60 minutes a day to lose or control weight. Supplemental questions were measured on a Likert-scale (e.g., never, once a month or less, 2-3 times a month, once a week, 2-6 times a week, or once a day or more). In addition, participants answered "Yes" or "No" to whether or not they had lost 20 pounds or more in the past 6 months. Individuals were identified as "at risk" if their total EAT-26 score was greater than 20 or if an individual met the "risk" criteria for one supplemental question. If the EAT-26 score is lower than 20 and individual does not meet the "risk" criteria for supplemental questions, then the individual is considered "not at risk." The EAT-26 has a reliability (internal consistency) of alpha = 0.90 (Garner et al.,1982). In a cross-validation sample, Mazzeo and Espelage (2002) reported coefficients alphas for subscales: dieting, α = .89; bulimia, α = .79; and oral control, α = .53. The alpha coefficients in the present study were as follows: total score, α = .91; dieting, α = .92; bulimia, α = .65 and oral control, α = .56 supporting subsequent analyses. Alpha coefficients across gender in this study were as follows: females, α = .91; dieting, α = .92; bulimia, α = .68 and oral control, α = .53 and males, α = .87; dieting, α = .89; bulimia, α = .60 and oral control, α = .60.

2.3.2 Center for Epidemiological Studies Depression Scale (CES-D)

Center for Epidemiological Studies Depression Scale (CES-D) was used to assess depression (Radloff, 1977). The CES-D is a 20-item self-report measure of depression. It consists of statements that may reflect persons' feelings throughout the week. These items are answered on a four-point scale from 1 = rarely to none of the time to 4 = most of the time. Total score of 16 or higher was considered depressed. The CES-D has 4 separate factors: Depressive affect, somatic symptoms, positive affect, and interpersonal relations. The CES-D has very good internal consistency with alphas of .85 for the general population (Radloff, 1977). The alpha coefficient for all athletes in this study was .89 (females: α = .90 and males: α = .88).

2.3.3 Rosenberg's Self-Esteem Scale (RSES)

The RSES was designed to provide a unidimensional measure of global self-esteem (Rosenberg, 1965). The instrument consists of 10 self-reported items related to overall feelings of self-worth or self-acceptance. These items are answered on a four-point Likert scale ranging from 1=strongly agree to 4=strongly disagree. Scores lower than 15 indicated low self-esteem. The scale is widely used and reported to have a high alpha reliabilities ranging from .72 to .85. The alpha coefficient for all athletes in this study was .90 (females: α = .90 and males: α = .89).

2.3.4 Gender-specific BMI figural Stimuli Silhouette (SIL)

The Figural Stimuli Survey examined body disturbance based on perceived and desired body images for both males and females (Stunkard et al., 1983). Stunkard's findings were extended by Bulik et al. (2001) by associating specific BMI anchors for each image. The Figural Stimuli is a scale links gender-specific BMI SILs associated with Likert-type ratings of oneself against one of nine SILs associated with a number which then represent a specific BMI ranging from 17.8 – 44.1 kg/m² and age range from 18-30 years (e.g., SIL 1 = 17.8, SIL 2 = 18.8, SIL 3 = 20.3, SIL 4 = 22.6, SIL 5 = 26.4. SIL 6 = 31.3, SIL 7 = 36.7, SIL 8 = 40.8, and SIL 9 = 44.1; Bulik et al. 2001). Previous research reported test-retest analyses for females' actual body image as r = .85 (p < .0001) and ideal body image, r = .82 (p < .0001; Peterson et al., 2003). Male BMI values for ages 18-30 years ranged from 18.8-49.4 kg/m² (e.g., SIL 1 = 18.8, SIL 2 = 20.2, SIL 3 = 21.4, SIL 4 = 22.9, SIL 5 = 25.4. SIL 6 = 28.2, SIL 7 = 33.1, SIL 8 = 35.8, and SIL 9 = 49.4; Bulik et al. 2001). The correlations between BMI and perceived actual SILs from others ranged from .42 to .55 (p > .001), and .11 (p > .05) to .28 (p < .01) for ideal SILs from others. This study's alpha coefficient for all body image SILs was .97 (females: α = .96, males: α = .98), and .98 for perceived SILs (females: α = .96, males: α = .98), and .96 for ideal SILs (females: α = .94, males: α = .96).

Consistent with previous research (Torres-McGehee et al. 2009; Torres-McGehee et al, In Press), SILs augmented by reference phrases were utilized to capture perceptions of actual and ideal body images in daily clothing and competitive uniform. Participants were provided with specific instructions to utilize the SILs (numbered 1-9) to identify which picture best represents: a) 'your appearance (now) in everyday clothing (e.g., what you wear to school)', b) 'the appearance you would like to be in normal daily clothing', c) 'your appearance (now) in your competitive uniform', and d) 'the appearance you would like to be in a competitive uniform'. Similar to Torres-McGehee & Monsma (n.d), additional questions were used to capture perceived body ideal from friends, parents and coaches: a) 'if your peers (friends) pick a picture that represents you now, what picture do you think they will pick,' and b) 'how do you think your peers (friends) would like your appearance to look like,' c) 'if your parents pick a picture that represents you now, what picture do you think they will pick,' d) 'how do you think your parents would like your appearance to look,' e) 'if your coach picks a picture that represents you now, what picture do you think they will pick,' and f) 'how do you think your coach would like your appearance to look.'

2.3.5 Exercise Dependence Scale-21

Exercise dependence was measured by the Exercise Dependence Scale (Hausenblas and Downs (2002)). The survey provides a mean overall score of exercise dependence symptoms; differentiates between at risk, nondependent-symptomatic, and dependent-symptomatic. In addition it specifies whether an individual has evidence of psychological dependence or no

psychological dependence and whether individuals have evidence of physiological dependence (i.e., evidence of tolerance or withdrawal) or no physiological dependence (i.e., no evidence of tolerance or withdrawal). Exercise dependence is measured in the scale by the presence of 3 or more of the following: tolerance, withdrawal, intention effect, lack of control, time, reduction in other activities, and continuance. The 21-item questionnaire designed as a 6-point Likert scale. Scale has been validated for the general population (18 years or older; Hausenblas & Down, 2002); however the scales has not been used for the athletic population. For this reason, instructions for the scale were modified as "refer to current exercise beliefs and behaviors outside of regular scheduled practice with your team that have occurred in the past 3 months". The alpha coefficient for all athletes in this study was .93 (females: α = .94 and males: α = .93).

2.3.6 Weight and pressures in sports

Athletes were asked the following questions regarding pressures within their sport: (1) 'do you gain or lose weight regularly to meet the demands of your sport?'; (2) 'has anyone pressured you to change your weight or eating habits?'; and (3) do you feel pressured to look a certain way for your sport?'.

2.4 Data analysis

SPSS statistical software (version XVIII; SPSS Inc. Chicago, IL) was used for all analyses. For the privacy and protection of the athletes, all data was de-identified prior to release to the researchers. Due to the inability to determine whether an athlete repeated the screening two consecutive years the data was assessed within each individual year and across gender. Prevalence of eating disorder characteristics and behaviors, supplemental EAT-26 questions, depression, self-esteem, and exercise dependence was estimated using the number of "at risk" individuals at a 95% confidence level. Chi-square analyses were used to examine the significance and distribution of all at risk variables among males and females. In addition, Chi-square was used to determine the significance and distribution of variables which included: a) college education level, b) ethnicity, c) sport and d) pressures to lose weight.
An a priori α level set at $p = .05$.
Body image dissatisfaction was examined using the Likert SIL anchor data, four ANOVAs with a repeated measures on the last two factors were used to examine clothing type and perceptions of others' body image variation for both Year 1 and Year 2: (a) 2 (gender: females, males) x 2 (clothing type: SIL daily clothing, SIL competitive uniform) x 2 (actual body image, ideal body image) and (b) (a) 2 (gender: females, males) x 3 (perceptions of others: SIL friends, SIL parents, SIL coach) x 2 (actual body image, ideal body image). Mauchly's Test of Sphericity was examined to determine whether a correction factor should be applied. An a priori α level set at $p = 0.05$. BMI-based SIL means established by Bulik et al (2001) are provided for comparative purposes but were not used in statistical analyses examining body image variation across groups because the distance in BMI values associated with each incremental Likert anchor is uneven and would inherently inflate type I error rate (Torres-McGehee et al., n.d).

3. Results

Academic status and self-reported physical measurements (i.e., BMI, height, weight, ideal weight, etc.) of collegiate athletes are reported in Table 1. Distribution of athletes classified

as "at risk" for eating disorders, depression, low self-esteem, and exercise dependence in athletes are reported in Table 2. Chi square values are represented for differences between females and males within each year. No significant differences were found among females and males for eating disorders (Year 2), depression, low self-esteem and exercise dependence; however, females in Year 1 reported significantly higher risk for eating disorders than males $\chi^2(1, n = 243) = 4.1$, $p = .04$. In addition, Year 2 females reported significantly higher pressure to look a certain way for their sport $\chi^2(1, n = 208) = 39.9$, $p < .01$ and pressured to change their weight or eating habits $\chi^2_1(1, n = 208) = 8.2$, $p < .01$ compared to males. Distribution of pathogenic behaviors (i.e., binging, vomiting to control or lose weight, use of diet pills/laxatives, excessive exercise) are reported in Table 3.

Repeated measures ANOVA results indicated a between subjects effect between clothing type and gender for both Years 1 and 2 respectively: $F(1,353)=52.3$, $p < .001$, $\eta^2 = .13$ and $F(1,338)=85.8$, $p < .001$, $\eta^2 = .20$. A main effect on perceptions was significant ($p < .001$) with a significant interaction by the clothing type by actual and ideal body image for Year 1: $F(1,353) = 30.2$, $p < .001$, $\eta^2 = .08$ and Year 2: $F(1,338) = 43.9$, $p < .001$, $\eta^2 = .12$. This indicated athletes desired to be smaller than their actual body image for each of the clothing types (Table 4). Repeated measures ANOVA results indicated a between subjects effect for perceptions from others and gender for both Years 1 and 2 respectively: $F(1,353)=49.7$, $p < .001$, $\eta^2 = .12$ and $F(1,338)=69.2$, $p < .001$, $\eta^2 = .17$. A main effect on perceptions was significant ($p < .001$) with a significant interaction by the all three variables (gender,

	Year 1						Year 2					
	All (n = 355)		Females (n = 243)		Males (n = 112)		All (n = 340)		Females (n = 208)		Males (n = 132)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	20.1	4.9	20.1	5.9	19.9	1.3	19.6	1.5	19.4	1.5	19.8	1.5
Weight (kg)												
Current	69.1	16.1	61.8	10.9	84.8	14.3	71.6	16.7	62.8	10.4	85.6	15.3
Ideal	68.0	16.3	59.8	9.3	85.4	13.8	71.0	17.5	60.8	9.6	87.1	14.7
High	72.3	16.5	65.0	11.1	88.1	15.3	74.6	17.7	65.7	11.2	88.7	16.9
Low	64.9	14.4	58.0	8.9	79.8	12.7	67.3	15.4	58.9	9.7	80.4	13.6
Current - Ideal	1.3	6.2	1.9	5.5	-1.0	7.1	.65	3.9	2.1	2.5	-1.6	4.6
Height (cm)	172.1	10.5	167.2	8.1	182.6	6.9	173.3	13.9	167.6	8.6	183.4	6.9
BMI (kg/m^2)	23.1	3.7	22.0	3.0	25.4	3.9	23.5	3.5	22.3	2.7	25.4	3.8
Academic Status	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*
Freshman	28.8	98	19.1	65	9.7	33	30.3	103	19.4	66	10.9	37
Sophomore	24.4	83	15.6	53	8.8	30	25.6	87	14.7	50	10.9	37
Junior	24.4	83	13.5	46	10.9	37	21.2	72	14.1	48	7.1	24
Senior	22.4	76	12.9	44	9.4	32	22.9	78	12.9	44	10.0	34

Table 1. Academic status and self-reported physical measurements of collegiate athletes.

	Year 1							Year 2						
	All (n = 355)		Females (n = 243)		Males (n = 112)			All (n = 340)		Females (n = 208)		Males (n = 132)		
	%	*n*	%	*n*	%	*n*	χ^2	%	*n*	%	*n*	%	*n*	χ^2
EAT-26 At Risk	12.9	44	9.7	33	3.2	11	4.1*	14.1	48	8.8	30	5.3	18	.04
EAT Scales	1.5	5	1.5	5	0	0		0.6	2	0.3	1	0.3	1	
Behaviors	9.1	31	6.5	22	2.6	9		10.9	37	6.5	22	4.4	15	
Both	2.4	8	1.8	8	0.6	2		2.4	8	1.8	6	0.6	2	
Depression At Risk	19.8	67	8.3	28	11.5	39	.29	12.4	42	9.1	31	3.2	11	3.2
Self-Esteem At Risk	4.1	14	3.2	11	0.9	3	1.9	3.5	12	2.6	9	0.9	3	1.0
Exercise Dependence							2.6							.33
At Risk	3.2	11	2.4	8	0.9	3		4.4	15	2.6	9	1.8	6	
Nondependent - Symptomatic	45.9	156	29.7	101	16.2	55		39.1	133	23.2	79	15.9	54	
Nondependent - Asymptomatic	50.9	173	29.1	99	21.8	74		56.5	192	35.3	120	21.2	72	
Weight & Pressures														
Change weight to meet demands of sport	17.9	61	11.8	40	6.2	21	.61	17.1	58	10.9	37	6.2	21	.65
Pressure to change weight	31.5	107	20.3	69	11.2	38	.72	14.4	49	11.5	39	2.9	10	8.2*
Pressure to look a certain way	29.1	99	17.9	61	11.2	38	.01	25.6	87	22.9	78	2.6	9	39.9*

* p = <.05

Table 2. Proportion of participants classified as "at risk" for eating disorders, depression, low self-esteem, and exercise dependence in athletes. Chi square values are represented for differences between females and males within each year.

perceptions from others and by actual and ideal perceptions) for Year 1: $F(1,353) = 11.7$, $p < .001$, $\eta^2 = .03$ and Year 2: $F(1,338) = 17.8$, $p < .001$, $\eta^2 = .05$. This indicated differences between actual and ideal perceptions were dependent on perceptions from others (e.g., friends, parents, coaches) and across gender. In both Years 1 and 2, females perceived the largest discrepancy in body image from coaches, revealing a much smaller image compared to friends and parents (Table 5). Similarly, males perceived the highest body image discrepancy in perceptions from coaches; however Year 1 data represented a much smaller ideal image than to Year 2 with a larger body image compared to perceptions from friends and parents (Table 5).

Study	Population (n)	Binge Eating	Vomiting	Laxatives	Diet Pills or Dieting	Diuretics	Excessive Exercise	Lost > 20 pounds
Current Study Year 1	Males & Females (n = 355)	5.9	2.9	3.2†	--	--	1.8	2.1
Current Study Year 2 (n = 340)	Males & Females (n = 340)	6.5	1.8	1.8†	--	--	3.8	2.6
Black & Burckes-Miller, (1988)	Males & Females (n = 695)	--	5.6	3.7	10.6	3.2	55.8	--
Johnson et al., (1999)	Males (n = 883)	12.6	2.0	1.0	0.57	0.23	--	--
	Females (n = 562)	16.2	6.4	1.8	1.4	0.53	--	--
Carter & Rudd, (2005)	Males							
	Females							
Petrie et al., (2008)	Males (n = 203)	3.4*	3.0*	2.5	3.0	3.0	20.7	--
Greenleaf et al., (2009)	Females (n = 204)	15.2	2.9	0.98	15.7	1.5	25.5	--
Torres-McGehee et al. (n.d)	Cheerleaders (n = 136)	11.8	9.6	19.9†	--	--	1.5	2.2
Torres-McGehee et al. (2009)	Dancers (n = 101)	14.9	9.9	18.9†	--	--	--	--
Torres-McGehee et al. (2011)	Equestrian (n = 138)	24.6	11.6	15.2†	--	--	--	--

Note: --No reported measures for these variables
*Reported 1-2 times/per week
†Included laxatives, diet pills, and diuretics in one question.

Table 3. Comparison of prevalence rates (proportions) of pathogenic behaviors among athletes in the current study, cheerleaders, varsity equestrian athletes, auxiliary performers and other female and male athletes. (Torres-McGehee et al., In Press)

4. Discussion

4.1 Eating disorder risk

This is study is unique because we examined retrospective screening data for eating disorders and associated symptomology (e.g., depression, low self-esteem, excessive exercise, body image) in Division I collegiate female and male athletes' PPEs. Another unique feature is that the data retrieved was not obtained in a controlled research environment, but rather part of the athletes' medical record. Overall estimated prevalence

	BMI SILs Anchor Means (kg/m²)											
	Year 1						Year 2					
	All (n = 355)		Females (n = 243)		Males (n = 112)		All (n = 340)		Females (n = 208)		Males (n = 132)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Self-Reported BMI	23.1	3.7	22.0	3.0	25.4	3.9	23.5	3.5	22.3	2.7	25.4	3.8
SIL Daily Clothing												
Actual	22.2	2.8	21.7	2.7	23.4	2.5	22.6	2.6	21.9	2.5	23.6	2.6
Ideal	21.3	2.3	20.5	1.9	23.1	1.9	21.7	2.3	20.7	1.9	23.4	1.9
SIL Uniform												
Actual	22.1	2.8	21.6	2.7	23.2	2.5	22.7	3.2	22.0	2.8	23.9	3.4
Ideal	21.3	2.4	20.5	2.2	23.1	1.9	21.9	2.8	20.7	1.8	23.7	3.1
	Likert SIL Anchor Means											
	All		Females		Males		All		Females		Males	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SIL Daily Clothing												
Actual	3.6	1.1	3.6	1.1	3.6	1.1	3.8	.97	3.6	.87	4.1	1.0
Ideal	3.3	1.0	3.2	1.0	3.3	1.0	3.5	.94	3.1	.76	4.1	.83
SIL Uniform												
Actual	3.6	1.1	3.6	1.1	3.5	1.1	3.8	1.0	3.6	.83	4.2	1.1
Ideal	3.3	1.0	3.2	1.1	3.3	1.0	3.5	1.0	3.0	.77	4.2	1.0

Table 4. Descriptive statistics for self-report-BMI and Likert SILs for clothing type body image variables (e.g., daily clothing and competitive uniform).

for eating disorder risk among all athletes was estimated at 12.9% for Year 1 and 14.1% for Year 2; which is significantly lower than previous research (Johnson et al., 1999; Greanleaf et al., 2009; Petrie et al., 2008). Due to the protection of athletes and the institution, sport context was not evaluated; therefore our study examined differences across gender. Interestingly, there was not a significant difference between males and females for Year 2; however results in Year 1 revealed that females portrayed higher risk symptoms for eating disorders than males (9.7% vs. 3.2%). Although, females reported to be higher risk, the estimated prevalence was still lower than previous studies examining female athletes (Black et al., 2003; Greenleaf et al., 2009; Sundgot-Borgen & Torstveit, 2004; Torres-McGehee et al., 2009; Torres-McGehee et al., In Press). Our study had representation of female athletes across 12 different sports. Similarly, in a sample of 204 female athletes, Greenleaf et al. (2009) estimated eating disorders risk across 17 female sports (e.g., gymnastics, rowing, softball, basketball, cross country, etc.), and classified athletes with eating disorders (2.0%; n=4), as symptomatic (25.5%; n=52) and asymptomatic (72.5%; n=148). In addition, no significant differences were found between sport team classification and eating disorder classification.

	BMI SILs Anchor Means (kg/m²)											
	Year 1						Year 2					
	All (n = 355)		Females (n = 243)		Males (n = 112)		All (n = 340)		Females (n = 208)		Males (n = 132)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Self-Reported BMI	23.1	3.7	22.0	3.0	25.4	3.9	23.5	3.5	22.3	2.7	25.4	3.8
SIL Friends												
Actual	22.0	2.6	21.4	2.5	23.4	2.5	22.4	2.8	21.7	2.6	23.6	2.7
Ideal	21.7	2.3	21.0	1.9	23.3	2.1	22.1	2.2	21.3	1.9	23.4	1.9
SIL Parents												
Actual	22.1	2.7	21.5	2.6	23.3	2.7	22.3	2.6	21.7	2.6	23.3	2.2
Ideal	21.7	2.2	20.9	1.9	23.2	2.1	22.1	2.3	21.1	1.7	23.5	2.2
SIL Coach												
Actual	22.3	2.8	21.7	2.7	23.5	2.7	22.6	3.1	22.0	2.7	23.7	3.3
Ideal	31.3	21.4	20.5	2.0	23.2	2.0	21.8	2.8	20.7	1.7	23.8	3.0

	Likert SIL Anchor Means											
	All		Females		Males		All		Females		Males	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SIL Friends												
Actual	3.5	1.1	3.5	1.1	3.5	1.1	3.7	1.1	3.4	.96	4.1	1.1
Ideal	3.4	1.0	3.4	1.0	3.4	1.0	3.6	.87	3.4	.75	4.1	.84
SIL Parents												
Actual	3.5	1.1	3.6	1.1	3.5	1.1	3.6	.97	3.5	.91	4.0	.98
Ideal	3.4	.99	3.4	.98	3.4	1.0	3.6	.92	3.2	.74	4.1	.93
SIL Coach												
Actual	3.6	1.1	3.6	1.1	3.6	1.2	3.8	1.0	3.6	.96	4.1	1.1
Ideal	3.3	1.1	3.2	1.1	3.3	1.1	3.5	1.0	3.0	.82	4.2	.95

Table 5. Descriptive statistics for self-report-BMI and Likert SILs for perceptions by others (e.g., friends, parents, and coaches).

Other studies, have examined eating disorder risk across categorized sport groups or specific individual team sports (Black et al., 2003; Sundgot-Borgen & Torstveit, 2004; Torres-McGehee et al., 2009; Torres-McGehee et al., In Press; Torres-McGehee et al., n.d). More specifically, Black and et al., (2003) estimated their highest eating disorder prevalence to be among cheerleaders (33%), while also finding disordered eating occurring frequently among gymnasts (50%), modern dancers (45%), and cross country athletes (45%). Similarly to Black et al. (2003), Torres-McGehee and colleagues (2009, In Press, n.d) estimated high risk among collegiate dancers (29%), cheerleaders (33%) and equestrian athletes (42%). Whereas, Sundgot-Borgen & Torstveit (2004) revealed eating disorder prevalence among categorized athletic sport groups vs. individual sports and revealed eating disorder risk in the following: technical sports (17%; e.g., bowling, golf), ball game sports (16%; e.g., team handball, soccer, tennis, volleyball); aesthetic sports (42%; e.g., gymnastics, dancing, figure skating, diving) and endurance sports (24%; e.g., aerobics, long-distance running).

This study revealed males to have a lower eating disorder risk (Year 1 = 3.2% vs. Year 1 = 5.3%) than male athletes in a studies conducted by Johnson et al. (1999) and Petrie et al., (2008). More specifically, Johnson et al. (1999) found males to be 9.5% for Anorexia Nervosa and 38% risk for Bulimia Nervosa; whereas Petrie et al. (2008) reported symptomatic eating disorders in male athletes across categorized sports (e.g., 13% for endurance sports, 20% for ball game sports, and 22% for power sports). However, our results were slightly higher than those reported among Australia elite male athletes (n = 108; Bryne & McLean, 2002). Byrne & McLean (2002) reported prevalence in the thin-build category (e.g., long distance running, swimming, gymnastics, diving) to be 4% at risk for Anorexia Nervosa, 2% Bulimia Nervosa, and 2% EDNOS. No eating disorders were identified among male normal-build athletes.

4.2 Compensatory/pathogenic behaviors

Clinical and subclinical eating disorders involve the use of specific disordered eating and compensatory weight-control behaviors to manage emotions, weight and body size (APA, 2000). In our study, ~17% of male and female athletes reported they gained or lost weight to regularly meet the demands of their sport. More specifically they reported highest prevalence with compensatory behaviors in: binging in Year 2 (6.5%), vomiting to control or lose weight in Year 1 (2.9%), use of diet pills and diuretic to control or lose weight in Year 1 (3.2%), and excessive exercise in Year 2 (3.8). Our findings were aligned with several studies examining compensatory behaviors in athletes (e.g., Table 3, Carter & Rudd, 2005; Johnson et al., 1999) but lower than Black and Burckes-Miller (1988), Greenleaf et al. (2009), Petrie et al., 2008; and studies that focused solely on aesthetic sports (e.g., Table 3, Torres-McGhee et al, 2009; Torres-McGehee et al., In Press; Torres-McGehee et al, n.d). However, these numbers may be lower due to the timing of PPEs. Previous research has found that athletes who engage in chronic dieting, fasting, laxative use, and/or self-induced vomiting do so during certain times of the year (e.g., in-season athletes attempting to maintain a certain weight (Sundgot-Borgen, 1994).

4.3 Depression, low self-esteem and weight pressures

Eating disorders have high rates of comorbidity with other psychological illnesses, such as depression and low self-esteem (Mischoulon et.al., 2010). Individuals, who have clinical eating disorders, characteristically have low mood and higher-than-average levels of depressive symptoms, and are at greater risk for clinical depression (Muscat & Long, 2008). It is often that athletes will be at higher risk for depression because of the commitment to competitive athletics. Although, we did not compare non-athletes in our study, our estimated prevalence for depression was similar to Armstrong et al. (2009). Armstrong et al. (2009) revealed collegiate athletes had significantly lower levels of depression and significantly greater levels of self-esteem than non-athletes (33.5% non-athletes vs. Year 1: 19.8% and Year 2: 12.4% in our study). In addition, Armstrong et al. (2009) reported that being an athlete was not a predictor of depression when compared with other variables such as gender and self-esteem. Similarly, our results revealed no significant difference between gender for both years; however our data was inconsistent for males for Years 1 and 2 (11.5% vs. 3.2%). On the other hand, Yang et al. (2007) took the analysis a little further and revealed that males were at 19.2% and females at 25.6% reported symptoms of depression, which were both significantly higher than males in females in both years of reported data.

One of the important psychological factors that have been studied in association with eating disorders is self-esteem. Petrie and colleagues (2009) identified self-esteem as a potential moderator between eating disorders and body dissatisfaction in that positive self-esteem affects the likelihood of female athletes internalizing sport-specific pressures about appearance or weight. Our results reflected higher levels of self-esteem in collegiate athletes. Although these are only estimates, it may be speculated that athletes may be protected from depression because of their regular exercise regime associated with sports, increased self-esteem (Armstrong et al., 2009; Dishman et al., 2006), and being more socially connected (Baumeister et al., 1995; Armstrong et al., 2009). Whereas, non-athletes reported higher levels of depression, and lower levels of self-esteem and social connectedness predicted higher levels of depression (Armstrong et al., 2009). Interestingly, in Year 1, 31.5% of athletes reported they had felt pressure to change their weight or eating habits; ~17% of athletes for both years revealed they gained or lost weight to regularly meet the demands of their sport; and on average ~27% felt pressured to look a certain way for their sport. Due to nature of sports, it may be speculated that athletes may have higher levels of social connectedness; however, the these pressures to maintain a certain weight or appearance may increase concerns regarding body image thus decreasing self-esteem and possibly triggering depression and/or low self-esteem. Another possibility of increased depression in athletes may arise when athletes have a severe athletic injury. The inability to continue participation with the team or individual sport or a decrease in athletic performance often leads to difficulty with coping with the injury cognitively, emotionally and behaviorally (Wiese-Bjornstal et al., 1998).

4.4 Body image disturbance

Aligned with the tenets from researchers (Fredrickson & Roberts, 1997), this study considered body related perceptions from others and in competitive uniform verses daily clothing, which was similar to previous research (Torres-McGehee et al., 2009; Torres-McGehee et al., In Press; Torres-McGehee & Monsma, n.p). Body image has links to both socio-culturally driven pressures to achieve a certain body shape and contextual demands for thinness to enhance performance (Bonci et al., 2008). The role of body image disturbance was examined from the perspective of clothing type (e.g., daily clothing, competitive uniforms) and perceptions from others (e.g, friends, parents, coach). Our study revealed significant differences in body image disturbances between males and females for both daily uniform and competitive uniform; however, there were no significant differences between actual and ideal discrepancies between daily clothing and competitive uniform within male and female athletes. Therefore, regardless of clothing type, all athletes wanted to be smaller for their ideal image. Our findings were consistent with recent studies on collegiate dancers, cheerleaders and equestrian athletes (Torres-McGehee et al., 2009; Torres-McGehee et al., In Press; Torres-McGehee & Monsma, n.d); however, males were not used in these studies. Therefore, this is the first study to examine collegiate male athletes and their associated actual and ideal discrepancies in daily clothing and uniform.

Previous research has examined external pressures and the delelopment of body image concerns from social agents (e.g., coaches, family members, and friends, Beisecker & Martz, 1999; Field et al. 2001; Griffin & Harris; 1996; Petrie et al., 2009; Vincent & McCabe, 1999). A unique part of the study was that actual and ideal discrepancies from social agents were examined. Data revealed a significant difference between gender, actual –ideal discrepancy, and between perceptions from others; therefore the differences between actual and ideal

discrepancies were dependent on perceptions from others (e.g., friends, parents, coaches) and across gender. Similar to Torres-McGehee & Monsma (n.d), females perceived the largest discrepancy in body image from coaches, revealing a much smaller image compared to friends and parents (Table 5). Similarly, males perceived the highest body image discrepancy in perceptions from coaches; however Year 1 data represented a much smaller ideal image than to Year 2 with a larger body image compared to perceptions from friends and parents (Table 5). It was also interesting to note that in Year 2, males reported coaches' ideal perceptions to be slightly larger than Year 1. This may be due the larger number of football athletes who completed the screening.

4.5 Limitations

There were several limitations to this study. First, the data set was retrieved from only one institution; therefore, the outcomes cannot be generalizable to the entire athletic population. However results can be used as a guideline to integrating eating disorder screening into PPEs. Although the EAT-26 is commonly used and a psychometrically sound instrument; it is a screening rather than diagnostic tool. In this study, the EAT-26 was used to identify individuals at risk or displayed risk eating behaviors pathology. Because we screened for, rather than diagnosed, eating disorder characteristics and behaviors, we cannot absolutely conclude that athletes classified as "at risk" actually had an eating disorder. Possible causes of false-positive, high EAT-26 scores may include subjects with eating disorders not otherwise specified (EDNOS) or generally disturbed individuals who respond positively on surveys without having significant eating concerns could have also inflated the EAT-26 scores in the absence of a diagnosable eating disorder (Fairburn & Cooper, 1993; Wilfley et al., 2000). Due to the scoring of the EAT-26, it is likely to have similar EAT-26 total score mean values for those athletes classified as "at risk" and "not at risk" (e.g., an "at risk" with a total EAT-26 score < 20, but reported "at risk" due to values on the Likert scale for the behavioral questions). Finally, due to the nature of the screening (not being anonymous), athletes could have under reported their responses. Many factors could lead to under reporting: 1) athletes are in denial of possible eating disorder or associated symptomology, 2) athletes may be afraid it will affect their playing time, 3) athletes may be scared to lose their athletic scholarship, or 4) being medically disqualified. Although there are some limitations to scoring the EAT-26, it is important to note the purpose of the instrument is to "screen" athletes. If suspicions of eating disorders or associated symptomology arise from interpretation of questionnaire results, an in-depth personal interview by a member of the health care team should follow for a more accurate interpretation of circumstances (Black et al., 2003; Bonci et al., 2008; Sundgot-Borgen & Torstveit, 2004). It is suggested that future research examines the association of eating disorders risk, associated symptomology and specific clinical outcomes throughout an athletes' career.

5. Conclusion

It is important to note that athletes with disordered eating symptomology; will rarely self-identify due to the secrecy, shame, denial, and fear of reprisal (Currie & Morse, 2005; Johnson et al., 1999; Ryan, 1992). Therefore, integrating eating disorder screening in conjunction with PPE may help identify those athletes presented with elevated risk. Previous research has examined the influence of sport on the occurrence and prevalence of psychological variables, and psychological well-being in athletes (Petrie et al., 2009). It was

suggested future research should identify psychosocial factors associated with eating disorders such as body image concerns, general and sport-specific weight pressures (e.g., coaches, teammates, parents, etc.), internalization of the ideal, restrained eating, negative affect, and modeled behaviors (e.g., family, friends, teammates, etc.). While this study didn't capture all of those variables, the instruments used for screening during PPEs were instrumental in identifying those athletes that presented elevated symptomology for potential eating disorder risk. However, specific questions items designed to assess disordered eating behaviors and attitudes should not only be incorporated into the medical history portion of the PPE; but also followed up with appropriate medical personal for more in-depth screening (Bonci et al., 2008). Moreover, a benefit for screening all athletes during PPEs is that individual institutions will be able to acquire an overall glance at the health and well-being of their student athletes. It is suggested that overall screening data is utilized to identify target areas of concern for all student athletes; and then followed up with solutions to integrate prevention programing for both the student athletes and coaches. Finally, our study also confirmed an understanding of how males and female athletes perceive their bodies. Evidence from this study exposed external pressures (e.g., clothing type and perceptions of others) for actual -ideal discrepancy which is indicative of possible risk for developing eating disordered thoughts and behaviors. These actual –ideal discrepancies may have practical implications for weight loss behaviors and mental status (e.g., depression and low self-esteem) in collegiate athletes. Therefore, it is suggested to examine mental health and compensatory behaviors to control or lose weight independent of eating-disorder risk status.

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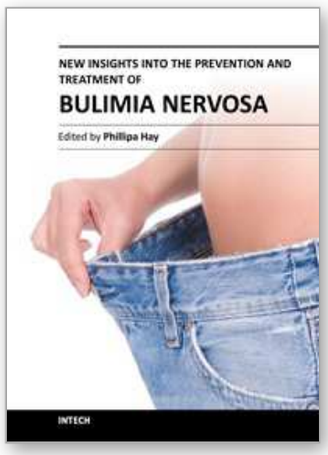

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Bulimia nervosa and eating disorders are common cause of distress and health related burden for young women and men. Despite major advances over the past three decades many patients come late to treatment and find that the therapy is incompletely addressed to the complex psychopathology and co-morbidities of the illness. The present book brings timely and contemporary understandings of bulimia nervosa to aid in current thinking regarding prevention and treatment. It will be read by therapists interested in enhancing their current approaches and those interested in earlier and more effective prevention and closing the gap between illness onset and accessing treatment. They will find practical guidance but also new ideas and ways of thinking about bulimia nervosa and the illness experience in this book.

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