BODY IMAGE DISTURBANCE, OBJECTIFICATION, AND COLLEGE WOMEN: COMPARING COLLEGIATE FEMALE ATHLETES AND NON-ATHLETES

By

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To my wonderful parents, Paul and Jill Varnes. Thank you for your support, advice, and confidence. I love you.

In memoriam of Kathryn Carson, 1979-2012.
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By

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Body image disturbance (BID) is highly prevalent among college-aged women, so much that researchers have described it as normative. Prior to 2001, research suggested that athletic participation served to decrease BID among females. Since then, female athletes have become increasingly sexually objectified in the media, and the sociocultural beauty ideal has shifted to emphasize appearing both athletic and thin. The present work used objectification theory to progress BID research in the college female population by investigating the current status of BID, and its measurement, among college-aged females, with an emphasis on identifying how participation in collegiate athletics might promote or protect from BID and self-objectification. These investigations extend the literature and attempt to address limitations of previous research. Chapters 1 and 2 provide a foundation for the research presented in Chapters 3 and 4. First, the potential impact of increased sexualization of the female athlete on the athlete’s BID and self-objectification is explored. Second, the research identifies salient and temporally relevant measures of BID for research in college female populations and college female athlete populations.

Overall findings support that female participation in collegiate athletics continues to provide protection from BID. Additionally, athletic participation appears to plays a role in
decreasing self-objectification tendencies; however, this may depend on the sport. These differences indicate that competitive athletes participating in sports that are more objectified by society could be at greater risk for certain psychological outcomes and health behaviors than athletes who are less objectified by society. However, more research needs to be done to understand the true mechanism of this difference. Through the work presented here, it appears that our understanding of the relationship between the objectification theory constructs is deficient when it comes to the female athlete population, and specifically athletes participating in more objectified sports. This line of inquiry provides a foundation for objectification research in female athlete populations, and provides recommendations for next steps.
CHAPTER 1
INTRODUCTION

Image is everything.

– Andre Agassi, tennis player

General Introduction

The concept of body image has been a topic of exploration and research in the academic literature for decades; though the psychological, behavioral, and emotional effects of body image have been noted as far back as the early 1800s (Brumberg, 1997). Despite the endurance of the body image concept, it remains a complex issue that has been difficult to define and understand. While what is known about the psychological and emotional repercussions of poor body image have varied very little over time, the behaviors associated with attempting to change the body to meet a self-perceived ideal appear to change frequently according to cultural “ideals.” Researchers have adopted Cash and Szymanski’s (1995) definition of body image as a multi-dimensional construct encompassing how one feels, thinks, and acts regarding their body. There are two distinct modalities of body image (Cash & Szymanski, 1995): 1) perceptual: having to do with body-size or body-part-size estimation; and 2) attitudinal: including body image evaluation (i.e., emotions and feelings regarding one’s appearance) and investment (i.e., degree to which an individual deems physical attributes as important).

Due to the dynamic, broad nature of the body image concept, there are many constructs that can be included under this umbrella term (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). These include, but are not limited to: weight (dis)satisfaction, body (dis)satisfaction, appearance (dis)satisfaction, appearance evaluation, body esteem, body dysmorphia, and body schema. The constructs of body image are many; thus, measurement becomes difficult and is often done in a fragmentary way, examining one or several constructs. Evidence of body size
misperception and/or negative attitudes or feelings towards the body and its appearance or physical attributes is considered an indication of body image disturbance (BID). BID has been linked to several negative health behaviors and psychological concerns, including, but not limited to: disordered eating (Calogero, Davis, & Thompson, 2005; Grabe, Hyde, & Ward, 2008; Schwitzer, Rodriguez, Thomas, & Salimi, 2001), cigarette smoking (Turnbull, 1999), alcohol use (Carr & Szymanski, 2010), depression (Ilaria, 2006; Schwitzer et al., 2001; Szymanski & Henning, 2007), overweight and obesity (Annis, Cash, & Hrabosky, 2004), decreased self-esteem (Clay, Vignoles, & Dittmar, 2005; Fingeret & Gleaves, 2004; Tylka & Sabik, 2010), anxiety (Ilaria, 2006), stress (Ruggiero et al., 2008), decreased flow in athletes (Dorland, 2006; Szymanski & Henning, 2007), and consideration of cosmetic surgery (Swami, 2009; Thompson et al., 1999).

The majority of body image literature focuses on college-aged white females or patients with an eating disorder. This is justified, as BID is highly prevalent in these populations; and research indicates that general dissatisfaction with the body’s shape or size has even become normative in college populations (e.g., Espelage, Mazzeo, Aggen, Quittner, Sherman, & Thompson, 2003; Grabe et al., 2008; Fitzsimmons-Craft, 2011). The present work seeks to further the research in this area by investigating BID, and its measurement, in college-aged females, with an emphasis on collegiate female athletes. Chapter 1 presents an overview on prominent theories that attempt to explain the etiology of BID among females. These theories, which are included under the Sociocultural Model, include Social Comparison Theory and Feminist Theories of Objectification Theory and Objectified Body Consciousness Theory. Chapter 1 also introduces the reader to the demographic prevalence of BID, factors related to BID, and information on how society and culture might affect BID among female athletes.
The introduction presented in Chapter 1 informed the subsequent aim of Chapter 2, which is to present a systematic review of literature from 1997 to 2012 that compares BID among collegiate female athletes and non-athletes. Chapter 3 provides an in depth look at the psychometric properties of one of the most prominently used instruments in BID research, the Eating Disorder Inventory (EDI). Chapters 2 and 3 informed the objectives and methods of the research study reported in Chapter 4, which examines multi-dimensional body image, and indicators of self-objectification in NCAA Division I female athletes and non-athletes. Chapter 5 summarizes and synthesizes the work presented in Chapters 2 through 4, and provides recommendations for next steps. The research studies reported in Chapters 2 through 4 were developed into manuscripts with the purpose of submission for publication in scholarly journals.

**The Sociocultural Model**

Several theories have been proposed to account for BID. The bulk of these theories are based on the premise that society defines and projects a cultural ideal of feminine beauty (known as the sociocultural ideal), with an inherent expectation that this ideal is a goal to be attained by all women (Heinberg, 1996; Thompson et al., 1999). At the core of BID is the degree to which a woman internalizes (i.e., takes within and believes to be self-defined) this definition of beauty, currently described as the *thin ideal* (Allen, 2012; Cafri, Yamamiya, Brannick, & Thompson, 2005; Clay et al., 2005; Fingeret & Gleaves, 2004; Fitzsimmons-Craft et al., 2012; Fredrickson & Roberts, 1997; Glauert, Rhodes, Byrne, Fink, & Grammer, 2009; Grabe et al., 2008; Low et al., 2003; McKinley & Hyde, 1996; Tsiantas & King, 2001). Internalization of sociocultural beauty ideals means that the individual believes their desire to attain the ideal body is a personal choice rather than a result of social pressure (McKinley & Hyde, 1996). Internalization of the thin ideal is considered to be the most consistent and significant predictor of BID in women (Cafri et al., 2005; Grabe et al., 2008) and stands as the foundation of the Sociocultural Model.
According to the sociocultural model, internalization of the thin ideal means the individual not only believes that thin is indeed ideal, but also that thinness is associated with success (Fitzsimmons-Craft, 2011). The sociocultural model arose from early research indicating that eating pathology increased in prevalence over the same decades that Miss Americas and Playboy centerfolds became thinner (Altabe, 1996). For this reason, internalization of the thin ideal may be a causal factor in the etiology of eating disorders and BID (Altabe, 1996; Fitzsimmons-Craft, 2011; Fitzsimmons-Craft et al., 2012).

Projections of the thin ideal are seen across media channels, including television, movies, magazines, and the Internet (Cusumano & Thompson, 1997; Grabe et al, 2008; Heinberg, 1996). There is strong evidence that society’s perception of the thin ideal is partially defined, and significantly perpetuated, by the media (Altabe, 1996; Fitsimmons-Craft, 2011; Heinberg, 1996), and that increased media exposure strengthens one’s level of internalization (Clay et al., 2005; Grabe et al., 2008). It is apparent, however, that individuals are not passive recipients of this pressure; but rather, exposure to, and thus internalization of, these pressures is self-perpetuated (Cusumano & Thompson, 1997; Fitzsimmons-Craft, 2011; Janelle, Hausenblas, Ellis, Coombes, & Duley, 2009; Mercurio & Rima, 2011). Self-perpetuation occurs via a litany of social-cognitive mechanisms that influence the various ways individuals perceive and interpret their social contexts (Fitzsimmons-Craft, 2011). Social-cognitive mechanisms relevant to college women can be further explained by feminist theories (e.g., Objectification Theory and Objectified Body Consciousness Theory) and Social Comparison Theory.

**Feminist Theories**

At the most basic level, feminist theories assert that Westernized women are socialized to equate physical attractiveness with self-worth (Heinberg, 1996). This socialization begins with
the first indication of maleness or femaleness, and the exclamation of, “It’s a boy!” or “It’s a girl!” Feminists assert that, with that first gendered comment, inherent gender role expectations are projected onto the fetus, baby, or child. Undoubtedly, “sex” is a biological construct determined chromosomally; however, “gender” is a socially defined concept. Thus, the male and female bodies exist within social and cultural contexts, and are constructed by society as such (Fredrickson & Roberts, 1997). Feminist theories purport that society has historically oppressed women through its tendency to decontextualize women's experiences by focusing on the female appearance and diminishing non-feminine successes (Busanich & McGannon, 2010). As a result of this gendered socialization, women over-identify with their bodies, making their self-value contingent on conforming to societal norms of beauty (Thompson et al., 1999).

The idea of this gender-role socialization and orientation is of significance in the development of BID, particularly for women. An example of this phenomenon is portrayed in a study conducted by Mahalik and colleagues (2005). Through the development of the Conformity to Feminine Norms Inventory (CFNI) instrument, Mahalik et al. (2005) identified eight qualities that women define as female gender roles. These gender roles include: developing friendly, supportive relationships (relational); pursuit of the thin ideal (thinness); not calling attention to one’s talents and abilities (modesty); maintaining the home (domesticity); take care of and be with children (care for children); investment of the self in a romantic relationship (romantic relationship); be sexually monogamous (sexual fidelity); and commitment to maintain and improve physical appearance (invest in appearance). Most notably, the thinness, relational, romantic relationship, and invest in appearance attributes are significantly related to BID constructs such as decreased body esteem (Steinfeldt, Zakrjsek, Carter, & Steinfeldt, 2011), drive for thinness, bulimia, body dissatisfaction, and lack of internal awareness (Mahalik et al.,

**Objectification theory**

Objectification theory is a feminist theory that posits that the societal pressures expressed through feminine gender norms and the sexual objectification of females contributes significantly to mental health problems (i.e., eating disorders, depression, sexual dysfunction, and substance abuse) among diverse groups of women (Fredrickson & Roberts, 1997; Szymanski, Moffit, & Carr, 2011). Sexual objectification occurs when a woman is recognized predominantly for her physical attributes (her body or body parts), and is viewed as a physical object of sexual desire (Szymanski et al., 2011). The experience of sexual objectification can be personally realized or observed as occurring to other women, as it is a sociocultural phenomenon (Fredrickson & Roberts, 1997); thus, the effect of sexual objectification on mental health risks can be direct and overt or indirect and subtle (Szymanski et al., 2011). The direct path portends from personal sexual objectification experiences that range from being “gazed” at sexually to apparent sexual violence (Fredrickson & Roberts, p.177-178, 1997). The indirect path involves observed or environmental sexual objectification experiences that result in self-objectification (Kozee, Tylka, Augustus-Horvath, & Denchik, 2007; Moradi, Dirks, & Matteson, 2005; Szymanski et al., 2011). This self-objectification is manifested as persistent body surveillance (monitoring the appearance of the body) and internalization of the thin ideal.

Among women, higher levels of self-objectification have been linked to disordered eating (Moradi et al., 2005; Noll & Fredrickson, 1998; Tiggeman & Kuring, 2004; Tylka & Hill, 2004), depression (Carr & Szymanski, 2010; Ilaria, 2006; Impett, Henson, Breines, Schooler, & Tolman, 2011; Szymanski & Henning, 2007; Tiggemann & Kuring, 2004), poor self-esteem
(Impett et al., 2011; Tylka & Sabik, 2010), sexual dissatisfaction and dysfunction (Fredrickson & Roberts, 1997; Szymanski et al., 2011), and substance use (Carr & Szymanski, 2010). The link between self-objectification and these mental health risks are typically mediated by psychological consequences, such as appearance anxiety and body shame, reduced flow, diminished internal awareness, and anxiety about physical safety (Calogero, 2004; Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Szymanski et al., 2011; Tylka & Hill, 2004). Figure 1-1 provides the mediation model for objectification theory principles as designed by Szymanski and colleagues (2010). Figure 1-2 is a more detailed model developed by Moradi (2010).

**Objectified body consciousness theory**

While objectification theory explains the foundation of objectification as a cultural phenomenon experienced on a public and private level (i.e., “feminine” gender stereotype and norms and sexual objectification), objectified body consciousness theory (OBCT) attempts to describe the interrelationships between three specific attributes that represent the construct of objectified body consciousness (OBC). The three components of OBC, as defined by McKinley & Hyde (1996), include *body surveillance, body shame, and appearance control beliefs.* Theoretically, higher levels of OBC are indicative of greater risk for mental health problems.

OBCT purports that, to meet the thin ideal, it becomes necessary for women to self-survey themselves from the perspective of others (*body surveillance*). This is done to ensure compliance with cultural body standards and thereby reduce the possibility of being negatively judged. While attempting to attain the sociocultural ideal, women compare themselves to an internalized ideal and strive to change their own body to meet this frame of reference. Inevitable failure can lead to feelings of guilt and lowered self-esteem, and eventually *body shame*
(McKinley & Hyde, 1996). The positive correlation between body shame and body surveillance has been supported by research ($r = .53 - .66$; McKinley & Hyde, 1996; Tylka & Hill, 2004).

Also connected to body shame is the idea that a woman is responsible for how her body looks and that she possesses the ability to conform to cultural standards with sufficient effort. Since this idea of attainment becomes a choice, the thought that one can control their own appearance becomes instilled in their beliefs (appearance control beliefs). Theoretically, women who have higher appearance control beliefs feel more ashamed of their body, especially if they feel they have not attained their own personalized ideal. This positive relationship is also somewhat supported in past research findings ($r = .23, p < .05$; McKinley & Hyde; 1996).

**Social Comparison Theory**

Social comparison theory asserts that human beings are driven to assess their progress and status in life; and, in the absence of an objective measure to compare oneself, individuals will evaluate their own self-worth and abilities by comparing them to others (Festinger, 1954). Qualities lacking objective measures, such as physical attractiveness, are susceptible to being defined by the norms of others (e.g., society or peers). A “norm” is generally described as what is typical, standard, or accepted, as it is a derivation of the word “normal.” There is evidence that an individual’s perception of normal is defined and modified by what they are exposed to. For example, Glauert and colleagues (2009) found that mere exposure to thin images alters one’s perception of a normal body size. In their study, participants were placed in one of two groups, and then were exposed to either “fatter” (Group 1) or “thinner” (Group 2) pictorial images. The results indicated that, regardless of group assignment, participants changed their personal definition of normal body size when exposed to the images. Those exposed to “fatter” images changed their definition of normal body size to be larger than originally stated, while those
exposed to “thinner” images changed their definition of normal body size to be smaller than originally stated.

These findings are concerning considering that the projected media images of women have continued to shrink over the past forty plus years (Cafri et al., 2005). When media figures (e.g., models, actresses, etc) do not meet the pre-specified ideal of beauty, technological modification via picture distortion (or “photoshopping”) is a common practice that occurs not only in advertising media, but also in movies and television (Kilbourne & Jhally, 2010). Thus, many of the images we are exposed to do not accurately represent appearance. Further, advertisers often piece together “parts” of various models to create what is perceived to be an ideal, beautiful woman (Kilbourne & Jhally, 2010). This perpetuates a societal ideal that is unattainable.

In a study by Krcmar, Giles, and Helme (2008), it was demonstrated that social comparison mediated the relationship between media consumption (specifically, magazines) and body esteem. The researchers identified an inverse relationship between exposure to a variety of magazines (i.e., celebrity, fashion, and news) and body esteem, but the relationship was mediated by social comparison. This suggests that comparison is actually the mechanism by which esteem is lowered, and not necessarily exposure to the magazine. This finding supports the contention that BID is somewhat self-perpetuated; and in this instance, comparison acts as the social-cognitive mechanism enabling that self-perpetuation. Other research also supports the relationship between self-comparison to BID and body shame (Fitzsimmons-Craft, 2011; Heinberg, 1996; Thompson et al., 1999; Tylka & Sabik, 2010).

Comparison to a self-defined ideal is not the only form of comparison that has been investigated. Individuals may use others opinions as referent points to their own progress. For
example, peers, parents, or other important others (e.g., coaches, teammates) provide appearance feedback in the form of criticism or teasing (negative), or compliments (positive; Cordero & Israel, 2009; Muscat & Long, 2008; Tylka & Sabik, 2010). This appearance feedback informs the female as to how she compares to external appearance expectations, and can lead her to compare herself to the ideals projected by others, resulting in BID and/or disordered eating (Cordero & Israel, 2009; Muscat & Long, 2008; Thompson et al., 1999; Tylka & Sabik, 2010).

Research indicates, however, that the relationship between appearance feedback and BID/disordered eating is mediated by thin ideal internalization (Cordero & Israel, 2009; Tylka & Sabik, 2010).

Prominent Measures of BID

Researchers have numerous instruments to choose from when measuring BID constructs. As with any research study, psychometric properties are an important consideration when attempting to appropriately measure a construct. When considering that BID is such a broad concept, proper selection of an instrument for BID research is also partly contingent on which BID-related construct is of interest. The most frequently used instruments are survey based, relying on self-response. In this section, four of the most prominently used instruments in BID research are described.

Objectified Body Consciousness Scale

The Objectified Body Consciousness Scale (OBCS) is based on OBCT, which asserts that the feminine body is constructed by society as an object to be viewed. Because of this, women tend to view their own bodies as outside observers (McKinley & Hyde, 1996). The instrument was developed and deemed valid for use in populations of undergraduate college women (McKinley & Hyde, 1996), as well as middle-aged women (McKinley & Hyde, 1996).
The OBCS contains 24-items across three subscales, which measure body surveillance, body shame, and control beliefs (OBC constructs defined previously).

Reliability in the form of internal consistencies of the OBCS subscales were have been shown to be high (Cronbach’s α = 0.72 to 0.89). In a study examining the test-retest reliability (two weeks) of the instrument (McKinley & Hyde, 1996), the subscales remained stable and significant at both time points (r = 0.73 to 0.79), indicating good test-retest reliability. Further convergent validation research reveals that the OBC scales are significantly related to public body consciousness (awareness of observable aspects of the body), while none are related to private body consciousness (awareness of internal sensations). These findings are consistent with the theoretical foundation of the OBCS in that body surveillance is based on perceived appearance to others, and is distinct from internal awareness. See Table 1-1 for additional convergent and divergent research results.

**Body Esteem Scale**

Body esteem is a component of body image that is highly related to self-esteem (Franzoi & Herzog, 1986; Franzoi & Shields, 1984). It is apparent that body esteem involves personal perceptions and feelings concerning the body’s appearance and function. The three components of body esteem for women are: 1) sexual attractiveness; 2) weight control; and 3) physical condition. Both sexual attractiveness and weight concern are concerned one’s thoughts and feelings regarding their physical appearance. Sexual attractiveness refers to an individual’s perception or feeling regarding “aspects or functions of the body associated with physical attractiveness” (Franzoi & Shields, p177, 1984). The sexual attractiveness component concerns the individual’s feelings about parts of the body that typically cannot be changed with exercise and diet (e.g., lips and breasts). Weight concern is also related to physical appearance, but
focuses on body parts that can be altered through exercise or food intake (e.g., appetite, waist, weight). The third component, physical condition, involves an individual’s feelings regarding endurance, strength, and health (Franzoi & Shields, 1984). Physical condition differs from the other two body esteem constructs, in that it is not an aspect typically evaluated by others; except in situations where physical qualities can be demonstrated and assessed, as is the case in athletics (Franzoi & Shields, 1984). This is the opposite of self-objectifying, considering the body as an object to be viewed; thus, a better feeling about physical condition theoretically indicates lower levels of OBC. A significant and inverse relationship has been identified between overall body esteem, as measured by the BES, and both body surveillance \((r = -.39, p < .001)\) and body shame \((r = -.51, p < .001)\) subscales of the OBCS (McKinley & Hyde, 1996). See Table 1-2 for further convergent and divergent validity results.

**Sociocultural Attitudes Towards Appearance Scale**

The most prominent measure purporting to assess sociocultural attitudes regarding appearance is the Sociocultural Attitudes Towards Appearance Scale (SATAQ; Heinberg, Thompson, & Stormer, 1995). The SATAQ and its updated version, SATAQ-R (Cusumano & Thompson, 1997), measure an individual’s awareness of societal pressure regarding beauty ideals and level of internalization regarding this ideal. The SATAQ was revised a third time (SATAQ-3) to account for changes in exposure to mass media channels, as well as an evolving definition of ideal beauty (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2003).

The SATAQ-3 is comprised of four subscales: **Pressures**, **Information**, **Internalization-General**, and **Internalization-Athlete**. The Information subscale measures one’s perception that the media is a source of information about appearance standards; while the Pressures subscale assesses one’s sense of pressure from the media to modify their personal appearance. Internalization-general measures the level at which the individual has internalized the thin ideal,
as it is projected by the media. Internalization-athlete specifically assesses the level at which the individual is influenced by the media’s projection of athletic female images.

At least one independent factor analysis study has confirmed the factor structure of the SATAQ (Markland & Oliver, 2008). Additionally, items within each subscale have been deemed internally consistent (Cronbach’s $\alpha = .94$ to .96; Calogero, Davis, & Thompson, 2004; Markland & Oliver, 2008; Thompson et al., 2003). Additionally, convergent and divergent validity studies indicate the construct validity of the SATAQ-3 subscales (Calogero et al., 2004; Thompson et al., 2003).

**Eating Disorder Inventory**

The Eating Disorders Inventory was developed in the early 1980s as a tool to assist in diagnosis of anorectics – both calorie restrictors and those with “the complication of bulimia.” It was validated for use within populations with clinical eating disorders (Garner, Olmstead, & Polivy, 1983, p20). The original EDI is comprised of eight subscales. The five subscales that measure “psychological traits” include: *perfectionism* (overemphasis on goal attainment), *ineffectiveness* (feelings of insecurity or inadequacy), *interoceptive awareness* (inability to recognize, or feeling uncomfortable with, strong emotions), *maturity fears* (desire to retreat to childhood), and *interpersonal distrust* (difficulty expressing thought or feelings to others). The three subscales measure that measure “behavioral traits” are *body dissatisfaction, bulimia,* and *drive for thinness* associated with eating disorders. *Body dissatisfaction* is indicated by discontent with the shape and size of body regions that are typically of concern to individuals with eating disorders (i.e., stomach, hips, thighs, buttocks). The *bulimia* subscale assesses the devotion of thought and behavior regarding uncontrollable eating (i.e., binge eating). *Drive for thinness* represents an (a) extreme desire to be thinner, (b) concern about dieting, (c) weight preoccupation, and (d) an intense fear of gaining weight.
Since its inception, the EDI has been modified twice. The EDI-2 expanded from 64 to 91 items and added three new personality (psychological trait) subscales. The three added psychological trait subscales were asceticism (virtue seeking through self-restraint and denial), impulse regulation (mood instability, recklessness, and self-destructiveness), and social insecurity (discomfort or reticence in social situations). The EDI-3 maintained the 91-item structure, but rearranged the items into 12 subscales instead of 11. Some EDI-3 subscales are unchanged from the EDI-2, yet others (and their labels) have been modified.

The three EWR subscales of the EDI have remained virtually unchanged across the three EDI iterations. Validity and reliability research on the EDI and its subscales within clinical populations is strong and long-standing (Garner et al., 1983; Garner 1991; Garner 2004); however, researchers question the validity of the EDI when it is administered in nonclinical populations, which occurs frequently (Campbell & Hausenblas, 2009; Grabe & Hyde, 2006; Hausenblas & Downs, 1983; Roberts, Cash, Feingold, & Johnson, 2006). Specifically, the item level properties of the EDI appear to vary between clinical and non-clinical populations (Clausen, Rosenvinge, Friborg, & Rokkedal, 2011; Espelage et al., 2003). It has been noted that individuals in these two populations interpret EDI items differently (Kashubeck-West, Mintz, & Saunders, 2001), likely because the instrument emphasizes the conceptual relationship of constructs to clinical level eating disorders (Garner, 2004). Furthermore, there has been no confirmation regarding the validity of using the EDI in nonclinical BID research.

**Summary of BID Instruments**

The four instruments that are briefly reviewed here appear to be the most relevant in BID research. Three of the instruments (BES, OBCS, SATAQ-3) appear to be psychometrically strong when administered among nonclinical female populations; however, appropriate
administration of the EDI in nonclinical populations has not yet been demonstrated and warrants further investigation.

**Prevalence of Body Image Disturbance**

While BID is prevalent in most populations, it is most prevalent in Westernized countries (Altabe, 1996; Holmqvist & Frisen, 2010; Thompson et al., 1999). Westernized countries are those that promote an individualistic lifestyle that is high in economic consumption. These countries include the United States (U.S.), Canada, Australia, and some countries in Western Europe. Acculturation to Westernized customs has been linked to BID in college-aged women (Turnbull, 1999). As such, body image research is most prevalent in Westernized countries, and is most notably focused on females. The focus on females has resonated from implications that: (a) BID is gendered in nature (prevalence and indicators vary between males and females; Smolak & Murnen, 2008); (b) body image appears to be a much more complex issue for females; and (c) females seem to have a higher personal stake in the issue of body image (Garner, 1997).

The majority of body image literature focuses on college-aged white women or patients with an eating disorder. BID is highly prevalent in these populations, and research indicates that general dissatisfaction with the body’s shape or size has actually even become normative in college populations (e.g., Espelage et al., 2003; Grabe et al., 2008; Fitzsimmons-Craft, 2011; Klemchuk, Hutchinson, & Frank, 1990). Because of this, research is increasing among female sub-groups to examine differences in age, race/ethnicity, and sexual orientation. This limited research indicates that some minorities have lower levels of BID than Whites (Altabe, 1996), and Blacks may have lower BID overall (Crissey & Honea, 2006; Grabe & Hyde, 2006). It also appears that lesbians have lower levels of BID than heterosexual women and gay men (Engeln-Maddox, Miller, & Doyle, 2011). Additionally, it appears that different constructs may predict BID and self-objectification among lesbian women (Kozee & Tylka, 2006).
BID, Objectification, and the Female Athlete

Research on female athletes is slowly increasing. Investigations in this area of inquiry are largely focused on eating pathology in specific appearance-focused sports, such as gymnastics (e.g., Anderson, Petrie, & Neumann, 2011; Berry & Howe, 2000; Doughty & Hausenblas, 2007). The sparse literature that does examine BID in collegiate female athletes is inconsistent, especially with respect to specific differences that may exist between college athletes and the general college female population.

A prior meta-analysis of studies from 1975 to 2000 indicated that athletes have less body image disturbance (BID) than non-athletes, with no differences among sport types (Hausenblas & Downs, 2001). Since the time of the review, two noteworthy sociocultural shifts have occurred: (1) female athletes have become increasingly sexually objectified in the media (American Psychological Association [APA], 2010; Kim, Segas, & Walker, 2010); and (2) the definition of ideal beauty now reflects being athletic and thin (Daniels, 2009; Thompson et al., 2003).

While media images of male athletes focus on athletic prowess, female athletic images are highly sexualized and objectified in the media (Kim et al., 2010). It has been proposed that the sexualization of female athletes is an extension of the cultural tendency to sexualize females in general, and represents an attempt to devalue female athletics and maintain “patriarchal power” over women (Daniels, 2009). In support of this feminist notion, Harrison & Secarea (2010) found that, compared to female athletes presented in a non-sexualized manner, a highly sexualized female athlete is more likely to be perceived as: a) having a more female oriented gender-role, b) possessing more feminine-stereotypic characteristics, and c) being heterosexual.

Further, Jones & Greer (2011) demonstrated that while women were more interested in reading an article about a female athlete who appeared more “masculine,” men preferred to read an
article about a female athlete when the athlete pictured was more “feminine” and the sport
discussed was also more “feminine.”

There has been some research attempting to investigate the effect that sexualization of
female athletes has on various populations. For example, Daniels (2009) investigated the impact
of the sexualization of female athletes on other non-athlete females’ level of self-objectification.
Adolescent girls and college women were assigned to one of four different groups. Participants
in each of these groups were exposed to pictures of unknown women in one of the following four
categories: (a) sexualized athletes, (b) performance athletes, (c) sexualized models, and (d)
nonsexualized models. The female in the picture was provided a false name and sport or
occupation (model). After viewing the images, participants were asked to make statements about
themselves. These statements were categorized into three general types (physicality, beauty, and
non-body statements), and two emotional tone types (positive and negative). The results
demonstrated that females who viewed sexualized images were more likely to make negative
comments about their own body, and these comments were more likely to be beauty-type
statements (e.g., “I am ugly.”). The results indicated that viewing sexualized images could be
“problematic” for female viewers, and sexualized images of female athletes perpetuate self-
objectification in girls and women (Daniels, 2009).

Research on how increased sexualization affects self-objectification among female
athletes appears to be almost non-existent. Given the recent sociocultural changes, it could be
important to investigate whether or not self-objectification is higher in female athletes than non-
athletes when considering the mental health risks that result from self-objectification. Dorland
(2006) examined the effect of female athletes’ self-objectification on flow (i.e. an athlete’s focus
and motivation while performing in her sport) and found that flow is related to body surveillance.
Dorland (2006) reported that athletes who monitored their body and appearance more also experienced decreased flow, while the same was not true for athletes who engaged in less body surveillance (Dorland, 2006).

The opposite of self-objectification would be viewing/valuing the body for its abilities, which is a direct measure of the physical condition subscale of the BES (Franzoi & Shields, 1984). It would stand to reason that higher levels of body esteem should indicate lower levels of OBC. However, the research regarding the nature of this relationship (direct vs. indirect), and differences in athletes and non-athletes, is sparse. In fact, only two studies have compared athletes and non-athletes with the BES, and these studies are more than a decade old (DiNucci, Finkenberg, McCune, McCune, & Mayo, 1994; Wiggins & Moode, 2000)

DiNucci et al. (1994) compared four undergraduate college female groups: non-athletes, basketball players, volleyball players, and softball players. While athletes tended to feel more positively about their physical condition when compared to the non-athletes, the only statistically significant difference was between basketball athletes and non-athletes. Additionally, non-athletes felt more negatively about their weight-related body parts as compared to all three athlete groups, indicating that the athletes felt more positively about their body weight and body parts affected by weight. A major limitation of this study was its very small sample size, with each sport group size ranging from nine to twelve.

The second study (Wiggins & Moode, 2000) compared a group of female athletes to a group of non-athlete females. The athlete group included participants in such sports as basketball, softball, track, cross-country, and volleyball. Comparison across the three BES subscales (physical condition, sexual attractiveness, and weight concern) indicated that the athletes felt more positively about all body esteem components, but these differences were only
statistically significant for physical condition, with female athletes reporting feeling better about the condition of their body (Wiggins & Moode, 2000).

*Physical condition* is a measure of feelings regarding one’s own endurance, strength, and agility, which is the opposite of self-objectifying (valuing the body as an object to be viewed). Thus, understanding that athletes feel better about their physical condition, points to the possibility that female athletes could be protected from higher levels of self-objectification. Researchers should further examine the relationship between self-objectification and body esteem for both athletes and non-athletes. First, further research needs to confirm the previous studies findings regarding body esteem, as both studies were under-represented in terms of the number of sport teams and both were conducted over a decade ago.

For athletes participating in higher aesthetic sports (e.g., swimming, tennis, and gymnastics), where appearance is a focus, self-objectification could be of greater concern, as these women may experience higher levels of sexualization and objectification (Kim et al., 2010; Parson & Betz, 2001). Conversely, it is also possible that participation in athletics provides a protective mechanism against negative body image which means athletes are less likely to experience BID. To test these hypotheses, a comparison between representative sport and non-sport samples is necessary (Smolak, Murnen, & Ruble, 2000).

It is unsurprising that athletes may feel better about the physical condition of their body. Athletes presumably train hard to maintain a physique that is optimal for athletic performance. Additionally, other researchers have noted that athletes “have a more functional orientation towards their bodies” (de Bruin, Oudejans, Bakker, & Woertman, p. 212, 2011), and thus interpret the body as tool for successful performance. This means that selection of appropriate body image measures could prove to be difficult when conducting research in the female athlete...
population because of indications that athletes experience body image differently than non-
athletes (de Bruin et al., 2011). In other words, there are different contributors to body image for
athletes as compared to non-athletes, causing participant responses to different body image
measures to vary depending on athletic status. This phenomenon has been demonstrated through
both correlational (D’Arcy, 2007; Hoag, 2012; Krane, Stiles-Shipley, Waldron, & Michalenok,
2002) and meta-analytic (Smolak et al., 2000) research. For this reason, it is necessary for
researchers to use a multi-dimensional body image measure that is salient for both athletes and
non-athletes.

Further work is necessary to better understand the differences in BID between athletes
and non-athletes. Gaining a deeper understanding of female athletes’ body image issues can be
of great benefit, particularly for taking steps towards understanding whether athletic involvement
serves as protection from BID. While the proposed research would not provide a causal link
between athletic involvement and protection from BID, it will provide an important step in
determining the presence (or absence) of a link between the two. Further, it will serve to guide
future research efforts looking into how sexual objectification of female athletes in the media
affects college-level female athletes.

Rationale and Organization of the Present Studies

Researchers debate the relationship between athletic performance and BID among
females. Some research shows female youth participation in sports is linked with enhanced self-
estee and body image (Miller, Sabo, Melnick, Farrell, & Barnes, 2000; Women’s Sports
Foundation [WSF], 2009), as well as reductions in depression (WSF, 2009). Yet other
researchers consider sport-related weight pressures a contributor to BID, particularly in college
female athletes (Reel, SooHoo, Petrie, Greenleaf, & Carter, 2010).
Further confounding the BID issue is its complex multi-dimensional nature, which leads to measurement difficulties. The present work was developed in an effort to progress BID research in the college female population by investigating BID, and its measurement, among college-aged females, with an emphasis on identifying how participation in collegiate athletics might promote or protect from BID. To do this, we present the following aims: 1) describe the impact of increased sexualization of the female athlete on the comparative BID of collegiate female athletes and non-athletes; 2) identify salient and temporally relevant measures of BID for research in college female populations and college female athlete populations; and 3) to examine how current BID and self-objectification levels vary between highly competitive collegiate female athletes and female non-athletes.

The investigation in Chapter 2 presents a systematic literature review of 10 recent (1998 to 2012) studies comparing BID of collegiate female athletes to non-athletes, in an attempt to identify the current status of BID in female athletes. The Chapter strives to update the work of Hausenblas and Downs (2001) in the context of collegiate female athletics, given the noted sociocultural changes since their article was published. Findings reported on in Chapter 2 confirmed that the EDI is the most commonly used instrument in BID research in college female populations. Given this finding, it was determined that the EDI should be more closely explored for potential use in the final study of this work. Prior to administrating the EDI, it was necessary to more closely examine its appropriateness for use in nonclinical female populations. Thus, the purpose of Chapter 3 was to critically review factor analytic studies that examined the internal structure of the EDI in nonclinical samples of women from Westernized countries. Chapter 4 presents a research study in which primary data were collected, with the purpose of examining multi-dimensional body image and self-objectification among NCAA Division I female athletes.
and non-athletes. Finally, Chapter 5 presents a synthesized discussion of the major findings across Chapter 2, 3, and 4, and provides practical implications and recommendations for future research. The research studies described in Chapters 2 through 4 were written in manuscript form for the purposes of submission for publication in scholarly journals.
Table 1-1. Statistically significant correlations between the subscales of the Objectified Body Consciousness Scale and referent measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Body Shame</th>
<th>Body Surveillance</th>
<th>Control Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of Fat</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Endorsement of Cultural Standards</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dieting</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Exercise to lose weight</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Wearing make-up</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Wearing certain clothes to look thinner</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight/Shape-efficacy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Public Self-Consciousness</td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Ideal / Actual Weight Discrepancy</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;,&lt;sup&gt;c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;,&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Body Competence</td>
<td>X</td>
<td></td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Body Esteem</td>
<td>X&lt;sup&gt;a,b,c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;a,b,c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;a,b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight Discrepancy</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Self-Acceptance</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Viewing media as an information source for beauty standards</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Perceive pressure from media to conform to beauty standards</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Thin Ideal Internalization</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Athletic Ideal Internalization</td>
<td></td>
<td></td>
<td>X&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>McKinley & Hyde, 1996  
<sup>b</sup>McKinley, 2004  
<sup>c</sup>McKinley, 2006  
<sup>d</sup>Forbes, Jove, & Revak, 2006
Table 1-2. Statistically significant correlations between the Body Esteem Scale and referent measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sexual Attractiveness</th>
<th>Weight Concern</th>
<th>Physical Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparative attractiveness</td>
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<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Body Competence</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Private Body Consciousness</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Amount of Aerobic Exercise</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of Anaerobic Exercise</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Views food as Weight</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Views food as Energy</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Current weight</td>
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<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Weight satisfaction</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
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<td></td>
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<tr>
<td>Self-Rated Phys. attractiveness</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>SCS Public</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCS Social Anxiety</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>EDI – Drive for Thinness</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
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<tr>
<td>EDI – Bulimia</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>EDI – Body Dissatisfaction</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>FRS current vs. ideal</td>
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<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>FRS current</td>
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<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>VCA Frontal Size</td>
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<td>VCA Profile Size Dissatisfaction</td>
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<td>-X&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td>Self-Esteem</td>
<td>X&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>X&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

SCS=Self-Consciousness Scale; EDI=Eating Disorder Inventory; FRS=Figure Rating Scale; VCA=Video Camera Assessment

<sup>a</sup> Frazoi & Herzog, 1984
<sup>b</sup> Franzoi & Shields, 1986
<sup>c</sup> Thomas & Freeman, 1990
Figure 1-1. Model of key objectification theory tenets (Szymanski et al., 2011)
Figure 1-2. Amended Objectification Theory Model. Note. For parsimony, where indirect chains of relations are depicted between two constructs, possible additional direct paths are not included. (Moradi, 2010).
Female participation in sports has been linked to improved academic performance and enhanced self-esteem, as well as reductions in depression and risk for osteoporosis and breast cancer (WSF, 2009). In addition, sports participation provides females with opportunities to learn valuable life and work skills, such as teamwork, goal-setting, and perseverance (WSF, 2009). Some research indicates athletic participation could enhance body image (Miller et al., 2000); yet, other researchers consider sport-related weight pressures to be a contributor to body image concerns (BIC), particularly in college female athletes (Reel et al., 2010).

Body image is a broad and dynamic concept that extends across perceptual and attitudinal modalities. BIC are indicated by body size misperception and/or negative attitudes or feelings toward the human body and its appearance (Cash & Szymanski, 1995). The term body image is an umbrella term encompassing many constructs. These include, but are not limited to: weight (dis)satisfaction, body (dis)satisfaction, body shame, appearance (dis)satisfaction, appearance evaluation, body esteem, body appreciation, body dysmorphia, and body schema (Avalos, Tylka, & Wood-Barcalow, 2005; McKinley & Hyde, 1996; Thompson et al., 1999). Among college aged females, BIC are associated with several heath issues, such as disordered eating (Grabe et al., 2008), substance abuse (Carr & Szymanski, 2010), depression (Carr & Szymanski, 2010), decreased self-esteem (Tylka & Sabik, 2010), and consideration of cosmetic surgery (Swami, 2009).

To explore the relationship between athletic participation and body image, Hausenblas and Downs (2001) conducted a meta-analysis of studies published between 1975 and 2000. They

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compared body image of non-athletes and athletes across gender, age, and competition level (i.e., adolescent/high school, club/recreational, elite, and college). The overall findings suggested athletes possessed a more positive body image than non-athletes, with an equivalent disparity between athletes and non-athletes of each gender. No comparison was made on body image among males versus females; yet, other research indicates that body image is “gendered” in nature (Smolak & Murnen, 2008, p. 258). In other words, the level at which BIC occur varies between males and females, and is indicated by different motivators (e.g., the pursuit of thinness versus pursuit of muscularity). Although Hausenblas and Downs’ (2001) results did not address gender differences, their research suggested athletic participation was associated with more positive body image.

One limitation of Hausenblas and Downs’ (2001) study was their inability to analyze data from all identified studies, due to more than 25 different types of body image measures being administered across the reviewed studies. As a result, most of the aggregated data came from studies using the Eating Disorder Inventory’s Body Dissatisfaction subscale (EDI-BD; Garner et al., 1983). Hausenblas and Downs (2001) and others (e.g., Bailey, Goldberg, Swap, Chomitz, & Houser, 1990) have noted that the EDI-BD is not an adequate measure of overall body image, as the items focus on the lower body (hips, thighs, etc.) to the exclusion of other body parts. Also, the EDI-BD appears specific to body shape dissatisfaction (Bailey et al., 1990). Despite these notable limitations, Hausenblas and Downs (2001) provided a comprehensive synthesis comparing body image among athletes and non-athletes at the time.

However, since the turn of the 21st Century, two notable sociocultural shifts have taken place: (a) the sexual objectification of female athletes in the media has increased (APA, 2010; Kim et al., 2010); and (b) the definition of ideal female beauty now includes appearing athletic,
in addition to being thin (Daniels, 2009; Thompson et al., 2003). Given the sociocultural changes that have occurred since Hausenblas and Downs’ (2001) meta-analysis, a timely, relevant update is necessary to understand the current status of body image among female athletes.

The purpose of this paper is two-fold. In Part I, we provide a brief overview of body image literature as it relates to the noted sociocultural changes and the female athlete. In Part II, we conduct a comprehensive narrative synthesis (Center for Reviews and Dissemination [CRD], 2009) of recent studies comparing BIC in collegiate female athletes and non-athletes. We elected to conduct a narrative synthesis as part of a systematic review because the varying nature of body image measurement in studies of female athletes and non-athletes makes pooling of all data within a meta-analysis impossible (Hausenblas & Downs, 2001). A meta-analysis of aggregated data from studies using such heterogeneous outcome measures could likely produce misleading results (CRD, 2009), while a narrative synthesis within a systematic review will facilitate a better comprehensive understanding of current body image literature among female athletes. Also, several new instruments (e.g., Objectified Body Consciousness Scale, Self-Objectification Questionnaire, Drive for Leanness Scale, Internalization-Athlete subscale of the Sociocultural Attitudes Towards Appearance Scale-3) have been developed since the work of Hausenblas and Downs (2001). Many of these instruments are not specific to body image, but measure constructs highly related to body image and are thus used when examining BIC. We hope to determine if there are differences in BIC between athletes and non-athletes that are specific to the different body image constructs and measures, which would be difficult to determine through a meta-analysis.

We focused exclusively on females. Due to the gendered nature of body image (Smolak & Murnen, 2008), a single sex focus will allow for a more in depth review of the literature and
will allow for more informed comparisons by sport. Our focus on college women is warranted since this population is considered to be at high-risk for BIC (Fitzsimmons-Craft et al., 2012).

Also, research indicates that there are discrepancies in BIC among collegiate female athletes depending on university competition level (i.e., Division I, II, and III; Kato, Jevas, & Culpepper, 2011); thus, comparisons of BIC between female athletes, across competition levels, and non-athletes are warranted. University competition level is best explained by the divisional structure of the National Collegiate Athletic Association (NCAA). The NCAA oversees competitive athletics throughout the United States and Canada, and its membership creates rules in Division I, Division II, and Division III (NCAA, 2012). Division I is the most competitive, as it includes the largest athletic programs that provide the most athletically related financial aid. Division II universities have somewhat smaller athletic programs (less sports) and offer more limited financial aid. Division III universities do not offer any athletically related financial aid. Division I and II also have special academic eligibility requirements, because of the financial aid offered, with Division I rules being more stringent. Because there is no potential financial aid associated with participation at the Division III levels, eligibility requirements are set by the individual college or university.

Research on how BIC differs among female athletes and non-athletes can help identify potential mediating and moderating effects of the relationship between athletic status and specific body image constructs. If differences in BIC among female athletes and non-athletes are found to vary depending on the construct, then researchers will need to determine how psychological, environmental, or sociocultural factors are related to specific constructs.
Part I: Sociocultural Changes and the Female Athlete

Sexual Objectification of Female Athletes

Objectification theory (Fredrickson & Roberts, 1997; Szymanski et al., 2011) suggests that the human body is not only constructed biologically; it is also developed through sociocultural contexts such as gender roles and sexual objectification. Female gender roles, as perceived by women, include exhibiting traits that emphasize submissiveness, modesty, thinness, and appearance investment (Mahalik et al., 2005). Sexual objectification reinforces these gender roles by focusing on the female appearance and diminishing non-feminine achievements. Sexual objectification occurs when the body is separated from the person and recognized predominantly for its physical attributes (body or body parts), with its worth being equated to its representation of an object of sexual desire (Fredrickson & Roberts, 1997).

It has been proposed that the sexual objectification of the female athlete’s body extends from the cultural tendency to sexualize females in general, and is an effort to maintain “patriarchal power” over women via masculine hegemony (Daniels, 2009). Further, sexual objectification of female athletes devalues female athletics (Hardin, Lynn, & Walsdorf, 2005). Increased sexual objectification of female athletes received much attention following the release of the 1997 Sports Illustrated Swimsuit Edition, the first issue in which the magazine began using female athletes as swimsuit models (Kim et al., 2010). Since 1997, there has been other research demonstrating that female athletes experience greater sexual objectification than male athletes, usually via sexually suggestive images and articles in print media (Daniels & Wartena, 2011; Fink & Kensicki, 2002; Hardin et al., 2005) and Internet sports blogs (Clavio & Eagleman, 2011). Even the highest level female athletes have been overtly sexualized. For example, during the 2012 Olympic Games, internet blogs pondered if Olympian javelin thrower Leryn Franco had
 Researchers posit that the enhanced sexual objectification of athletes could most negatively affect the body image of female athletes playing sports that focus on appearance, leanness, or both (Karr, Davidson, Bryant, Balague, & Bohnert, 2013; Reel et al., 2010). It seems that “appearance-focused” (i.e., aesthetic) sports are adjudicated sports in which appearance and physique are emphasized for success in competition, and include cheerleading, gymnastics,
figure skating, and diving (Harrison & Fredrickson, 2003; Hausenblas & Carron, 2002; Petrie & Greenleaf, 2012). Cheerleading, gymnastics, and figure skating all emphasize several aspects of appearance, including the aesthetics of technical form (i.e., gracefulness), physical build, make-up and hair, and costume (i.e., uniform). The emphasis of appearance in diving is exclusive to technical form and physical build. Thus, the extent to which appearance is emphasized in each of these sports differs.

The definition of a “lean-focused” sport is even less clear. Some researchers define a lean sport as an endurance-type sport, such as swimming and long-distance running, where being lighter in weight and leaner in fat contributes to improved performance (Engel et al., 2003). Other researchers use the term lean to describe sports that emphasize weight as part of appearance, and include sports such as gymnastics, cheerleading and figure skating (Harrison & Fredrickson, 2003; Homan, McHugh, Wells, Watson, & King, 2012). Still others have indicated that this term could include sports that emphasize leanness for either competition or appearance, which would encompass all of the aforementioned sports (Reel et al., 2010; Reinking & Alexander, 2005).

It is apparent that the definition of the terms “lean sport” and “aesthetic sport” emphasize the competition aspect. In other words, athletes are grouped into these categories based on expectations specific to competition within the sport. However, athletes may experience additional sociocultural expectations that are related to appearance, but unrelated to athletic performance (Hardin & Greer, 2009; Parsons & Betz, 2001; Petrie & Greenleaf, 2012). Through a survey of college students, Parsons and Betz (2001) attempted to determine society’s comparative objectification of athletes participating in a variety of sports. Results indicated that female athletes participating in tennis, swimming, gymnastics, and cheerleading experienced
greater objectification by peers. As noted previously, swimming, gymnastics, and cheerleading have been defined as lean- and/or appearance-focused sports in the literature. Tennis, however, has consistently been grouped separately from such sports (Harrison & Fredrickson, 2003; Hausenblas & Carron, 2002).

Parsons and Betz’s (2001) findings indicate that there may be external sociocultural expectations of attractiveness and femininity projected onto female athletes that are unrelated to competition. In fact, several researchers have indicated that the same athletes identified as highly objectified by peers (Parsons & Betz, 2001) are also considered more feminine (Clavio & Eagleman, 2011; Hardin & Greer, 2009; Kane, 1988; Kim et al., 2010). Additionally, athletes from tennis and swimming appear to be some of the most sexually objectified in the media (Fink & Kensicki, 2002; Kim et al., 2010). Researchers have also noted volleyball (Kane, 1988; Kim et al., 2010) and golf (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Kane, 1988; Kim et al., 2010) as two feminine sports in which athletes are more objectified in the media.

Early researchers defined feminine sports as being less physical and aggressive, lower-risk, and non-strength-based (Kane, 1988). More recent research indicates that society’s perception of an athlete’s femininity is affected by the media’s portrayal of the athlete. For example, Harrison and Secarea (2010) found that a sexualized high status female basketball player was more likely to be perceived as stereotypically feminine and heterosexual than a non-sexualized female basketball player. Basketball is typically perceived as a more masculine sport (Hardin & Greer, 2009; Kane, 1988; Kim et al., 2010; Parsons & Betz, 2001; Petrie & Greenleaf, 2012); thus, these findings indicate that the sexual objectification of an athlete, regardless of sport type, can lead viewers to label the athlete as more feminine. Their findings, however, provide no indication as to society’s general categorizing of sports as feminine or masculine, just

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the athlete in question. Although there are indications that the media more frequently objectify athletes from feminine sports (Fink & Kensicki, 2002; Hardin & Greer, 2009; Kim et al., 2010), we do not know if these sports are considered feminine because of this objectification, or if they are objectified because they are considered more feminine.

In summary, the traditional focus of body image research among female athletes has been on weight- and appearance-related pressures specific to competition; however, recent research points to the objectification of female athletes as potentially imposing additional pressures on other female athletes to exemplify stereotypic female characteristics, including ideal appearance. Furthermore, it appears that these sociocultural expectations are not exclusive to athletes participating in sports traditionally considered appearance- or weight-focused.

The New Ideal

Research demonstrates that society’s perception of ideal beauty is partially defined, and significantly perpetuated, by the media (Grabe et al., 2008). The new ideal of athletic and thin was partly evident with the evolution of mainstream health and fitness magazines, such as *Women’s Health* and *Fitness* (Thompson et al., 2003). The images, articles, and ideals of these magazines, combined with the general media’s portrayal of the new beauty ideal has put more pressure on girls and women to attain a glorified, unreachable physical ideal (Kilbourne & Jhally, 2010). The detrimental effect of this pressure has been noted among females in general (e.g., Daniels, 2009; Harrison & Fredrickson, 2003; Swami, 2009), and early research indicates female athletes have acknowledged and heeded society’s message that appearance is at least as important as performance (Gibson, 2007; Larabee, 2011).

In recognition of the evolving beauty ideal, prominent body image researchers have revised existing body image survey instruments and created new ones in an effort to include measures specific to the new athletic ideal. For example, in its third revision, the Sociocultural
Attitudes Towards Appearance Questionnaire-3 (SATAQ-3; Thompson et al., 2003) added a new subscale called Internalization-Athlete. This subscale assesses the level at which the athletic ideal has been internalized by asking participants how much they try, or want, to look like sport and athletic figures. An example of another instrument is the Athletic Image Scale (AIS; Lenart, Goldberg, Bailey, Dallal, & Koff, 1995), a three-dimensional silhouette instrument designed to assess a female’s actual and ideal physiques. These instruments can assist researchers in identifying how the desire to attain an athletic physique is related to body image in both female athletes and non-athletes.

Part II: Systematic Review of Comparative Studies

Research prior to 2001 indicates that athletes experienced a more positive body image than non-athletes. Since this time, the sexualization of female athletes in the media has increased, and the sociocultural beauty ideal has come to include appearing athletic in addition to being thin. These sociocultural changes further pressure women and girls to attain a glorified, unreachable ideal, while also pressuring female athletes to exemplify these projected beauty ideals. For the second part of this paper, we conducted a systematic and comprehensive literature review to synthesize recent body image research that compares collegiate female athletes and non-athletes to identify the current status of BIC among female athletes. As previous research indicates that these group differences may vary depending on which sport-type (e.g., lean, feminine, aesthetic) or university competition level (i.e., Division I, II, and III) is considered, we also will explore differences between athletes and non-athletes in the context of sport-type and competition level.

Method

In this systematic review, “competitive athletics” is defined as a college- or university-level sport or “emerging sport” team governed by the NCAA, or a similar governing body (e.g.,
Canada’s Collegiate Intrauniversity Sport [CIS]). The term “collegiate female athlete” is defined as a female athlete participating in a college or university sport team governed by the NCAA, or a similar governing body. This distinction is important, because past research indicates that varsity athletes experience less BIC than club/recreational athletes attending college (Hausenblas & Downs, 2001). Since varsity athletes and recreational/club athletes experience BIC at significantly different levels, the two groups of athletes should not be collapsed together as one homogenous group. Also, club sports are not nationally governed; they are student-run and university-regulated with eligibility requirements that differ by university and sport. For example, some universities only allow students to participate in club sports, while other universities allow staff, faculty, and/or alumni to participate. Furthermore, some club sports require individuals to try-out for team membership, while other club sports are open to anyone regardless of skill level. Due to these differences, we felt that participation in club sports could not be considered inherently equal to varsity sport participation.

Search Procedures

Hausenblas and Downs (2001) used the key words athlete, sport, body image, body image disturbance, body dissatisfaction, and body esteem, in a computer search of the following databases: Dissertation Abstracts Online, Educational Resources in Completion, MedLine, PsychINFO, and SPORTDiscus. We used their search terms to query the same databases, with the addition of the key words internalization, objectification, thin ideal, and athletic ideal. We also searched the following additional databases: Academic Search Premier, Communication and Mass Media Complete, Masters Abstracts International, Psychological and Behavioral Sciences Collection, PubMed, and Women’s Studies International. We also searched the reference lists of all retained articles. Studies were required to meet the following inclusion criteria: (a) peer-reviewed manuscript, article, dissertation, or thesis available in the English language; (b)
published or documented between 1997 and 2013 (January); (c) measured a component of body image; and (d) included a sample of collegiate female athletes with a non-athletic comparison group. The beginning cutoff of 1997 was chosen due to our interest in examining how BIC differs between collegiate female athletes and non-athletes after the noted sociocultural shifts in beauty ideals and sexual objectification of female athletes. While we concede that this shift did not occur at a single moment in time, the noted change in focus of the 1997 *Sports Illustrated Swimsuit Edition* to include athlete models provided what we felt to be an appropriate starting point for our literature search. We intended to include any research studies that may have been inadvertently excluded by Hausenblaus and Downs (2001) from 1997 to 2000.

The database search returned 333 studies spanning from 1998 to 2012. One-hundred thirty eight ($n = 138$) studies were eliminated prior to abstract review because they focused on males and/or adolescents ($n = 100$) or non-college athletes (e.g., ballet dancers, auxiliary unit members; $n = 38$). After this primary exclusion, abstracts for 195 studies were reviewed, which led to the elimination of 83 additional studies that did not include an athlete group. Full articles were obtained for the remaining 112 studies. Of these 112 studies, four studied an adolescent sample; 66 did not measure body image; 13 did not have a non-athlete comparison group; and 19 did not include sports that met our definition of competitive athletics. Ten studies ultimately satisfied all selection criteria and were included in this review. The following information was extracted from each article: (a) study purpose; (b) participant makeup (sample size, sport type, and grouping); (c) school size, type, and/or region; (d) measurement tools for assessing body image constructs; (e) research design; (f) data analysis procedures; and (g) results. Comparisons were then made on various body image constructs by sport type and competition level.
Results

Description of Studies Included in the Review

Ten studies spanning from 1998 to 2012 met the inclusion criteria for this review. Six studies were reported in peer-reviewed manuscripts (DiBartolo & Shaffer, 2002; Finkenberg, DiNucci, McCune, Chenette, & McCoy, 1998; Krane et al., 2002; Robinson & Ferraro, 2002; Steinfeldt et al., 2011; Wiggins & Moode, 2000), three as Master’s theses (D’Arcy, 2007; Fellows, 1999; Rose, 2008), and one was part of a doctoral dissertation (Hoag, 2012). Two studies (Fellows, 1999; Finkenberg et al., 1998) occurred in the two-year overlap period between the beginning of the search time window and Hausenblas and Downs’ (2001) meta-analysis. One study (Finkenberg et al., 1998) was listed by Hausenblas and Downs (2001) as being reviewed; however, the study was not included in the data analysis section of their meta-analysis, nor referenced within their manuscript. Table 2-1 outlines the author(s), year, sample size/type, school type, body image measure(s) administered, and associated study results.

Research design

All 10 studies were cross-sectional, quantitative, and collected self-report data. Seven used paper/pencil format to collect data (D’Arcy, 2007; DiBartolo & Shaffer, 2002; Krane et al., 2002; Robinson & Ferraro, 2004; Rose, 2008; Steinfeldt et al., 2011; Wiggins & Moode, 2000), while one used an Internet format (Hoag, 2012). Survey format was not identified in two studies (Fellows, 1999; Finkenberg et al., 1998).

Sampling methodology was not reported for either the athlete or non-athlete group in one study (Finkenberg et al., 1998). All nine remaining studies recruited athletes through team coaches, although one obtained initial permissions at a higher administrative level (i.e., NCAA conference representatives; Hoag, 2012). For the non-athlete group, eight studies used non-
random sampling and one combined snowball sampling (requested non-athlete names from athletes) with non-random sampling (Hoag, 2012).

Three studies (DiBartolo & Shaffer, 2002; Finkenberg et al., 1998; Krane et al., 2002) did not operationally define the term *female athlete*. One of these studies (Finkenberg et al., 1998) did not identify the competition level (Division) or sports in which the surveyed athletes participated. The two other studies identified as Division I (Krane et al., 2002) or Division III (DiBartolo & Shaffer, 2002), but reported including sports never governed, nor listed as emerging, by the NCAA (precision figure skating and squash respectively; NCAA, 2012). Thus, while these studies appear to include some sports considered eligible for NCAA membership (NCAA, 2012), this apparent eligibility does not confirm they are sanctioned under the auspices of the NCAA. For example, softball, which is an NCAA-eligible sport, is also offered as an intramural or club sport; colleges and universities can have both club-softball and an NCAA-governed team. Thus, the extent to which non-NCAA athletes comprised the samples in these studies (DiBartolo & Shaffer, 2002; Finkenberg et al., 1998; Krane et al., 2002) is unclear. One of these studies (Krane et al., 2002) used a non-athlete comparison group comprised solely of aerobic exercisers, while the other nine studies used a non-athlete comparison group comprised of female non-athlete undergraduate students. This difference in research design, combined with the unknown extent to which the athlete group is comprised of club athletes, led our research team to determine that the Krane et al. (2002) study did not fit the general characterization of athletes versus non-athletes as defined in other reviewed investigations. Due to the study’s noted incompatibility with the other nine reviewed studies, we chose to exclude the results from the Krane et al. (2002) study.
**Sport groupings**

Most studies predominantly included athletes from sports considered less objectified (e.g., basketball, soccer, and track). Table 2-2 provides data from Parsons and Betz (2001) that report how athletes in each sport are objectified according to their peers. These data provide an accessible comparison of mean objectification ratings for each rated sport that is included in each reviewed study. Also, athletes were grouped differently in the reviewed studies. Five studies grouped all athletes from several sports into one large athlete group (D’Arcy, 2007; DiBartolo & Shaffer, 2002; Finkenberg et al., 1998; Steinfeldt et al., Wiggins & Moode, 2000). Two studies divided the athlete group to facilitate comparisons based on body-related pressures (Fellows, 1999) or determination of success (Robinson & Ferraro, 2004). Two other studies used athlete group(s) representative of only one sport each (Hoag, 2012; Rose, 2008). These types of comparisons are warranted, as researchers have posited that BIC could vary according to sport-type (e.g., Parsons & Betz, 2001; Reel et al., 2010).

**Measurement of body image**

The most commonly used measure to assess body image was the EDI-BD (body shape dissatisfaction), which was administered in five studies. Three studies used traditional (thin) ideal/actual figure measures (e.g., Figure Ratings Scale [FRS]; Stunkard, Sorenson & Schulsinger, 1983), and two studies used athletic ideal/actual figure measures (i.e., AIS) to compare athletes and non-athletes on body size dissatisfaction. Three studies measured internalization of the thin ideal: two with the SATAQ-3 internalization-general subscale, and one with the body shame subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996). The two studies administering the thin-internalization subscale of the SATAQ-3 also administered the other three SATAQ-3 subscales: pressures, information, and internalization-athlete. Three studies measured weight preoccupation with the EDI Drive for
Thinness subscale (EDI-DT), and three others measured SPA with the Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rejeski, 1989). Of the three studies that administered the Body Esteem Scale (BES; Franzoi & Shields, 1984), one reported on overall body esteem, another reported on the three constructs of body esteem (i.e., physical condition, sexual attractiveness, and weight concern), and the third reported on both overall body esteem and its three components. The Self-Objectification Questionnaire (SOQ; Noll & Fredrickson, 1998) and Body Appreciation Scale (BAS; Avalos et al., 2005) were used in one study each.

**Differences in BIC between Athletes and Non-Athletes**

In nine reviewed studies (excluding Krane et al., 2002 as previously noted), athletes and non-athletes differed significantly on at least one body image construct. Of these nine studies, athletes overall scored more positively in all but one study (i.e., Hoag, 2012). Specifically, the three studies measuring ideal/actual body size discrepancy with a traditional rating scale found non-athletes to be more dissatisfied with their body size (D’Arcy, 2007; DiBartolo & Shaffer, 2002; Robinson & Ferraro, 2004). Compared to non-athletes, athletes reported more positive overall body esteem (Fellows, 1999; Steinfeldt et al., 2011); as well as more positive feelings about their body’s physical condition, a component of body esteem (Fellows, 1999; Wiggins & Moode, 2001). Two other body esteem components, weight concern (body parts modifiable with diet and exercise) and sexual attractiveness (body parts not modifiable with diet and exercise), trended higher (more positive) in athletes, but were not statistically significant in one of the two studies (Wiggins & Moode, 2000). Fellows (1999), however, noted statistically significant differences between athletes and non-athletes on all three BES subscales, reporting moderate to large effect sizes for each outcome (physical condition $d = 1.11$, $p < .001$; weight concern $d = 0.80$, $p < .001$; and sexual attractiveness $d = 0.39$, $p = .001$).
Although athletes and non-athletes did not differ in their athletic ideal/actual figure discrepancies, athletes did identify a larger and more muscular current (actual) figure and ideal figure than did non-athletes (D’Arcy, 2007; Hoag, 2012). Additionally, the two studies measuring internalization of the athletic ideal found that athletes internalized the athletic ideal more so than non-athletes (D’Arcy, 2007; Hoag, 2012). With regards to internalization of the thin ideal, the three studies measuring this construct reported no statistical differences between athletes and non-athletes (D’Arcy, 2007; Hoag, 2012; Rose, 2008). Also, according to two studies, SPA appeared unrelated to athletic status (Finkenberg et al., 1998; Hoag, 2012). These results, and others, are further described in the context of sport type and competition level.

**Relationship between BIC and Sport Type**

Three studies found that athletes competing in the endurance sports of swimming, track, and water polo experienced less BIC than non-athletes. Specifically, endurance athletes reported less self-objectification and weight preoccupation (Robinson & Ferraro, 2004; Rose, 2008); and better general body esteem, including more positive feelings about their physical condition, sexual attractiveness, and weight-affected body parts (Fellows, 1999). On the other hand, three of four studies that compared non-athletes to athletes participating in the more feminine sports of gymnastics, tennis, and volleyball found no differences in BIC. This was noted for constructs specific to appearance of the body and body parts (Fellows, 1999), body appreciation (Hoag, 2012), and self-objectification (Rose, 2008). The fourth study (Robinson & Ferraro, 2004) reported that golf and volleyball athletes experienced less weight preoccupation than non-athletes.

Between sport-type comparisons revealed that athletes defined as participating in “appearance-focused” sports (gymnastics and tennis) experienced lower positive body esteem and greater weight concern than athletes in sports labeled as “non-appearance/non-lean” focused
(volleyball, soccer softball, track and field, and basketball; Fellows, 1999). In another study, combined body shame and self-objectification scores were able to predict group membership to a non-appearance focused endurance sport (water-polo) or highly appearance-focused sport (gymnastics; Rose, 2008).

**Relationship between BIC and Competition Level**

Three studies reported that athletes at lower competition levels (e.g., Division II or III) were more satisfied with their body shape (via the EDI-BD) than non-athletes (D’Arcy, 2007; DiBartolo & Shaffer; Robinson & Ferraro, 2004), while a fourth study reported no significant difference in body shape dissatisfaction between non-athletes and volleyball players at either the Division II or III level (Hoag, 2012). On the other hand, Division I volleyball players were significantly more dissatisfied with their body shape than non-athletes (Hoag, 2012). The single study comparing non-athletes to volleyball players across all three competition levels noted a linear trend between body shape dissatisfaction and competition level, with Division I athletes reporting the highest body shape dissatisfaction (Hoag, 2012). These findings could indicate that competition level and body shape dissatisfaction as experienced by athletes are related. Or, these results might not be specific to competition level, but to volleyball, or sports that could be grouped as similar to volleyball. A negative linear trend was also noted for competition level when looking at body appreciation in volleyball players. That is, volleyball players’ body appreciation increased as competition level decreased, although these differences were not significant (Hoag, 2012).

Two reviewed studies found that athletes at various levels idealized an athletic physique more so than non-athletes (D’Arcy, 2007; Hoag, 2012), with one of these studies (Hoag, 2012) reporting that the difference was more pronounced as competition level increased. Comparison between the groups on the SATAQ-3 measures of pressures and information were mixed. While
one study (Hoag, 2012) reported no difference between non-athletes and athletes across all three competition levels on these measures, another study (D’Arcy, 2007) found that less competitive athletes perceived less pressure from the media and reported using the media less as a source of information about beauty than non-athletes. Again, the differences in the two studies could be attributable to the type of sports included in the athlete groups, and not just competition level.

**Discussion**

Female athletes have been marginalized in the media for decades; however, in the last 15 years, the sexual objectification of the female athlete seems to have risen in concurrence with a modified beauty ideal of athletic and thin (APA, 2010; Kim et al., 2010). We aimed to identify changes in BIC among female athletes since this shift. A thorough search process revealed 10 studies spanning from 1998 to 2012 that compared various body image constructs among collegiate female athletes and non-athletes. When considering that BIC are associated with increased risk of adverse psychological (e.g., depression) and behavioral (e.g., disordered eating) consequences (Fitzsimmons-Craft et al., 2012; Grabe et al., 2008; Szymanski et al., 2011), the deficiency of body image research in the athlete population is a bit startling. Moreover, during our search process, we found that most research conducted between 1997 and 2012 comparing athletes to non-athletes was focused on eating pathology and not differences in body image. This is unfortunate, given that BIC are more common than eating disorders and often a strong predictor of eating pathology as well as other disorders (e.g., depression, sexual dysfunction; Carr & Szymanski, 2010; Szymanski et al., 2011). Thus, assessing and targeting body image may help identify and help those at risk before disorder develops (Farrell, Shafran, & Lee, 2006; Thompson et al., 1999).

Five of the reviewed studies assessed body image with the EDI-BD, making the EDI-BD the most commonly used instrument administered across the 10 reviewed studies. This was
surprising to us, given that researchers have questioned whether the EDI-BD can adequately assess overall body image (Bailey et al., 1990; Hausenblas & Downs, 2001). Three studies also reported assessing body size dissatisfaction using a type of figure rating or silhouette scale. Researchers in these three studies asked participants to select one of seven (Robinson & Ferraro, 2004) to nine (D’Arcy, 2007; DiBartolo & Shaffer, 2002) figures that most closely represented their actual body-size and select the figure that most closely represented their ideal size. The discrepancy between perceived and ideal size was used to determine body size dissatisfaction. The psychometric validity of such scales, however, has been questioned. Some scholars suggest these scales do not assess the distress participants feel when they have not met the indicated ideal, but rather an awareness of the attractiveness stereotype (Hildebrandt & Walker, 2006). Others note that the number of response options is too limited and that successive images do not occur on a true interval scale, potentially causing inflated test-retest reliability scores and scale coarseness (over- or under-estimation of moderated regression effect sizes; Gardner, Friedman, & Jackson, 1998). There are other indications that these scales do not represent ethnic and racial diversity of body size preferences for specific body parts, such as breasts or buttocks (Grabe & Hyde, 2006; Swami, Jones, Einon, & Furnham, 2009). Other researchers’ findings indicate that the scales’ results can be misleading when considered alone (Forbes & Jung, 2008; Grabe & Hyde, 2006).

Advancements in body image research within the last 15 years have sparked the development of several new instruments for measuring body image; as such, we expected that some of these newer instruments would have been used in place of the EDI-BD. We were also surprised to find that only one study compared female athletes and non-athletes using self-objectification measures. Considering the increase in sexual objectification of female athletes, it
would seem that more researchers would be exploring female athletes’ self-objectification. Despite these concerns, our systematic and narrative analytic approach led us to identify two critical findings: (a) female athletes desire a slightly heavier, more athletic physique and (b) BIC of female athletes may differ across competition level and sport type on various body image constructs.

**The Athletic Physique**

Athletes, compared to non-athletes, desire a more muscular body (D’Arcy, 2007; Hoag, 2012) that more closely resembles their current figure (D’Arcy, 2007; DiBartolo & Shaffer, 2002; Robinson & Ferraro, 2004). As indicated by Hausenblas and Downs (2001) in their meta-analysis, the results of this review also suggest that athletes are more satisfied with their body shape in general. Despite the increased sexualization and objectification of female athletes in the past decade, it appears female athletes continue to be more satisfied with the overall shape of their body than non-athletes. As such, it comes as no surprise that collegiate female athletes also feel more positively about the functions and abilities of their body (e.g., strength, stamina, and coordination; Fellows, 1999; Wiggins & Moode, 2000).

As would be expected, collegiate female athletes internalize the athletic ideal more so than non-athletes (D’Arcy, 2007; Hoag, 2012). However, studies at the highest competition level (Division I) noted that athletes and non-athletes have similar sociocultural attitudes related to thin-ideal internalization, perceived media pressure, and using the media as a source for beauty information (Hoag, 2012; Rose, 2008). Research in the general female population has demonstrated a positive directional relationship between sociocultural attitudes and body size dissatisfaction (Forbes et al., 2006). Yet, for female athletes, the desire to look athletic might protect them from body size dissatisfaction, despite their similar attitudes regarding sociocultural variables. Whether or not this is accurate is difficult to discern, as previous literature has not
determined whether athletic internalization or desiring an athletic figure contributes positively or negatively to body image.

**Competition Level Differences**

University competition (Division) level differences were not examined by Hausenblas and Downs (2001). Our findings indicate there may be competition level differences within the college athlete group. This finding is in line with other research that indicates Division I and Division III college athletes experience BIC differently, depending on the construct of measure (Kato et al., 2011). Specifically, prior research indicates that athletes at the Division I level experience more body dissatisfaction than athletes at the Division III level (Kato et al., 2011). Our results supported this, as Division I athletes were the only athletes to report being more dissatisfied with their body shape (Hoag, 2012), while athletes at other competition levels reported feeling more satisfied with their body shape (D’Arcy, 2007; DiBartolo & Shaffer, 2002; Robinson & Ferraro, 2004).

The issue of weight concern may also differ across competition levels. However, it was the Division I and II athletes that felt more positively regarding weight concern and preoccupation (Fellows, 1999; Robinson & Ferraro, 2004), while other athletes did not (D’Arcy, 2007; Wiggins & Moore, 2000). This finding supports other research that indicates Division III athletes experience greater weight preoccupation than Division I athletes (Kato et al., 2011). Notably, the results of our review indicate that the difference in weight concern may disappear among Division I athletes and non-athletes, when the athlete group is comprised of athletes in more feminine sports such as gymnastics and tennis (Fellows, 1999).

Among females in general, the relationship between greater weight preoccupation and body dissatisfaction to thin-ideal internalization has been documented (Grabe et al., 2008; McKinley & Hyde, 1996). For that reason, our finding that competitive athletes are less...
concerned with their weight, yet more dissatisfied with their body shape is counterintuitive, considering these athletes experience levels of thin internalization similar to non-athletes (Hoag, 2012; Rose, 2008). This apparent contradiction could be partly explained by highly competitive female athletes struggling to reconcile two separate identities: being an athlete and female (Krane, Choi, Baird, Aimar, & Kauer, 2004). Research has demonstrated the positive linear relationship between a female’s athletic identity and BIC (Krane et al., 2004; Larabee, 2011). The more pronounced the athletic identity and the more internalized the thin ideal, the more likely the athlete will self-objectify and will experience body shame (Larabee, 2011). Thus, the highly competitive female athlete’s internalization of the thin ideal, which is similar to the non-athlete’s, is conflicted with her identity of being an athlete, thereby linked to greater BIC.

It is also possible that these competition level differences are confounded by the different types of sports included in each study. In other words, competition level and sport type may have been confounded, or may have had an interactive affect. Thus, while the results of this review indicate that Division I athletes appear to be at greater risk for body shape dissatisfaction than their college-aged peers, this same difference might be explained by the fact that these Division I athletes participated in more feminine sports.

**Sport Differences**

Despite conjecture that lean-focused athletes and appearance-focused athletes are at greater risk for BIC, the results of Hausenblas and Downs’ (2001) meta-analysis indicated no difference between aesthetic (appearance), endurance (lean), and ball game sports. Our findings differed from Hausenblas and Downs (2001), as we found that BIC varied by sport grouping with athletes in more feminine sports (e.g., gymnastics, volleyball, and tennis) found to be at greater risk for BIC and athletes in endurance sports (e.g., swimming, long-distance running, and water polo) at lower risk for BIC. Specifically, endurance athletes reported higher body esteem,
less self-objectification, and greater overall body satisfaction than non-athletes (Fellows, 1999; Rose, 2008; Robinson & Ferraro, 2004), while feminine athletes did not (Fellows, 1999; Hoag, 2012; Rose, 2008). Further, athletes in more feminine sports felt less positively about their weight-affected body parts when compared to athletes in less feminine sports (Fellows, 1999). These results indicate that athletes in more feminine sports may feel more negatively about parts of the body that are significantly changed by weight fluctuations (e.g., weight, figure, and waist) when compared to other athletes.

As noted previously, the grouping of sports as appearance- or lean-focused is inconsistent in the literature, as different researchers use these terms to refer to different sports. This confusion was inherent in at least one reviewed study. Fellows (1999) compared athletes by appearance-focus, lean-focus, and non-lean/non-appearance focus. Fellows’ (1999) inclusion of tennis as an appearance-focused sport was not clear, since the author defined appearance-focused as “sports (gymnastics, diving, ballet) where performance and appearance are judged, and the degree to which the athlete meets the prevailing ideal for body shape and size may greatly influence her score” (p. 11). Additionally, no other literature has identified tennis as an appearance sport. However, several researchers do indicate that both gymnastics and tennis are considered more “feminine” sports (Clavio & Eagleman, 2011; Kim et al., 2010; Parsons & Betz, 2001). In light of this research, we refer to this grouping as “more feminine sports.” The term “lean-focused” is also inconsistently used in the literature. Thus, we use the term “endurance” to include sports that emphasize leanness for performance, or require training that is mostly aerobic (e.g., long-distance running and swimming).

Body image research among athletes has traditionally focused on the performance aspect of pressure related to appearance, yet has failed to examine the sociocultural aspect. Our results
indicate that the pressures associated with being an athlete extend beyond performance expectations to sociocultural expectations as projected and perpetuated by the media’s sexualization and objectification of athletes performing in sports considered more feminine. It appears that it is now necessary to revise groupings of sport-types, as sports that have not traditionally been considered appearance-focused (e.g., tennis, volleyball) are now being overtly sexualized in the media (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Kim et al., 2010), objectified by peers (Parsons & Betz, 2001), and seem to be at increased risk for BIC.

**Limitations**

One consistent limitation of this review was that all studies used non-random sampling techniques to recruit non-athlete comparison groups. As such, the generalizability of studies analyzed in this review may be limited. Also, almost all studies collected survey responses from athletes during or immediately following sport practices and/or meetings. Previous literature indicates response bias may be of concern in these types of environments (Garner, 2004), because athletes may not feel assured of response anonymity or confidentiality in these settings. One of the studies (Robinson & Ferraro, 2002) reported that coaches were not present during survey administration, and athletes were assured of confidentiality.

Three reviewed studies (DiBartolo & Shaffer, 2002; Finkenberg et al., 1998; Krane et al., 2002) did not operationalize the term “collegiate female athlete,” diminishing the ability of our review to make unequivocal conclusions about the research. Without an operational definition of the term “athlete,” we are unable to confirm if all athletes included in these studies were varsity level, NCAA sport athletes. In many cases, athletes were grouped differently across studies, which made specific between-sport comparisons difficult. Additionally, the variation of included sports at different competition levels means that we might have attributed some differences to
competition level, when the difference was actually due to sport type. In other words, competition level and sport type may have been confounded, or may interact.

**Conclusions and Future Research**

Evidence indicates participation in athletics is related to enhanced body esteem and valuing the human body for its physical abilities. The latter is not surprising given that successful athletic performance requires a certain level of bodily skill, endurance, stamina, and strength. Perceiving the body as a useful instrument is the antithesis of self-objectifying, so it seems plausible that athletic involvement could provide some protection against self-objectification. This is unknown, however, as only one reviewed study compared athletes and non-athletes on self-objectification. In fact, the most commonly used scale in the reviewed studies was the EDI-BD, despite indications that the subscale is not a good single measure of body image or even general body dissatisfaction. Given the sexual objectification of individuals from this population, researchers should consider instruments that assess outcomes that are more salient and temporally relevant to female athlete populations. Selection of such measures can also assist researchers in examining the relationship between BIC and the media’s increased sexualization of female athletes. Examples of constructs that need to be measured include self-objectification and body comparison, as well as body esteem. The latter focuses on the traditional body image measures of perceived self-attractiveness as well as demonstrable physical abilities (e.g., strength, endurance). In a similar vein, researchers should consider measuring other positive body image constructs such as body appreciation and body functionality.

Additionally, results from this review suggest that enhanced athletic internalization may not indicate decreased risk for BIC; but rather there may be other, unexplored variables serving to moderate this relationship. Possible examples include sport objectification level (Parsons & Betz, 2001) and gender norm conformity (Steinfeldt et al., 2011). Looking more closely at
female athletes’ conformity to gender norms (both male and female norms) could be particularly informative considering that female athletes may find it difficult to reconcile their female identity from their athletic identity (Krane et al., 2004; Larabee, 2011); and that female athletes are engaging in some performance-enhancing and appearance-modifying behaviors that are similar to their male athlete counterparts (Muller, Gorrow, & Schneider, 2009). Considering society’s idealization of the athletic physique, continued research in this area is critical, as is the use of instruments that attempt to measure constructs salient to the athletic ideal. In addition to the AIS and internalization-athlete subscale, researchers should consider administering Smolak and Murnen’s (2008) Drive for Leanness Scale.

Results of this review indicate that there may be body image differences across the competition (NCAA Division) levels; although these differences might be confounded by the types of sports included in each Division level. Thus, more research should be conducted comparing Division I female athletes to female athletes in other Divisions and to non-athletes on relevant body image constructs with consideration to the level at which the included sports are perceived as feminine and/or the level at which athletes from the sport are objectified by society and the media. This is important because the results of this review indicate that athletes in more feminine (e.g., gymnastics) and objectified (e.g., tennis) sports experience greater BIC than other athletes.

It is apparent that society’s view of what defines an athlete as feminine has changed, and sports that were once considered to be more feminine (e.g., golf; Kane, 1988) may no longer be viewed as such (Parsons & Betz, 2001). Further, recent research indicates that society’s perception of an athlete’s femininity is affected by the media’s portrayal of the athlete (Daniels & Warten, 2011; Hardin & Greer, 2009; Harrison & Secarea, 2010). Thus, researchers should
examine how current definitions of athletic femininity are developed. Specifically, researchers should study the relationship between what society defines as a feminine sport and the media’s objectification of athletes from these sports. Additionally, researchers should seek to determine how the media’s sexual objectification of high-profile, sport-specific female athletes affect the BIC of female athletes participating in that sport.

Continued research examining body image and female athletes can help researchers and clinicians better understand the ways in which athletic involvement can protect against BIC. This enhanced understanding can also contribute to improved programming for non-athlete females. For example, understanding that athletes value the abilities of their body more than non-athletes suggests that interventionists should identify ways to enhance non-athletes’ feelings regarding their body’s abilities. Participation in college-level varsity sports is not possible for every female, and regular participation in general exercise and physical activity may not be sufficient to enhance non-athletes feelings toward the utility of their body. Researchers and interventionists should explore how dedication to perfecting a physical skill (e.g., roller blading or rock climbing), even outside of the sports realm, may enhance body esteem. Continued empirical and conceptual efforts will develop new knowledge that can assist researchers and practitioners in the selection of effective methods for addressing BIC in female athletes, especially with respect to internalized sociocultural beauty norms and objectification.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Type &amp; Size</th>
<th>School, Type or Region (Division)</th>
<th>Measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>D’Arcy (2007)</td>
<td></td>
<td>York University, Canada (N/A)</td>
<td>BMI, FRS, AIS, EDI-BD, EDI-DT, SATAQ-3</td>
<td>Attorneys had a higher BMI; larger current figure (AIS) and ideal figure (AIS); and internalized the athletic ideal more. Non-attorneys had significantly greater body dissatisfaction (FRS &amp; EDI-BD); used the media for information about appearance more; and perceived greater pressure from the media to conform to sociocultural beauty ideals.</td>
</tr>
<tr>
<td>DiBartolo &amp; Shaffer (2002)</td>
<td></td>
<td>Liberal arts college, northeastern (Division III)</td>
<td>EDI-BD, BIS</td>
<td>Non-attorneys experienced greater body dissatisfaction (EDI-BD; BIS).</td>
</tr>
<tr>
<td>Fellows (1999)</td>
<td></td>
<td>University, western U.S. (Division I)</td>
<td>BES, WC, SA, PC</td>
<td>All attorneys had more positive body esteem and PC than non-attorneys. Lean attorneys also had more positive SA and WC than non-attorneys. Other attorneys had more positive overall body esteem and WC than appearance-focused athletes. No differences between other athletics and lean athletes.</td>
</tr>
<tr>
<td>Finkenberg et al. (1998)</td>
<td></td>
<td>University, southwestern (not noted)</td>
<td>SPAS</td>
<td>SPA was lower for athletes; however the groups were not discriminated by SPA.</td>
</tr>
<tr>
<td>Hoag (2012)</td>
<td></td>
<td>33 Universities, across the U.S. (All Divisions)</td>
<td>BMI, AIS, EDI-BD, SPAS, BAS, SATAQ-3</td>
<td>Athletic status was related to body image after controlling for BMI, as was competition level. Compared to non-athletes, athletes had a larger, more athletic actual and ideal figure (AIS), as well as greater internalization of the athletic ideal. Division I athletes had greater body shape dissatisfaction (EDI-BD) than non-athletes.</td>
</tr>
<tr>
<td>Krane et al. (2002)</td>
<td></td>
<td>4 Universities, Midwest (Division I)</td>
<td>EDI-BD, EDI-DT, SPAS</td>
<td>Body satisfaction did not differ between groups, nor did physique about anxiety. The two body satisfaction variables were the strongest predictors of social physique anxiety in both exercisers and athletes.</td>
</tr>
</tbody>
</table>
## Table 2-1. Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Type &amp; Size</th>
<th>School, Type or Region (Division)</th>
<th>Measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robinson &amp; Ferraro (2004)</td>
<td>All athletes, $n = 53$&lt;br&gt;Speed-focused, $n = 37$&lt;br&gt;Technique-focused, $n = 16$&lt;br&gt;Non-athlete, $n = 55$</td>
<td>University of North Dakota (Division II)</td>
<td>EDI-BD&lt;br&gt;EDI-DT&lt;br&gt;Current/ideal weight&lt;br&gt;Current/ideal body type</td>
<td>Non-athletes were more weight preoccupied (EDI-DT), and dissatisfied with body weight and shape than both athlete groups. Non-athletes had higher BMI than speed-focused athletes. No differences between the two athletes groups.</td>
</tr>
<tr>
<td>Rose (2008)</td>
<td>Gymnastics, $n = 29$&lt;br&gt;Water polo, $n = 41$&lt;br&gt;Non-athlete, $n = 22$</td>
<td>Two universities, West coast (Division I)</td>
<td>SOQ&lt;br&gt;OBBCS-BS</td>
<td>Non-athletes self-objectified more than water polo athletes, but similarly to gymnasts. Combined self-objectification and body shame predicted group membership with 46% accuracy.</td>
</tr>
<tr>
<td>Steinfeldt et al. (2011)</td>
<td>Athletes, $n = 78$&lt;br&gt;Non-athletes, $n = 65$</td>
<td>Private college (Division III)</td>
<td>BES</td>
<td>Body esteem significantly correlated to athletic status ($r = .28$, $p &lt; .001$).</td>
</tr>
<tr>
<td>Wiggins &amp; Moore (2000)</td>
<td>Athletes, $n = 57$&lt;br&gt;Non-athletes, $n = 67$</td>
<td>Two universities, southern medium-sized (Not noted)</td>
<td>WC&lt;br&gt;SA&lt;br&gt;PC</td>
<td>Athletes felt more positively about their physical condition than non-athletes. No difference between groups on the body esteem constructs of WC or SA.</td>
</tr>
</tbody>
</table>

BMI = Body Mass Index; FRS = Figure Ratings Scale; AIS = Athletic Image Scale; EDI-BD = Eating Disorders Inventory-Body Dissatisfaction Scale; EDI-DT = Eating Disorder Inventory-Drive for Thinness; SATAQ-3 = Sociocultural Attitudes Toward Appearance Questionnaire-3; BIS = Body Image Survey; BIC; Body Image Concerns; BES = Body Esteem Scale; WC = Weight Concern; SA = Sexual Attractiveness; PC = Physical Condition; SPAS = Social Physique Anxiety Scale; BAS = Body Appreciation Scale; SOQ = Self-Objectification Questionnaire; OBBCS-BS = Objectified Body Consciousness Scale-Body Shame. 

*Only measures used to compare BIC in athlete and non-athlete groups were included.*

*Unpublished Doctoral dissertation or Master’s thesis.*
## Table 2-2. Included sports in the reviewed studies alongside Parsons and Betz (2001) objectification scores

<table>
<thead>
<tr>
<th>Sport</th>
<th>Objectification Score</th>
<th>D'Arcy a,b,c</th>
<th>DiBartolo &amp; Shaffer d</th>
<th>Fellows</th>
<th>Hoag</th>
<th>Krane et al. e</th>
<th>Robinson &amp; Ferraro</th>
<th>Rose b</th>
<th>Steinfeldt et al. c</th>
<th>Wiggins &amp; Moode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf</td>
<td>2.09</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lacrosse</td>
<td>2.12</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Crew f</td>
<td>2.17</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Field Hockey</td>
<td>2.25</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>2.27</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Soccer</td>
<td>2.33</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Cross Country</td>
<td>2.51</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Softball</td>
<td>2.58</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Track</td>
<td>2.60</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Volleyball</td>
<td>2.93</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Diving</td>
<td>2.99</td>
<td></td>
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<tr>
<td>Swimming</td>
<td>3.17</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Tennis</td>
<td>3.29</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Gymnastics</td>
<td>4.02</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>2.67</strong></td>
<td>X</td>
<td></td>
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</table>

Notes: Objectification scores averaged from appearance and femininity scores for each sport. Rating scales were based on 1 to 5 ratings (1=little focus on appearance or least feminine, 5=strong focus on appearance or most feminine; n = 195 first-year undergraduate students at a large public University). Fourteen of the 17 sports from Parsons and Betz’s (2001) study are included in Table 2-2. Dance Team, Synchronized Swimming, and Cheerleading were removed (non-NCAA sports). Mean score = 2.67 for these 14 sports. Finkenberg et al., 1998 is not included, due to no sport list provided by the authors.

a Included, but not listed in Parsons and Betz (2001): Ice Hockey
b Included, but not listed in Parsons and Betz (2001): Water Polo
c Included, but not listed in Parsons and Betz (2001): Rugby
d Included, but not listed in Parsons and Betz (2001): Skiing; Squash
e Included, but not listed in Parsons and Betz (2001): Precision Figure Skating
f Designated as “Rowing” by NCAA
Body image disturbance (BID) is a multi-dimensional disorder characterized by an individual’s negative attitude toward, or evaluation of, weight, shape, or size of their body (Cash & Szymanski, 1995; Garner, 2004). BID is a diagnostic criterion for eating disorders such as anorexia nervosa (AN), bulimia nervosa (BN), and eating disorders not otherwise specified (EDNOS; American Psychiatry Association [APA], 1994). Researchers have widely reported the positive relationship between disordered eating (subclinical level eating pathology) and BID in nonclinical populations of women (Calogero et al., 2005; Fitzsimmons-Craft, 2011; Grabe et al., 2008). Both BID and disordered eating have been linked to several negative health behaviors and psychological concerns among women, including alcohol use (Carr & Szymanski, 2010), depression (Carr & Szymanski, 2010; Ilaria, 2006; Szymanski & Henning, 2007; Tiggeman & Kuring, 2004), decreased self-esteem (Tylka & Sabik, 2010), anxiety (Ilaria, 2006), and stress (Ruggiero et al., 2008).

Due to the relationship between BID and disordered eating, the two constructs are often assessed concurrently using numerous types of survey instruments. Most BID instruments were developed and validated for use in nonclinical populations; while most eating disorder instruments were developed and validated in clinical settings for females suffering from clinical-level eating disorders (Tury, Gulec, & Kohls, 2010). As such, most eating disorder survey instruments are administered to assess symptoms, plan for treatment, or evaluate treatment effectiveness among individuals with and without eating disorders (Espelage et al., 2003; Tury et al., 2010). Because eating disorder instruments can generally discriminate between those with and without eating disorders, nonclinical researchers also use these screening assessments. Over
the last several decades, one of the most popular eating disorder instruments used to identify
groups at greater risk for eating pathology and/or BID has been the Eating Disorder Inventory
(EDI; Campbell & Hausenblas, 2009; Garner et al., 1983; Hausenblas & Downs, 2001; Roberts
et al., 2006). The original EDI is a 64-item survey organized into eight subscales (Garner et al.,
1983). Five subscales measure “psychological traits” (i.e., perfectionism, ineffectiveness,
interoceptive awareness, maturity fears and interpersonal distrust), and three subscales measure
“behavioral traits” (i.e., body dissatisfaction, bulimia, and drive for thinness) or “eating- and
weight-related” (EWR) subscales associated with eating disorders (Garner et al., 1983; Garner,
2004).

The psychological traits subscales have been criticized for their inability to differentiate
eating disorder patients from patients with other psychological disorders, calling into question
their usefulness for identifying subclinical eating pathology or BID (Cooper, Cooper, &
Fairburn, 1985; Hurley, Palmer, & Stretch, 1990; Schoemaker, Verbraak, Breteler, & Van der
Staak, 1997). On the other hand, the frequent administration of the EWR subscales have shown
these scales to be highly relevant to eating pathology and BID in both clinical and nonclinical
populations (Campbell & Hausenblas, 2009; Grabe et al., 2008; Hausenblas & Downs, 2001;
Roberts et al., 2006; Smolak et al., 2000). Each of the three EWR subscales are often
administered individually in nonclinical research to determine BID risk; however, all three
subscales can be administered together in nonclinical research to obtain an overall disordered
eating risk score.

Since its inception, the EDI has been modified twice. In its first revision, the EDI-2 added
27 new items (new total = 91 items) ascribed to three additional psychological trait subscales
(asceticism, impulse regulation, and social insecurity; Garner, 1991). The EDI-3 maintained the
same 91-items as the EDI-2, but rearranged the items into 12 subscales instead of 11. Some EDI-3 subscales are unchanged from the EDI-2, yet others (and their labels) have been modified. Correlations between subscales included in each EDI iteration are high (see Table 3-1), suggesting “that researchers and clinicians can assume equivalence” (Garner, 2004, p. 140) in the three iterations, allowing for score comparisons across EDI versions. It should be noted that nonclinical researchers continue to frequently use subscales from the original EDI more often than updated versions, due to its availability, length, and relative comparability to the EDI-2 and EDI-3 (De Barardis, Serroni, & Campanella, 2009; Gordon, Castro, Sitnikov, & Holm-Denoma, 2010).

Despite the long-standing popularity of the EDI among nonclinical researchers, there is debate as to whether this clinical survey instrument is appropriate for measuring BID and eating pathology in nonclinical populations. Specifically, researchers have noted that EDI items may be interpreted differently by individuals without eating disorders (Clausen et al., 2011; Kashubeck-West et al., 2001). Moreover, data acquired from patients with eating-disorders versus nonclinical comparison groups may lead to different EDI structures (Garner, 2004; Garner et al., 1983). One possible reason for these differences is because the EDI item-to-subscale assignment was primarily based on clinical experience and conceptual fit (Garner, 2004). For example, despite statistical indications (item-to-factor correlations) that item 47 belongs with other drive for thinness items, it was assigned to the body dissatisfaction subscale of the EDI-3 due to content-related considerations exclusive to individuals with clinically diagnosed eating disorders. The aforementioned issues have led researchers to suggest the need for item-level investigations of the EDI subscales when administered in nonclinical populations (Clausen et al., 2011; Espelage et al., 2003).
To date, no studies have critically reviewed factor analytic studies due to content-related considerations exclusive to individuals with clinically diagnosed eating disorders. The aforementioned issues have led researchers to suggest the need for item-level investigations assessing the administration of the EDI in nonclinical populations. A critical psychometric analysis of studies using the EDI will assist researchers in identifying which EDI items and subscales may be inappropriate for measuring eating pathology and BID in nonclinical populations of women from Westernized countries. Limiting this critical review to studies of women from Westernized countries is appropriate because development of the EDI and its subsequent revised iterations were tested in females from Westernized countries (Garner, 1991; Garner, 2004; Garner et al., 1983). In addition, factors affecting the development of BID, and subsequently eating disorders, are different for females in Westernized versus non-Westernized and Asian countries (Forbes & Jung, 2008; Holmqvist & Frisen, 2009).

Methods

Due to its aggregated nature, a meta-analysis is not appropriate for examining survey instruments at the item-level; thus, a critical review of factor analytic studies is the optimal method for exploring the internal structure of the EDI. The critical review described here was conducted in three phases. In Phase 1, we systematically identified research studies. In Phase 2, we systematically evaluated the methodological quality of all retained studies. In Phase 3, we synthesized the analytic results of the reviewed studies to propose a theoretical structure for using the EDI when conducting assessments in nonclinical populations of women.

Search Process (Phase 1)

Phase 1 consisted of a two-step search protocol. First, a cross-search of Academic Search Premier, Communication and Mass Media Complete, Psychology & Behavioral Sciences Collection, PsychINFO, PubMed, Sociological Collection, and Women’s Studies International
was conducted by inputting the following search terms: *eating disorder inventory, EDI, validity, factor,* and *psychometric.* Second, the reference sections of all studies identified in the first step were searched to locate additional studies. Inclusion criteria required that each study: (a) aimed to explore the item-level factor structure of the 64- or 91-item EDI in a nonclinical population of women; and (b) was available in the English language. Studies were excluded if they: (a) were conducted in non-Westernized or Asian countries; (b) sampled females under 18 years of age; (c) investigated only clinical populations; (d) did not analyze all EDI items (either 64 or 91 items); or (e) did not provide EDI item-level information (e.g., item-to-factor loadings). Figure 3-1 describes the search and screen process. Ultimately, six articles (\(n = 6\)) met the inclusion and exclusion criteria and were retained for evaluation and review.

**Evaluation of Study Methods (Phase 2)**

Phase 2 of our critical review involved evaluating the methodological quality of studies retained after Phase 1 to determine the relative strength of each study when evaluated against a set of factor analytic (Birrell, Meares, Wilkinson, & Freestno, 2011; Sveinbjorsdottir & Thorsteinsson, 2008) and methodological (Mokkink et al., 2009) criteria. Several statistical resources were also consulted to identify specific best practice methods for factor analysis to use in our evaluation (Costello & Osborne, 2005; Crocker & Algina, 2008; Gorsuch, 1983; Hu & Bentler, 1999; Kachigan, 1986; Nunnally, 1978; Pett, Lackey, & Sullivan, 2003; Stellefson, Hanik, Chaney & Chaney, 2009; Wheaton, 1987). Through our review of these resources, we identified three broad evaluation categories to consider: (1) sampling, (2) data analysis, and (3) result reporting. This evaluation enabled the research team to determine which studies were less rigorous, and therefore given less consideration when synthesizing results from the reviewed studies in Phase 3.
Types of factor analysis

To develop appropriate evaluation criteria, it was necessary to identify the types of factor analyses used in the studies retained from Phase 1. The retained studies used either Principal Components Analysis (PCA) or Confirmatory Factor Analysis (CFA). Both PCA and CFA studies were considered relevant to this critical review, because item-level psychometric information can be obtained using either method. However, the methods for conducting a CFA versus a PCA differ; thus, the two types of factor analytic studies were evaluated separately.

PCA is considered a more exploratory method of factor analysis, primarily because a pre-specified model is not typically expected. In CFA, items are expected, a priori, to load onto certain factors; and emphasis is on confirming (or refuting) a theoretically existing factor structure, rather than exploring the data to identify a best-fitting model (Gorsuch, 1983). The criteria described within each of the following categories are specific to PCA studies. The CFA criteria will be described separately. For all studies, criteria were scored as being met (X), not met (0), not performed (NP), information insufficient to evaluate (-), or not applicable (NA).

Sampling methods

Evaluation of a study’s sampling method is necessary to determine the validity of the study sample (i.e., if the sample is appropriate based on study aims). First, we evaluated whether or not the sampling method for each study was conducted in a way that reduced sampling error. Second, we examined the demographic data of each study’s sample to evaluate whether or not the sample was representative of the population of interest. Third, we evaluated sample size. The best approach for researchers planning a factor analytic study is to assess the suitability of the collected data for factor analysis with a statistical test (e.g., Kaiser–Meyer–Olkin; Gorsuch, 1983; Pett et al., 2003). Studies indicating application and interpretation of such an a priori statistical test met the parameters of the sample size criterion (X). Unfortunately, these tests are
underutilized or underreported; thus, it could be necessary to assess sample size with a participant-to-item ratio (Gorsuch, 1983; Pett et al., 2003). Thus, studies that did not test for sample adequacy were scored as “not performed” (NP), and a sample size criterion of ten participants per item was applied. This participant-to-item ratio (10:1) is more likely to result in a correct factor structure, with fewer misclassified items and factor loading errors than a smaller ratio (i.e., 2:1 or 5:1; Costello & Osborne, 2005; Nunnally, 1978). Studies that met the ten-to-one minimum ratio met this criterion (X).

**Data analytic methods**

In factor analytic studies, researchers must make several assumptions about data. These include expected correlations of factors, normality of the data, and if a pre-specified factor structure is anticipated. Description of these assumptions assists the reader in interpreting study findings. Studies explicitly describing these assumptions met the assumption criterion (X).

Next, we considered whether the reviewed studies identified a minimum item-to-factor correlation. Item-to-factor correlation indicates the relationship of the item to the factor, with “high” correlations (.70 - .80) useful for defining the resulting factor. A minimum item-to-factor correlation of .30 is commonly applied in factor analysis (Crocker & Algina, 2008; Kachigan, 1986). A higher cut-off of .40 is typically observed in PCA due to the tendency for PCA to result in inflated item-to-factor correlations (Costello & Osborne, 2005; Gorsuch, 1983). In this review, studies applying the .40 minimum met the item-to-factor correlation criterion (X). Studies indicating a lower minimum were scored as criterion not met (0). Studies failing to indicate a cut-off were noted as providing insufficient information (-).

Another consideration of item retention is whether or not the item is complex. Complex items are items loading above the item-to-factor minimum on two or more factors. When deciding to retain or drop a complex item, some researchers suggest considering the item’s
content relevance and its contribution to the internal consistency (or reliability) of the factor (Kachigan, 1986; Pett et al., 2003). Developers of the EDI retained several complex items, assigning them to the most “conceptually relevant” subscale (Garner, 2004). For this reason, we scored the evaluated studies on this criterion based on whether the complexity issue was addressed. Evaluated studies met this criterion if complex items were noted (X).

Next, we examined each study’s method of component extraction. A clear explanation of these methods allows the reader to judge the validity of the proposed model structure (Costello & Osborne, 2005; Gorsuch, 1983; Pett et al., 2003; Stellefson et al., 2009). There are many tests available to assist researchers in determining the number of components to retain. The eigenvalue method (latent root, typically ≥ 1) is one of the most frequently used, though arguably the least accurate (Costello & Osborne, 2005; Gorsuch, 1983; Stellefson et al., 2009). Another commonly used method, generally considered superior to the eigenvalue method, is Cattell’s (1966) scree test (Costello & Osborne, 2005). Other methods include: the standard error scree test (Zoski & Jurs, 1996), Velicer’s Map criteria (1976), and parallel analysis (Horn, 1965). Due to varying results observed when using these different extraction methods, researchers should consider several methods in determining the number of factors to retain (Stellefson et al., 2009). Thus, evaluated studies had to apply at least two factor extraction methods to meet this criterion (X).

Another important consideration is internal consistency, which is generally reported using the Cronbach’s alpha (α) statistic (Gorsuch, 1983; Nunnally, 1978). This statistic is necessary to evaluate the reliability and validity of each retained factor (Gorsuch, 1983). As suggested for instruments administered in the social sciences, we considered an appropriate internal consistency coefficient to be Cronbach’s $\alpha \geq .70$ (Nunnally, 1978). Studies using the $\alpha$
cutoff met this criterion (X). Studies indicating a higher or lower cut-off, or failing to provide internal consistency scores, did not meet this criterion (0).

Several reviewed resources suggest the number of items loading onto each factor should be considered when deciding to retain or exclude a factor (Costello & Osborne, 2005; Gorsuch, 1983; Pett et al., 2005). Factors with fewer than three items are “generally weak and unstable,” while factors with at least five items are desirable and indicate a solid factor (Costello & Osborne, p. 5, 2005). We designated a minimum of five items per extracted component for this criterion to be met (X).

**Result reporting**

In our final evaluation category, we examined the results and result interpretations reported in each study. First, we evaluated whether a visual interpretation of results was provided. Visual interpretation is an integral part of valid interpretation and can be achieved with table displays of data, graphs, plots, etc (Crocker & Algina, 2008; Gorsuch, 1983; Kachigan, 1986; Pett et al., 2003). Within each reviewed study, we looked for graphic displays of item-to-factor correlations; as well as inter-factor correlations.

For the second criterion in this category, we assessed whether the final model constructs were operationally defined in a meaningful way. A meaningful definition is one that is made explicitly through a description of the construct’s relationship to other variables (Crocker & Algina, 2008; Gorsuch, 1983). Reviewed studies that recommended a model structure differing from the clinically derived EDI met this criterion (X) if all new constructs were defined in a way considered meaningful to eating pathology and BID research.

**CFA Evaluation**

Some of the evaluative criteria for PCA studies are also applicable to CFA. Criteria for PCA studies that are not appropriate for evaluating CFA studies include: factor extraction
method; item-to-factor ratio; and meaningful operationalization of new constructs. One PCA criterion requiring modification for evaluating CFA studies is the item-to-factor correlation cut-off. While this cut-off for the PCA studies was designated at .40, it is acceptable for studies using common factor analysis to set this cut-off at .30 (Crocker & Algina, 2008; Gorsuch, 1983; Pett et al., 2003). Thus, CFA studies applying an item-to-factor correlation minimum of 0.30 met this criterion (X).

A statistical criterion specific to CFA, but not PCA, is goodness of fit. Goodness of fit tests can indicate a supported (or unsupported) factor structure. The most basic measure for goodness of fit is chi-square; however, this method is highly susceptible to error with larger sample sizes (Gorsuch, 1983; Hu & Bentler, 1999; Wheaton, 1987). To offset this effect of sample size, relative chi-square (chi-square to degrees of freedom ratio, $\chi^2 / df$) is frequently calculated and reported; however, there are indications that relative chi-square can also be affected by sample size (Wheaton, 1987). As such, there are multiple other recommended methods for assessing a model’s goodness of fit (Hu & Bentler, 1999; Wheaton, 1987). For Maximum Likelihood (ML) CFA studies, Hu and Bentler (1999) recommend assessing model fit using a ML-based Standardized Root Mean Square Residual (SRMS) in addition to at least one of the following indices: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Bollen’s Fit Index (BL89), Relative Noncentrality Index (RNI), Gamma Hat, McDonald’s Centrality Index (Mc), or Root Mean Square Error of Approximation (RMSEA). CFA studies following Hu and Bentler’s (1999) recommendation of assessing goodness of fit with SRMS and a second (aforementioned) index met the goodness of fit criterion (X).
Results

Eligible Studies (Phase 1)

Six \((n = 6)\) eligible studies, published between 1987 to 2003, were identified in the Phase I search (see Table 3-2). The six studies included a total of nine nonclinical samples of women, with the median age for each sample ranging from 18 (Klemchuk et al., 1990; Raciti & Norcross, 1987) to 26 (Welch, Hall, & Walkey, 1988). Five studies (Klemchuk et al., 1990; Raciti & Norcross; Welch et al., 1988; Bennett & Stevens, 1997; Limbert, 2004) analyzed data from the EDI with PCA, while one (van Strien & Ouwens, 2010) analyzed data with ML-CFA. The five PCA studies focused on the original 64-item EDI. The CFA study explored both the 64-item EDI and the 91-item EDI-2.

Methodological Quality and Results of Reviewed Studies (Phase 2)

Table 3-3 summarizes the evaluation results from Phase 2. For each study, we summed the total number of met criteria (X) for a “criteria met” score. This was repeated for the unmet criteria (0) to obtain a “criteria not met” score. Also of interest were the number of criterion marked as “insufficient to evaluate” (-). Application of the evaluation criteria revealed that the methodological rigor of the studies varied. For the single CFA study in this review (van Strien & Ouwens, 2010), six of the ten applicable criteria were met (X), while two were not met (0), and one had insufficient information to evaluate (-). Out of the twelve criteria applied to the PCA studies, the “criteria met” (X) score ranged from four (Bennett & Stevens, 1997) to seven (Raciti & Norcross; Welch et al., 1988); “criteria not met” (0) ranged from two (Klemchuk et al., 1990; Raciti & Norcross) to five (Limbert, 2004); and the number of criteria scored as “insufficient information to evaluate” (-) ranged from one (Limbert, 2004; Raciti & Norcross) to four (Klemchuk et al., 1990). Based on these results, the three studies noted as being the strongest methodologically were Raciti and Norcross (1987; X = 7/12; 0 = 3/12; - = 1/12), van Strien and
Ouwens (2010; X = 6/10; 0 = 3/10; - = 1/10), and Welch et al. (1988; X = 7/12; 0 = 3/12; - = 2/10).

Across the studies, sampling methods appeared to be the weakest dimension. Despite four studies (Klemchuk et al., 1990; Limbert, 2004; Raciti & Norcross; van Strien & Ouwens, 2010) appropriately describing sampling strategy, Klemchuk et al. (1990) was the only study that provided a sample demographic detailed enough to determine if the sample was representative of the study aims. Another common weakness related to sampling methods was sample size. None of the evaluated studies reported applying a statistical test to assess the adequacy of the sample for factor analysis; thus, all studies were evaluated on sample size using the ten to one (10:1) participant-to-item ratio. Limbert’s (2004) study was the only one to meet this minimum. Klemchuk et al. (1990) came very close to meeting this criterion with the participant-to-item ratio just under ten-to-one for each of the two samples in their study (N1 = 9.7:1; N2 = 9.9:1). The only criterion noted as being met by all studies was “explicit assumptions about the data.” The studies varied in their scores for other criteria in the data analytic methods category, as well as the result reporting category.

**Bennett and Stevens (1997)**

Based on our quantitative analysis, Bennett and Stevens’ study was less rigorous (X = 4/12; 0 = 4/12; - = 3/12). While most reviewed studies reported running analyses several times with varying constraints and factor rotation methods, Bennett and Stevens’ description of their analysis was much less specific. The authors reported generally that PCA with varimax rotation was used, applying an item-to-factor correlation minimum of .4 and an eigenvalue cut-off of 1.5. The authors further report, “the method of extraction produced the most parsimonious solution” with seven factors extracted (para. 15). Internal consistency estimates (Cronbach’s α) were not provided. Overall, the description of their data analytic method is insufficient to allow
researchers to attempt replication of the study. Further, this missing information makes valid interpretation of the results difficult for the reader.

On the other hand, one strength of Bennett and Stevens’ study, which is true for only one other study in this review (van Strien & Ouwens, 2010), was their detailed reporting of item-to-factor correlations for complex items. Other studies reported items removed due to complexity, but did not note which factors these items correlated with. The final model structure reported by Bennett and Stevens differed from the clinically derived eight-subscale EDI, and was notably difficult to interpret; thus, Bennett and Stevens concluded the EDI to be inappropriate for use in nonclinical populations.

**Klemchuck et al (1990)**

Of the six reviewed studies, Klemchuk and colleagues had the most evaluation criteria marked as insufficient information to evaluate (X = 5/12; 0 = 2/12; - = 4/12). Their factor extraction method criterion was particularly puzzling. While sole use of the eigenvalue method was reported, the resulting 16-factor solution was discarded due to ten of the factors being uninterpretable and accounting for little variance. The authors reran the data three separate times constraining items to load on five-, six-, and eight-factors, subsequently rotating each solution both orthogonally and obliquely. The six-factor model provided “the most meaningful and easily interpretable solution” (p. 299). Costello and Osborne (2005) recommend an extraction approach similar to that reported by Klemchuk and colleagues, with a few differences. First, the application of a scree test (or more rigorous extraction method) is recommended over the eigenvalue method to inform factor extraction. Second, based on Costello and Osborne’s (2005) recommendations, it seems a seven-factor solution should have also been examined. Since Klemchuk et al’s methodological process for factor extraction was difficult for our research team to interpret, this criterion was marked as having insufficient information to evaluate (-).
Two other criteria marked insufficient were the item-to-factor ratio and visual interpretation of item-to-factor correlations. The authors reported the items that loaded onto only the first two factors, and item-to-factor correlations for only the second factor. The authors elected to focus on these results due to the second factor’s “significant departure from the clinically derived eight-scale structure of the EDI” (p. 299) which is noted by its inclusion of items from three EDI subscales (bulimia, drive for thinness, and interoceptive awareness). The first factor was noted as being a replication of the nine-item body dissatisfaction subscale. The final four factors were indicated as “highly similar to the ineffectiveness, interpersonal distrust, maturity fears, and perfectionism scales…of the EDI” (p. 299). This high similarity is supported by high correlations between the study’s four derived factors and their corresponding EDI subscales. These correlations were noted in a table that displayed the inter-correlations of the study’s six factors to the eight subscales of the EDI. The provision of this table resulted in the criterion of “visual interpretation of factor-to-factor correlations” being marked as met (X).

Also missing from Klemchuk et al’s report was notation of complex items and Cronbach’s α estimates. Aside from these methodological limitations, this study had five criteria that were fully met, with a sixth almost met (sample size). Overall, the study appears methodologically strong; however, our ability to interpret the results of Klemchuk et al. at the item-level is limited because of the noted missing information.

Limbert (2004)

Limbert had several criteria marked as not met (X = 5/12; 0 = 5/12; - = 1/12). Notably, some of these criteria being unmet (e.g., visual interpretation, notation of complex items, item-to-factor ratio) could have resulted from the aims of the study, which was to determine the replicability of the clinically derived EDI in a nonclinical population. Additionally, Limbert used the psychometric standards indicated for clinical EDI use to evaluate the instrument’s
replicability. For example, a Cronbach’s α minimum of .80 was ascribed for internal consistency. Such a rigorous cut-off is only necessary in applied settings (i.e., to determine treatment, enhance learning, or evaluate treatment; Nunnally, 1978). A lower cut-off of .70 is acceptable for research in nonclinical populations.

“Visual interpretation of item-to-factor correlations” was not met (0); however, a table was provided indicating which items loaded onto which factors. This, combined with a known item-to-factor correlation minimum of .40, allows for a basic item-level interpretation. Limbert concluded that the eight-subscale EDI was not successfully replicated, despite several subscales being replicated (body dissatisfaction and perfectionism) or nearly replicated (bulimia, drive for thinness, and interpersonal distrust) with adequate internal consistency (α ≥ .70).

**Raciti and Norcross (1987)**

Raciti and Norcross also attempted to replicate the eight-subscale structure of the clinically derived EDI; however, their provision of detailed information (e.g., factor-to-item correlations and complex items) resulted in the study being noted as methodologically strong (X = 7/12; 0 = 3/12; - = 1/12). One strength was their application of two factor extraction methods (scree test and eigenvalue ≥ 1). This was the only reviewed study to conclude that results supported the original eight-factor structure.

**Welch et al. (1988)**

Welch et al (√ = 7/12; 0 = 2/12; - = 2/12) also implemented a factor extraction method, FACTOREP, that increased the strength and rigor of their investigation. This method differs from those indicated as acceptable by our designated evaluation criteria. However, it was determined that the authors’ application of the FACTOREP procedure should be included as meeting the factor extraction method criterion. FACTOREP is a program that conducts a series of factor analyses, varying the number of factors used in each rotation until a structure meeting
the researcher’s specifications is found that replicates across several independent groups (in this case, \(J = 3\); Walkey & McCormick, 1985).

The final model proposed by Welch and colleagues differed from the original EDI. It included only 44 items comprising three components (perfectionism; self-esteem; and weight, shape, and eating concern). All items from two subscales (maturity fears and interoceptive awareness) were removed from the final model due to an “unclear pattern of loadings” (p. 53) as were two EWR items for complexity (bulimia #53) and low item-to-factor correlations (drive for thinness #1). The authors included a table noting the final model’s item-to-factor correlations for each of the three samples, resulting in the visual interpretation criterion being marked as met (X). However, the table was uninterpretable due to item number and factor loading inconsistencies. The nature of the errors indicates that it is likely they occurred during the printing process, and were not a result of author error. Unfortunately, this error coupled with the authors’ use of the .30 item-to-factor correlation minimum makes our interpretation of item-level specifics difficult.

**van Strien and Ouwens (2010)**

Based on the evaluation criteria, van Strien and Ouwens study appears methodologically strong (\(X = 6/10; 0 = 3/10; - = 1/10\)). A strength of their study was the provision of a detailed table denoting item-to-factor correlations above .40 for all items, including complex items. van Strien and Ouwens’ comparison of the 64-item EDI structure to the 91-item EDI-2 structure led them to conclude that items from the three additional EDI-2 psychological trait subscales did not add anything unique for nonclinical populations beyond the original eight subscales. It was also reported that the clinically derived eight-factor structure of the EDI was not a good fit for data from nonclinical populations, despite most items loading “principally with their assigned subscales” (p. 79). This poor fit was indicated by the relative chi-square being just over a designated 2.00 maximum (\(\chi^2/df = 2.04\)). A more rigorous goodness of fit method was
indicated by our evaluation criteria; thus, van Strien and Ouwens, did not meet this criterion. As stated previously, the relative chi-square test can lead to inaccurate results (Wheaton, 1987). Further, the dependence of relative chi-square on sample size makes general threshold guidelines “impossible to suggest,” which means satisfactory fit cannot be clearly defined with a cut-off score (e.g., 2.00; Wheaton, p. 128, 1987).

**Synthesis (Phase 3)**

In Phase 3 of our critical review, we synthesized the internal structure results presented in each of the six studies to identify a potentially stable structure for the EDI in nonclinical populations of Westernized women. Table 3-4 displays the internal structure results from each study [i.e., which items loaded together onto which component, each component’s Cronbach’s α (if provided), and items that were either noted as complex or otherwise removed from the final model of each study]. Bennett and Stevens (1997) and van Strien and Ouwens (2010) were the only two reviewed studies to report which factors the complex items loaded onto. Thus, complex items listed in these studies are included in the “Items” column with the corresponding factor, as well as the “Removed & Complex Items” column.

To identify a potentially stable model structure, we examined the item-mapping patterns across the six reviewed studies, as well as reliability and validity evidence (e.g., item-to-factor correlations, item loading, and internal consistency coefficients) presented in each study. Based on our methodological evaluation, we gave the least consideration to the results of Bennett and Stevens’ (1997) study. We further considered that Klemchuk and colleagues (1990) provided item-level specifics for only two of the final six factors. Thus, the greatest consideration was given to the results presented by the four remaining studies (Limbert, 2004; Raciti & Norcross; van Strien & Ouwens, 2010; Welch et al., 1988). Synthesis of the reviewed studies’ results revealed five components represented by 51 items (see Table 3-5). The first component is
evident in the first or second factor in five studies (refer to Table 3-4; Bennett & Stevens, 1997; Limbert, 2004; Raciti & Norcross; van Strien & Ouwens, 2010; Welch et al., 1988). The second, third, and fourth components reflect existing EDI subscales (body dissatisfaction, perfectionism, and interpersonal distrust), which were replicated in each of the reviewed studies. The fifth and final component was less clear through item-mapping comparisons; however, examination of other validity and reliability evidence suggested the combination of several EWR items.

**Discussion**

The validity of administering the clinically derived EDI in nonclinical populations has been questioned and evaluated by BID and eating pathology researchers for decades. We aimed to critically review factor analytic studies that examined the internal structure of the EDI in nonclinical populations of Westernized women, in an effort to identify a stable EDI structure for this population. A systematic search process revealed six studies eligible for review. Our systematic evaluation of the methodological quality of the studies indicated they varied in terms of methodological rigor. We note, however, that the exclusion or under-reporting of some criteria by each study could be attributable to publication restraints and the relative importance of reporting other aspects of the study. In our final step, we synthesized the internal structure results presented by the reviewed studies. Through this synthesis, we were able to identify a 51-item EDI structure comprising five factors: low self-esteem, body dissatisfaction, perfectionism, interpersonal distrust, and eating disorder risk. Evidence for each component is provided below with consideration given to the reviewed studies’ results and the broader body of BID and eating pathology literature.

**Low Self-Esteem**

The first component of our proposed model, low self-esteem, is comprised of ten ineffectiveness items, four interoceptive awareness items, and one maturity fears item. All 15 of
these items loaded together on the first or second component in three studies (Limbert, 2004; Raciti & Norcross; van Strien & Ouwens, 2010) with high internal consistency ($\alpha = .88$ to .89). Bennett and Stevens (1997) also present a large first component with 12 of these items. Ten of the 15 items loaded together on a large second component ($\alpha = .88$ to .90) presented by Welch and colleagues (1988). Notably, Welch et al. reported removing all maturity fears and interoceptive awareness items from their final model due to an “unclear pattern of loadings” across three samples (p. 53).

The combination of items from the ineffectiveness and interoceptive awareness subscales is not surprising, as the two constructs measured by these subscales overlap significantly (Bruch, 1973; Garner et al., 1983). Despite the strong relationship between the two constructs, EDI developers purported to measure them separately because the subscale scores were considered valuable in discriminating between different types of eating disorders (Garner et al., 1983). For the nonclinical researcher, who is interested in group level comparisons of general BID or eating disorder risk, separation of the two constructs seems superfluous. This is apparent in the results of the reviewed factor analytic studies, which demonstrate that these items consistently load together with one additional item (#35).

This low self-esteem component appears to evaluate the level of insecurity about one’s self-worth (e.g., “I feel inadequate.”) and emotions (e.g., “I get confused about what emotion I am feeling.”). Construct validity for this subscale is seen in research that confirms the relationship of the component’s items to other validated self-esteem measures (i.e., Rosenberg Self-Esteem Scale [RSES]; Garner, 2004). Inclusion of this component is relevant for nonclinical BID and disordered eating researchers due to the significant amount of nonclinical research linking self-esteem to BID (Fingeret & Gleaves, 2004; Franzoi & Herzog, 1986; Shea &
Pritchard, 2007; Tylka & Sabik, 2010) and disordered eating (Berland, Thompson, & Linton, 1986; Tissot & Crowther, 2008; Tylka & Sabik, 2010).

**Body Dissatisfaction**

A body dissatisfaction component was consistently replicated as a first or second factor with high internal consistency ($\alpha = .91$ to $.94$) in four studies (Bennett & Stevens, 1997; Klemchuk et al., 1990; Limbert, 2004; Raciti & Norcross). In a fifth study, these nine items loaded together on a large first component with other EWR items (Welch et al., 1988).

Notably, the nine-item EDI body dissatisfaction subscale appears to be the most frequently used measure in BID research (Campbell & Hausenblas, 2009; Hausenblas & Downs, 2001; Roberts et al., 2006), with its relationship to eating pathology and BID (Berland et al., 1986; Cafri et al., 2005; Kelly et al., 2011; Thompson et al., 2003) often noted. This subscale is often administered as a sole measure of BID (Bailey et al., 1990; Hausenblas & Downs, 2001); yet researchers should consider its singular use carefully, as its ability to fully encapsulate the concept of BID has been questioned (Bailey et al., 1990; Hausenblas & Downs, 2001; Tissot & Crowther, 2008). Additionally, the title of the subscale could be a misnomer, as it doesn’t appear to measure general body dissatisfaction (Bailey et al., 1990). It also does not appear to measure body weight dissatisfaction, as research indicates that body dissatisfaction does not decrease with weight loss (Bailey et al., 1990; Rathner & Rumphold, 1994). In fact, it appears that the subscale’s true measure is body shape dissatisfaction, distinct from body size dissatisfaction (Bailey et al., 1990; Rathner & Rumphold, 1994). Our findings support that the body dissatisfaction subscale does not appear to measure size or weight dissatisfaction, because, across most reviewed studies, items loaded separately from other diet or weight specific items. The focus of the items on body shape and lower body parts (i.e., hips, thighs, stomach, and
buttocks) further indicate that the subscale is a narrow measure of BID specific to lower body shape dissatisfaction, and distinct from preoccupation or problems with food or weight.

**EDI-3 update**

The EDI-3 adds a tenth item (#47, “I feel bloated after eating a normal meal”) to the *body dissatisfaction* subscale, despite consistent replication of the subscale across both nonclinical and clinical studies (Eberenz & Gleaves, 1994; Espelage et al., 2003). The change, as indicated by EDI developers (Garner, 2004), was made primarily because of the item’s conceptual fit and clinical relevance for eating disorder patients. This was despite statistical evidence (e.g., item-to-factor correlations) that the item fit with a *drive for thinness* factor for clinical groups. Three of our reviewed nonclinical studies reported this item was highly correlated with *drive for thinness* and/or *bulimia* items (Klemchuk et al., 1990; Limbert, 2004; van Strien & Ouwens, 2010). None of the six reviewed studies reported this item as loading with *body dissatisfaction* items. Our evidence indicates that this item fits better on the proposed *eating disorder risk* component for nonclinical populations.

**Interpersonal Distrust**

Six items from the *interpersonal distrust* subscale of the EDI comprise the third component extrapolated from synthesis of the reviewed studies. Five studies reported that four (Bennett & Stevens, 1997; Raciti & Norcross, 1987), five (van Strien & Ouwens, 2010), or all six (Limbert, 2004; Welch et al., 1988) of these items loaded together onto one factor. The study noting the six-item component reported a moderate internal consistency (α = .77; Limbert, 2004).

*Interpersonal distrust* represents an avoidance of, and inability to form, close relationships, due to the individual’s discomfort in expressing emotions toward others (Garner et al., 1983). Interpersonal difficulties are known to characterize those with AN (Garner et al., 1983). There is also evidence that interpersonal difficulties should be considered in disordered
eating research (Broberg, Hjalmers, & nevonen, 2001; Piran & Cormier, 2005). The modest amount of construct validity research in nonclinical populations suggests that the interpersonal distrust items are related to BID risk factors of exercise dependence (Grandi, Clementi, Guidi, Benassi, & Tossani, 2011) and pursuit of thinness (Mahalik et al., 2005). Convergent validity has also been demonstrated between the interpersonal distrust subscale and feelings of inadequacy ($r = .32$) and sexual anxiety ($r = .39$) as measured by the Anorexia Nervosa Inventory Scale (ANIS); as well as anxiety ($r = .45$), depression ($r = .44$), and insufficiency ($r = .43$) as measured by the Symptom Checklist-90 (SCL-90; Garner, 2004). These correlations and the consistent replication of the interpersonal distrust subscale across the reviewed studies provide support for its use in BID and disordered eating research in nonclinical populations.

**Perfectionism**

The six-item perfectionism subscale of the EDI was replicated or nearly replicated in five studies (Klemchuk et al., 1990; Limbert, 2004; Raciti & Norcross, 1987; van Strien & Ouwens, 2010) with varying internal consistency ($\alpha = .66 - .79$). Inclusion of a perfectionism component is supported by the recognized relationship of perfectionism to both BID (Boone, Soenens, & Braet, 2011; Grandi et al., 2011; Hewitt, Flett, & Ediger, 1995; Rathner & Rumphold, 1994) and disordered eating (Berland et al., 1986; Boone et al., 2011; Hewitt et al., 1995; Schwarz, Aruguete, & Gold, 2005; Sherry, Hewitt, Besser, McGee, & Flett, 2004) in nonclinical populations. In support of the subscale’s construct validity, nonclinical researchers have noted its moderate correlation to “feelings of inadequacy” ($r = .43$) and “obsessive-compulsive traits” ($r = .41$) as measured by the ANIS (Rathner & Rumphold, 1994), as well as insufficiency ($r = .35$, SCL-90; Garner, 2004). Further, nonclinical research demonstrates that the six-items of the EDI perfectionism subscale are a multidimensional measure of perfectionism (Boone et al., 2011;
Sherry et al., 2004). Thus, the perfectionism subscale appears to be an adequate measure of perfectionism in nonclinical populations, and relevant for BID and eating pathology research.

**Eating Disorder Risk**

A consistent mapping pattern was difficult to discern for the items comprising the bulimia and drive for thinness subscales of the EDI. Removal of item one (1; drive for thinness; “I eat sweets and carbohydrates without feeling nervous”), however, was indicated based on the item’s low factor loadings in three studies (Bennett & Stevens, 1997; van Strien & Ouwens, 2010; Welch et al., 1988) and inconsistent item mapping in the remaining studies. Examination of the remaining thirteen bulimia and drive for thinness items revealed frequent cross-loadings among these items and two interoceptive awareness items (47 and 64; Bennett & Stevens, 1997; Klemchuk et al., 1990; Limbert, 2004; Raciti & Norcross, 1987; van Strien & Ouwens, 2010). Moreover, several of these 15 items were reported as complex, loading onto separate components representative of either drive for thinness or bulimia (Bennett & Stevens, 1997; Raciti & Norcross, 1987; van Strien & Ouwens, 2010. Considering the confirmed relationship between the three subscales represented by these items, item cross-loading and/or complexity can be expected (Garner, 2004). However, the frequency with which this seems to occur points to potential problems with each subscale’s psychometric properties, calling into question the valid use of these subscales to individually assess their purported constructs in nonclinical populations. This is further concerning when considering that BID researchers frequently use only one or two of the three subscales in their research. Combining the bulimia and drive for thinness items (sans item #1) with items 47 and 64 into a single component potentially alleviates the cross-loading and complexity issues seen with these items. This combined component is further justified when considering that three studies (Bennett & Stevens, 1997; Klemchuk et al., 1990; Welch et al., 1988) reported most, if not all, of these items loaded together as a larger
component; and two studies reported moderately high inter-factor correlations on an eight-factor structure ($R = .49 - .59$; Limbert, 2004; Raciti & Norcross, 1987). Also of note is that both item 47 and 64 were moved to the EWR subscales in the EDI-3.

As part of the clinically derived EDI, the drive for thinness and bulimia subscales assist in diagnosis of AN and BN respectively. A broader measure of eating disorder risk is more relevant for nonclinical populations of women, because researchers have noted that a combination of disordered eating behaviors (e.g., periodic caloric restriction and episodic binging and/or purging) are practiced by women with subclinical eating disorders (Schwitzer et al., 2008). Combining the 13 items from these two subscales with items 47 and 64 to form the eating disorder risk component provides a more relevant measure for nonclinical populations where specific eating disorder diagnoses (e.g., AN and BN) are not indicated. This eating disorder risk component measures preoccupation with food or weight (e.g., “I am terrified of gaining weight.”). Klemchuk et al. (1990) reported a similar component noting that it appeared to “constitute a multidimensional syndrome of maladjustment in young women” (p. 303).

**Removed Items**

Items removed from our proposed model include seven from maturity fears items, four from interoceptive awareness, one from interpersonal distrust, and one from drive for thinness. Generally, the maturity fears subscale was unstable and ill-defined for nonclinical populations of Westernized women. This was demonstrated by three studies reporting a trivial maturity fears component (< 5 items; Bennett & Stevens, 1997; Limbert, 2004; Raciti & Norcross, 1987). Though one study reported an adequately replicated maturity fears component, the component’s internal consistency was low ($\alpha = .61$; Limbert, 2004). Another study removed all maturity fears items because of inconsistent item-mapping across the three samples included in their analysis (Welch et al., 1988). Other nonclinical research supports removing the subscale, as the maturity
fears construct is considered less relevant to BID and disordered eating in nonclinical populations (Broberg et al., 2001; Crowther, Lilly, Crawford, & Shepherd, 1992; Grandi et al., 2011; Rathner & Rumphold, 1994). One maturity fears item (#35) was retained as part of the low self-esteem component. The remaining seven items (3, 6, 14, 22, 35, 39, 48, and 58) were removed.

Several studies reported difficulty interpreting the mapping of items represented by the interoceptive awareness subscale (Bennett & Stevens, 1997; Limbert, 2004; van Strien & Ouwens, 2010; Welch et al., 1988). In fact, only one study (Raciti & Norcross, 1987) identified an interoceptive awareness component; however, this component represented four EDI subscales. Other nonclinical research studies analyzing the EDI at the subscale level have also reported difficulties with the interoceptive awareness measure (Crowther et al., 1992; Podar & Allik, 2009). These findings suggest that the clinically derived interoceptive awareness subscale is unstable for nonclinical populations. While the construct does not appear to be a relevant measure, six interoceptive awareness items were valuable as part of two other apparent factors (low self-esteem and eating disorder risk). The inconsistent mapping of the remaining four items (21, 26, 33, and 40) led to their removal from our final proposed model.

Six interpersonal distrust items were retained in our proposed model. The seventh item (#23; “I can communicate easily with others”), however, was removed due to unpredictable item mapping (Bennett & Stevens, 1997; Limbert, 2004), and low factor loadings (Raciti & Norcross, 1987; van Strien & Ouwens, 2010). As noted previously, item one (1) from the drive for thinness subscale was also removed. Although the item loaded appropriately with other EWR items in one study (Raciti & Norcross, 1987), it failed to correlate adequately with any factor in three other reviewed studies (Bennett & Stevens, 1997; van Strien & Ouwens, 2010; Welch et
al., 1988). Notably, this same drive for thinness item is the only EDI item expressly retained by EDI developers despite low item-total correlations (<.40; Garner et al., 1983). In sum, our results indicate that these 13 items should be removed because they do not fit with the components being measured by the other 51 items.

Limitations

Considering the popular administration of the EDI in nonclinical research, we were surprised to find only six studies examining the item-level structure of the EDI in nonclinical populations of Westernized women. Of these six studies, almost all used PCA. The limitations of PCA result in error variance being included as explained variance, which can further result in inflated item-to-factor correlations and misspecified items (Costello & Osborne, 2005; Gorsuch, 1983). We attempted to account for this limitation by requiring a higher item-to-factor correlation minimum in our review. Some argue that use of PCA is not a severe limitation, because strong factor structures should be identifiable by several methods of analysis, including PCA (Gorsuch, 1983; Kachigan, 1986).

An additional limitation is the variation in methodological rigor across the six reviewed studies. It is important to note that this could be a limitation of our review, and not necessarily a limitation of the reviewed studies. Though we attempted to evaluate each study equally by designating a pre-specified set of criteria, other important criteria might have inadvertently been excluded. Also, the relative strength of the reviewed studies and their failure to meet specific criteria could be attributable to publication restraints and the relative importance of reporting other aspects of the study. Thus, the results of our methodological evaluation should be considered only in the context of this review.

Finally, due to the nature of the studies identified, our critical review focused on the original 64-item EDI. There were no identified research studies exploring the internal structure
of the EDI-3 in our population of interest, and only one study examined the internal structure of the EDI-2. Notably, the study indicated that the additional 27 EDI-2 items appear unnecessary for BID and disordered eating measurement in nonclinical populations (van Strien & Ouwens, 2010). Despite our focus on the original 64-item EDI, the results of the proposed model are relevant to current BID and disordered eating researchers. This is true for several reasons. First, nonclinical researchers continue to administer items from the original EDI due to its availability and comparability to the EDI-2 and EDI-3. Second, nonclinical BID and disordered eating researchers’ administration of the EDI continues to favor the EWR subscales, which sustained very minor revisions in the EDI-3. Third, in nonclinical research, time for survey completion is an important consideration in participant response rates and survey fatigue; thus, a parsimonious model and shorter survey, such as the one we propose, is favored over a more complicated model and extensive survey. Finally, while structural modifications to the EDI-3 potentially enhance its relevance, reliability, and validity within clinical populations, these changes may not be relevant to general nonclinical populations. EDI-3 developers noted that item-to-subscale assignment was dictated by more than just statistical indications (Garner, 2004). Also considered was the “conceptual fit” of the item to the subscale for clinical eating disorder measurement. As indicated by variation in results for the EDI structure between clinical and nonclinical groups, this conceptual fit appears less relevant to nonclinical populations.

**Conclusion**

Although administration of the EDI in clinical populations is strongly supported, researchers have suggested that the item-level properties and internal structure of the EDI for use in nonclinical populations should be closely examined. Overall, the findings presented in this paper indicate significant modifications are needed to enhance the validity and reliability for administration of the EDI in nonclinical populations. Our in-depth critical review of studies that
analyzed the internal structure of the EDI after administration to nonclinical populations of Westernized women allowed us to identify item-mapping patterns, problematic items, and constructs poorly defined for this population. This resulted in the identification and proposal of a five-component, 51-item model structure. Three of these proposed constructs (body dissatisfaction, perfectionism, and interpersonal distrust,) are relatively unchanged from their original form, and there is current evidence of their construct validity. There is also strong support for the low self-esteem component, and provisional support for the eating disorder risk component; however, their convergent and divergent validities should be studied further. Future research should also attempt to confirm the five-factor proposed model structure with CFA. As it stands, the results of this review suggest that the five components of this proposed model appear stable and useful for nonclinical BID and disordered eating research.
Table 3-1. EDI, EDI-2, and EDI-3 subscale correlations and item assignment (Garner 2004)

<table>
<thead>
<tr>
<th>EDI Subscale</th>
<th>Items</th>
<th>EDI-3 Subscale</th>
<th>Items</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Dissatisfaction</td>
<td>2, 9, 12, 19, 31, 45,</td>
<td>Body Dissatisfaction</td>
<td>2, 9, 12, 19, 31, 45,</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td>55, 59, 62</td>
<td></td>
<td>47, 55, 59, 62</td>
<td></td>
</tr>
<tr>
<td>Bulimia</td>
<td>4, 5, 28, 38, 46, 53,</td>
<td>Bulimia</td>
<td>4, 5, 28, 38, 46, 53,</td>
<td>.73a</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td></td>
<td>61, 64</td>
<td></td>
</tr>
<tr>
<td>Drive for Thinness</td>
<td>1, 7, 11, 16, 25, 32,</td>
<td>Drive for Thinness b</td>
<td>1, 7, 11, 16, 25, 32,</td>
<td>.97</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td></td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Maturity Fears</td>
<td>3, 6, 14, 22, 35, 39,</td>
<td>Maturity Fears b</td>
<td>3, 6, 14, 22, 35, 39,</td>
<td>.97</td>
</tr>
<tr>
<td></td>
<td>48, 58</td>
<td></td>
<td>48, 58</td>
<td></td>
</tr>
<tr>
<td>Perfectionism</td>
<td>13, 29, 36, 43, 52, 63</td>
<td>Perfectionism b</td>
<td>13, 29, 36, 43, 52, 63</td>
<td>.98</td>
</tr>
<tr>
<td>Ineffectiveness</td>
<td>10, 18, 20, 24, 27, 37,</td>
<td>Low Self-Esteem</td>
<td>10, 27, 37, 41, 42, 50</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td>41, 42, 50, 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interoceptive</td>
<td>8, 21, 26, 33, 40, 44,</td>
<td>Interoceptive</td>
<td>8, 21, 26, 33, 40, 44,</td>
<td>.95</td>
</tr>
<tr>
<td>Awareness</td>
<td>47, 51, 60, 64</td>
<td>Deficits</td>
<td>51, 60, 77</td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td>15, 17, 23, 30, 34, 54,</td>
<td>Interpersonal</td>
<td>15, 23, 34, 57, 69, 73,</td>
<td>.85</td>
</tr>
<tr>
<td>Distrust</td>
<td>57</td>
<td>Insecurity</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EDI-2 Subscale</strong> c</td>
<td><strong>EDI-2 Items</strong></td>
<td><strong>EDI-3 Items</strong></td>
<td><strong>EDI-2 Items</strong></td>
<td></td>
</tr>
<tr>
<td>Asceticism</td>
<td>66, 68, 71, 75, 78, 82,</td>
<td>Asceticism d</td>
<td>66, 68, 75, 78, 82,</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td>86, 88</td>
<td></td>
<td>86, 88</td>
<td></td>
</tr>
<tr>
<td>Impulse Regulation</td>
<td>65, 67, 70, 72, 74, 76,</td>
<td>Emotional</td>
<td>67, 70, 72, 79, 81,</td>
<td>.93</td>
</tr>
<tr>
<td></td>
<td>77, 79, 81, 83, 85, 90</td>
<td>Dysregulation</td>
<td>83, 85, 90</td>
<td></td>
</tr>
<tr>
<td>Social Insecurity</td>
<td>69, 73, 80, 84, 87, 89,</td>
<td>Personal Alienation</td>
<td>18, 20, 24, 56, 84, 91</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Interpersonal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alienation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17, 30, 54, 65, 74, 76,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>89</td>
<td></td>
</tr>
</tbody>
</table>

*a Lower correlation is attributed to groups with differing types of eating disorders scoring on greater ends of the subscale continuum (i.e., anorexia nervosa-restricted type versus bulimia nervosa).

*b Subscale is unchanged across all three iterations.

c EDI-2 consists of the 8 original EDI subscales and their items, plus three additional subscales with new items.

d Item 71 from the EDI-2 is included in the EDI-3 item booklet, but is not scored on the EDI-3.

e Subscale is highly related to interpersonal distrust ($r = .77$) and social insecurity ($r = .72$) subscales of the EDI-2.

Note. Correlational data reflects a U.S. adult clinical sample.
<table>
<thead>
<tr>
<th>Study</th>
<th>Title</th>
<th>Country</th>
<th>N</th>
<th>Factor Analysis Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett &amp; Stevens</td>
<td>The internal structure of the EDI.</td>
<td>Unknown</td>
<td>N = 310</td>
<td>PCA with varimax rotation. Eigenvalue ≥ 1.5.</td>
</tr>
<tr>
<td>(1997)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klemchuk et al. a</td>
<td>Body dissatisfaction and eating-related problems on the college campus: Usefulness of the EDI with a non-clinical population.</td>
<td>United States</td>
<td>N1 = 621</td>
<td>PCA with oblique and orthogonal rotation. No constraint, then constraining to load onto 5-, 6-, and 8-factors.</td>
</tr>
<tr>
<td>(1990)</td>
<td></td>
<td></td>
<td>N2 = 636</td>
<td></td>
</tr>
<tr>
<td>Limbert</td>
<td>The EDI: A test of the factor structure and internal consistency in a nonclinical sample.</td>
<td>United Kingdom</td>
<td>N = 647</td>
<td>PCA with varimax rotation constraining 8 factors.</td>
</tr>
<tr>
<td>(2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1987)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>van Strien &amp; Ouwens a</td>
<td>Validation of the Dutch EDI-2 in one clinical and two non-clinical populations.</td>
<td>Netherlands</td>
<td>N = 492</td>
<td>First- and second-order ML-FA with varimax rotation and Kaiser normalization.</td>
</tr>
<tr>
<td>(2003)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welch et al.</td>
<td>The factor structure of the EDI.</td>
<td>New Zealand</td>
<td>N1 = 192</td>
<td>PCA with varimax rotation for an 8-, 7-, 5-, 4-, 3- and 2-factor solution, with FACTOREP.</td>
</tr>
<tr>
<td>(1988)</td>
<td></td>
<td></td>
<td>N2 = 253</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N3 = 142</td>
<td></td>
</tr>
</tbody>
</table>

PCA=Principal Component Analysis; EDI=Eating Disorder Inventory; EAT=Eating Attitudes Test; ML=Maximum Likelihood; FA=Factor Analysis.

a The study sampled numerous groups. Sample size(s), as reported here, is only for nonclinical samples of women whose data was analyzed with factor analysis.
Table 3-3. Methodological evaluation of retained EDI factor analytic studies

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Bennett &amp; Stevens</th>
<th>Klemchuk et al.</th>
<th>Limbert</th>
<th>Raciti &amp; Norcross</th>
<th>van Strien &amp; Ouwens</th>
<th>Welch et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sampling Methodology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Method of sampling minimized error</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>1.2 Representative sample (i.e., age, race, ethnicity)</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.3 Tested sample for adequacy</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
</tr>
<tr>
<td>1.4 Ratio participants to item ≥10:1</td>
<td>0</td>
<td>0a</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 Data Analytic Methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Explicit assumptions about the data</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2.2 Factor extraction (≥ 2 methods)</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>X</td>
<td>NA</td>
<td>Xe</td>
</tr>
<tr>
<td>2.3 Goodness of fit</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>2.3 Item-to-factor load cut-off (PCA = 0.40; CFA = 0.30)</td>
<td>X</td>
<td>Xb</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>0</td>
</tr>
<tr>
<td>2.4 Noted complex items</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2.5 Internal consistency</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2.5 Ratio items to factor (≥ 5:1)</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>X</td>
</tr>
<tr>
<td>3 Reported Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Visual interpretation of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Item-to-factor loads</td>
<td>X</td>
<td>-c</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>-f</td>
</tr>
<tr>
<td>b. Factor-to-factor correlations</td>
<td>NP</td>
<td>Xd</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.2 Meaningfully operationalized final constructs</td>
<td>0</td>
<td>X</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>X</td>
</tr>
</tbody>
</table>

**Summed Scores**

| Criteria met score | 4 | 4 | 5 | 7 | 6 | 6 |
| Criteria not met score | 4 | 2 | 5 | 3 | 3 | 3 |
| Information insufficient to evaluate score | 3 | 5 | 1 | 1 | 1 | 2 |

**Note:** NP = not performed; X = Criterion met; 0 = criterion not met; - = information insufficient or information totally missing; NA = not applicable. a Ratio approached 10:1 (N1 = 9.7:1; N2 = 9.9:1); b Criterion not noted in text. Tabled results indicated a probable cut-off of 0.40; c Item-to-factor loads reported in a table only for the largest (18-item) extracted factor; d Provided correlation table of the proposed factors to original EDI subscales. e An acceptable alternative procedure (FACTOREP) used for factor extraction; f The table provided was uninterpretable, likely due to printer errors.
Table 3-4. Factor structure results

<table>
<thead>
<tr>
<th>Study</th>
<th>Factor</th>
<th>Items</th>
<th>Name (α)</th>
<th>Removed &amp; Complex Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett &amp;</td>
<td>1</td>
<td>3, 5, 6, 8, 10, 13, 14, 16, 18, 21, 24, 25, 27, 28, 32, 33, 34, 35, 38, 40, 41, 42, 43, 44, 46, 47, 48, 49, 51, 52, 54, 56, 60, 61, 64</td>
<td>No labels</td>
<td>Complex: a</td>
</tr>
<tr>
<td>Stevens</td>
<td>2</td>
<td>2, 4, 7, 9, 11, 16, 32, 45, 49, 59, 64</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12, 19, 31, 55, 62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>20, 23, 26, 37, 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>15, 17, 30, 57</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>29, 36, 43, 52, 63</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>22, 39, 58</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2, 9, 12, 19, 31, 45, 55, 59, 62</td>
<td>Body dissatisfaction</td>
<td>Not provided</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4, 5, 11, 16, 21, 25, 28, 32, 33, 38, 40, 46, 47, 49, 53, 60, 61, 64</td>
<td>Eating disorders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>“highly similar to” b</td>
<td>Ineffectiveness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>“highly similar to” b</td>
<td>Interpersonal distrust</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>“highly similar to” b</td>
<td>Maturity fears</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“highly similar to” b</td>
<td>Perfectionism</td>
<td></td>
</tr>
<tr>
<td>Klemchuk</td>
<td>1</td>
<td>8, 10, 18, 20, 21, 23, 24, 26, 27, 33, 35, 37, 41, 42, 44, 50, 51, 56, 60</td>
<td>No labels (.89)</td>
<td>Not indicated</td>
</tr>
<tr>
<td>et al.</td>
<td>2</td>
<td>2, 9, 12, 19, 31, 45, 55, 59, 62</td>
<td></td>
<td>(.91)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4, 5, 28, 38, 40, 46, 53, 61, 64</td>
<td></td>
<td>(.78)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>7, 11, 16, 25, 32, 47, 49</td>
<td></td>
<td>(.84)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>13, 29, 36, 43, 52, 63</td>
<td></td>
<td>(.76)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15, 17, 30, 34, 54, 57</td>
<td></td>
<td>(.77)</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1, 14, 22, 39, 48, 58</td>
<td></td>
<td>(.61)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>3, 6</td>
<td></td>
<td>(.54)</td>
</tr>
</tbody>
</table>
Table 3-4. Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Factor</th>
<th>Items</th>
<th>Name (α)</th>
<th>Removed &amp; Complex Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raciti &amp; Norcross</td>
<td>1</td>
<td>2, 9, 12, 19, 31, 45, 55, 59, 62</td>
<td>Body dissatisfaction (.92)</td>
<td>Complex:</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8, 18, 21, 26, 33, 35, 41, 44, 48, 51, 54, 56, 60</td>
<td>Interoceptive awareness (.88)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1, 11, 16, 25, 38, 49, 53</td>
<td>Drive for thinness (.90)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4, 5, 24, 40, 46, 61</td>
<td>Bulimia (.82)</td>
<td>Low load:</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>10, 20, 27, 37, 42, 50</td>
<td>Ineffectiveness (.90)</td>
<td>13, 14, 17, 28</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15, 30, 34, 57</td>
<td>Interpersonal distrust (.81)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>29, 36, 43, 52, 63</td>
<td>Perfectionism (.79)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>6, 22, 39, 58</td>
<td>Maturity fears (.80)</td>
<td></td>
</tr>
<tr>
<td>van Strien</td>
<td>1</td>
<td>8, 10, 18, 20, 23, 24, 27, 35, 37, 41, 42, 44, 50, 51, 56, 60, 62</td>
<td>(Not Provided)</td>
<td>Complex:</td>
</tr>
<tr>
<td>&amp; Ouwens</td>
<td>2</td>
<td>2, 7, 9, 12, 19, 31, 45, 55, 59, 62</td>
<td>(.93-.94)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7, 11, 16, 25, 32, 49, 64, 68, 86</td>
<td>(.82-.88)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>15, 17, 21, 23, 26, 34, 54, 57, 76</td>
<td>(.85-.87)</td>
<td>Low load:</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4, 5, 28, 38, 46, 53, 61, 64</td>
<td>(.69-.76)</td>
<td>1, 6, 30, 33, 40, 47, 65, 71, 72, 74, 75, 77, 78, 81, 82, 87, 88, 90</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>13, 29, 36, 43, 52, 63</td>
<td>(Not Provided)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>3, 14, 22, 39, 48, 58</td>
<td>(Not Provided)</td>
<td></td>
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<tr>
<td></td>
<td>8</td>
<td>70, 83, 85, 79</td>
<td>(Not Provided)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9c</td>
<td>0</td>
<td>(NA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10d</td>
<td>2, 12</td>
<td>(Not Provided)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11d</td>
<td>23</td>
<td>(Not Provided)</td>
<td></td>
</tr>
<tr>
<td>Welch et al.</td>
<td>1</td>
<td>2, 4, 5, 7, 9, 11, 12, 16, 19, 25, 28, 31, 32, 38, 45, 46, 49, 53, 55, 59, 62</td>
<td>Concern with weight, shape, and eating (.93-.94)</td>
<td>Complex: 61</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10, 15, 17, 18, 20, 23, 24, 27, 30, 34, 37, 41, 42, 50, 54, 56, 57</td>
<td>Self-esteem (.88-.90)</td>
<td>Low load: 1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>13, 29, 36, 43, 52, 63</td>
<td>Perfectionism (.70-.78)</td>
<td>Others:</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3, 6, 8, 14, 21, 22, 26, 33, 35, 39, 40, 44, 47, 48, 51, 58, 60, 64</td>
</tr>
</tbody>
</table>

*a Factors onto which these items loaded are also noted in the ‘items’ column.

*b As noted by the authors.

*c There were no items loading onto this factor above the 0.40 level (authors’ item-to-factor correlation minimum).

*d The only items reported by the authors as loading onto these factors were complex items.

*e Removed due to unpredictable item mapping of the represented subscales (interoceptive awareness and maturity fears) across three samples.
## Table 3-5. Proposed EDI structure for non-clinical populations

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Definition</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Self-Esteem</td>
<td>Poor self-concept. Inability to recognize feelings.</td>
<td>8, 10, 18, 20, 24, 27, 35, 37, 41, 42, 44, 50, 51, 56, 60.</td>
</tr>
<tr>
<td>Body Shape Dissatisfaction</td>
<td>Dissatisfaction with the shape of body parts affected by weight fluctuations (e.g. hips, thighs, buttocks).</td>
<td>2, 9, 12, 19, 31, 45, 55, 59, 62.</td>
</tr>
<tr>
<td>Perfectionism</td>
<td>Excessive, likely unrealistic, expectations for one’s achievement.</td>
<td>13, 29, 36, 43, 52, 63.</td>
</tr>
<tr>
<td>Interpersonal Distrust</td>
<td>Avoidance of and inability to form close relationships, due to discomfort expressing emotions toward others.</td>
<td>15, 17, 30, 34, 54, 57.</td>
</tr>
<tr>
<td>Eating Disorder Risk</td>
<td>Provides indication of pathological eating behaviors. General feelings of guilt about eating, and an unhealthy relationship with food.</td>
<td>4, 5, 7, 11, 16, 25, 28, 32, 38, 46, 47, 49, 53, 61, 64.</td>
</tr>
</tbody>
</table>

\*Definition is unmodified from the original EDI subscale definition.*
169 studies identified through database search.

8 additional articles identified through review of reference lists.

177 abstracts reviewed

91 studies failed to meet inclusion / exclusion criteria
- 14 Did not utilize the Eating Disorder Inventory
- 45 Not adult female sample
- 23 Clinical sample
- 3 Non-Westernized / Asian sample
- 4 Did not utilize all EDI items

86 full articles retrieved for review

80 studies failed to meet inclusion / exclusion criteria
- 76 Did not analyze the factor structure
- 3 Did not provide item-level psychometrics
- 1 Included males in the sample

6 studies met inclusion / exclusion criteria and are included in this review
CHAPTER 4
BODY ESTEEM AND SELF-OBJECTIFICATION: USING OBJECTIFICATION THEORY TO COMPARE COLLEGIATE FEMALE ATHLETES AND NON-ATHLETES

After the enactment of Title IX, federal legislation prohibiting sex discrimination in athletics, images of female athletes became more prominent in the media (Kane, 1988); though they continue to be far less publicized than male athletes (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Kane, 1988). Additionally, recent research indicates that media images of male athletes emphasize power and athletic prowess, while media images of female athletes are sexualized and objectified (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Hardin et al., 2005; Kim et al., 2010). According to objectification theory, societal pressures expressed through feminine gender norms and sexual objectification contribute significantly to mental health problems (e.g., eating disorders, depression, sexual dysfunction, and substance abuse) among diverse groups of women (Fredrickson & Roberts, 1997; Szymanski et al., 2011). Sexual objectification occurs when the body is recognized predominantly for its physical attributes (body or body parts), and is viewed as an object of sexual desire (Fredrickson & Roberts, 1997).

It is widely understood that the media’s portrayal of feminine beauty contributes significantly to psychological (e.g., body shame) and mental health (e.g., eating disorders; Fitsimmons-Craft, 2011; Grabe et al., 2008) problems; however, we do not understand how the female athlete’s body image and/or self-objectification is affected by society’s sexual objectification of female athletes participating in different sports (Varnes et al., 2013). Traditionally, body image research among female athletes has focused on the relationship between body image and sport-related pressures, such as weight- or appearance-pressures in sport competition (Engel et al., 2003; Harrison & Fredrickson, 2003; Hausenblas & Carron, 2002; Reel et al., 2010; Reinking & Alexander, 2005). Results from these studies have been
equivocal, which has largely been attributed to: (a) inconsistent definitions of various sport classifications (Hausenblas & Carron, 2002; Varnes et al., 2013); (b) failure to consider external societal expectations of female athletes (Hardin & Greer, 2009; Varnes et al., 2013); and (c) less relevant body image measures being administered to the athlete group (Varnes et al., 2013).

One example of a sport classification that is commonly used in research is “lean-focused sport.” Some researchers use this term to describe sports that emphasize weight as part of appearance, and include adjudicated sports such as diving, gymnastics, cheerleading and figure skating (e.g., Harrison & Fredrickson, 2003). Yet other researchers define lean-focused sports as endurance-type sports where being lower in weight and body fat contribute to improved athletic performance, such as swimming and long-distance running (Hausenblas & Carron, 2002; Engel et al., 2003). Still others have indicated that lean-focused sports could include sports that emphasize leanness for either competition or appearance, which would encompass all of the aforementioned sports (Reel et al., 2010; Reinking & Alexander, 2005). In any of these instances, the sport definition is specific to a sport-related pressure, leaving external societal pressures, such as society’s increased sexual objectification of female athletes, outside the scope of these investigations.

The last noted limitation of previous female athlete research emphasizes the importance of selecting body image measures that are appropriate for the population. This proves difficult when conducting research in the female athlete population, because athletes experience body image differently than non-athletes (Petrie & Greenleaf, 2012). In other words, there are different contributors to body image for athletes versus non-athletes, causing participant responses to some measures of body image to vary depending on athletic status. This phenomenon has been demonstrated through both correlational (D’Arcy, 2007; Hoag, 2012; Krane et al., 2002) and
meta-analytic (Smolak et al., 2000) research. For this reason, it is necessary for researchers to use a multi-dimensional body image measure that is salient for both athletes and non-athletes when examining body image differences between the two groups.

In summary, research is needed that focuses on both self-objectification and multi-dimensional body image among female athletes, with particular consideration given to external societal pressures, including sexual objectification. The purpose of this study was to use select constructs from objectification theory (Fredrickson & Roberts, 1997; Szymanski et al., 2011) to investigate how society’s sexual objectification of female athletes is related to differences in multi-dimensional body image and self-objectification among collegiate female athletes and non-athletes. First, we provide an overview of objectification theory and discuss society’s sexual objectification of the female athlete.

**Overview of Objectification Theory**

The effect of sexual objectification on mental health risks can be direct and overt or indirect and subtle (Szymanski et al., 2011). The direct path portends from personal sexual objectification experiences that range from being “gazed” at sexually to apparent sexual violence (Fredrickson & Roberts, p.177-178, 1997). The indirect path involves observed or personal sexual objectification experiences that result in self-objectification (Moradi et al., 2005; Szymanski et al., 2011). Self-objectification occurs when an individual takes an observer’s perspective of their own body, thereby defining their body as an object to be viewed (Moradi et al., 2005; Szymanski et al., 2011). Moradi (2010) noted that self-objectification should be considered a “process” that manifests as body surveillance as well as internalization (i.e., taken within and believed to be self-defined) of sociocultural beauty standards (p. 146). Internalization of sociocultural beauty ideals may lead the individual to believe their desire to attain the culturally defined beauty ideal is a personal choice rather than a result of social pressure.
(McKinley & Hyde, 1996). There is strong evidence that the sociocultural definition of beauty is partially defined, and significantly perpetuated, by the media (Fitsimmons-Craft, 2011; Grabe et al, 2008).

The extant manifestation of internalization and body surveillance, resulting from sexually objectifying experiences, are in turn related to increased body shame and anxiety, and reduced flow and internal awareness (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Szymanski et al., 2011; Tylka & Hill, 2004). Thus, self-objectification, via the mechanistic nature of internalization and body surveillance, potentially promotes negative body image or body image disturbance (BID; Cafri et al., 2005; Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Moradi & Huang, 2008; Szymanski et al., 2011). BID is a multidimensional disorder characterized by an individual’s negative attitude toward, or evaluation of, their body -weight, -shape, -size, or -appearance (Cash & Szymanski, 1995). Both BID and self-objectification are associated with health risks such as disordered eating (Grabe et al., 2008; Moradi et al., 2005; Tylka & Sabik, 2010), depression (Carr & Szymanski, 2010; Szymanski & Henning, 2007), decreased self-esteem (Tylka & Sabik, 2010), anxiety (Muscat & Long, 2008), substance abuse (Carr & Szymanski, 2010), and sexual dysfunction (Szymanski et al., 2011). It is important to note that, although self-objectification can contribute to BID, and although both BID and self-objectification can result in similar outcomes, high levels of one does not necessarily predict the other. In other words, the psychological and behavioral consequences of self-objectification occur as a result of being preoccupied with one’s appearance, regardless of appearance satisfaction (Noll & Fredrickson, 1998).
Sexual Objectification of the Female Athlete Varies by Sport

Sexual objectification reinforces feminine gender roles by emphasizing the importance of female appearance and diminishing non-feminine achievements. Thus, sexual objectification of female athletes devalues female athletics (Hardin et al., 2005). Notably, the level at which female athletes are sexually objectified varies by sport. Female athletes who are depicted in, and objectified by, the media are more likely to be from sports that are considered sex-appropriate or feminine (e.g., gymnastics, swimming, tennis, and volleyball; Clavio & Eagleman, 2011; Hardin & Greer, 2009; Kim et al., 2010). Research has indicated that female athletes participating in more feminine sports are also more objectified by their peers than female athletes participating in less feminine sports (e.g., basketball; Hardin & Greer, 2009; Kim et al., 2010; Parsons & Betz, 2001). The term sport objectification refers to the different levels of sexual objectification that occur for female athletes from different sports (Moradi & Huang, 2008; Parsons & Betz, 2001).

There has been a deficit in research examining how society’s select objectification of female athletes potentially imposes additional pressures for female athletes to exemplify stereotypic female characteristics, such as ideal appearance and femininity. In addition, researchers have identified a need to examine populations in which sexual objectification experiences intersect with a woman’s conflicting identities – i.e., being female and being in another marginalized position (Krane et al., 2004; Moradi & Huang, 2008; Szymanski et al., 2011). Female athletes represent one such conflicted population, as previous research indicates female athletes have difficulty reconciling their dual feminine- and athletic-identity (Krane et al., 2004; Larabee, 2011). Thus, it is necessary to address the self- and sexual-objectification research gap in female athlete research.

It is possible that elements of society’s (e.g., media and peers) increased sexual objectification of female athletes serves to conjoin the feminine- and athletic- identities for those
participating in more objectified sports. In other words, sexual objectification could act to reconcile these conflicting identities by putting the female athlete more at ease with her athletic body and athletic abilities, while also assuring her that she is still feminine. Or, the media’s sexual objectification of female athletes could act to promote self-objectification and/or BID among athletes, especially those participating in more objectified sports. This phenomenon could activate the potential for adverse psychological consequences and increased mental health risks. Also of interest is how the media’s sexual objectification of female athletes affects those participating in less objectified sports. Athletes participating in less objectified sports may experience greater levels of self-objectification and/or BID because of the media’s implication that these athletes do not meet the social standard of attractiveness and femininity compared to athletes from more objectified sports. Or, less objectified female athletes may experience less pressure to conform to feminine standards, and care more about what the body can do rather than its appearance, thereby self-objectifying less.

The Present Study

The present study was designed to explore and compare body esteem (physical condition, sexual attractiveness, and weight concern) and the three self-objectification process constructs of thin ideal internalization, body surveillance, and body shame among three groups: (1) female non-athletes; (2) NCAA Division I female athletes participating in sports that are considered more objectified; and (3) NCAA Division I female athletes participating in sports that are considered less objectified.

Each of the three variables associated with body esteem (physical condition, sexual attractiveness, and weight concern) represent three different dimensions of body esteem; however, they are also moderately correlated, with positive feelings on one dimension typically indicating positive feelings on the others ($r = .33$ to $.40$; Franzoi & Shields, 1984). Therefore, we
developed an overall body esteem hypothesis (Hypothesis 1) that included all three body esteem constructs, and sub-hypotheses related to the specific constructs:

Hypothesis 1. Group classification (non-athletes, more objectified athlete, less objectified athlete) will have a statistically significant impact on the three measures of body esteem: physical condition, sexual attractiveness, and weight concern.

1a. Because athletes generally feel better about the form and physical function of their body (Fellows, 1999; Petrie & Greenleaf, 2012), we posit that physical condition will be the most influential body esteem construct characterizing a statistically significant difference between athletes and non-athletes, with weight concern being less influential (Fellows, 1999), and sexual attractiveness being least influential.

1b. Differences in weight concern will be more pronounced between non-athletes and athletes participating in less objectified sports, versus comparisons made between non-athletes and athletes participating in more objectified sports (Fellows, 1999).

Objectification theory research indicates that the process of self-objectification manifests separately as thin ideal internalization and/or body surveillance, which mediate the relationship between sexual objectification experiences and body shame (Moradi, 2010). Thus, thin ideal internalization, body surveillance, and body shame are all considered part of the self-objectification process and are related; however, it is important to measure each construct separately, because they represent distinct and important constructs in objectification theory (Moradi, 2010). Additionally, very little objectification theory research has been conducted in the female athlete population. Therefore, we proposed three sets of pairwise comparison hypotheses to test differences among our three groups (non-athletes, more objectified athletes, less objectified athletes) on the constructs of thin ideal internalization (Hypothesis 2), body surveillance (Hypothesis 3), and body shame (Hypothesis 4):

Hypothesis 2. We hypothesize that: (a) non-athletes will internalize the thin ideal more than athletes participating in less objectified sports; (b) non-athletes and athletes participating in more objectified sports will internalize the thin ideal
at similar levels; and (c) athletes participating in more objectified sports will internalize the thin ideal more than athletes from less objectified sports.

Hypothesis 3. Because of the additional external pressure to conform to societal appearance standards that female athletes in more objectified sports potentially experience, we hypothesize that (a) athletes participating in more objectified sports will monitor their body and appearance more than non-athletes; (b) athletes participating in more objectified sports will monitor their body and appearance more than athletes participating in less objectified sports; and (c) athletes participating in less objectified sports will monitor their body less than non-athletes.

Hypothesis 4. Although internalization and body surveillance have both been shown to predict body shame in females (McKinley & Hyde, 1996; Moradi, 2010; Moradi et al., 2005; Tylka & Hill, 2004; Tylka & Sabik, 2010), we hypothesize that athletes participating in more objectified sports will experience less body shame than non-athletes (due to feeling better about the physical function of their body); (b) there will be no difference in body shame between the two athlete groups; and (c) athletes from less objectified sports will report less body shame than non-athletes.

Methods

Recruitment and Procedure

In this study “competitive athletics” is defined as a university-level sport or “emerging sport” governed by the NCAA (2012). The term “female athlete” is defined as a female athlete playing for a university-level sport or “emerging sport” team governed by the NCAA (2012). All potential participants in this study were required to be female, full-time undergraduate students (enrolled in 12 or more credit hours) between the ages of 18 and 25, attending a large Division I southeastern university in either the Fall 2012 or Spring 2013 semester. All students were given the option to complete the survey online (via Qualtrics) or using pen and paper. Separate web survey links were administered for athlete and non-athletes, to double check student-athlete classification accuracy and avoid duplicate survey completion. The study protocol and materials were approved by the Institutional Review Board at the participating university prior to
recruiting participants. We used a tailored design method for non-athletes and athletes (Dillman, Smyth, & Christian, 2009).

Non-athlete group

A list of 1,400 randomly selected full-time undergraduate female students was requested from the Office of the University Registrar (OUR), including student email and local mailing addresses. It was requested that this list exclude athletes at the university (athletic status is indicated in the OURegistrar database). After obtaining the sample, a postcard was mailed to the local address of each potential non-athlete participant to provide notification that they would be receiving an email requesting their participation in a survey about body attitudes of female undergraduate students. The email invitation to participate, with the survey link embedded, was sent on a Sunday evening in October, 2012, five days following postcard distribution. Participants were told to contact the principal investigator if they wished to be mailed a paper copy of the survey in lieu of the online version. Two follow-up emails were sent later in the week on a weekday afternoon (before 5pm), and a weekday morning (before 11am) to facilitate an optimal response rate (Molasso, 2005). These multiple recruitment communications resulted in a total of 422 surveys received from the non-athlete group (response rate = 30.1%). This was judged to be an excellent response rate considering that the survey was web-based (Sax, Gillmartin, & Bryant, 2003), and response rates are typically low for this age-group (Dillman et al., 2009). Of the received survey responses, 53 records were removed due to respondents reporting characteristics that made them ineligible for this study (i.e., \( n = 40 \) graduate students; \( n = 2 \) part-time students; \( n = 11 \) did not meet age range specifications). One additional survey was removed because the participant indicated current participation on an NCAA varsity team at the university-level, which was surprising given that the link was only sent to students who were not
classified as athletes in the OUR. Of the remaining 368 eligible records, survey data was complete for 322 non-athletes.

**Athlete group**

To recruit athletes from the university, assistance was requested from a senior administrator at the University’s Athletic Association (UAA). A current list of all 231 collegiate female athletes (including names and emails) who participated in at least one of the 11 NCAA-governed sport teams during Fall 2012 was acquired from the UAA. Recruitment of athletes into the study was conducted in two waves. The first wave occurred in October 2012 with the UAA administrator making initial contact via email with all 231 female athletes to encourage (but not require) participation in the research. It was noted in this email that, although the UAA supported the research, no one affiliated with the UAA would have access to individual or aggregated sport team data. A subsequent recruitment email was sent three days later from the principal investigator to the student-athletes. This email reiterated the measures taken to protect the anonymity of their responses. This recruitment email was worded similarly to the email sent to the non-athlete group; however, a different survey link was embedded in the email to athletes. As was the case for the non-athlete group, a paper survey option was also provided. The first wave of recruitment resulted in 65 responses (response rate = 28.1%) from athletes participating in 10 of the 11 NCAA-governed sports at this university.

The second wave of athlete recruitment occurred in January 2013 with the UAA administrator first contacting, via email, the coaches of seven sports (basketball, gymnastics, soccer, softball, swimming and diving, tennis, and volleyball) that were under-represented in the first wave. The UAA notified the coaches of these teams that they would be receiving a request for assistance from study administrators to help facilitate athlete participation. Subsequently, the principal investigator sent each of the seven head coaches an email requesting assistance with
distributing paper surveys at an upcoming team meeting or practice. It was emphasized to the coaches that student athletes would be expected to complete and return the surveys to the study investigators on their own time to preclude coaches from being present during survey completion and submission. Six of the seven coaches agreed to let a program administrator or team manager distribute the paper surveys. These surveys were individually distributed to 97 athletes in a manila envelope with a university mailing address on the front label. In an effort to maintain response anonymity, all athletes were asked to accept the survey regardless of whether or not they had completed it in the first wave. Athletes who had completed the survey in the first wave were asked to recycle the paper survey that they received. Additionally, a question was added to the second wave survey asking if the student-athlete had completed a survey on body attitudes (title of the survey) sometime in the previous semester, as extra assurance that responses from each participant were included only once. The cover letter of the survey indicated three options for completing and returning the survey: (1) complete the paper copy of the survey and return it in the envelope through campus mail (no postage required); (2) complete the paper copy of the survey and hand deliver it to the campus address listed on the envelope; or (3) complete the survey online via a survey link that would be emailed securely to all second-wave participants within 48 hours. This second wave of athlete data collection resulted in 40 returned paper surveys, and no new online surveys (response rate = 41.2%). Three \( n = 3 \) of the returned second-wave surveys were marked to indicate that the survey had been completed in the first wave; thus, 37 new responses were received and considered for this study. Of the 102 total athlete responses that were collected following waves one and two of the athlete data collection (final athlete response rate = 44.1%), eight records \( n = 8 \) were discarded \( n = 5 \) under age 18; \( n \)
= 3 were not registered as full-time students). Of the 94 remaining responses, data was complete for 85 records.

**Participants**

Based on inclusion and exclusion criteria for this study, the final sample included 322 female non-athletes and 85 female athletes (total \( n = 407 \)). Every NCAA sport at the university was represented in our athlete sample: basketball \( n = 4 \), cross country \( n = 2 \), golf \( n = 5 \), gymnastics \( n = 13 \), lacrosse \( n = 6 \), volleyball \( n = 3 \), soccer \( n = 20 \), softball \( n = 7 \), swimming and diving \( n = 6 \), tennis \( n = 5 \) and track and field \( n = 14 \).

The athlete group was sub-divided into two groups: athletes participating in less objectified sports (LOS-athletes) and athletes participating in more objectified sports (MOS-athletes). Parsons and Betz (2001) sport objectification findings were used to classify the study’s 11 sports into MOS-athletes and LOS-athletes. Parsons and Betz (2001) sport objectification scores indicate the level at which college students perceive a specific sport is feminine, and how the sport emphasizes the female athlete’s appearance and body. Per Parsons and Betz (2001), the 11 sports included in our study have a mean sport objectification score of 2.74 (range 2.09-4.02) on a Likert-type five-point scale (1=least objectified to 5=most objectified). Athletes from sports that fell below Parsons and Betz’s (2001) 2.74 mean were classified into the LOS-athlete group; and athletes from sports above the 2.74 mean were classified into the MOS-athlete group. This resulted in the LOS-athlete group being comprised of athletes from basketball, cross country, golf, lacrosse, soccer, softball, and track and field (sport objectification score range 2.09 - 2.60; \( n = 58 \)); and the MOS-athlete group being comprised of athletes from gymnastics, swimming and diving, tennis, and volleyball (sport objectification score range 2.93 - 4.02; \( n = 27 \)). We cross-checked these classifications with other researchers’ findings of which sports are more or less
objectified by the media (Kim et al., 2010), and which sports are deemed feminine versus non-
feminine (Crissey & Honea, 2006; Hardin & Greer, 2009).

**Measures**

All participants responded to demographic questions about weight, height, year in school (first-year, second-year, third-year, fourth-year, or other undergraduate student), and race and ethnicity (American Indian or Alaska Native, Asian, Black or African American, Hispanic, Mixed, Native Hawaiian or Other Pacific Islander, or Non-Hispanic white). Participants marking two or more responses under race were coded as multi-racial. Self-reported weight and height were used to calculate BMI.

**Body esteem**

Franzoi and Shields’ (1984) Body Esteem Scale (BES) was selected to measure body image because of its multi-dimensional nature and conceptual fit with objectification theory (McKinley & Hyde, 1996; Noll & Fredrickson, 1998; Varnes et al., 2013). The concept of body esteem includes measures of perceived self-attractiveness (sexual attractiveness and weight concern), as well as feelings regarding demonstrable physical abilities, such as endurance and strength (physical condition).

To assess body esteem, the three subscales of the female version of the BES were administered: sexual attractiveness (13 items), weight concern (10 items), and physical condition (9 items). All BES items are measured on a five-point Likert-type scale (1=strong negative feelings to 5=strong positive feelings). The weight concern subscale is specific to parts or functions of the body that are modifiable through physical activity and food intake (e.g., weight, appetite, figure). The sexual attractiveness subscale focuses on parts and functions of the body that are not modifiable through exercise or diet (e.g., body hair, lips, sex drive). The physical condition subscale assesses how one feels about their body’s physical abilities (e.g., strength,
agility, energy). The physical condition component differs from the other two, as it represents qualities that are not typically evaluated by others, except in situations where they can be demonstrated and assessed (as in athletics).

Principal components analysis of the BES supports the three aforementioned factors (Franzoi & Shields, 1984). In our study, obtained internal consistency scores were moderately high: sexual attractiveness, $\alpha = .85$; weight concern, $\alpha = .91$; physical condition, $\alpha = .90$. Scores from the BES have also revealed high three-month test-retest reliability ($r = .75$ to $.87$; Franzoi, 1994). Convergent validity with other instruments has been demonstrated in the female undergraduate population for each subscale (Franzoi & Herzog, 1986; Thomas & Freeman, 1990). It should be noted that all three subscales are moderately correlated with self-esteem ($r = .22$ to $.39$; Franzoi & Shields, 1984; Franzoi & Herzog, 1986).

**Thin ideal internalization**

We administered the Internalization-General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3; Thompson et al., 2003) to measure thin ideal internalization. The Internalization-General subscale assesses the degree to which the sociocultural ideal of thin beauty is internalized. Participants indicate on a five-point Likert-type scale (1=definitely disagree to 5=definitely agree) how much they want or try to look like people who are on TV, or in movies and magazines (e.g., “I would like my body to look like the people who are in the movies”). In our study, internal reliability of the subscale was high ($\alpha = .94$), and comparable to previous studies (e.g., Cafri et al., 2005; Thompson et al., 2003). The Internalization-General subscale has demonstrated satisfactory convergent validity in previous studies (e.g., Thompson et al., 2003).
Body surveillance

Body surveillance was measured using the Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996). Body surveillance is the extent to which women monitor their body in terms of how it appears to others. The body surveillance subscale contains eight items (e.g., “I often worry about whether clothes I am wearing make me look good”) measured on a seven-point Likert-type response scale (1=strongly disagree to 7=strongly agree) with a “not applicable” (NA) option. Six items are reverse scored, and NA responses are treated as missing values. If more than two responses for the subscale are missing, the entire subscale is counted as missing. Researchers have indicated that this subscale yields valid and reliable scores. For example, women’s responses to the subscale are consistent over a two week time period ($r = .79$); and Body Surveillance has been shown to be highly related to a public self-consciousness measure ($r = .73$) and unrelated to private self-consciousness (McKinley & Hyde, 1996). In our sample, internal consistency was demonstrated as sufficient (Cronbach’s $\alpha = .84$), and consistent with reliability scores reported in previous studies (McKinley & Hyde, 1996; Tylka & Hill, 2004).

Body shame

Body shame refers to a woman’s belief that she is not a good person if she does not attain cultural expectations related to her body (e.g., “I feel ashamed when I haven’t made the effort to look my best”). The Body Shame subscale of the OBCS (McKinley & Hyde, 1996) was used to measure body shame. This subscale contains eight items (two are reverse scored) measured on a seven-point Likert-type response scale (1=strongly disagree to 7=strongly agree) with an NA option. NA responses are treated as missing values. If more than two responses in the subscale are missing, the entire subscale is excluded. Researchers have indicated that data collected using the Body Shame subscale are valid and reliable. For example, women’s responses to the Body
Shame subscale are consistent over a two week period \( (r = .79) \); and convergent validity has been demonstrated when tested against measures of body esteem \( (r = -.46 \text{ to } -.51; \) McKinley & Hyde, 1996). In our sample, the internal reliability of data collected using the Body Shame subscale was satisfactory \( (\text{Cronbach’s } \alpha = .84) \), and consistent with values reported in previous studies \( (\text{McKinley & Hyde, 1996; Tylka & Hill, 2004}) \).

**Data Analysis**

Statistical tests for analyzing data were performed using SAS Version 9.3; except for descriptive discriminant analysis (DDA), which was done using SPSS Version 21. First, descriptive statistics, Cronbach’s alpha coefficients \( (\alpha; \) values reported previously), and correlations between the measures were analyzed.

Our first Hypothesis was testing with multivariate analysis, using the process outlined by Huberty and Olejnik (2006). Multivariate analysis was used for body esteem because physical condition, sexual attractiveness, and weight concern are considered to be three important dimensions of the multi-dimensional construct of body esteem \( (\text{Franzoi & Shields, 1984}) \). Additionally, strong moderate correlations between the three subscales were revealed in the data for our study \( (r = .56 \text{ to } .65, p < .01; \) Huberty & Olejnik, 2006). We first performed a one-way multiple analysis of variance (MANOVA) to assess the three dependent variables of body esteem (physical condition, weight concern, and sexual attractiveness) using group membership (non-athlete, MOS-athletes, LOS-athletes) as the independent variable. Prior to assessing MANOVA results, Box \( M \) was used to test the assumption of covariance matrix homogeneity across the three groups \( (\text{Huberty & Olejnik, 2006}) \). Assuming similar covariance matrices and a significant MANOVA, group differences and follow-up hypotheses were analyzed with DDA.

Thin ideal internalization (Hypotheses 2), body surveillance (Hypothesis 3), and body shame (Hypothesis 4) were evaluated separately, using the following pairwise comparisons for
each outcome: (a) non-athletes to MOS-athletes, (b) non-athlete to LOS-athletes, and (c) MOS-athletes to LOS-athletes. The separate analysis of each dependent variable was warranted in this research case because we proposed a separate hypothesis for each of the three constructs; and, despite each construct being related to some degree, researchers propose each dependent variable to be a separate construct in the overall self-objectification process with each providing unique information in objectification theory’s mediational model (Moradi, 2010). When pre-planned contrasts are of primary interest, as they were when testing hypotheses 2, 3, and 4 in this study, conducting an unnecessary omnibus $F$ test can result in a loss of power (Huberty & Olejnik, 2006; Myers, Well, & Lorch, 2010). Thus, an omnibus test was not conducted prior to analyzing the pairwise comparisons. Levene’s test was used to test the equal variances assumption prior to analyzing pairwise contrasts. If the equal variances assumption was upheld, the Bonferroni method was used to adjust the Type I error rate that is associated with multiple pairwise comparisons (Huberty & Olejnik, 2006; Myers et al., 2010). If Levene’s revealed that the equal variances assumption was violated, Games-Howell was used in lieu of Bonferroni, as the Games-Howell method accounts for unequal variances and unequal group sizes (Myers et al., 2010).

Results

Preliminary Analyses

Demographic information for the three groups is presented in Table 4-1. The majority of participants in this study were Non-Hispanic White ($n = 259; 63.6\%$), while 14.7\% ($n = 60$) were Hispanic, 9.6\% ($n = 39$) were Black or African American, 7.9\% ($n = 32$) were Asian, 3.7\% ($n = 15$) reported being multi-racial, and 0.5\% ($n = 2$) did not report race or ethnicity. The mean age of participants was 19.77 years (SD = 1.44 years). Academic classification was well distributed with 28.7\% of the sample being first year students, 21.6\% second year students, 21.4\% third year students, 25.8\% fourth year students, and 2.5\% indicating “other” undergraduate status. Average
BMI was 23.0 kg/m² (SD=3.97 kg/m²), and there was no difference in average BMI across the three groups \( F(2,401) = 1.25, p = .288 \).

**Testing Hypothesis 1 (Multivariate Analysis)**

Table 4-2 provides descriptive statistics for the three body esteem outcomes, including group means on each of the three outcomes, and error correlations between the three outcomes. Results of Box’s \( M \) test for covariance homogeneity indicated the covariance matrices for the three groups were somewhat different \( F(12, 25418) = 2.04, p = .018 \). However, the Box test is overly sensitive to even small departures from covariance equality or multivariate normality (Huberty & Olejnik, 2006), so we examined the (natural) logarithms of the determinants for each covariance matrix. The generalized variance of the LOS-athlete group (ln =10.14) was slightly less than either the non-athlete (ln = 11.70) or MOS-athlete (ln = 11.38) groups; however, these group variations were not different enough to invalidate our results (Huberty & Olejnik, 2006). Considering the slight variation between the covariance matrices and the unequal sizes of the three groups, we proceeded with the one-way MANOVA opting to use Pillai’s trace statistic \( U \) to evaluate multivariate effects. Pillai’s trace is robust to unequal sample sizes, as well as small violations of normality and unequal variance-covariance matrices (Haase & Ellis, 1987). The results of the MANOVA provided evidence that the observed differences among the three groups were generalizable to the populations they represented with respect to the three body esteem variables \( U = .155, F(6, 806) = 11.26, p < .001, \xi^2_{adj} = .08 \); thus, Hypothesis 1 (body esteem differences between the groups) was supported.

We followed-up the statistically significant MANOVA with DDA. The three \( F \)-to-remove values, as reported in Table 4-3, indicated that physical condition contributed the most, by far, to overall group differences (\( F \)-to-remove = 24.10), followed by sexual attractiveness (\( F \)-to-remove = 2.01). Weight concern appeared to contribute the least (\( F \)-to-remove = .30). We
further explored differences between the three groups by obtaining two linear discriminant functions (LDFs) for the multivariate body esteem outcome. The first LDF explained 97.1% of the variance, canonical $R^2 = 14.9$; whereas the second explained only 2.9% of the variance, canonical $R^2 = 0.53$. The first LDF was significant in distinguishing between the groups (LDF$_1$: $\Lambda = .85$, $F(6, 804) = 11.67$, $p < .001$), while the second LDF was not (LDF$_2$: $\Lambda = .99$, $F(2, 403) = 1.077$, $p = .345$). Examination of group centroid plots (Figure 4-1) confirmed a clear separation of the groups on the first function, with the non-athlete group centroid mean (LDF$_1$ mean = -2.14) being distinctly less than the centroid means of both the MOS-athlete group (LDF$_1$ mean = .729) and LOS-athlete group (LDF$_1$ mean = .849; Table 4-4).

We interpreted the variables underlying these group differences by evaluating the correlations of each of the three outcome variable scores to their respective LDF score (structure $r$'s). Based on the structure $r$'s for our data (presented in Table 4-5), the first construct as represented by LDF$_1$ was shown to be defined primarily by physical condition ($r = .98$), with weight concern also contributing moderately ($r = .52$). Sexual attractiveness contributed the least ($r = .37$), although not negligibly (Huberty & Olejnik, 2006). Thus, the differences between the non-athlete group and two athlete groups appear to be attributable to the athletes having better body esteem, and feeling much more positively about their physical condition and somewhat more positively about their physical appearance. We defined this first construct as physical condition plus appearance. These findings provide support for Hypothesis 1a, which posited that the differences between the groups would be mostly attributed to physical condition, and moderately attributed to weight concern.

Notably, the F-to-remove statistics (refer to Table 4-3) indicated that sexual attractiveness contributed to group differences more than weight concern; however, weight concern was a
larger contributor than sexual attractiveness in separating the groups on the first statistically
significant dimension. Further examination of the structure r’s revealed that the sexual
attractiveness component is more highly correlated with LDF₂ (r = .84; Table 4-5), which was
not statistically significant, than with LDF₁. Figure 4-1 shows that the second function does
appear to indicate a non-statistically significant difference between the MOS-athletes and LOS-
athletes, and a more subtle difference between MOS-athletes and non-athletes. Thus, it is
possible that sexual attractiveness contributes to overall group differences more than weight
concern; but weight concern is more highly related to the first, statistically significant, construct,
while the sexual attractiveness differences occurred as part of a separate construct. For
discussion purposes, we labeled the second construct, as defined by LDF₂, *sexual attractiveness*.

Our second sub-hypothesis for body esteem (Hypothesis 1b) posited that the differences
in feelings about weight concern would be more pronounced between non-athletes and LOS-
athletes, and less pronounced between non-athletes and MOS-athletes. This sub-hypothesis was
not supported by the results of this study, as weight concern contributed to separating athletes
from non-athletes, but not in separating the two athlete groups. Examination of the group means
for the weight concern construct confirms this, as the almost identical group means for the two
athlete groups (LOS-athletes, M = 34.97; MOS-athletes, M = 34.44), were notably higher than
the non-athlete group mean (M = 29.79).

**Testing Hypotheses 2, 3, & 4 (Pairwise Comparisons)**

Descriptive statistics, including means and standard deviations for the outcomes of thin
ideal internalization, body surveillance, and body shame are reported in Table 4-6. Levene’s test
for equal variances was upheld for each of the three outcomes: thin ideal internalization \([F(2, 404) = 3.00, p = .051]\); body surveillance \([F(2, 404) = 0.71, p = .491]\); and body shame \([F(2, 404) =

125
Thus, a Bonferroni correction was used in controlling the Type I error rate for the multiple comparisons of Hypothesis 2, Hypothesis 3, and Hypothesis 4.

Results of the pre-planned pairwise comparisons for each of the outcomes revealed mixed results for Hypotheses 2 through 4. As predicted in Hypothesis 2, LOS-athletes internalized the thin ideal significantly less than non-athletes ($t = -3.94, p < .001$); and internalization did not differ between the MOS-athletes and non-athletes ($t = -1.10, p = .273$). However, contrary to our hypothesis, we found no difference in level of thin ideal internalization between the LOS-athletes and MOS-athletes ($t = 1.47, p = .143$).

For Hypothesis 3, our prediction that non-athletes would report higher levels of body surveillance than LOS-athletes was supported ($t = -4.96, p < .001$). Contrary to our prediction, however, MOS-athletes engaged in body surveillance less than non-athletes ($t = -2.51, p = .012$), and there was no statistically significant difference between the LOS-athletes and MOS-athletes on the body surveillance outcome ($t = 0.88, p = .381$).

Our fourth Hypothesis predicted that both MOS-athletes and LOS-athletes would have significantly less body shame than non-athletes. This was upheld for LOS-athletes ($t = -2.97, p < .0032$), but not for MOS-athletes ($t = -0.21, p = .832$). These results unexpectedly indicate that MOS-athletes and non-athletes experience similar levels of body shame. As expected, there was no difference between the LOS-athletes and MOS-athletes ($t = 1.64, p = .103$) on body shame.

Discussion

Researchers have traditionally studied BID among athletes in the context of sport-related pressures without considering whether society’s increased sexual objectification of female athletes may exert additional pressure on the female athlete to meet society’s feminine and sexualized athletic ideal (Hardin & Greer, 2009; Parsons & Betz, 2011; Varnes et al., 2013). We designed the present study to examine differences between non-athletes, collegiate female
athletes participating in sports that are less objectified, and collegiate female athletes participating in sports that more objectified on the outcomes of thin ideal internalization, body surveillance, and body shame, as well as feelings about physical condition, sexual attractiveness, and weight concern.

Our results revealed that athletes at this Division I university have higher body esteem than non-athletes, with the physical condition outcome contributing the most to this difference. This was expected, as other research indicates that athletes feel better about the functional abilities of their body (e.g., strength, agility, energy) when compared to non-athletes (Fellows, 1999; Petrie & Greenleaf, 2012; Varnes et al., 2013). Our results also suggest that weight concern and sexual attractiveness both contributed to athletes’ enhanced body esteem over non-athletes. Although we expected physical condition to be the greatest contributor to body esteem differences between athletes and non-athletes, the magnitude of this difference was somewhat surprising. The physical condition outcome was almost perfectly correlated ($r = .98$) with the construct defined as physical condition plus appearance, while the weight concern outcome was more moderately correlated with this construct ($r = .52$), and sexual attractiveness was somewhat correlated with this construct ($r = .37$). Collegiate female athletes typically have set strength and conditioning programs related to their sport participation, which likely contributes to their strong positive feelings regarding physical abilities and functionality.

While physical condition and weight concern were unquestionably most related to the first function ($r > .50$), sexual attractiveness appeared to be more highly related to the second function ($r = .84$) than to the first ($r = .37$); and mean score differences (refer to Table 4-2) on sexual attractiveness indicated that, of the three groups, MOS-athletes felt the most sexually attractive. In this study, however, these differences were not statistically significant. This non-
statistically significant result could be partly attributable to low power due to small sample size in the MOS-athlete group. Thus, sexual attractiveness differences may need to be explored separately from physical condition and weight concern when considering sport objectification.

Considering weight concern alone, it is apparent that all athletes in our study have more positive feelings about their weight-related body parts when compared to non-athletes. This is somewhat contrary to our prediction that, out of the three groups, LOS-athletes would feel the most positive about weight concern, as it appears that both MOS-athletes and LOS-athletes felt similarly about their weight-related body parts. This is particularly noteworthy, because most (67.9%) of the athletes included in our MOS-athlete group (n = 19 of 27) were from sports that are also considered more appearance-focused (e.g., gymnastics, and swimming and diving). Previous research has suggested that these athletes are at higher risk for BID and its associated mental health risks (e.g., Engel et al., 2003; Fellows, 1999; Varnes et al., 2013). Contrary to this, our findings indicate that college athletes in swimming, diving, and gymnastics do not experience greater BID than non-athletes, and are not more pre-occupied with their weight-affected body parts.

It seems plausible that higher body esteem, and specifically better feelings about weight-related body parts, should also translate to lower body shame. The body parts included on the weight concern subscale of the BES (e.g., waist, thighs, body build, buttocks, hips, legs, figure, appearance of stomach) are those that both men and women perceive as important in judging a woman’s attractiveness (Franzoi & Herzog, 1987), indicating that these are the parts that are potentially objectified and self-objectified. Thus, it may seem somewhat surprising that MOS-athletes felt better about weight concern than non-athletes, but experienced similar feelings of guilt regarding their potential inability to attain the cultural beauty expectations. Yet these results
are not entirely surprising, as they are not necessarily conflicting. In fact, these results provide support for other researchers’ indications that the self-objectification process is defined as being preoccupied with appearance, and not necessarily satisfied or dissatisfied with appearance (Noll & Fredrickson, 1998). In other words, although MOS-athletes are more satisfied with their appearance than non-athletes, the MOS-athletes and the non-athletes are similarly preoccupied with the appearance of their body. This preoccupation results in both MOS-athletes and non-athletes experiencing similar levels of shame or guilt when feeling they have failed to live up to sociocultural expectations related to their appearance.

Although body shame differences were statistically significant in comparing LOS-athletes (M = 2.87, SD = 1.04) and non-athletes (M = 3.35, SD = 1.18), the body shame difference between LOS-athletes and MOS-athletes (M = 3.30, SD = 0.94) was not statistically significant. Considering body shame group means, it is probable that the difference between LOS-athletes and MOS-athletes was not statistically significant because of small sample sizes resulting in power too low to detect a difference between the two groups.

It was surprising to find that MOS-athletes monitor their appearance less than non-athletes, despite similar feelings of body shame and thin ideal internalization. Considering that both MOS-athletes and LOS-athletes engaged in less body surveillance than non-athletes, it appears that female participation in competitive athletics generally contributes to decreased levels of body surveillance, possibly due to increased positive feelings about physical condition. Thus, it is plausible that participation in athletics, in general, decreases self-objectification tendencies. However, it appears that the higher levels of sport objectification experienced by MOS-athletes may negate the positive effects of high body esteem and low body surveillance when it comes to body shame and thin ideal internalization. These findings indicate that society’s
sexual objectification of MOS-athletes is a concerning factor in the female athlete’s self-objectification process.

**Strengths and Limitations**

Recruitment strategies and efforts were one strength of this study, particularly the use of random sampling for recruitment of the non-athlete group, and the all-inclusive sampling of the finite female athlete population at this large southeastern university. However, because non-athletes and athletes were sampled at only one university, the sample can only be assumed to be representative of the female student population at the university where the study took place, and may or may not be generalizable to other individual universities.

Despite a high response rate and our ability to recruit a diverse group of athletes into our study, the athlete group sample size and its make-up could be considered somewhat limiting. While the non-athlete group was fairly large \((n = 322)\), the MOS-athlete group was much smaller \((n = 27)\); and, of the four sports included in the MOS-athlete group, gymnasts represented almost half of the total sample \((n = 13)\). The LOS-athlete group was proportionately larger \((n = 58)\), but was mostly comprised of soccer athletes \((n = 20)\) and track and field athletes \((n = 14)\).

Based on the demographic make-up of the sampled university, we believe that our non-athlete sample was an adequate representation of the overall female student population. Additionally, the racial/ethnic distribution of our sample appeared to be more diverse than those reported in other similar studies (Lenart et al., 1995; Steinfeldt et al., 2011). Despite this, there were some apparent ethnic/race differences across the three groups. The non-athlete group included 32 participants (7.9%) who identified only as Asian, while no one in the athlete group responded being of Asian descent. Also of note is that the MOS-athlete group did not include any Hispanic participants, while the non-athlete \((n = 52)\) and LOS-athlete \((n = 8)\) groups did \((16.2\%\) and \(13.8\%\) respectively). We were unable to explore the effect of race/ethnicity in our
outcomes because there was not enough power to do so; however, researchers have indicated that race and ethnic differences may play a role in body image and self-objectification (Harrison & Fredrickson, 2003; Roberts et al., 2006). Additionally, at least one study has found body image differences between adolescent girls of different races participating in the same sport (Crissey & Honea, 2006). Further, the NCAA (2012) indicates that the breakdown of race and ethnicity varies by sport. As such, researchers should consider examining race and college athletic status in an interactive model predicting BID or self-objectification.

Lastly, we went to extensive lengths to assure anonymity of participant responses. This was done not only for ethical reasons, but also because prior research indicates response bias should be considered, as female athletes may be concerned that their responses will jeopardize their eligibility (Garner, 2004). Despite our attempts to assure anonymity, response bias is somewhat of a concern because the second-wave of recruitment was conducted with assistance from individuals who were directly involved with the sport teams. We did not conduct comparisons between responses from the first- and second-waves of data collection, because the second-wave data collection was sport-focused and attempted to gain responses from athletic teams that were under-represented in the first wave.

**Conclusion and Next Steps**

In general, it appears that female participation in competitive athletics is related to increased body esteem and decreased body surveillance. Additionally, per our findings, athletes participating in less objectified sports self-objectify less than non-athletes. This was indicated by LOS-athletes internalizing the thin ideal less, engaging in less body surveillance, and feeling less body shame than non-athletes. Because LOS-athletes self-objectify less and experience greater body esteem, we can conclude that they also appear to be at decreased risk for the psychological and behavioral risks associated with self-objectification and BID.
It is apparent that athletes participating in more objectified sports also experience better body esteem than non-athletes. Considering the make-up of our MOS-athlete group, our findings appear to refute previous researchers’ indications that appearance-focused athletes in gymnastics and swimming and diving are at higher risk for BID than non-athletes. Despite these findings, it does not appear that this high body esteem translates to decreased mental health risks for athletes participating in more objectified sports, as their levels of body shame were similar to non-athletes. In other words, according to the mediation model of objectification theory (Szymanski et al., 2011; Moradi, 2010), MOS-athletes and non-athletes appear to be at similar risk for the mental health concerns that result from body shame.

Overall, our results indicate that the increased sexual objectification of certain sports serves to promote thin ideal internalization among athletes participating in those more objectified sports, thereby enhancing body shame without increasing body surveillance or BID. These findings suggest that researchers and interventionists should put more focus on sexual- and self-objectification of collegiate female athletes participating in these sports, as their psychological and mental health risks appear to be associated with objectification and not necessarily BID. Researchers should continue this line of work by examining how other factors might mediate or moderate these relationships. For example, body comparison has been indicated as a mediator between sexual objectification and body shame (Tyka & Sabik, 2010). Thus, researchers should examine this relationship for female athletes, striving to identify who more and less objectified athletes compare themselves to, and how that mediates the relationship between objectification theory constructs. Researchers should also consider the female athlete’s perception of how she is viewed or judged by others. If an athlete perceives that others are critical of her appearance or weight, she may experience increased body shame (Muscat & Long, 2008), despite her own
positive feelings about her body condition and appearance. In a similar vein, research exploring female athletes’ awareness and perception of how they are depicted in the media will allow for a better understanding of the self-objectification process of female athletes.
Table 4-1. Demographic counts and BMI by group

<table>
<thead>
<tr>
<th>Race</th>
<th>Non-Athlete (N = 322)</th>
<th>MOA (N = 27)</th>
<th>LOA (N = 58)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Asian</td>
<td>32</td>
<td>9.9%</td>
<td>0</td>
</tr>
<tr>
<td>Black / African American</td>
<td>30</td>
<td>9.3%</td>
<td>2</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>197</td>
<td>61.2%</td>
<td>21</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>9</td>
<td>2.8%</td>
<td>4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>52</td>
<td>16.2%</td>
<td>0</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>0.6%</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Undergraduate Status</th>
<th>Non-Athlete (N = 322)</th>
<th>MOA (N = 27)</th>
<th>LOA (N = 58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Year</td>
<td>100</td>
<td>33.1%</td>
<td>11.1%</td>
</tr>
<tr>
<td>2nd-Year</td>
<td>63</td>
<td>19.6%</td>
<td>22.2%</td>
</tr>
<tr>
<td>3rd-Year</td>
<td>69</td>
<td>21.4%</td>
<td>12.3%</td>
</tr>
<tr>
<td>4th-Year</td>
<td>82</td>
<td>25.5%</td>
<td>40.7%</td>
</tr>
<tr>
<td>Other Undergraduate</td>
<td>8</td>
<td>2.5%</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>Non-Athlete (N = 322)</th>
<th>MOA (N = 27)</th>
<th>LOA (N = 58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>23.12 (4.26)</td>
<td>22.28 (2.29)</td>
<td>22.39 (2.67)</td>
</tr>
</tbody>
</table>

Note: No participants indicated their race as “American Indian or Alaska Native” or “Native Hawaiian or Other Pacific Islander,” so they are not included here.

Table 4-2. Means and standard deviations by group for body esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group Means/SDs</th>
<th>Error Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NA</td>
<td>Athletes MOS</td>
</tr>
<tr>
<td>Sexual Attractiveness</td>
<td>46.51 (7.77)</td>
<td>50.78 (8.63)</td>
</tr>
<tr>
<td>Weight Concern</td>
<td>29.79 (9.46)</td>
<td>34.44 (9.91)</td>
</tr>
<tr>
<td>Physical Condition</td>
<td>29.68 (7.46)</td>
<td>36.52 (6.66)</td>
</tr>
</tbody>
</table>

NA=Non-athlete; MOS=More Objectified Sports; LOS = Athlete-Less Objectified Sports.

a df1 = 2, df2 = 406
b p < .01
c p < .001
Table 4-3. F-to-remove results for body esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>F-to-Remove</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Condition</td>
<td>24.103</td>
</tr>
<tr>
<td>Sexual Attractiveness</td>
<td>2.005</td>
</tr>
<tr>
<td>Weight Concern</td>
<td>0.295</td>
</tr>
</tbody>
</table>

Table 4-4. Functions at group centroids for the three groups on body esteem data

<table>
<thead>
<tr>
<th>Group</th>
<th>LDF 1</th>
<th>LDF 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Athlete</td>
<td>-.214</td>
<td>-.002</td>
</tr>
<tr>
<td>MOS-A</td>
<td>.729</td>
<td>.241</td>
</tr>
<tr>
<td>LOS-A</td>
<td>.849</td>
<td>-.099</td>
</tr>
</tbody>
</table>

Table 4-5. Structure r’s for body esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>LDF 1</th>
<th>LDF 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual attractiveness</td>
<td>.37</td>
<td>.84</td>
</tr>
<tr>
<td>Weight Concern</td>
<td>.52</td>
<td>.02</td>
</tr>
<tr>
<td>Physical Condition</td>
<td>.98</td>
<td>.17</td>
</tr>
</tbody>
</table>

\(^a\) Significant at \(p < .001\)

\(^b\) Largest absolute correlation between each variable and any discriminant function.

Table 4-6. Mean and standard deviation for each group as a function of outcome; multiple comparisons, and eta-squared values

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Group Means/SDs</th>
<th>Diff(^a)</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin Internalization</td>
<td>NA</td>
<td>MOS-Athlete</td>
<td>LOS-Athlete</td>
</tr>
<tr>
<td>M</td>
<td>27.53</td>
<td>25.52</td>
<td>22.40</td>
</tr>
<tr>
<td>(SD)</td>
<td>(9.32)</td>
<td>(10.01)</td>
<td>(7.51)</td>
</tr>
<tr>
<td>Body Surveillance</td>
<td>MOS-Athlete</td>
<td>LOS-Athlete</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.86</td>
<td>4.34</td>
<td>4.12</td>
</tr>
<tr>
<td>(SD)</td>
<td>(1.04)</td>
<td>(1.05)</td>
<td>(0.94)</td>
</tr>
<tr>
<td>Body Shame</td>
<td>LOS-Athlete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.35</td>
<td>3.30</td>
<td>2.87</td>
</tr>
<tr>
<td>(SD)</td>
<td>(1.18)</td>
<td>(0.94)</td>
<td>(1.04)</td>
</tr>
</tbody>
</table>

NA=Non-athlete; MOS=more objectified sports; LOS=less objectified sports.

\(^a\) \(p < .05\) using Bonferroni adjustment
Figure 4-1. Linear discriminant functions for the body esteem constructs of physical condition, sexual attractiveness, and weight concern.
CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Body image disturbance (BID) is highly prevalent among college-aged women, so much that researchers have described it as normative (e.g., Espelage et al., 2003; Grabe et al., 2008; Fitzsimmons-Craft, 2011). The present work was developed in an effort to progress BID research in this population by investigating BID, and its measurement, among college-aged females, with an emphasis on identifying how participation in collegiate athletics might promote or protect from BID. The following steps were undertaken to achieve this goal: (1) explore recent BID literature comparing collegiate female athletes and non-athletes with consideration to the changes in sociocultural beauty ideals in the last 15 years; (2) identify salient and temporally relevant measures of BID for research in college female populations; (3) critically evaluate the most commonly used BID measure for appropriateness of use in research among college females; and (4) using temporally relevant and appropriate measures, compare current BID levels among highly competitive collegiate female athletes and female non-athletes. Three investigations were developed and presented that expand on the current literature, address weaknesses of previous research, and provide direction for future research.

Chapter 2 presented a systematic literature review of studies from 1997-2012 that explored BID among collegiate female athletes given the two recent sociocultural changes: (a) the increase in sexual objectification of female athletes in the media; and (b) the evolution of ideal female beauty to include appearing athletic, in addition to being thin. The review aimed to provide an in depth and focused update of research previously presented by Hausenblas and Downs (2001) that indicated athletes (across age, gender, and competition level) experienced lower levels of BID than non-athletes. The update, as written in Chapter 2, focused specifically
on comparing BID among collegiate female athletes and college female non-athletes. Findings indicated that female involvement in collegiate athletics still provides some protection from BID; however, this protection appeared to attenuated for athletes in more feminine sports (e.g., gymnastics) and at higher competition levels (e.g., Division I). The work presented in Chapter 2 also identified 13 different instruments used to evaluate BID across the 10 studies. Of these, the Eating Disorder Inventory (EDI) was used by half of the studies, supporting previous indications that the EDI is the most commonly used survey instrument in BID research. There were indications, however, that the EDI may not be appropriate for BID measurement in general female populations due to the instrument’s clinical nature. Also, given the increased sexual objectification of female athletes and the scarcity of research regarding this, it was determined that there may be more optimal survey instruments to evaluate the current status of BID. Specifically, it was noted that researchers should consider measures that focus on self-objectification, positive body image, and thin- and athletic-ideal internalization. The manuscript titled “A Systematic Review of Studies Comparing Body Image Concerns Among Female College Athletes and Non-Athletes, 1997-2012” was provisionally accepted for publication in Body Image: An International Journal of Research (May 29, 2013).

As indicated by the findings of Chapter 2, the EDI has been the most frequently and popularly used measure of BID for research in female populations; thus, it warranted consideration for administration in the final study of this work. However, because of indications that the instrument may not be appropriate for use in nonclinical populations, further evaluation of the EDI was needed, prior to its administration. The aim of Chapter 3 was to examine the relevance and appropriateness of the EDI in nonclinical BID research. Chapter 3 presented a critical review of factor analytic studies that examined the internal structure of the EDI for use in
nonclinical populations of women from Westernized countries, in an effort to synthesize the results of the reviewed studies to identify a stable EDI structure for this population. Thorough and systematic methodological evaluation of the six studies identified for review revealed that methodological rigor varied by study. Final results of the reviewed studies also varied somewhat. Examination of item-mapping patterns and validity and reliability results across the six reviewed studies revealed that significant modifications were indicated for using the EDI in nonclinical research. Thus, it was decided that the EDI would not be administered as part of the final study (Chapter 4). The manuscript titled “Validity of the Eating Disorder Inventory for Nonclinical Research in Populations of Westernized Women: A Critical Review of Factor Analytic Studies” was submitted for publication in International Journal of Eating Disorders (revision for resubmission in progress).

Chapter 4 described an original research study conducted with 322 randomly selected female undergraduate non-athletes, and 85 NCAA female athletes from a large southeastern Division I university. The study used objectification theory as a guide in comparing non-athletes and two groups of athletes (athletes participating in sports that are more objectified by society and athletes participating in sports that are less objectified by society) on three constructs of body esteem (sexual attractiveness, weight concern, and physical condition), and three constructs identified as part of the self-objectification process: thin ideal internalization, body surveillance, and body shame. The study was the first to consider external sociocultural pressures (i.e., sexual objectification of female athletes) when comparing BID and self-objectification among athletes and non-athletes. This was also the only known study to examine the construct of body surveillance among female athletes.
The first Hypothesis tested the differences between three groups (non-athletes, athletes participating in more objectified sports (MOS), and athletes participating in less objectified sports (LOS)) on the constructs measuring body esteem. Multivariate analysis revealed significant differences across the three groups on body esteem. Descriptive discriminant analysis (DDA) results indicated that the non-athletes experienced less positive body esteem than both athlete groups with physical condition being the primary contributor to this difference. Weight concern (feelings about parts of the body modifiable through diet and exercise) also contributed moderately to this difference, and sexual attractiveness (feelings about parts of the body not modifiable through diet and exercise) contributed minimally. Results also suggested that athletes participating in MOS feel more sexually attractive than either of the two groups; although this dimension of difference was not statistically significant.

The second, third, and fourth Hypothesis compared groups on the self-objectification outcomes of thin ideal internalization, body surveillance, and body shame respectively. It was found that athletes participating in LOS self-objectify less than non-athletes. This was indicated by LOS-athletes reporting less body surveillance, less body shame, and less internalization of the thin ideal. There were no statistically significant differences between LOS-athlete and MOS-athletes. Comparisons between non-athletes and MOS-athletes were somewhat mixed. Athletes participating in MOS also reported less body surveillance than the non-athletes; however, their levels of body shame and thin ideal internalization were similar to the non-athletes. This is particularly interesting because thin ideal internalization has been shown to be a strong predictor of body surveillance (Fitzsimmons-Craft et al., 2012; Moradi et al., 2005), and body surveillance has been shown to be a somewhat stronger predictor of body shame than has thin ideal internalization (Moradi et al., 2005; Tylka & Hill, 2004). While past research indicates that body
surveillance is slightly more positively correlated with body shame than is internalization (Moradi et al., 2005), our results may indicate that, for the athlete group, thin ideal internalization is a better predictor of body shame than is body surveillance. These results could indicate that the increased sexual objectification of certain sports serves to promote thin ideal internalization among athletes participating in MOS, thereby enhancing body shame without increasing body surveillance.

Overall, the findings of the study in Chapter 4 indicate that athletes have better body esteem than non-athletes and that athletes participating in LOS self-objectify less than non-athletes. The findings also indicate that researchers using objectification theory should consider that body surveillance may not be a strong indicator of self-objectification among female athletes participating in MOS. The manuscript titled “Body Esteem and Self-Objectification: Comparing Collegiate Female Athletes and Non-Athletes in the Context of Objectification Theory” is being prepared for submission to a scholarly journal.

**Conclusion**

The overall findings from this line of research indicate that female participation in collegiate athletics continues to provide protection from BID, despite society’s increased sexual objectification of female athletes. Findings of this work also support other researchers’ implications that female athletes generally experience better body esteem (Fellows, 1999; Steinfeldt et al., 2011), are more satisfied with their weight and weight-affected body parts (Fellows, 1999; Robinson & Ferraro, 2004), and desire a more athletic, physically fit figure than non-athletes (D’Arcy, 2007; Hoag, 2012). Also, as indicated in Chapter 2 of this work and by other researchers (D’Arcy, 2007; Hoag, 2012; Homan, 2010), it appears that the athlete’s enhanced athletic internalization may not be related to decreased risk for BID.
This work also supports that athletes feel better about their body’s physical form and function (Fellows, 1999; Petrie & Greenleaf, 2012; Wiggins & Moode, 2000). There is consensus among researchers that valuing the body for its abilities is the antithesis of self-objectifying (taking an external observer perspective of the body); however, it is apparent through this work that better feelings about physical condition do not necessarily translate into decreased self-objectification for all athletes. Although our overall findings indicated that all athletes felt better about the body’s abilities when compared to non-athletes, we also found that not all athletes experienced less overall self-objectification. While LOS-athletes experienced less self-objectification, findings for MOS-athletes were mixed, and indicated that sport objectification experiences could be contributing to thin ideal internalization and body shame.

Since Fredrickson and Roberts (1997) first introduced objectification theory, researchers, psychologists, and clinicians have tested its tenets and principles, providing strong support for a path model that shows sexually objectifying experiences lead to psychological disorders and mental health risks through the self-objectification process. The research supporting this theory has largely been conducted in general college female populations, though research across races, cultures, and sexual orientation have found support for the objectification theory model in minority populations as well (e.g., Moradi et al., 2005; Moradi & Huang, 2008; Kozee et al., 2007; Szymanski et al., 2011). Through the work presented here, it appears our understanding of how objectification theory constructs are related is deficient when it comes to the female athlete population, and specifically MOS-athletes. While our results support the relationship between thin ideal internalization and body shame, some correlates appear to be refuted (e.g., negative relationship of physical condition to body surveillance and thin ideal internalization); and others difficult to interpret because they oppose findings in this work (e.g., body surveillance and body
shame of MOS-athletes). There are many possible reasons construct relationships differ for athletes and non-athletes, including athletic status acting as a moderator that diminishes body surveillance, while sport objectification acts as a moderator in the self-objectification process that affects body shame and thin ideal internalization.

In conclusion, it is apparent that female participation in competitive collegiate athletics is related to lower levels of BID. It is also apparent that role athletic participation plays in self-objectification varies by sport. These differences indicate that competitive athletes participating in sports that are more objectified by society could be at greater risk for certain psychological outcomes and health behaviors than athletes who are less objectified by society, despite them feeling better about their body abilities and appearance. The mechanism of this difference, however, is not yet understood and more research needs to be done.

**Recommendations for Researchers**

We continue to lack understanding about how the female athlete’s body image is developed, enhanced, or worsened. Thus, we need more foundational information to better guide research studies and intervention possibilities. More research is necessary that explores how societal definitions of athletic femininity are developed. For example, identifying the relationship (correlational and causal) between what society defines as a feminine sport and the media’s objectification of athletes from these sports. Additionally, it is necessary to further determine how current societal definitions of athletic femininity affect the female athlete’s overall identity and how this relates to self-objectification. In a similar vein, researchers should examine sport-specific female athlete’s awareness and perceptions of the media’s depiction of female athletes, and if female athletes perception contributes to their personal feelings of being sexually objectified. One athlete group, specifically, that may be at higher risk than other athletes are volleyball players (Hoag, 2012 and Chapter 2 of this work). Future research should examine this
more closely to identify why. Last, in terms of foundation research, we are still lacking in understanding how non-athletes and athletes interpret and respond to different BID assessment instruments. Enhancing this understanding can serve to inform researchers on which instruments will provide the best interpretable information on outcomes of interest.

Despite deficiencies in the broader body of literature, this work has helped to identify next steps for practical/intervention research that could be explored among non-athletes. Understanding that athletes value the abilities of their body more than non-athletes suggests that interventionists should identify ways to enhance non-athletes’ feelings regarding their body’s abilities. Specifically, intervention researchers should explore how dedication to perfecting a physical skill (e.g., roller blading or rock climbing), even outside of the sports realm, may enhance body esteem among non-athletes.

There are also recommendations for next steps in moving forward from the findings of this work. These include: (1) conduct a confirmatory factor analysis on the EDI structure presented in Chapter 3; (2) determine if objectification theory constructs are upheld in a path model for collegiate female athletes; (3) examine the interactive effects of competition level, sport, and race on body image and self-objectification outcomes; (4) examine how the media’s sexual objectification of high-profile, sport-specific female athletes affects the BID of impressionable female athletes participating in that sport; (5) explore the role of body comparison in predicting athletes’ self-objectification; and (6) identify who athletes are comparing themselves to, and what how that affects other self-objectification constructs.
APPENDIX A
DEMOGRAPHIC AND BACKGROUND QUESTIONS

The following items were included for Chapter 4 only.

1. What is your sex?
   □ Female - Please proceed to Question 3 (this section)
   □ Male → Thank you for your participation, but this survey is for females only. You may stop the survey at this time, and you do not need to return the survey.

2. Are you registered for at least 12 credits at the University of Florida for the current semester?
   □ Yes - Please proceed to Question 4 (this section)
   □ No → Thank you for your participation, but this survey is for full-time students only. You may stop the survey at this time, and you do not need to return the survey.

3. What is your classification (check all that apply)?
   □ 1st year undergraduate
   □ 2nd year undergraduate
   □ 3rd year undergraduate
   □ 4th year undergraduate
   □ International Student
   □ Transfer student
   □ Other undergraduate student
   □ I am not an undergraduate student → Thank you for your participation, but we are surveying undergraduate students only. You may stop the survey at this time, and you do not need to return the survey.

4. How old are you today? ________ Years

5. Are you a student athlete who plays an NCAA varsity level sport for the University of Florida?
   □ Yes, I am a student athlete --- Continue to Question #2 (this section)
   □ No, I am not a student athlete --- Skip Question #2 and go to Question #3 (this section)

6. Which University of Florida NCAA varsity athletic team are you a member of?
   □ Basketball
   □ Cross Country
   □ Diving
   □ Golf
   □ Gymnastics

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☐ Lacrosse
☐ Soccer
☐ Softball
☐ Swimming
☐ Tennis
☐ Track
☐ Volleyball

7. Are you Hispanic or Latina?
   ☐ Yes
   ☐ No

Regardless of your response to the previous question, please continue to answer the following, if applicable, by marking one or more boxes to indicate what you consider your race to be.

8. How would you describe yourself? (Choose one or more from the following racial groups)
   ☐ American Indian or Alaska Native
   ☐ Asian
   ☐ Black or African American
   ☐ Native Hawaiian or Other Pacific Islander
   ☐ White

9. How tall are you (please respond in feet and inches. For example 5 feet 2 inches)?

10. What is your approximate weight (please respond in pounds)?
APPENDIX B
OBJECTIFIED BODY CONSCIOUSNESS SCALE

This scale was used for Chapter 4 only.

**INSTRUCTIONS:** On a scale of 1 to 7 (1 = strongly disagree; 4 = neither agree nor disagree; 7 = strongly agree), please clearly circle the response that corresponds to how much you agree or disagree with each statement.

**IMPORTANT:** Circle NA only if the statement does not apply to you. Do not circle NA if you don't agree with a statement. For example, if the statement says "When I am happy, I feel like singing" and you don't feel like singing when you are happy, then you would circle one of the disagree choices. You would only circle NA if you were never happy.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Strongly Agree</th>
<th>Does not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I rarely think about how I look……………….</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. When I can’t control my weight, I feel like something must be wrong with me…………</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I think it is more important that my clothes are comfortable than whether they look good on me……………………………………</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I think a person is pretty much stuck with the looks they are born with……………….</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I feel ashamed of myself when I haven’t made the effort to look my best…………….</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. A large part of being in shape is having that kind of body in the first place……………</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I think more about how my body feels than how my body looks…………………………..</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I feel like I must be a bad person when I don’t look as good as I could…………………</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I rarely compare how I look with how other people look…………………………………</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I think a person can look pretty much how they want to if they are willing to work at it...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strongly Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>---</td>
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<td>-------------------</td>
<td>----------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>11.</td>
<td>I would be ashamed for people to know what I really weigh.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>I really don’t think I have much control over how my body looks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13.</td>
<td>Even when I can’t control my weight, I think I’m an okay person.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>During the day, I think about how I look many times.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>15.</td>
<td>I never worry that something is wrong with me when I am not exercising as much as I should.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16.</td>
<td>I often worry about whether the clothes I am wearing make me look good.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17.</td>
<td>When I’m not exercising enough, I question whether I am a good enough person.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18.</td>
<td>I rarely worry about how I look to other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19.</td>
<td>I think a person’s weight is mostly determined by the genes they are born with.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20.</td>
<td>I am more concerned with what my body can do than how it looks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21.</td>
<td>It doesn’t matter how hard I try to change my weight, it’s probably always going to be about the same.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22.</td>
<td>When I’m not the size I think I should be, I feel ashamed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23.</td>
<td>I can weigh what I’m supposed to when I try hard enough.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24.</td>
<td>The shape you are in depends mostly on your genes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
APPENDIX C
BODY ESTEEM SCALE

This scale was used for Chapter 4 only.

INSTRUCTIONS: In this section, several body parts and functions are listed. Please read each item, and clearly circle the number corresponding with how you feel about this part or function of your own body using the following scale:

1 = Have strong negative feelings
2 = Have moderate negative feelings
3 = Have no feeling one way or the other
4 = Have moderate positive feelings
5 = Have strong positive feelings

<table>
<thead>
<tr>
<th></th>
<th>Have strong negative feelings</th>
<th>Have moderate negative feelings</th>
<th>Have no feelings one way or the other</th>
<th>Have moderate positive feelings</th>
<th>Have strong positive feelings</th>
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<tbody>
<tr>
<td>1.</td>
<td>Body Scent</td>
<td>1</td>
<td>2</td>
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<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Appetite</td>
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<td>Nose</td>
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<td>Physical Stamina</td>
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<td>2</td>
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<tr>
<td>5.</td>
<td>Reflexes</td>
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<tr>
<td>6.</td>
<td>Lips</td>
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<td>2</td>
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</tr>
<tr>
<td>7.</td>
<td>Muscular strength</td>
<td>1</td>
<td>2</td>
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<tr>
<td>8.</td>
<td>Waist</td>
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<td>2</td>
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<tr>
<td>9.</td>
<td>Energy Level</td>
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<tr>
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<td>Thighs</td>
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<tr>
<td>11.</td>
<td>Ears</td>
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<td>12.</td>
<td>Biceps</td>
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<td>Chin</td>
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<td>14.</td>
<td>Body Build</td>
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<td>15.</td>
<td>Physical Coordination</td>
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<tr>
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<td>Have strong negative feelings</td>
<td>Have moderate negative feelings</td>
<td>Have no feelings one way or the other</td>
<td>Have moderate positive feelings</td>
<td>Have strong positive feelings</td>
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<td>16. Buttocks</td>
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<td>4</td>
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<td>17. Agility</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>18. Breasts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>19. Appearance of eyes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>20. Cheeks / cheekbones</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>21. Hips</td>
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<td>3</td>
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<tr>
<td>22. Legs</td>
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<td>2</td>
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<td>4</td>
<td>5</td>
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<td>23. Figure</td>
<td>1</td>
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<td>3</td>
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<td>5</td>
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<tr>
<td>24. Sex Drive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>25. Sex Organs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>26. Appearance of Stomach</td>
<td>1</td>
<td>2</td>
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<td>27. Health</td>
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<td>2</td>
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<td>28. Sex Activities</td>
<td>1</td>
<td>2</td>
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<td>5</td>
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<tr>
<td>29. Body Hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>30. Physical Condition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>31. Face</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>32. Weight</td>
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<td>2</td>
<td>3</td>
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</table>
APPENDIX D
INTERNALIZATION-GENERAL SUBSCALE OF THE SOCIOCULTURAL ATTITUDES TOWARDS APPEARANCE QUESTIONNAIRE-3

This instrument was used for Chapter 4 only.

**INSTRUCTIONS:** Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree = 1
Mostly Disagree = 2
Neither Agree Nor Disagree = 3
Mostly Agree = 4
Definitely Agree = 5

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Definitely Disagree</th>
<th>Mostly Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Mostly Agree</th>
<th>Definitely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I do not care if my body looks like the body of people who are on TV</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>I compare my body to the bodies of people who are on TV</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>I would like my body to look like the models who appear in magazines</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>I compare my appearance to the appearance of TV and movie stars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>I would like my body to look like the people who are in movies</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>I do not compare my body to the bodies of people who appear in magazines</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>I wish I looked like the models in music videos</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>I compare my appearance to the appearance of people in magazines</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>I do not try to look like the people on TV</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Julia Rae Varnes was born (1980) and raised in Gainesville, Florida to Dr. Paul Ray Varnes (University of Florida, TRSM – retired) and Dr. Jill Wilson Varnes (University of Florida, HEB – retired). She attended the University of Florida for her undergraduate studies earning a Bachelor of Science and Masters in Health Science Education in 2002 and 2003, respectively. Soon after graduation, Julia was accepted into the Department of Public and Community Health, School of Public Health at the University of Maryland, College Park. While studying at UMCP, Julia worked as a graduate teaching assistant and as a research assistant in the Center for Health Behavior Research. Julia earned her Masters of Public Health from UMCP in 2007. After graduating with her MPH, Julia worked at the University of Florida Area Health Education Centers (AHEC) Program as their Education and Training Coordinator for Tobacco Programs. In 2009, Julia began part-time studies toward a Ph.D. in Health and Human Performance at the University of Florida. In 2010, she became a full-time student and worked as a graduate assistant within the Department of Health Education and Behavior, where she taught classes and pursued her dissertation research. She developed a line of research investigating body image among college females, and narrowed that focus to societal objectification and collegiate female athletes. Julia’s doctoral dissertation includes several scientific papers based on her research, submitted for publication to scholarly journals. Julia will be granted a Doctor of Philosophy in Health and Human Performance with an emphasis in Health Education and Behavior and minor in Research and Evaluation Methodology in August 2013.