Body Esteem and Self-Objectification Among Collegiate Female Athletes: Does Societal Objectification Make a Difference?

Julia R. Varnes¹, Michael L. Stellefson², M. David Miller³, Christopher M. Janelle⁴, Virginia Dodd⁵, and R. Morgan Pigg²

Abstract
The purpose of our study was to use select constructs from objectification theory to investigate how society’s sexual objectification of female athletes is related to differences in body esteem and self-objectification among collegiate female athletes and non-athletes. Using a cross-sectional survey, we sampled three groups at a Division I National Collegiate Athletic Association university: 322 non-athletes, 58 athletes participating in sports that are considered more objectified, and 27 athletes participating in sports that are considered less objectified. Participants completed survey measures assessing body esteem (sexual attractiveness, weight concern, and physical condition), body surveillance, thin-ideal internalization, and body shame. As predicted, all athletes experienced better body esteem than non-athletes. Surprisingly, both more and less objectified athletes also reported lower rates of body surveillance than non-athletes. Other findings varied by grouping. Overall, study findings suggested that athletes in more objectified sports experience greater thin-ideal internalization, thereby enhancing body shame without increasing body surveillance or body image concerns. Researchers and interventionists should put more focus on sexual- and self-objectification of collegiate female athletes participating in the more objectified sports because their psychological and mental health risks appear to be associated with objectification and not necessarily poor body image.

Keywords
objectification, body image, sports, athletes

After the enactment of Title IX, U.S. federal legislation prohibiting sex discrimination in educational programs and activities, including athletics, images of female athletes became more prominent in the media (Kane, 1988), although female athletes continue to receive far less publicity than male athletes (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Kane, 1988). Additionally, recent research has indicated that media images of male athletes emphasized power and athletic prowess, whereas media images of female athletes were sexualized and objectified (Clavio & Eagleman, 2011; Fink & Kensicki, 2002; Hardin, Lynn, & Walsdorf, 2005; Kim, Sagas, & Walker, 2010). 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). According to objectification theory, sexual objectification of women contributes significantly to mental health problems (e.g., eating disorders, depression, sexual dysfunction, and substance abuse) among diverse groups of women (Fredrickson & Roberts, 1997; Szymanski, Moffitt, & Carr, 2010). The purpose of the study presented here is to investigate differences in body image concerns and self-objectification among collegiate female athletes from sports that are considered more and less objectified and female non-athletes.

It is widely understood that the media’s portrayal of feminine beauty contributes significantly to psychological consequences (e.g., body shame) and mental health risks (e.g.,

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eating disorders; Fitzsimmons-Craft, 2011; Grabe, Ward, & Hyde, 2008; Szymanski et al., 2010). However, we do not fully 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 concerns and sport-related pressures, such as weight- or appearance-pressures in sport competition (Engel et al., 2003; Harrison & Fredrickson, 2003; Hausenblas & Carron, 2002; Reel, Sooho, Petrie, Greenleaf, & Carter, 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) use of body image measures that were less relevant to athletes as compared to non-athletes (Varnes et al., 2013).

One example of a sport classification that has commonly been used in research is “lean-focused sport.” Some researchers have used this term to describe sports that emphasize weight as part of appearance, including adjudicated sports such as diving, gymnastics, cheerleading, and figure skating (Harrison & Fredrickson, 2003). Yet other researchers have defined lean-focused sports as endurance-type sports, such as swimming and long-distance running, where being lower in weight and leaner in fat contribute to improved athletic performance (Engel et al., 2003; Hausenblas & Carron, 2002). 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 appearance-lean and endurance-lean sports (Reel et al., 2010; Reinking & Alexander, 2005). In any of these instances, classification was specific to sport-related pressures, 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 research with female athletes emphasizes the importance of selecting body image measures that are appropriate for the population. This charge 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 concerns for athletes versus non-athletes, and participants’ responses to some measures of body image may vary depending on athletic status. This phenomenon has been demonstrated through both correlational (Hoag, 2012; Krane, Stiles-Shipley, Waldron, & Michalenok, 2002) and meta-analytic (Smolak, Murnen, & Ruble, 2000) research. For this reason, it is necessary for researchers to use a multidimensional body image measure that is salient for both athletes and non-athletes when examining body image differences between the two groups.

Objectification Theory
Objectification theory (Fredrickson & Roberts, 1997; Szymanski et al., 2010) suggests that the human body not only is constructed biologically but also is developed through sociocultural contexts such as gender roles and sexual objectification. Sexual objectification acts to socialize girls and women to believe their value is dependent on their appearance, thereby teaching them to treat themselves as objects on display, or to self-objectify (Moradi, Dirks, & Matteson, 2005; Moradi & Huang, 2008; Szymanski et al., 2010).

Moradi (2010, p. 146) noted that self-objectification should be considered a “process” that manifests as body surveillance and internalization of sociocultural beauty standards. Internalization of sociocultural beauty ideals may lead the individual to believe her desire to attain the culturally defined beauty ideal is a personal choice rather than a result of social pressure (McKinley & Hyde, 1996). The extant manifestations of internalization and body surveillance are in turn related to increased body shame and anxiety, as well as to reduced flow and internal awareness (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Szymanski et al., 2010; Tylka & Hill, 2004). Thus, self-objectification, via the mechanistic nature of internalization and body surveillance, potentially promotes negative body image or body image concerns (Cafri, Yamamiya, Brannick, & Thompson, 2005; Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Moradi, 2010; Moradi & Huang, 2008; Szymanski et al., 2010).

Body image is a multidimensional construct characterized by an individual’s attitude toward, or evaluation of, his or her body-weight, -shape, -size, or -appearance (Cash & Szymanski, 1995). Both self-objectification and body image concerns have been linked 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., 2010). It is important to note that, although self-objectification can contribute to body image concerns, and although body image concerns and self-objectification are both related to similar outcomes, high levels of one do not necessarily predict high levels of 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 Varies by Sport
Sexual objectification reinforces female 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). This is especially concerning because the sexual objectification of female athletes has increased over the last two decades (American Psychological Association, 2010; Kim et al., 2010); however, the level at which female athletes are sexually objectified does appear to vary by sport (see Varnes et al., 2013, for a comprehensive review). Although female athletes are generally more objectified than male athletes, research has indicated that female athletes 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). Further, female athletes participating in these 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).

There has been a deficiency in research examining how society’s designation of female athletes as more or less feminine/objectified is related to the female athlete’s own self-objectification. In fact, only one identified publication has explored the differences between these groups, with results indicating that “athletes in more feminine (e.g., gymnastics) and objectified (e.g., tennis) sports experience greater body image concerns than other athletes” (Varnes et al., 2013, p. 430). Other researchers have identified a need to examine populations in which sexual objectification experiences intersect with a woman’s conflicting identities—such as being a woman and being in another marginalized position (Krane, Choi, Baird, Aimar, & Kauer, 2004; Moradi & Huang, 2008; Szymanski et al., 2010). Female athletes represent one such conflicted population because previous research indicates that female athletes have difficulty reconciling their dual feminine and athletic identities (Krane et al., 2004; Larabee, 2011). We conceptualized the study presented here to begin to address the research gap between society’s sexual objectification of female athletes and the female athletes’ own self-objectification.

The Present Study

We designed the present study to explore and compare body image concerns and three constructs of the self-objectification process among three groups: (a) female non-athletes, (b) National Collegiate Athletic Association (NCAA) Division I female athletes participating in sports that have been classified in recent research as being more societally objectified (i.e., more objectified athletes = MOA), and (c) NCAA Division I female athletes participating in sports that have been classified in recent research as being less societally objectified (i.e., less objectified athletes = LOA). The three self-objectification process constructs we included were thin-ideal internalization, body surveillance, and body shame (Moradi, 2010, 2011). Body esteem and its three components (physical condition, sexual attractiveness, and weight concern) were chosen as the multidimensional construct to represent Body Image Concerns in our study. Because the three body esteem dimensions are moderately correlated, with positive feelings on any of the three dimensions related to positive feelings on the others (r = .33 to .40; Franzoi & Shields, 1984), we developed an overall body esteem hypothesis that included all three body esteem constructs, as well as subhypotheses related to the specific constructs.

Thus for our first hypothesis, we predicted that group classification (non-athlete, MOA, LOA) will have a statistically significant impact on the three measures of body esteem: physical condition, sexual attractiveness, and weight concern (Hypothesis 1). Specifically, athletes generally feel better about the form and physical function of their body (Petrie & Greenleaf, 2012); thus, 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, and sexual attractiveness being least influential (Hypothesis 1a; Varnes et al., 2013). Furthermore, non-athletes will experience more negative weight concern than either athlete group, with this difference being larger for LOA than MOA women (Hypothesis 1b; Varnes et al., 2013).

Objectification theory research indicates that the process of self-objectification manifests separately as thin-ideal internalization and/or body surveillance, both of which mediate the relationship between sexual objectification and body shame (Moradi, 2010, 2011). 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; Moradi & Huang, 2008). 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-athlete, MOA, LOA) on the constructs of thin-ideal internalization (Hypothesis 2), body surveillance (Hypothesis 3), and body shame (Hypothesis 4).

Specifically, we hypothesize that (a) non-athletes will internalize the thin ideal more than LOA, (b) non-athletes and MOA will internalize the thin ideal at similar levels, and (c) MOA will internalize the thin ideal more than LOA (Hypothesis 2). Because female athletes in more objectified sports potentially experience additional external pressure to conform to societal appearance standards, we hypothesize that (a) MOA will report engaging in body surveillance more than non-athletes, (b) MOA will report engaging in body surveillance more than LOA, and (c) LOA will report engaging in less body surveillance than non-athletes (Hypothesis 3). Finally, although internalization and body surveillance have both been shown to predict body shame in women and girls in general (McKinley & Hyde, 1996; Moradi, 2010; Moradi et al., 2005; Tylka & Hill, 2004; Tylka & Sabik, 2010), we hypothesize that (a) MOA will experiences less body shame than non-athletes (due to athletes feeling better about the...
physical function of their body), (b) MOA and LOA will experience body shame at similar levels, and (c) LOA will report less body shame than non-athletes (Hypothesis 4).

Method

Recruitment

In our study, “competitive athletics” was defined as a university-level sport or “emerging sport” governed by the National Collegiate Athletic Association (NCAA, 2012). The term “female athlete” was defined as a female athlete playing for a university-level sport or “emerging sport” team governed by the NCAA (2012). All potential participants in our 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 U.S. Southeastern university in the Fall 2012 or Spring 2013 semesters. Participants were given the option to complete the survey online (via Qualtrics) or using pen and paper. Separate web survey links were administered for athletes and non-athletes to verify student-athlete classification and avoid duplicate survey completion. 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 the two groups in an effort to increase response rates and enhance accuracy of participants’ responses (Dillman, Smyth, & Christian, 2009).

Non-athletes. We obtained a list of 1,400 randomly selected full-time undergraduate female non-athlete students, including e-mail and local mailing addresses, from the Office of the University Registrar whose database includes students’ athletic status. The non-athlete participants were notified via mailed postcard that they would be receiving an e-mail requesting their participation in a survey about body attitudes of female undergraduate students. The e-mail invitation to participate, with an embedded survey link, was sent on a Sunday evening in October, 2012, 5 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 e-mails were sent later in the week on a weekday afternoon (before 5 p.m.), and a weekday morning (before 11 a.m.) to encourage an optimal response rate. 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, Gilmartin, & Bryant, 2003) and that 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 our study (40 graduate students; 2 part-time students; 11 did not meet age range specifications). One additional survey was removed because the participant indicated current participation in competitive athletics, signaling a misclassification. Of the remaining 368 eligible records, survey data were complete for 322 non-athletes.

Athletes. To recruit athletes, assistance was requested from a senior administrator at the University’s Athletic Association (UAA). A list of all 231 collegiate female athletes (including names and e-mails) who participated in at least 1 of the 11 NCAA-governed sport teams during Fall 2012 was received. 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 e-mail with all 231 female athletes to encourage (but not require) participation in the research. It was noted in this e-mail that, although the UAA supported the research, no one with UAA affiliation would have access to individual or aggregated sport team data. A subsequent recruitment e-mail was sent 3 days later from the principal investigator to the student-athletes. This e-mail reiterated the measures taken to protect the anonymity of their responses. This recruitment e-mail was worded similarly to the e-mail sent to the non-athlete group; however, a different survey link was embedded. As was the case for the non-athlete group, a paper survey option was 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 e-mail, the coaches of seven sports (basketball, gymnastics, soccer, softball, swimming and diving, tennis, and volleyball) that were underrepresented 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 e-mail 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.

A single survey, enclosed within a preaddressed manila envelope, was distributed to each of the 97 athletes. 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 whether the student-athlete had completed a survey on body attitudes sometime in the previous semester, as extra assurance that responses from each participant were included only once. As indicated in a
cover letter, student-athletes had three options for completing and returning the survey: (a) mail (via campus mail) the completed paper survey in the provided envelope (no postage required), (b) hand deliver the completed paper survey to the campus address listed on the envelope, or (c) complete the survey online via a survey link e-mailed securely to all second-wave participants within 48 hours of the distribution of paper surveys.

The second wave of athlete data collection resulted in 40 returned paper surveys and no new online surveys (response rate \(= 41.2\%\)). Three 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 our study. Of the 102 total athlete responses that were obtained in the two waves of data collection from athletes (final athlete response rate \(= 44.1\%\)), eight records were discarded (five for being under age 18; three were not registered as full-time students). Of the 94 remaining responses, data were complete for 85 records.

**Participants**

Based on inclusion and exclusion criteria for our study, the final sample of 409 participants included 322 female non-athletes and 85 female athletes. Every NCAA sport at the participating university was represented in the 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 \((n = 14)\).

Research indicates that female athletes from certain sports are more objectified than others (Clavio & Eagleman, 2011; Crissy & Honea, 2006; Fink & Kensicki, 2002; Hardin & Greer, 2009; Kim et al., 2010; Petrie & Greenleaf, 2012; Varnes et al., 2013); thus, we divided the larger athlete group into two subgroups representing less objectified athletes (LOA) and more objectified athletes (MOA). Classification of the 11 sports into the LOA and MOA groups was done using prior researchers’ findings regarding which sports are more and less objectified by the media (Kim et al., 2010) and more and less objectified by peers (Parsons & Betz, 2001), as well as which sports are deemed feminine versus non-feminine (Crissy & Honea, 2006; Hardin & Greer, 2009). Gymnastics, swimming and diving, tennis, and volleyball were identified as MOA (27 athletes); and basketball, cross-country, golf, lacrosse, soccer, softball, and track and field were identified as LOA (58 athletes).

Demographic information for the three groups is presented in Table 1. The majority of participants were non-Hispanic White \((n = 259; 63.6\%)\), whereas 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 multiracial, and 0.5\% \((n = 2)\) did not report race or ethnicity. The mean age of participants was 19.77 years (standard deviation \([SD]\) = 1.44 years). Academic classification was well distributed with 28.7\% of the full 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. The average body mass index (BMI) for all participants was within the normal weight range at 23.0 kg/m\(^2\) \([SD = 3.97 kg/m^2]\). There were no significant differences

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<th>Table 1. Demographics by Group.</th>
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Note. Obj = Objectified; “American Indian or Alaska Native” and “Native Hawaiian or Other Pacific Islander” were response options; however, no participant indicated those responses.
differences across the three groups for BMI, $F(2, 401) = 1.25, p = .29$, year in school, $\chi^2(8, N = 407) = 12.24, p = .141$, or race, $\chi^2(4, N = 407) = 4.96, p = .292$. Although a one-way analysis of variance (ANOVA) was significant for age, $F(2, 404) = 4.35, p = .013$, follow-up tests identified no group differences and using age as a covariate in subsequent tests did not change the results reported here.

**Measures**

All participants responded to demographic questions about weight, height, year in school, age, and race and ethnicity. Participants marking two or more responses under race were coded as multiracial. For the purposes of group comparisons, race and ethnicity categories were divided into non-Hispanic White, non-Hispanic Black, and other due to low power when including all categories. Self-reported weight and height were used to calculate BMI.

**Body esteem.** The female version of Franzoi and Shields’ (1984) Body Esteem Scale (BES) was used to measure body image because of its multidimensional nature and conceptual fit with objectification theory (McKinley & Hyde, 1996; Noll & Fredrickson, 1998; Varnes et al., 2013). The BES 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). The weight concern subscale (10 items) is specific to parts or functions of the body that are modifiable through physical activity and food intake (e.g., weight, appetite, and figure). The sexual attractiveness subscale (13 items) focuses on parts and functions of the body that are not modifiable through exercise or diet (e.g., body hair, lips, and sex drive). The physical condition subscale (9 items) assesses how one feels about the body’s physical abilities (e.g., strength, agility, and energy). The physical condition component differs from the other two because it represents qualities that are not typically evaluated by others, except in situations where they can be demonstrated and assessed (as in athletics). All BES items are measured on a 5-point Likert-type scale from 1 (strong negative feelings) to 5 (strong positive feelings). Per the instrument developer’s designation (Franzoi & Shields, 1984), composite scores were obtained by summing item responses for each subscale.

Construct validity has been demonstrated via convergent validity studies (Franzoi & Herzog, 1986; Thomas & Freeman, 1990). Additionally, all three subscales are moderately correlated with self-esteem ($r = .22$–.39; Franzoi & Herzog, 1986; Franzoi & Shields, 1984). Scores from the BES also reveal high 3-month test–retest reliability ($r = .75$–.87; Franzoi, 1994). In our study, obtained $\alpha$s were moderately high: .85 for sexual attractiveness, .91 for weight concern, and .90 for physical condition.

**Thin-ideal internalization.** We administered the Internalization–General subscale (9 items) of the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 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 5-point Likert-type scale from 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”). Responses to the 9 items were summed for a composite score, with higher scores indicating greater levels of thin-ideal internalization. The Internalization–General subscale has demonstrated satisfactory convergent validity in previous studies (Thompson et al., 2003). In our study, internal reliability of the subscale was high ($\alpha = .94$) and comparable to previous studies (Cafri et al., 2005; 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 8 items (e.g., “I often worry about whether clothes I am wearing make me look good”) measured on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree), with a “not applicable” (NA) option. Six items were reverse scored, and NA responses were treated as missing values. If more than two responses for the subscale were missing, the entire subscale was counted as missing. Composite body surveillance scores reflect an averaged score, with higher scores indicating higher levels of body surveillance. Researchers have indicated this subscale yields valid and reliable scores. For example, women’s responses to the subscale are consistent over a 2-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 ($\alpha = .84$) 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 8 items (2 are reverse scored) measured on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree), with an NA option (treated as a missing value). If more than two responses in the subscale were missing, the entire subscale was excluded. Composite body shame scores reflect an averaged score, with higher scores indicating greater body shame. 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 2-week period ($r = .79$), and convergent validity has been demonstrated when tested against measures of body esteem ($r = .46$ to $.51$; McKinley & Hyde, 1996). In our sample, the internal reliability of data collected using the Body Shame subscale was satisfactory ($\alpha = .84$) and consistent with values reported in previous studies (McKinley & Hyde, 1996; Tylka & Hill, 2004).

### Results

#### Preliminary Analyses

Statistical tests for analyzing data were performed using SAS Version 9.3—except for descriptive discriminant analysis (DDA), which was done using Statistical Package for the Social Sciences Version 21. Descriptive statistics, Cronbach’s $\alpha$ coefficients, and correlations between the measures were analyzed first. Descriptive statistics including means and $SD$s and error correlations for the three body esteem dimensions (physical condition, sexual attractiveness, and weight concern), as well as thin-ideal internalization, body surveillance, and body shame, are provided in Table 2.

#### Multivariate Analysis: Body Esteem

Our first hypothesis (group differences on body esteem measures) was tested 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 multidimensional construct of body esteem (Franzoi & Shields, 1984), and moderate correlations among the three subscales (see Table 2) were revealed in the data for our study. We first ran a one-way multivariate 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, MOA, and LOA) as the independent variable. (A separate MANOVA that included BMI as a covariate showed that BMI did not add to the model.) Before interpreting results, we assessed Box’s $M$ test and determined that the assumption of equal covariance matrices had been met, indicating that no additional steps were needed to control for unequal sample sizes. However, as an extra precaution, Pillai’s trace statistic ($U$), which is robust to unequal sample sizes, was used to evaluate multivariate effects (Haase & Ellis, 1987). Statistical power was calculated to be high, exceeding .99. MANOVA results revealed statistically significant group differences on body esteem, $U = .155$, $F(6, 806) = 11.26, p < .001$, $\eta^2_{adj} = .08$.

Huberty and Olejnik (2006) recommend following up a significant MANOVA with DDA, because DDA allows for identification and substantive interpretation of the constructs underlying group differences. Although follow-up one-way ANOVAs and subsequent pairwise comparisons can help to identify which groups differ from one another on specific constructs, such tests ignore the structure of the underlying system of outcomes and potentially decrease statistical power. DDA allows for a better understanding of the structure of the group-comparison effects, including the relative contribution of the variables.

### Table 2. Group Comparisons and Correlations for All Study Variables.

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<tr>
<th>Outcome</th>
<th>Non-A</th>
<th>MOA</th>
<th>LOA</th>
<th>Differences</th>
<th>$\eta^2$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sexual attractiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.03</td>
<td>.55</td>
<td>.56</td>
<td>.63</td>
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<tr>
<td>$M$ (SD)</td>
<td>46.51 (7.77)</td>
<td>50.78 (8.63)</td>
<td>48.91 (6.90)</td>
<td>Non-A &lt; MOA</td>
<td></td>
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<tr>
<td>2. Weight concern</td>
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<td>.05</td>
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<tr>
<td>$M$ (SD)</td>
<td>29.79 (9.46)</td>
<td>34.44 (9.91)</td>
<td>34.97 (8.31)</td>
<td>Non-A &lt; MOA</td>
<td>Non-A &lt; LOA</td>
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<tr>
<td>3. Physical condition</td>
<td></td>
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<td></td>
<td></td>
<td>.14</td>
<td>.56</td>
<td>.63</td>
<td>.51</td>
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<tr>
<td>$M$ (SD)</td>
<td>29.68 (7.46)</td>
<td>36.52 (6.66)</td>
<td>36.95 (5.08)</td>
<td>Non-A &lt; MOA</td>
<td>Non-A &lt; LOA</td>
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<td>4. Thin internalization</td>
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<td></td>
<td></td>
<td>.07</td>
<td>.23</td>
<td>.39</td>
<td>.25</td>
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<tr>
<td>$M$ (SD)</td>
<td>27.53 (9.32)</td>
<td>25.52 (10.01)</td>
<td>22.40 (7.51)</td>
<td>LOA &lt; Non-A</td>
<td></td>
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<td>5. Body surveillance</td>
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<td></td>
<td></td>
<td></td>
<td>.04</td>
<td>.27</td>
<td>.45</td>
<td>.37</td>
<td>.56</td>
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<tr>
<td>$M$ (SD)</td>
<td>4.86 (1.04)</td>
<td>4.34 (1.05)</td>
<td>4.12 (0.94)</td>
<td>LOA &lt; Non-A</td>
<td>MOA &lt; Non-A</td>
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<tr>
<td>6. Body shame</td>
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<td></td>
<td></td>
<td>.02</td>
<td>.33</td>
<td>.62</td>
<td>.42</td>
<td>.48</td>
<td>.51</td>
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<tr>
<td>$M$ (SD)</td>
<td>3.35 (1.18)</td>
<td>3.30 (0.94)</td>
<td>2.87 (1.04)</td>
<td>LOA &lt; Non-A</td>
<td></td>
<td></td>
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</tbody>
</table>

Note. Non-A = Nonathlete; MOA = more objectified athletes; LOA = less 0 athletes. Groups with the same subscript were statistically significantly different from each other on the indicated construct at $p < .05$, using Bonferroni adjustment.
Our first step was to obtain linear composites of the body esteem variable or linear discriminant functions (LDFs; Huberty & Olejnik, 2006). LDFs allow for a description of group differences in terms of constructs. The total number of identified constructs (maximum of \( J - 1 \)) determined to be useful in defining the structure of the outcome variable is referred to as the structure dimension. In our study, the first LDF, which explained 97.1% of the variance, canonical \( R^2 = 14.9 \), was statistically significant in distinguishing between the groups, LDF1: \( \Lambda = .85, F(6, 804) = 11.67, p < .001 \); whereas the second LDF, which explained only 2.9% of the variance, canonical \( R^2 = .53 \), was not statistically significant, LDF2: \( \Lambda = .99, F(2, 403) = 1.08, p = .345 \). These results indicate that the groups differed significantly on only one underlying composite construct. To better understand which groups differ from which, Huberty and Olejnik (2006) recommend examining group centroid means and the plotted group centroid means. Notably, the non-athlete group centroid mean was distinctly less than the centroid means of both the LOA group and MOA group, indicating that the significant difference between the groups was between the non-athletes and the two combined athlete groups (see Figure 1).

The next step was to identify which variables best characterized the group differences on the construct represented by LDF1 by examining the LDF’s structure correlations (Huberty & Olejnik, 2006). Each structure \( r \) score indicates the correlation between each variable (e.g., physical condition, weight concern, and sexual attractiveness) and each LDF. The structure correlations for our study indicated that the difference between the non-athlete group and the two athlete groups was characterized primarily by physical condition, which was highly correlated \( (r = .98) \) with the statistically significant LDF1. Weight concern also contributed moderately \( (r = .52) \); sexual attractiveness contributed the least \( (r = .37) \), although not negligibly (Huberty & Olejnik, 2006). Thus, the differences between the non-athletes and athletes appeared to be attributable to the athletes feeling much more positively about their physical condition and somewhat more positively about their physical appearance. As such, we defined the construct represented by LDF1 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.

Our second subhypothesis for body esteem (Hypothesis 1b) posited that the differences in feelings about weight concern would be more pronounced between non-athletes and LOA and less pronounced between non-athletes and MOA. This subhypothesis was not supported by the results of our study; although weight concern contributed to separating athletes from non-athletes, it did not distinguish the two groups of athletes. Examination of the group means for the weight concern construct confirmed this conclusion; group means for the two athlete groups were almost identical and were notably higher than the mean for non-athletes (see Table 2).

### Multiple Pairwise Comparisons

Hypotheses 2 (thin-ideal internalization), 3 (body surveillance), and 4 (body shame) each included a subset of pairwise comparisons. Because preplanned contrasts were of primary interest, the omnibus \( F \) test was not run prior to analyzing the
pairwise comparisons because doing so could result in a loss of power (Huberty & Olejnik, 2006; Myers, Well, & Lorch, 2010). Group differences on thin-ideal internalization, body surveillance, and body shame were each evaluated separately, using the following pairwise comparisons for all three variables: (a) non-athletes to MOA, (b) non-athletes to LOA, and (c) MOA to LOA. The separate analysis of each dependent variable was warranted in the present case because we proposed a separate hypothesis for each of the three constructs; 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; Moradi & Huang, 2008). Model assumptions were tested and upheld for each outcome. Bonferroni’s correction was used to adjust the Type I error rate associated with multiple pairwise comparisons (Huberty & Olejnik, 2006; Myers et al., 2010).

**Thin-ideal internalization.** As predicted in our second hypothesis, LOA internalized the thin ideal significantly less than non-athletes, \( t(379) = -3.94, p < .001, d = .60 \); and internalization did not differ between the MOA group and the non-athlete group, \( t(348) = -1.10, p = .273 \). However, contrary to our hypothesis, we found no difference in thin-ideal internalization when comparing LOA and MOA, \( t(84) = 1.47, p = .143 \). Post hoc power analysis revealed that statistical power was sufficient to detect group differences at .96.

**Body surveillance.** Our third hypothesis, which predicted that non-athletes would report higher levels of body surveillance than LOA, was supported, \( t(379) = -4.96, p < .001, d = .75 \). Contrary to our prediction, however, MOA engaged in body surveillance less than non-athletes, \( t(348) = -2.51, p = .012, d = .50 \), and there was no statistically significant difference between LOA and MOA on the body surveillance outcome, \( t(84) = 0.88, p = .381 \). Post hoc power analysis revealed statistical power of .96, which is more than sufficient to detect group differences.

**Body shame.** Our fourth hypothesis predicted that both MOA and LOA would have significantly less body shame than non-athletes. This was upheld for LOA, \( t(379) = -2.97, p < .004, d = .43 \) but not for MOA, \( t(348) = -0.21, p = .832 \). These results unexpectedly indicate that MOA and non-athletes experience similar levels of body shame. There was no statistically significant difference between LOA and MOA on body shame, \( t(84) = 1.64, p = .103 \). Despite this lack of statistical significance, it is noteworthy that the body shame mean for non-athletes (\( M = 3.30, SD = 0.94 \)), which was found to be statistically significant in difference from LOA body shame (\( M = 2.87, SD = 1.04 \)), was very similar to the body shame mean for MOA (\( M = 3.30, SD = 0.94 \)), which was not found to be significantly different from LOA. It is possible that power was not sufficient to detect body shame differences between LOA and MOA; indeed, post hoc power analyses revealed statistical power was .76, which is below the desired .80 (Cohen, 1988), and well below the .96 to .99 for the other tests in our study.

**Discussion**

Recent research has indicated that the sexual objectification of female athletes, in general, has increased in the last two decades; however, this increase has been disproportionate across the sports. In other words, athletes from some sports (e.g., tennis) are notably more objectified than athletes from other sports (e.g., basketball; Crissy & Honea, 2006; Fink & Kensicki, 2002; Hardin & Greer, 2009; Kim et al., 2010; Parsons & Betz, 2001; Petrie & Greenleaf, 2012; Varnes et al., 2013). The current study sought to examine differences in self-objectification and body image concerns between female non-athletes, collegiate female athletes participating in sports that are less objectified by the media and peers, and collegiate female athletes participating in sports that are more objectified by the media and peers.

Our results revealed that female athletes at this Division I university, regardless of being in the more or less objectified athlete group, have more positive body esteem than female non-athletes. Of the three body esteem outcomes, physical condition (i.e., feeling better about the physical function and abilities of the body) contributed the most to body esteem differences between athletes and non-athletes. This was expected because other research has indicated that athletes feel better about the functional abilities of their body (e.g., strength, agility, and energy) when compared to non-athletes (Petrie & Greenleaf, 2012; Varnes et al., 2013). Somewhat more positive feelings about physical appearance (weight concern and sexual attractiveness) also contributed to the athletes’ higher body esteem when compared to 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 in comparison to weight concern and sexual attractiveness was somewhat surprising. Perhaps it should not be surprising, however, considering that collegiate female athletes typically have set strength and conditioning programs related to their sport participation. This likely contributed to the athletes’ strong positive feelings regarding physical abilities and functionality.

Considering weight concern alone, it was apparent that the athletes in our study had more positive feelings about their weight-related body parts when compared to non-athletes. This finding was somewhat contrary to our prediction that, of the three groups, LOA would feel the best about body parts most affected by weight change. In fact, both MOA and LOA reported feeling similarly about their weight-related body parts. This is particularly noteworthy because most athletes (67.9% of 27) included in the MOA group were from sports (e.g., gymnastics and swimming and diving) that previous researchers had suggested are at higher risk for body image concerns and associated mental health risks (Engel et al., 2003; Varnes et al., 2013). Contrary to this expectation,
our findings indicated that college athletes in swimming/diving and gymnastics do not experience greater body image concerns than non-athletes, and they are not more preoccupied with their weight-affected body parts.

We also found that all athletes in our study, both MOA and LOA, monitored their body less than non-athletes, with no differences on body surveillance between the two groups of athletes. This finding was contrary to our hypothesis that MOA would experience higher levels of body surveillance than both LOA and non-athletes. We expected MOA to monitor their body more not only because of societal expectations related to appearance and femininity but also because of previous researchers’ indications that body monitoring is necessary for athletes in sports (e.g., gymnastics and diving), where appearance during performance is integral to success in competition (Petrie & Greenleaf, 2012). Items on the Body Surveillance instrument ask about how often personal appearance is thought about, how frequently the person engages in appearance comparisons to others, the importance of clothes feeling good versus looking good, and concern with how the body feels versus how it looks. Perhaps the female athlete, who is less concerned with body image, feels less of a need to monitor her appearance because she already feels good about her body and feels it is more important that her body feels good. In fact, previous research shows that collegiate female athletes report needing to “put aside” stereotypical female appearance-related concerns when competing, indicating that personal appearance is thought about less for female athletes compared to female non-athletes (Krane et al., 2004, p. 327). Perhaps these attitudes carry over into the athlete’s everyday life, despite recognizing that a more feminine image is more socially accepted when out of competition (Krane et al., 2004).

Thus far, we have seen that female athletes, regardless of their objectification classification, have better body esteem and less body surveillance when compared to their non-athlete peers. Subsequent findings were not so clear-cut because it was apparent that the two athlete groups experienced thin-ideal internalization and body shame in different ways. Although the LOA and MOA groups did not differ in a statistically significant way on thin-ideal internalization, separate comparison of LOA and MOA to non-athletes revealed different findings. LOA internalized the thin ideal less than non-athletes, whereas MOA and non-athletes experience similar levels of thin-ideal internalization. This pattern suggests that LOA have not adopted and internalized the media’s portrayal of ideal female beauty as much as non-athletes. This is further supported by our finding that LOA also experienced less body shame than non-athletes, indicating that LOA do not feel the same level of shame associated with failing to meet the socially defined ideal.

With regard to athlete differences and paralleling our findings for thin-ideal internalization, we found that LOA and MOA did not differ on body shame in a statistically significant way. Considering the results of the other group comparisons, the group means (see Table 2), and the less than optimal power for the body shame construct, it is plausible that a Type II error was made in comparing LOA and MOA on body shame. If a Type II error occurred, that would mean that MOA do experience more body shame than LOA, making this the only identified difference between the two athlete groups in our study. Because there are greater expectations of femininity associated with being an athlete in a more objectified sport, it makes sense that these athletes would also experience enhanced feelings of body shame related to fears of not meeting the socially defined ideal version of beauty. Further research focused on this possibility is thus warranted.

According to the self-objectification process (Moradi, 2010), thin-ideal internalization and body surveillance are both predictors of body shame for women and girls. Our results indicate, however, that this may not hold true for female athletes. Actually, it seems that thin-ideal internalization, but not body surveillance, is a potential predictor of body shame for female athletes. These findings support previous researchers who have reported that Division I female athletes who internalize the thin ideal more also experience more body shame and are thus more likely to self-objectify (Larabee, 2011).

Overall, our findings suggest that participation in competitive athletics is related to decreased body surveillance for women. Thus, we tentatively suggest that participation in competitive athletics, in general, is related to decreased self-objectification tendencies and that societal objectification is a factor in the female athlete’s self-objectification process. This is apparent in our pattern of findings, which indicate that women who participate in less objectified sports are somewhat protected from the self-objectification process, whereas women who participate in the more objectified sports are somewhat less protected. Thus, societal objectification of athletes may compromise the positive effects of high body esteem and low body surveillance when it comes to body shame and thin-ideal internalization.

**Practice Implications**

Numerous studies have been conducted to compare female athletes and non-athletes on body image and related issues. Often, these studies classify athletes into subgroups based on appearance- or weight-related pressures specific to competition. Ours is the first known study to explore the possibility that collegiate female athletes’ experiences of body image concerns or self-objectification are related to the level at which female athletes from their sport are objectified by others.

Our findings refute previous researchers’ implications that appearance-focused athletes in gymnastics and swimming/diving are at higher risk for body image concerns than non-athletes; we found athletes, regardless of whether their sport is high (MOA) or low (LOA) on objectification, to have enhanced body esteem compared to non-athletes. Despite this overall difference, it does not appear that their higher body esteem...
esteem translates into decreased psychological consequences for athletes participating in more objectified sports (MOA) whose levels of body shame were similar to non-athletes. In other words, according to the mediation model of objectification theory (Moradi, 2010; Szymanski et al., 2011), non-athletes, as well as athletes from sports that are more objectified, could be at similar risk for the mental health concerns (e.g., eating disorders) that result from body shame.

Overall, the results of our study indicate that participation in competitive athletics is related to increased body esteem and decreased body surveillance for women and that societal sexual objectification of female athletes from certain sports is unrelated to either body esteem or body surveillance. We further infer that a woman’s participation in competitive athletics has the potential to protect her from thin-ideal internalization and body shame because LOA reported lower levels when compared to non-athletes. However, this protective mechanism was not observed in the MOA group, indicating that societal sexual objectification appears related to thin-ideal internalization and body shame. An alternate possibility is that MOA and LOA self-select into such sports (Boiche, Plaza, Chalabaev, Guillet-Descas, & Serrazin, 2014). In any case, it would appear that LOA are at decreased risk for the psychological and behavioral risks associated with both self-objectification and body image concerns.

Our findings suggest that researchers and interventionists’ focus on body image concerns may be misplaced because the psychological consequences experienced by MOA appear to be associated with self-objectification and not necessarily body image concerns involving sexual attractiveness, weight concern, or physical condition. Thus, more research is needed on how sexual- and self-objectification of female athletes is related to mental health risks, such as disordered eating. 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 (Tyarka & Sabik, 2010). Thus, researchers should examine this relationship for female athletes, striving to identify to whom more and less objectified athletes compare themselves and how that fits into the objectification theory model.

**Strengths, Limitations, and Future Directions**

Recruitment strategies and efforts were strengths of our 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 U.S. Southeastern university. However, because non-athletes and athletes were sampled at 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 comparatively small sample sizes of our two athlete groups could have been limiting. We did, however, use data analysis methods robust to unequal sample sizes. We also confirmed that all assumptions held, despite these unequal sample sizes. Additionally, power to detect group differences was found to be high for all tests ($1 - \beta s > .95$), with the exception of body shame ($1 - \beta = .76$). The sport composition of the athlete groups is also a consideration in terms of limitations. Of the four sports included in the MOA group, gymnasts represented almost half the total sample ($n = 13$ of 27; 48%); and the LOA group was mostly composed of soccer athletes ($n = 20$ of 58; 34%) and track and field athletes ($n = 14$ of 58; 24%).

Based on the demographic composition of the sampled university, we believe that our non-athlete sample was an adequate representation of the overall female undergraduate student population. Additionally, the racial/ethnic distribution of our sample appeared to be more diverse than those reported in other similar studies (Lenart, Goldberg, Bailey, Dallal, & Koff, 1995; Steinfeldt, Zakraysek, Carter, & Steinfeldt, 2011). We were unable to explore the effect of race/ethnicity in our outcomes because there was not enough power to do so; however, research has indicated that race and ethnic differences may play a role in body image and self-objectification (Harrison & Frederickson, 2003; Roberts, Cash, Feingold, & Johnson, 2006). Additionally, at least one study has found body image differences between adolescent girls of different races who participated in the same sport (Crissy & 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 body image concerns or self-objectification.

We went to extensive lengths to assure anonymity of participants’ responses. This was done not only for ethical reasons but also because prior research has indicated that response bias should be considered in such studies because some 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 underrepresented in the first wave.

Finally, the classification of athletes into more or less objectified groups was done using prior researchers' findings related to the level at which the media and peers objectify athletes from different sports. We did not ask the athletes about their personal experiences related to feeling or being sexually objectified, nor did we ask them if they perceived that female athletes from their sport are objectified more or less than other athletes. This is important to note because recent research indicates that an adolescent athlete’s gender bias or gender stereotype toward certain sports can predict
whether or not that athlete will continue to play that sport (Boiche et al., 2014). Subsequent research should also explore female athletes’ awareness and perceptions of how they are depicted in the media. This would allow for a better understanding of the self-objectification process of female athletes. In a similar vein, researchers should consider the female athlete’s perception of how she is viewed or judged by others, including the media. 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.

Conclusion

The sexual objectification of female athletes extends from our societal sexual objectification of women and girls in general. It is widely understood that the media’s portrayal of feminine beauty contributes significantly to psychological consequences, such as body shame, and mental and physical health risks, such as eating disorders. It would seem that the targeted sexual objectification of female athletes would be correlated with increased body image concerns and self-objectification, especially among athletes from the more feminine sports. The study presented here, which is one of the first known to examine these ideas, supports that this relationship does indeed exist when it comes to self-objectification—but not body image concerns. Further, our findings indicate that researchers who focus on the increased psychological consequences and mental health risks experienced by female athletes may be placing too much emphasis on body image concerns and sport-related pressures of female athletes and not enough emphasis on the relationship between sexualization of female athletes and their related self-objectification.

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Declaration of Conflicting Interests

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Notes

1. Box M test results indicated the covariance matrices for the three groups were somewhat different, $F(12, 25418) = 2.04, p = .018$. However, Box test is overly sensitive as degrees of freedom increase and when there are largely unequal sample sizes. Thus, Huberty and Olejnik (2006) recommend two follow-up steps: (1) examine the (natural) logarithms of the determinants for each covariance matrix and (2) rerun the test with subsamples of the larger group(s). In examining the logarithms, we found the generalized variance of the LOA group ($ln = 10.14$) to be slightly less than either the non-athletes ($ln = 11.70$) or MOA ($ln = 11.38$) groups; however, these group variations were not different enough to invalidate our results (Huberty & Olejnik, 2006). In rerunning the Box M test with increasingly smaller subsamples of the non-athlete group ($N = 75; N = 59; N = 47; N = 35$), all test results revealed non-significant differences between the covariance matrices. For example, with a non-athlete $N = 35, F(12, 33,693) = .85, p = .599$. Thus, we concluded that the assumption of homogeneity was met.

2. The MANOVA and all follow-up tests were also run with increasingly smaller subsamples of the non-athlete group. The pattern of findings was consistent with that of the original non-athletes sample. For example, MANOVA results with non-athlete $N = 35$ indicated significant differences, $U = .20, F(6, 232) = 4.35, p < .001, \eta^2_{adj} = .10$, and DDA follow-up tests revealed that only the first LDF was statistically significant in distinguishing between the groups, LDF: $\Lambda = .80, F(6, 230) = 4.50, p < .001$.

3. LDF2 was not explored further because it was not statistically significant. Structure correlations for LDF2 were as follows: sexual attractiveness, $r = .84$; weight concern, $r = .02$; physical condition, $r = .17$.

4. All tests were also run with increasingly smaller subsamples of the non-athlete group. The pattern of findings was consistent with that of the original non-athlete sample.

References


