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Collegiate female athletes' body image and clothing behaviors

Mary Claire Nemeth¹, Huiju Park^{2*}  and Jane Mendle³

*Correspondence:

hp347@cornell.edu

² Associate Professor,
Department of Fiber Science
& Apparel Design, College
of Human Ecology, Cornell
University, 131 Human
Ecology Building, 37 Forest
Home Drive, Ithaca, NY
14850, USA

Full list of author information
is available at the end of the
article

Abstract

This study investigated the body image experiences unique to collegiate female athletes in relation to their apparel wear. Female athletes ($n = 36$) participated in interview sessions, 3D body scanning, and photography of garment fit, and the Multidimensional Body-Self Relations Questionnaire (MBSRQ). Through Qualtrics, the MBSRQ was distributed to female college students nationwide, to obtain a larger participant pool (Lean sport athletes ($n = 36$), non-lean sport athletes ($n = 42$) and non-athletes ($n = 101$)). Results indicated that both sports groups were most influenced by sport specific body ideals. Correlation of body image and athletic uniforms was more influenced by the fit of the uniform than by the categorization of the sport. Both lean and non-lean sport group participants expressed dissatisfaction in pant fit. 3D body scans revealed similar body proportions and shape between sports groups. MBSRQ results indicated no significant difference between sports groups but higher body image scores in comparison to non-athletes.

Keywords: 3D body scanning, Apparel fit, Athletic uniforms, Body image, Female athletes

Introduction

Female athletes find themselves particularly at odds with the cultural body ideal. While a more muscled body has become increasingly important in the ideal female body aesthetic (Grogan 2008), not all muscle tone is regarded as gender appropriate for women and deemed culturally unattractive (Choi 2000). Previous studies suggest that female athletes struggle with the contradiction of desiring strength and athletic success, but not developing 'oversized' muscles. Their athletic bodies may become a source of concern and body dissatisfaction in social settings (Krane et al. 2004; Russell 2004). A female athlete may experience a discrepancy between her current body and her ideal body as well as a discrepancy between her current body and her ideal sport body, which may differ from the cultural ideal.

In particular, Rudd and Carter (2006) outline a variety of body image pressures that college athletes experience directly related to their sport including:

1. Gender: Female athletes are overwhelmingly more at risk for eating disorders than male athletes.

2. Link between weight/body fat and performance: A belief exists that body fat and/or weight reduction will enhance athletic performance.
3. Athletic body stereotypes: Particular body shapes and sizes have come to characterize certain sports.
4. Desired athletic characteristics vs. disordered behaviors: A narrow line exists between admirable athletic traits such as strong work ethic and characteristics associated with disordered behaviors such as excessive exercising despite pain or injury.
5. Type of Sport: Sports that emphasize leanness as an aesthetic and/or competitive advantage possess higher rates of disordered eating behaviors.

Literature categorizes sports as 'lean sports' (sports in which athletes place a competitive and/or aesthetic value on leanness) and 'non-lean sports' (sports in which body weight and aesthetic appearance are less central to athletic success) (Rudd and Carter 2006). Lean sports include cross country, equestrian, figure skating, and gymnastics (Gordon and LeBoff 2015). Basketball, volleyball, soccer, field hockey, softball, golf, football, tennis, lacrosse, and hockey are categorized as non-lean sports (Gordon and LeBoff 2015). Collegiate female athletes, particularly lean sport athletes, experience a greater risk for disordered eating than non-athletes (Smolak et al. 2000).

Additionally, female athletes experience unique body image concerns relating to their apparel wear (Krane et al. 2004). Chattaraman and Rudd (2006) discovered strong connections between clothing fit and body image. Low body image and an increase in body size correlate with a preference for greater body coverage in clothing. Clothing can improve an individual's body satisfaction and acceptance (Feather et al. 1996). However, clothing can also induce negative feelings about the body. When clothing does not fit an individual correctly, the individual may perceive the cause as related to the body and not the clothing, which manifests itself into negative feelings about the body (Labat and DeLong 1990). Therefore, a female athlete's clothing, whether her athletic uniform or the clothing she wears in a non-athletic setting, can serve as a positive or negative influence on body image. Satisfaction with uniform fit correlates with satisfaction with the body (Feather et al. 1996). Krane et al. (2004) found that female athletes felt more ready to compete when wearing their uniform- likening putting the uniform on to 'putting on their gameface' (pp. 89). This indicates that clothing has the potential to improve an individual's body image and self-esteem.

Considering collegiate female athletes' existing body image pressures and the significant impact of clothing on body image, this study (1) assessed their body image in connection with their apparel, (2) analyzed their anthropometric data (3) compared the body image of collegiate female athletes and collegiate non-athletes, and (4) provided implications to the fashion and sportswear industry.

Method

Interviews

Thirty-six Division I collegiate female athlete (age: 18–22) from a National Collegiate Athletic Association (NCAA) Middle Atlantic university participated in the study with approval of Institutional Review Board. Of the three NCAA divisions, Division I schools typically have the largest student population and athletic budgets and offer the most

Table 1 Frequency distribution of female athlete participants

Sport	<i>n</i>	%
Basketball	8	22.2
Cross country	9	25.0
Rowing (open-weight)	16	44.4
Volleyball	3	8.3

Table 2 Frequency distribution of lean sport and non-lean sport

Category	Sport	<i>n</i>	%
Lean sports	Cross country	12	33.3
	Rowing coxswains		
Non-lean sports	Basketball	24	66.7
	Rowing		
	Volleyball		

substantial number of scholarships (National Collegiate Athletic Association 2017). Sports represented included basketball, cross country, open-weight rowing, and volleyball (Table 1).

Based on literature review, basketball, rowing, and volleyball participants were categorized as non-lean sport athletes and cross country participants were categorized as lean sport athletes. While rowers were categorized as non-lean sport athletes, rowing coxswains, the individuals who steer the boat, were categorized as lean sport athletes due to their position's emphasis on leanness. Therefore, the participant groups was made up of 12 lean sport athletes, and 24 non-lean sport athletes (Table 2).

Participants were asked 10 questions (Table 3) relevant to her sport, her body satisfaction, her apparel wear, and the fashion industry. Questions were derived from and inspired by interview questions published in 'Role of uniforms in the body image of female college volleyball players (Steinfeldt et al. 2013).

The interview questions were developed (1) to identify which factor most strongly influence the body image of female athletes and (2) to determine the relationship between their clothing and body image. Additional questions were asked to assess garment fit concerns and preferences, and the level of satisfaction with current imagery projected by social media and the fashion industry.

The fit of athletic uniforms worn by participants are categorized using McCullough's (2007) system for uniform fit categorization (Table 4). 'Tight fit' reveals the shape of the body like a "second skin." 'Form-fit' drapes the body in a way that suggests the shape of the body without conforming direct to the shape of the body. 'Loose fit' clothing drapes off the body to the point of concealing the body's shape.

For the purpose of visually illustrating garment fit issues, participants were photographed wearing garments which with they consistently experienced fit concerns. In addition, each female athlete participated in a 3D body scan using the Human Solutions Scanner (Human Solutions, Kaiserslautern, Germany) to compare the body proportions between lean and non-lean sport groups. Key body measurements (bust, waist, and hip girth; shoulder width; inseam length) were selected to provide an understanding of body

Table 3 Interview questions

Assesses	Questions
Body image pressures Inherent to sport Body shape ideals within sport	1. For your sport, is it necessary to maintain a certain weight? Is there a particular advantage to being a certain body type/body shape? If so, do you feel this body type applies to your own body?
Body image in athletic uniform Body image in athletic uniform in comparison to teammates and competitors wearing athletic uniform	2. Explain how your athletic uniform contributes to how you feel about your body. Do you like how you look in your uniform? 3. Have you ever felt like you needed to do anything to change your body in order to look better in your uniform in front of other people? 4. Explain how the way your teammates and competitors look in their uniform impact how you feel about your body
Body image in nonathletic wear Body image in comparison to non-athletic women	5. How do you think you look in the clothing you wear outside of sports related activity? Do you like how you look in the clothing you wear outside an athletic environment? 6. How do you feel about your body in non-athletic wear, particularly in comparison to women who do not play sports?
Garment preferences Garment fit concerns related or unrelated to sport	7. Can you describe your favourite styles of garments? What type of silhouette do you enjoy wearing? 8. How easily can you find well-fitting garments (pants, shirts, jackets, dress, etc.?)
Impact of a social media trend	9. Are you aware of the “thigh-gap trend”? If so, how do you feel about it?
Level of satisfaction with imagery projected by current fashion industry	10. What body types/body shapes would you like to see represented by the fashion industry?

Table 4 Athletic uniforms worn by participants

Sport	Uniform	Categorization
Basketball	Semi-fitted sleeveless tank Very loose athletic shorts that extend to the knee	Loose fit
Volleyball	Tight, long sleeve spandex shirt Short spandex shorts	Tight fit
Rowing (including coxswains)	Tight spandex unisuits Bodice is sleeveless; the shorts of the unisuit stop at the mid-thigh	Tight fit
Cross country	Tight sleeveless tank Choice between very short spandex or briefs	Tight fit

shape of participants. These measurements are also considered essential measurements for design and construction of common garments (Joseph-Armstrong 2010). Additionally, thigh, calf, upper arm girth and across back width measurements were selected to address specific garment fit concerns discussed by the female athletes during interview sessions.

Height, weight, and BMI were also recorded. A BMI calculation is unable to differentiate between body fat and muscle and does not account for differences in body composition. Therefore, highly muscular people (e.g. competitive athletes) may fall into the overweight or obese category because of their high levels of muscularity which causes them to weigh densely despite having low body fat content. (Center for Disease Control

and Prevention 2015a). Waist circumference and waist/hip ratio are also used as indicators of obesity and cardiovascular risk. A waist measurement of below 88.9 cm and a waist/hip ratio below 0.85 are also considered indicators of a healthy body composition for women (Center for Disease Control and Prevention 2015b; World Health Organization 2011).

Multidimensional Body-Self Relations Questionnaire

Participants completed the Multidimensional Body-Self Relations Questionnaire (MBSRQ), a 69-question body image survey (Table 5) developed by Cash and his colleagues (Brown et al. 1990) for the assessment of the multiple components of body image (Thompson et al. 1999).

The MBSRQ includes ‘factor subscales’ that assess attitudes towards appearance, fitness, and health. In addition, the questionnaire includes three special subscales: The Body Areas Satisfaction Scale, the Overweight Preoccupation Scale, and the Self-Classified Weight Scale. This questionnaire is particularly interesting in the context of the female athlete. For optimal athletic performance, her involvement in competitive sports potentially creates a greater preoccupation with appearance, fitness, and health compared to non-athletes. For this study, non-athletes were defined as any student not a member of a Division I sports team. Through Qualtrics (Qualtrics 2005), the MBSRQ was distributed to 143 female college students (age: 18–25) nationwide, to obtain a larger participant pool of Division I collegiate female athletes and collegiate female non-athletes. The 36 MBSRQ paper survey responses were combined with the online sample. The distribution is demonstrated in Table 6. For statistical analysis of data, two different methods were used based on the number of participants in each group. In the case of focus group interview and 3D body scanning study with fewer than 30 participants per group (lean sports and non-lean sport groups), Mann–Whitney U test, which is a non-parametric test, was performed as presented in Tables 7, 9, 10. In the case of Qualtrics online survey ($n = 143$) and interview study ($n = 36$) with more than 30 participants per

Table 5 MBSRQ scales

Scale	Assesses
Appearance Evaluation (AE)	Feelings of physical attractiveness or unattractiveness; satisfaction or dissatisfaction with one’s looks
Appearance Orientation (AO)	Extent of investment in one’s appearance
Fitness Evaluation (FE)	Feelings of being physically fit or unfit
Fitness Orientation (FO)	Extent of investment in being physically fit or athletically competent
Health Evaluation (HE)	Feelings of physical health and/or the freedom from physical illness
Health Orientation (HO)	Extent of investment in a physically healthy lifestyle
Illness Orientation (IL)	Extent of reactivity to being or becoming ill
Body Area Satisfaction (BASS) ^a	Satisfaction with discrete aspects of one’s appearance
Overweight Preoccupation (OWP)	Construct reflecting fat anxiety, weight vigilance, dieting, and eating restraint
Self-Classified Weight (SCW) ^b	How one perceives and labels one’s weight, from very underweight to very overweight

Participants ranked items of appearance on a Likert type scale from 1 (very dissatisfied) to 5 (very satisfied)

^a Participants responded with one of the following: “Never (1);” “Rarely (2);” “Sometimes (3);” “Often (4);” or “Very often (5).”

^b Participants responded with one of the following: “Very underweight (1);” “Somewhat underweight (2);” “Normal weight (3);” “Somewhat overweight (4);” “Very overweight (5)”

Table 6 Categorization of all MBSRQ participants

Lean sport (n = 36)			Non-lean sport (n = 42)			Non-athletes (n = 101)
Sport	n	%	Sport	n	%	
Cross country	10	27.8	Basketball	8	19.0	
Equestrian	10	27.8	Fencing	1	2.4	
Gymnastics	4	11.1	Field hockey	3	7.1	
Rowing (coxswains)	3	8.3	Lacrosse	3	7.1	
Swimming and diving	7	19.4	Rowing	13	31.0	
Track and field (running events)	2	5.6	Soccer	4	9.5	
			Softball	2	4.8	
			Tennis	4	9.5	
			Volleyball	4	9.5	

group, ANOVA (analysis of variance) was performed as shown in Tables 11, 12. This was followed by post-hoc multiple comparisons with Bonferroni corrections.

Results

Collegiate female athletes' body image and the influence of their apparel

This study found that basketball and volleyball players do not experience pressure to maintain a specific body weight which supports their non-lean sports categorization. However, rowers experience weight pressures as indicated by the frequently discussed concept of 'weight efficiency'. Rowers strive to achieve a balance between great physical strength and leanness. Rowing Participant #5 explains that '... there is a huge advantage to being tall and being thick, but not necessarily overweight. Big boned, high muscle content, and low fat content'. All rowing participants discussed a particular weight range that their coach suggested they maintain.

Both lean sports (cross country and rowing coxswains) experience pressure to be lean and light. Strength and athleticism, however, is much more important for cross country runners than for rowing coxswains. Cross country participants also discussed experiences with the conditions of the Female Athlete Triad most frequently out of all of the participating sports. Several cross country participants shared their experiences with disordered eating behaviors, bone injuries due to low bone density, and amenorrhea.

Cross country Participant #2 spoke candidly about disordered eating on the team:

"I would say half the team has orthorexia . . . orthorexia is when you're overly concerned about health and reading every label and everything. Orthorexia often leads to other eating disorders. I would say about half the team has that and there are definitely five girls on the team that are currently dealing with eating disorders of some sort."

Cross country Participant #16 discussed her own experience with disordered eating the previous year.

"I didn't think I was eating improperly; I thought I was doing the right thing. It just wasn't enough and everyone told me it wasn't enough. But I thought 'I know what's best for me, I know this is ok' and it just wasn't."

This particular athlete experienced a fractured pelvis due to her low bone density and was forced to take a significant time off running. She described disordered eating on Division I cross country teams as ‘epidemics,’ explaining how eating together in college dining halls can influence disordered eating behaviors. She said: ‘If someone is running really well at the time and she’s eating very little, you think: she must be doing something right.’ Additionally, for both lean and non-lean sport athletes, the desire to possess the body best for their sport consistently outweighed the desire for the cultural body ideal. Cross country Participant #7 explains:

“I definitely do not have as many curves as most girls my age. It would be nice to have some more. But then it’s like a trade-off. Being curvier would most-likely mean not being as good as an athlete. So, it’s a tradeoff that I’m willing to make.”

However, 22 out of the 36 participants (lean—7; non-lean—15) did not believe they possessed the ideal body shape for their sport.

Positive body image in athletic uniforms is closely related to garment fit, rather than the categorization of lean or non-lean sports. The majority of basketball participants felt confident in their loose fitting athletic uniforms. The majority of rowers, coxswains, volleyball players, and cross country runners expressed discontentment with their athletic uniforms because of the body revealing qualities of the uniform. Volleyball Participant #38 described the uniform as ‘very short, very tight, and very revealing.’ Throughout the game, all volleyball participants stated that they find themselves continually readjusting their uniform, complaining that the spandex shorts are too short and constantly ride up their legs.

All cross country participants discussed some level of discomfort wearing their uniform which includes brief style bottoms, frequently referred to as ‘buns.’ Unsure of the necessity of the revealing uniform, Cross Country Participant #9 states: ‘It’s just the uniform, that’s just what we have to wear. I would prefer looser fitting ones because I don’t really think the ‘buns’ make you faster, it’s just what everyone wears.’ Multiple cross country participants discussed the idea that opponents that appear small, lean, and strong are visually intimidating. The revealing cross country uniform highlights these attributes. Three cross country participants discussed desiring a “loose uniform”. While the spandex uniform is supposed to be tight, these participants described an opponent’s loose uniform as an indicator of speed- the idea that she is so slim that her spandex uniform fits loosely. However, two other participants mentioned that they have concerns that the athlete is at greater risk for injury when the uniform is too loose.

Despite the athlete’s discomfort wearing the uniforms, the majority of the participants stated their ability to ignore these insecurities while performing in their sport. The female athlete participants believed that performing athletically well is of greater importance than their physical appearance.

Participants from both lean and non-lean sports most frequently discussed the problem of finding proper fitting pants that fit in the waist but provide extra room for the muscular development of their leg and gluteal muscles (Fig. 1a).

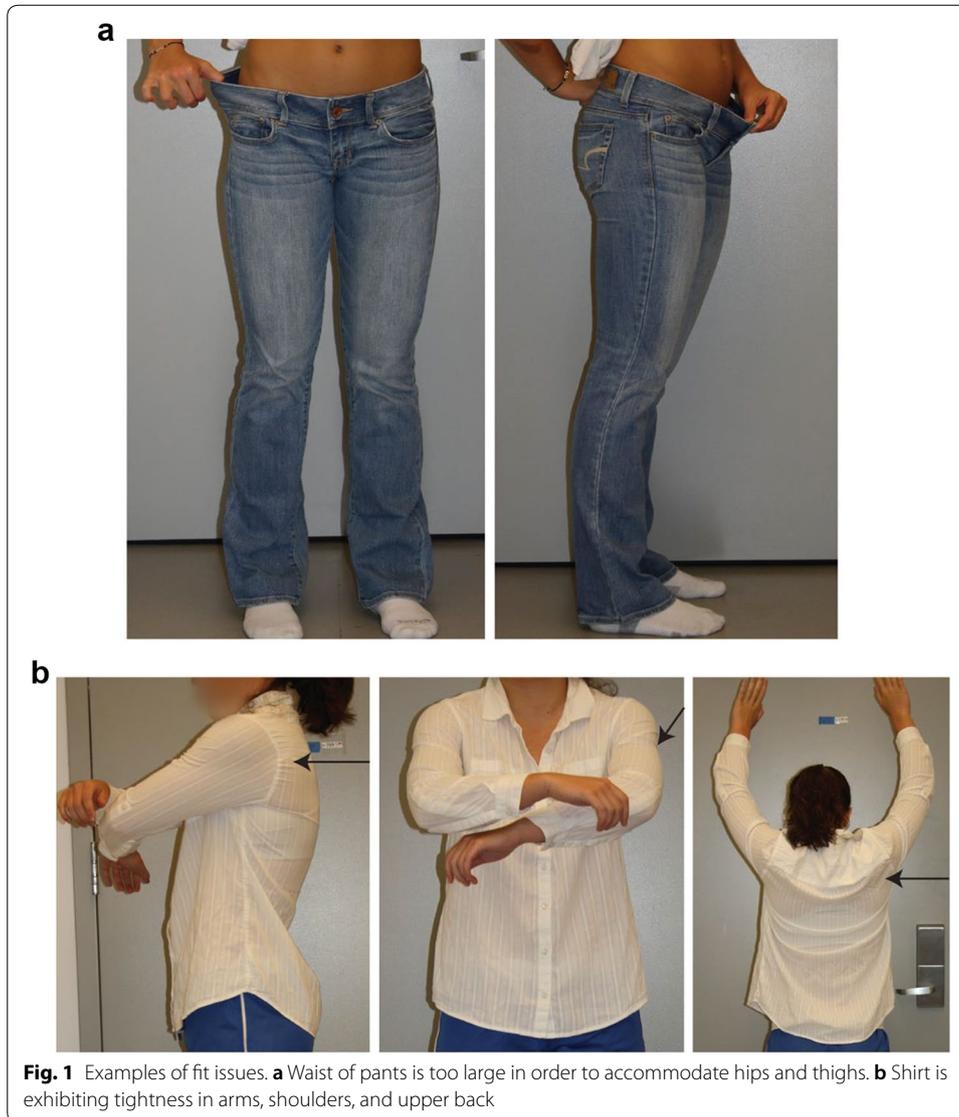


Fig. 1 Examples of fit issues. **a** Waist of pants is too large in order to accommodate hips and thighs. **b** Shirt is exhibiting tightness in arms, shoulders, and upper back

Rowing and basketball participants experienced additional clothing fit issues. These concerns included tightness in the arms, shoulders, and back with woven shirts due to increased upper body musculature (Fig. 1b).

In addition, participants from sports that value height (basketball, rowing, and volleyball) discussed the difficulty in finding garments of sufficient length. While some apparel companies directly address the garment length concern for taller women, participants discussed concern about their affordability. These participants were similarly frustrated with the problem of garments that increased simultaneously in size and width, resulting in garments that were too large when sufficient length was obtained. All non-lean athletes discussed how their clothing tends to fit more comfortably when they are not heavily training and weight-lifting. The decrease in musculature provides more comfort in non-athletic wear.

Table 7 Estimated mean (Est. mean), standard error (S. E.), and p value of height, weight, and BMI of lean sport and non-lean sport athletes

	Lean (n = 12)		Non-lean (n = 24)		p value
	Est. mean	S.E	Est. mean	S.E	
Height (cm)	166.296	1.483	176.345	2.097	< 0.001
Weight (kg)	56.712	2.297	71.628	1.624	< 0.001
BMI	20.467	0.528	22.992	.374	< 0.001

p value is the results of exact Mann–Whitney U test

Table 8 Minimum, maximum, mean, and standard deviation (SD) for height, weight, BMI, waist circumference, and waist/hip ratio of lean sport and non-lean sport athletes

Measurement	Lean (n = 12)				Non-lean (n = 24)			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Height	160.02	179.07	166.30	5.69	160.02	190.50	176.34	7.91
Weight	49.94	67.19	56.71	5.89	55.39	88.53	71.63	8.77
BMI	18.90	23.30	20.47	1.43	19.70	27.40	22.99	1.99
Waist (cm)	66.34	79.96	72.80	4.05	72.59	91.01	80.00	4.67
Waist/hip ratio	0.72	0.79	0.75	0.02	0.69	0.83	0.76	0.03

Body image experts consider the ‘thigh gap’ trend a harmful body-image obsession found across social media (Salter 2013). The ‘thigh gap’ trend is the desire of a woman to become so slender that when she stands with her feet together, her thighs do not touch, creating a gap between her legs. For this study, the majority of participants (lean—9; non-lean—23) regarded the ‘thigh gap’ trend as insignificant to their body image, and valued their strength and fitness over this aesthetic trend. However, three cross country participants referred to the ‘thigh gap’ as advantageous for their sport, stating the greater facility in running without their thighs rubbing together. Finally, all participants except for one (lean—11; non-lean—24) indicated a desire for more athletic bodies portrayed in fashion. These participants appreciated the more athletic bodies depicted in athletic company advertisements, and desired to see more of these bodies advertising everyday clothing.

Anthropometric data analysis of collegiate female athletes

The non-lean sport group possessed statistically significant higher estimated means for height, weight, and Body Mass Index (BMI) (Table 7). For both sport groups, the estimated means were categorized as healthy BMIs, but results indicated that the maximum BMI for non-lean sports group (27.40) was over the prescribed healthy range (Table 8).

However, a BMI calculation is unable to differentiate between body fat and muscle and does not account for differences in body composition. Therefore, highly muscular people (e.g. competitive athletes) may fall into the overweight or obese category because of their high levels of muscularity which causes them to weigh densely despite having low body fat content. (Center for Disease Control and Prevention 2015a).

Waist circumference and waist/hip ratio are also used as indicators of obesity and cardiovascular risk. A waist measurement of below 88.9 cm and a waist/hip ratio below 0.85 are also considered indicators of a healthy body composition for women (Center for Disease Control and Prevention 2015b; World Health Organization 2011). The maximum waist circumference for non-lean sports group (91.01 cm) was above the prescribed healthy limit. However, all female athlete participants' waist/hip ratio fell within the healthy range (<0.85), supporting the idea that a variety of tools should be used in the assessment of overall health.

Key body measurements (bust, waist, and hip girth; shoulder width; inseam length) were selected to provide an understanding of body shape of participants. These measurements are also considered essential measurements for design and construction of common garments (Joseph-Armstrong 2010). Additionally, thigh, calf, upper arm girth and across back width measurements were selected to address specific garment fit concerns discussed by the female athletes during interview sessions.

Non-lean sports participants had a statistically significant higher means for bust, waist, hip, thigh, calf, upper arm girth, across back width and inseam length than lean sport athletes (Table 9). In combination with height, weight, and BMI results discussed previously, these results indicate that non-lean sport athletes are overall larger individuals than lean sport athletes.

However, because of the variance in the participants' height and body size, ratios of body measurements provided a better indication of overall body shape than linear measurements. Bust, hip, thigh, calf, and across back width were divided by the participant's waist measurement to create these ratios (Table 10).

Results of the body measurements ratio comparison did not indicate any statistical difference between the two groups except calf/waist ratio. Lean sport participants showed a statistically significantly greater calf/waist ratio (0.487) than non-lean sport participants (0.473). This means the overall body shape of lean and non-lean sport participants display very similar ratios in body girth and proportion.

Table 9 Estimated mean, standard error and *p* value for key body measurements of lean sport and non-lean sport athletes

Measurement	Lean (<i>n</i> = 12)		Non-lean (<i>n</i> = 24)		<i>p</i> value
	Estimated mean	Standard error	Estimated mean	Standard error	
Bust girth	85.302	1.382	93.446	0.977	<0.001
Waist girth	72.805	1.294	79.997	0.915	<0.001
Hip girth	96.647	1.602	105.815	1.133	<0.001
Thigh girth	54.536	1.196	60.129	0.845	0.001
Calf girth	35.471	0.603	37.793	0.427	0.002
Upper arm girth	25.762	0.535	28.971	0.378	<0.001
Across back width	37.279	0.664	39.576	0.470	0.012
Shoulder width	14.669	0.606	14.311	0.429	0.804
Inseam	75.252	1.483	79.454	1.049	0.024

p value is the result of exact Mann–Whitney U test

Table 10 Estimated mean (Est. mean), standard error (S.E.), and *p* value of key body ratio measurements of lean sport and non-lean sport athletes

	Lean (<i>n</i> = 12)		Non-lean (<i>n</i> = 24)		<i>p</i> value
	Est. mean	S.E	Est. mean	S.E	
Bust/waist	1.172	0.014	1.170	0.010	0.631
Hip/waist	1.328	0.014	1.324	0.010	0.631
Thigh/waist	0.753	0.010	0.752	0.007	0.779
calf/waist	0.487	0.007	0.473	0.005	0.029
Across back width/waist	0.512	0.008	0.496	0.006	0.120

p value is the results of exact Mann–Whitney U test

Table 11 Estimated mean (Est. mean), standard error (S.E.), *F* value, and *p* value of height, weight, and BMI of all participants

Measurement	Lean (<i>n</i> = 36)		Non-lean (<i>n</i> = 42)		Non-athletes (<i>n</i> = 101)		<i>F</i>	<i>p</i> value
	Est. mean	S.E	Est. mean	S.E	Est. mean	S.E		
Height	165.146 ^a	1.323	173.038	1.225	163.767 ^a	0.790	20.644	< 0.001
Weight	59.167 ^a	1.877	66.795	1.738	61.155 ^a	1.121	5.223	0.006
BMI	21.738	0.653	22.248	0.605	22.827	0.390	1.114	0.331

Estimated means with the common letter a in the same row are not significantly different from each other (Bonferroni, $\alpha = 0.05$)

Assessing the body image of collegiate female athletes and collegiate non-athletes

Table 11 analyzes the anthropometric data results of all 179 participants collected from interview participants (*n* = 36) and Qualtrics online survey (*n* = 143). For height and weight, the estimated means for non-lean sport athletes was significantly higher than both lean sport athletes and non-athletes. However, there was no significant difference among BMI for all three groups.

Table 12 analyzes the MBSRQ scale results of all 179 participants.

MBSRQ subscales AE (Appearance Evaluation), AO (Appearance Orientation), FE (Fitness Evaluation), FO (Fitness Orientation), HE (Health Evaluation), BASS (Body Areas Satisfaction Scale), and OWP (Overweight Preoccupation) all produced statistically significant results. The AE scale indicated that non-lean athletes have a statistically higher satisfaction with appearance in comparison to non-athletes. However, the AO scale indicated that non-lean athletes possess a statistically lower investment in their appearance. While non-lean athletes were more apathetic about their appearance compared to non-athletes, they had the greatest satisfaction in their appearance among all groups. BASS scale results indicated that both lean and non-lean sport groups were more satisfied with their bodies compared to non-athletes.

Both lean and non-lean sport groups possessed a statistically higher score for FE and FO in comparison to non-athletes. The FE scale indicated that both sport groups felt more physically fit and athletically competent than the non-athlete group. The FO scale indicated that both lean and non-lean sport groups valued fitness and were actively involved in activities to maintain their fitness more so than non-athletes.

Table 12 Estimated mean, standard error, *F* value, and *p* value of MBSRQ scales for all participants

Scale	Lean (<i>n</i> = 36)		Non-lean (<i>n</i> = 42)		Non-athletes (<i>n</i> = 101)		<i>F</i>	<i>p</i> value
	Estimated mean	Standard error	Estimated mean	Standard error	Estimated mean	Standard error		
AE	3.575 ^{ab}	0.128	3.687 ^a	0.118	3.233 ^b	0.076	6.275	0.002
AO	3.634 ^{ab}	0.094	3.450 ^a	0.087	3.783 ^b	0.056	5.259	0.006
FE	4.156 ^a	0.110	4.210 ^a	0.102	3.327	0.065	37.460	<.001
FO	4.576 ^a	0.106	4.446 ^a	0.099	3.257	0.064	84.753	<.001
HE	3.963 ^a	0.109	4.024 ^a	0.101	3.452	0.065	15.275	<.001
HO	3.664	0.095	3.603	0.088	3.470	0.057	1.872	0.157
IL	3.344	0.123	3.390	0.114	3.398	0.073	0.071	0.931
BASS	3.586 ^a	0.107	3.646 ^a	0.099	3.215	0.064	8.804	<0.001
OWP	2.847 ^{ab}	0.150	2.381 ^a	0.139	2.896 ^b	0.089	5.052	0.007
SCW	3.000	0.095	3.048	0.088	3.178	0.057	1.644	0.196

Estimated means with the common letter *a* in the same row are not significantly different from each other (Bonferroni, $\alpha=0.05$)

HE scale results revealed that both sport groups had significantly greater feelings of physical health than non-athletes. However, the HO (Health Orientation) scale indicated no significant difference in investment in a healthy lifestyle by any of the three groups. Despite feeling physically healthier than non-athletes, both sport groups were not investing any more in their health than non-athletes. This may indicate that the greater feelings of physical health experienced by both sports groups is influenced by their investment in physical fitness (FO).

According to OWP scale results, non-athletes and lean sport athletes possessed a statistically higher occurrence of overweight preoccupation compared to non-lean sport athletes. The estimated means of lean sport athletes (2.847) was similar to non-athletes' estimated mean (2.896) and statistically higher than non-lean sport athletes' (2.381).

Overall, as indicated by scales AE, FE, HE, and BASS, both lean and non-lean sport athletes experienced greater satisfaction with their appearance, fitness, health, and overall bodies in comparison to non-athletes.

Discussion

Implications to the fashion and sportswear industry

Body image results are observed through Self-Discrepancy Theory (Higgins 1987). Self-Discrepancy Theory proposes consequences occur when individuals compare her 'actual' self versus her 'ideal' self and discovers that a discrepancy exists between the two. In this study, sport specific body ideals, rather than the cultural body ideal, were most influential for both lean and non-lean female athletes. This may be due to the value they invest in their athleticism. Participants were more likely to compare their bodies with fellow athletes rather than non-athletes. The results of the FE (Fitness Evaluation) and FO (Fitness Orientation) subscales of the MBSRQ revealed a significantly higher level of investment in physical fitness demonstrated by both sport groups in comparison with non-athletes. However, sport specific body ideals vary from sport to sport. As an example, a small, lean body may be greatly valued on the cross country course but not on the

basketball court. Therefore, the root of a women's level of body satisfaction will differ between sports (Furnham et al. 1994).

Interview discussions of the 'thigh gap' trend indicate the strong influence of sport-specific body ideals for the female athlete participants. The majority of athletes were unaffected by the trend because it contradicted with their athletic need for muscular legs. Additionally, of the few athletes that desired the 'thigh gap', the majority were cross country participants. Given the physical demands of long distance running, slim thighs that do not touch while running decreases the possibility of uncomfortable chafing of skin. Therefore, this desire for the social media trend is more rooted in striving for athletic excellence and less rooted in adhering to cultural appearance standards. Additionally, the vast majority of participants requested that more athletic looking models be represented in the fashion industry. This further supports the influential impact of the athletic body shape ideal.

Self-Discrepancy Theory indicates that a discrepancy between the 'actual' and the 'ideal' self causes dejection-related emotions such as body dissatisfaction (Higgins 1987). This can encourage an individual to participate in behaviors, such as disordered eating, that will reduce the discrepancy. Studies have shown that athletes have more concern with body image issues and with eating and dieting than non-athletes (Brownell and Rodin 1992). Lean sport athletes are more at risk for eating problems than non-athletes (Rudd and Carter 2006). Harmful psychological effects of idealized bodies within athletics can occur and raises a need for more realistic body expectations among female athletes (Robert-McComb et al. 2008).

In this study, MBSRQ results indicated that lean and non-lean sport groups possessed greater satisfaction in appearance, fitness, health, and their bodies in comparison to non-athletes. However, the majority of participants believed that they did not possess the ideal body shape for their sport. This indicates that while female athletes experience a discrepancy between their body and their 'ideal' body, other factors may work to decrease the effects of this discrepancy. A female athlete achieves athletic success due to her physical fitness and athletic ability, not how well her body conforms to her sports' body shape ideal. Valuing athleticism over appearance may help to reduce the effects of an observed discrepancy. This supports the idea that exercise possesses the potential to improve body satisfaction (Grogan 2008). Research indicates that physically active women have a more positive body perception and an increased acceptance of their muscularity (Furnham et al. 1994). Additionally, this study did not include specific eating behavior questionnaires. While some athletes discussed personal eating problems during the interview sessions, eating behaviors were not measured through the use of eating behavior tests such as the Eating Attitudes Test (Garner and Garfinkel 1979).

Interview discussions indicated that revealing uniforms contributed to the greatest feelings of body self-consciousness among participants. However, participants discussed an ability to ignore body image concerns while participating in their sport. The female athlete participants understood that performing athletically well is of greater importance than their physical appearance. Women who disregard the idea that their physical attractiveness determines their self-worth may have a more positive view of their bodies than other women do (Dionne et al. 1995). However, body image concerns should not be magnified by a revealing uniform fit. Interview sessions found that the loose fitting

basketball uniform contributed to the athletes' self-confidence. Because of the way in which the garment drapes off the body, concealing its shape and hiding 'imperfections,' participants did not feel body conscious in the uniform. All basketball participants stated that their uniform did not influence a desire to change something about their body. The uniform also helped to make body image concerns much less predominant. This supports research that clothing contributes to a more positive body image (Feather et al. 1996) and expands the acceptability of a variety of body shapes because bodies become more uniform in appearance in loose clothing (McCullough 2007). This indicates an area in which the sportswear industry can effectively improve the body image of female athletes. While certain attributes of revealing uniforms are necessary (e.g. rowing uniforms), some arguably are not (e.g. length of the spandex volleyball shorts). The sportswear industry should reconsider the necessity of revealing athletic uniforms and find ways to make the uniform more comfortable for the wearer. In this way, she can best focus on her sport, not her uniform. Additionally, international governing bodies for sports who possess control over uniform regulations should collaborate with the sportswear industry to discover ways in which to improve the athletic uniform.

Interview discussions of satisfaction with non-athletic apparel revealed similarities between lean and non-lean sport groups. The most predominant discussion involved difficulty in finding proper fitting pants for their muscular lower bodies. This similarity in response among lean and non-lean sport participants is supported by anthropometric data results. While linear measurements of female athletes indicated that non-lean sport participants were significantly bigger individuals (taller, larger, and heavier) than lean sport participants, the ratios of key body measurements revealed similar body proportions between the two groups. This may suggest that female athletes' apparel fit issues, particularly for non-athletic wear, exist as a result of the differences between the body proportions of athletes and non-athletes. Some apparel companies (e.g. Barbell Apparel) are directly addressing the pant fit concern experienced by athletes. They have developed pants that allow sufficient room in the buttock and thigh area yet taper sufficiently in the waist (Payne 2014). Anthropometric results from this study suggests that Barbell Apparel is correct in generalizing the female athlete, rather than targeting specific types of female athletes. The participants possessed similar body proportions despite their sport categorization. However, pant fit is a common female clothing fit issue and not entirely unique to female athletes. There has been an influx of clothing companies addressing the array of women's body shapes and generating pants to fit unique body types (e.g. Levi's Curve ID). Future research would benefit from analyzing the anthropometric data of female athletes versus female non-athletes.

Non-lean sport athletes experienced greater self-consciousness while wearing non-athletic clothing. Participants from basketball, rowing, and volleyball (all sports in which height is greatly valued) discussed feeling confident about their height within the context of their sport, but self-conscious about their height in other social settings. Many of these non-lean athletes experienced difficulty in finding garments with sufficient length (including pants, shirts, skirts, and dresses) which is supported by anthropometric results. The non-lean participants are significantly taller than the average woman. The ASTM standards for the Adult Female Misses Figure Type (size range 00–20) is based off of a 166.37 cm (5 ft. 5 in.) individual, 65% of the average USA population (ASTM

D5585-11e1 2011). This height is significantly shorter than the estimated means for the non-lean sports groups (176.35 cm and 173.04 cm respectively). Most likely, garment length concerns experienced by non-lean athletes arise due to their situation as outliers in the apparel industry demographics. Female athletes discussed two main problems regarding apparel companies addressing the garment length issue for taller women. First, garments that simultaneously increase in size and width result in garments that are too large when sufficient length is obtained. Second, the higher price of these more specialized garments limits accessibility. When proper fitting clothing is difficult to find, female athletes are reminded of the discrepancy between their bodies and the bodies of non-athletic women (Krane et al. 2004). In order to positively affect the body image of female athletes, the apparel industry needs to address the height and body proportions of female athletes and provide affordable options.

Conclusion

In this study, female athletes had a more positive body image than non-athletes. They may have been able to reduce the importance of their body image concerns by focusing on other aspects of themselves, such as placing greater value in their athletic ability and physical fitness. Due to this value on athleticism, female athletes were more influenced by sport specific body ideals than the cultural body ideal. However, interview discussions still revealed body image concerns. The vast majority of female athlete participants desired to see more 'athletic looking' models represented in fashion. This indicates that female athletes still desire ways in which to reduce the discrepancy between their body and the cultural body ideal. Female athletes have a unique body discrepancy experience. They may experience a discrepancy with their sport ideal as well as a discrepancy with the cultural ideal.

Female athletes that wore revealing uniforms felt uncomfortable, but were able to ignore their insecurities to focus on their sport. Sports should reconsider the necessity of body revealing uniforms. It was also found that both lean and non-lean female athletes experience unique concerns with non-athletic apparel due to their increased muscularity. For athletes in sports that value height, garment length is a consistent problem.

Future study should include greater female athlete participation. To further improve apparel construction for female athletes, future research studies should include in-depth analysis of anthropometric data in which outstanding characteristics of the female athletes' bodies are compared to the average female population.

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Authors' contributions

MCN as the first author designed the research study, acquired the data, and analyzed and interpreted that data. HP and JM provided guidance for research direction and process, and were involved in the drafting of the manuscript and its revisions, and contributing important intellectual content. All authors read and approved the final manuscript.

Authors' information

Mary Claire Nemeth received her BA in Art History and Visual Arts from Columbia University, her MA in Apparel Design at Cornell University, and her MFA in Textiles from Indiana University, Bloomington. While at Cornell, she investigated the body image of collegiate athletes in relation to their apparel wear. She is currently a member of the Art Faculty at Phillips Exeter Academy in Exeter, New Hampshire.

Dr. Huiju Park is an Associate Professor of Apparel Design in the Department of Fiber Science & Apparel Design at Cornell University. He received his Ph.D. in Human Science with an emphasis on functional apparel design from Oklahoma State University. His creative design and research focus on human-centered design solutions for improved comfort, mobility, safety and functionality of clothing systems.

Dr. Jane Mendle is an Associate Professor in the Department of Human Development at Cornell University. She received her Ph.D. in clinical psychology from the University of Virginia. Dr. Mendle specializes in adolescent psychology, particularly how changes in physical appearance during adolescence correspond with changes in psychological well-being and self-concept.

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Availability of data and materials

The datasets analyzed during the current study are available from the first author on reasonable request.

Ethics approval and consent to participate

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Competing interests

The authors declare that they have no competing interests.

Author details

¹ Art Instructor, Phillips Exeter Academy, 20 Main St, Exeter, NH 03833, USA. ² Associate Professor, Department of Fiber Science & Apparel Design, College of Human Ecology, Cornell University, 131 Human Ecology Building, 37 Forest Home Drive, Ithaca, NY 14850, USA. ³ Associate Professor, Department of Human Development, College of Human Ecology, Cornell University, G52 Martha Van Rensselaer Hall, Ithaca, NY 14850, USA.

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