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Body confident coaching: a pilot randomized controlled trial evaluating the acceptability of a web-based body image intervention for coaches of adolescent girls

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ABSTRACT

Coaches influence athletes' body image, but often feel ill-equipped to address body image concerns and inadvertently perpetuate harmful body ideals. No evidence-based, empirically-tested body image intervention for coaches exists. This study evaluated the acceptability and preliminary efficacy of a novel web-based intervention (body confident coaching [BCC]), comprising five self-led 20-min modules. A pilot randomized controlled trial was conducted with 97 coaches of adolescent girls (M_{age} = 36.6yrs, SD = 10.4; 70% women). Coaches were randomized into the intervention (n = 52) or waitlist control condition (n = 45). Intervention condition participants completed baseline self-assessments (demographics, target outcomes), took part in BCC over two weeks, and completed post-intervention self-assessments (target outcomes, acceptability, adherence). Waitlist control participants completed baseline (demographics, target outcomes) and post-intervention self-assessments (target outcomes), after which they received unmonitored access to the intervention. Intervention condition participants who completed post-intervention assessments (n = 16) finished all five modules and 75% reported engaging with the additional resources. Coaches found the intervention easy to follow, appropriate, useful, and enjoyable. Preliminary efficacy analyses indicated that the intervention condition reported higher levels of self-efficacy toward body image (η_p^2 = .19), and lower levels of fat phobia (η_p^2 = .39) and gender essentialist beliefs (η_p^2 = .20) at post-intervention, compared to the waitlist condition. A limitation of this study is the small sample size and high attrition rate (51%), which may bias results. Following modifications to the intervention and trial protocol, BCC will be evaluated in a large-scale randomized controlled effectiveness trial.

Lay summary: Body dissatisfaction is common among girls in sport, but coaches are unprepared and unskilled to address these concerns, and few resources for coaches exist. A new education program was found to be appropriate, useful, and enjoyable for coaches

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and improved their ability to recognize and address athletes' body image concerns.

IMPLICATIONS FOR PRACTICE

- It is important for sport organizations to understand and recognize the relationship between athletes' body image and their broader mental health and sport performance, as well as coaches' influence on, and responsibility to address, body image concerns among their athletes and to promote body positive sport environments.
- BCC can increase coaches' self-efficacy to identify and address athletes' body image concerns, as well as reduce coaches' fat phobia and gender essentialist beliefs.
- BCC: a pilot randomized controlled trial evaluating the acceptability of a web-based body image intervention for coaches of adolescent girls

Trial Registration: This trial has been registered with ClinicalTrials.gov, a database of privately and publicly funded studies conducted around the world. Registration date: 7 April 2022; Registration ID: NCT05316558. https://clinicaltrials.gov/ct2/show/NCT05316558.

Introduction

Sport is generally seen as conducive to good physical and mental health and well-being (Biddle et al., 2019). However, athletes are also at high risk for developing body image concerns, disordered eating, and eating disorders (Gorrell et al., 2021; Kristjánsdóttir et al., 2019; Satterfield & Stutts, 2021). Such concerns are especially prevalent among athletes who identify as female, which is due, in part, to several sociocultural factors, including: how female athletes are portrayed in traditional and social media; the objectifying and ill-fitting sport uniforms offered to girls; sexual harassment from boys and men within sport environments; and an overarching pre-occupation and evaluation of female athletes' bodies by sport communities (e.g., coaches, athletic trainers) and society more broadly (Marashi et al., 2023; Murray et al., 2022; Vani et al., 2021). Furthermore, adolescence is a particularly vulnerable time for female athletes due to biological, emotional, cognitive, and social changes that occur during this developmental period and the subsequent increased focus on their developing physical bodies (Holmqvist & Frisén, 2010).

Coaches are a key influence of athletes' well-being (Roxas & Ridinger, 2016), and this extends to how athletes feel about their bodies although playing sport. Research has shown that coaches' communication and behaviors can both positively and negatively impact athletes' body image (i.e., the way an individual thinks, feels, and behaves toward their body, its appearance, and how it functions; Cash & Smolak, 2011; Coppola et al., 2014; Hardie et al., 2022; Martinez, 2022). However, at present, there are limited resources available to educate coaches about this concept, both in terms of how to identify body image concerns among their athletes and how to promote a positive body image environment among their teams and in their sport communities. Therefore, many coaches are unaware of the range of body image concerns that occur among their

teams, or the risks associated with having poor body image; subsequently, they feel ill-equipped to address such issues (Sabiston et al., 2020). Given the prevalence of body image concerns among female athletes and the influential role of coaches (Koulanova et al., 2021), evidence-based body image education programs for coaches are urgently required. This paper outlines the preliminary evaluation of a new body image intervention, which aims to increase coaches' ability to improve athletes' body image and create body positive sport environments.

Body image among athletes

Body image is a key barrier to sport participation (Sabiston et al., 2019; Slater & Tiggemann, 2010, 2011). In sport, poor body image, such as dissatisfaction with one's body weight or shape, has been proposed to be associated with the development of disordered eating and exercise practices, poor performance, and sport dropout (De Bruin et al., 2011; Sabiston et al., 2019; Slater & Tiggemann, 2010). On the other hand, positive body image—commonly defined as an overarching respect and appreciation for the body (Tylka & Wood-Barcalow, 2015)—has been identified as a protective factor. Athletes who feel more positive about their bodies are more likely to enjoy, and perform well in, sport and less likely to drop out (Sabiston et al., 2019; Soulliard et al., 2019).

Research has highlighted numerous factors associated with the sport environment that influence athletes' body image. Specifically, environments that emphasize a certain weight, body shape, and appearance; have a requirement for athletes to wear revealing or form-fitting athletic attire; and encourage appearance comparisons within and between teams have been found to be associated with more negative body image (Marashi et al., 2023; Martinez, 2022; Voelker et al., 2022). Moreover, gender biases and stereotypes have been identified as key predictors of body image concerns and a barrier to sport participation among female-identifying athletes, for example through the widespread preoccupation with, and sexualization of, female athletes' bodies and pressures for female athletes to be "feminine" in sport (Marashi et al., 2023; Murnen & Don, 2012; Reichart Smith, 2016; Riebock & Bae, 2013). On the other hand, environments that promote athlete well-being, body and appearance diversity, and body functionality—what the body is capable of doing and experiencing, rather than what it looks like (Alleva & Tylka, 2021)—have been found to be associated with more positive body image and body appreciation (Deogracias-Schleich et al., 2022; Varnes et al., 2013).

Research conducted with girls in sport also highlights the importance of coaches in influencing how athletes feel and think about their bodies during practice or competition (Lucibello et al., 2021). Concerningly, findings show that coaches often engage, intentionally or inadvertently, in negative body image practices, such as openly criticizing athletes' bodies, emphasizing weight and appearance as a marker of health, promoting a specific appearance ideal, and comparing athletes to each other or to other people (Beckner & Record, 2016; Vani et al., 2021). Furthermore, many coaches show high levels of gender essentialism—the belief that women and men are distinctly, immutably, and naturally different, such that men have an athletic and physical advantage over women (Allison, 2018; LaVoi et al., 2007; Skewes et al., 2018)—which, in turn, promotes

gender biases and stereotypes toward female athletes. In line with such findings, girls often cite coach behaviors as a key reason for sport disengagement (LaVoi, 2018; Vani et al., 2021).

Targeting coaches to address athletes' body image

Multiple body image prevention and intervention programs targeting athletes directly have been developed to address body image concerns in sport; however, such interventions show limited effectiveness, particularly in the long term (for a review, see Sick et al., 2022). Recent efforts have been made to take a systemic and multilevel approach to reduce the prevalence of body image and disordered eating concerns in sport, particularly by considering the wider environment and external influences of athletes' body image (Koulanova et al., 2021; Murray et al., 2022; Sick et al., 2022; Voelker et al., 2022). Coaches have been identified as the most proximal influences of athletes' well-being in sport settings (Langan et al., 2013; LaVoi, 2018). Indeed, coaches play a key role in sport that goes beyond athletes' performance and teaching sport-specific skills, and therefore have a significant influence on athletes' physical and mental health (Roxas & Ridinger, 2016).

Numerous Coach Development Programs (CDPs) have been developed to support coaches in a wide range of domains (Evans et al., 2015; Silva et al., 2020). However, at present, no empirically-tested body image interventions exist for coaches. Research conducted from the perspective of coaches shows that most coaches feel ill-equipped to address body image concerns among their athletes and teams and want training on how to recognize and tackle body image concerns effectively (Koulanova et al., 2021; Sabiston et al., 2020). Due to the various influences of girls' body image in sport settings, it is therefore crucial to target individual athletes as well as their coaches and wider sport organizations to ensure significant and sustainable change (Voelker et al., 2022).

The current study

This study is part of a larger research project that aims to develop and evaluate body image interventions for girls and coaches (Matheson et al., 2023; Schneider et al., 2023). This pilot study describes the preliminary testing of a novel web-based intervention aimed at increasing coaches' ability to improve athletes' body image and create body positive sport environments. The body confident coaching (BCC) intervention fills a gap in the existing literature and aims to: (1) increase coaches' knowledge and awareness of attitudes and behaviors that perpetuate body image concerns among adolescent girls in sport and (2) increase coaches' self-efficacy in tackling negative body image and promoting positive body image practices among their athletes and wider sport community.

Unlike previous interventions targeting individual athletes, BCC takes a systemic approach to addressing body image concerns in sport by targeting coaches as influential agents of athletes' body image (Koulanova et al., 2021; Sick et al., 2022; Voelker et al., 2022). BCC also addresses gender biases and stereotypes, which are predictors of body

image concerns and sport disengagement among female-identifying athletes (Marashi et al., 2023; Murnen & Don, 2012; Reichart Smith, 2016; Riebock & Bae, 2013). Finally, BCC targets negative and positive body image as distinct constructs (Tylka & Wood-Barcalow, 2015; Webb et al., 2015), in line with recent research in the sport domain (Godoy-Izquierdo & Díaz, 2021) that has advocated for the consideration of both positive and negative body image in interventions targeted at reducing body image concerns and disordered eating among athletes.

The main objectives of this pilot study were to: (1) evaluate the acceptability of BCC among coaches of adolescent girls; (2) trial the research protocol ahead of a large-scale randomized controlled effectiveness trial; and (3) explore the preliminary efficacy of the BCC intervention. In line with these objectives and the literature outlined above, we hypothesized that coaches who took part in BCC would: (H1) find the intervention acceptable, as assessed through open-ended feedback and the framework of acceptability (Sekhon et al., 2017); (H2) report greater self-efficacy in identifying and tackling body image concerns among their athletes at post-intervention, compared to the waitlist control group; and (H3) report lower levels of fat phobia and gender essentialist beliefs at post-intervention, compared to the waitlist control group.

Materials and methods

Study design

This pilot study adopted a two-arm, pre-post randomized controlled trial design with a waitlist control group. The study was pre-registered on ClinicalTrials.gov (identifier: NCT05316558), and all procedures were approved by the Institutional Review Boards of the University of the West of England (ref no. HAS.21.03.120) and the University of Minnesota (ref no. STUDY00012457). We followed the CONSORT EHEALTH checklist (V.1.6.1; Eysenbach & CONSORT EHEALTH Group, 2011) and the CONSORT 2010 statement: extension to randomized pilot and feasibility trials (Eldridge et al., 2016) when reporting the findings.

Participants and sample size

Participants were recruited through sport organizations known to the research team, newsletters and emails to coaches, and social media posts. Participant recruitment and data collection were conducted between May and August 2022. Inclusion criteria were being a current coach of adolescent girls and being based in the United States. Coaches were excluded if they coached only boys and/or men or had taken part in body image research in the past. We aimed to recruit 90 participants (1:1 randomization) to: (1) assess study retention and (2) obtain estimates of the degree of variation in outcome measures. Quantifying the variation in outcomes is essential for the sample size estimation for a follow-on substantial or definitive randomized controlled trial for which it is essential to avoid underpowering whilst simultaneously minimizing the risk of estimating a sample size which is too large. Using Browne's method (Browne, 1995), for an 80% chance of avoiding underpowering a definitive trial and a 70% chance of not

excessively overpowering, each arm in the pilot study should have at least $n = 16$ participants (32 in total) providing outcome data.

Body confident coaching intervention

The BCC intervention was developed to be self-guided and delivered fully online, and consists of five 20-min modules: Challenging Gender Stereotypes, Introducing Body Image, Tackling Negative Body Image, Promoting Body Confidence, and Creating Body Confident Communities. Each module comprises the following main sections: (1) key terms and definitions; (2) core educational content; (3) applied learning; (4) reflection; and (5) review. All modules have to be completed in order, and subsequent modules remain locked until the coach completes the prior module(s). For practical reasons and to mimic real-world environments, coaches were able to complete the modules at their own pace over a two-week period (asynchronous learning). A progress bar at the top of the page allowed users to track their progress through each module. The modules included a variety of exercises and learning modalities to increase coaches' uptake of key learning outcomes, including case studies, checklists, quizzes, reflection exercises, and links to further external content and in-depth information. The module pages were designed to present content in a bite-sized manner, interspersed with activities and images; images within the modules showed girls with diverse identities, including age, ethnicity, religion, and ability.

At the end of each module, coaches were provided with further resources in the form of media articles, videos/movies, websites, sources of support, books, and scientific literature that contained more in-depth information about that module's topic. In line with previous recommendations around the importance of reflection as a learning tool (Santos et al., 2019), coaches were also provided with a reflective log that they could download and complete. Guiding reflection questions were provided at the end of each module based on the module's content. Coaches were also encouraged to look back on their reflective logs as often as needed after completing the intervention. At the end of the last module (Creating Body Confident Communities), coaches received a 'Key Takeaways' sheet that contained a summary of the intervention content and a checklist for best practice to create more diverse, inclusive, and accepting environments within and beyond sport. Coaches were advised that this sheet can be used as a handout to give to others (e.g., parents, teachers, volunteers). The components, underpinning theories, and learning outcomes of the BCC intervention are detailed in Table 1.

Procedures

Coaches who provided electronic consent gained immediate access to the baseline survey, after which they were randomized by the Qualtrics platform into either the intervention condition (five modules of BCC) or the waitlist control condition using a 1:1 randomization ratio. Coaches were informed that they would take part in the intervention after completing the first survey or after completing the second survey; however, full allocation concealment was not possible due to the nature of web-based interventions. Participants in the intervention condition completed baseline self-assessments

Table 1. Outline of the body confident coaching intervention.

Modules	Underpinning theories	Learning objectives	Learning experience
Module 1: Challenging gender stereotypes—explains the effect of gender stereotypes on girls' participation in, and enjoyment, of sport	Gender essentialism (Allison, 2018; Greene, 2020): understand and identify how gender biases and stereotypes are perpetuated in sport; self-objectification theory (Fredrickson & Roberts, 1997): understand and identify how sexual objectification experiences accumulate over time and foster a self-objectifying attitude among girls in sport	*Understand* what gender stereotypes are and how they affect girls; *identify* gender stereotypes that are prevalent in sport; *reflect* on own explicit and implicit gender stereotypes and biases about girls in sport	Implicit bias association test, reflective log, quizzes, links to additional resources and scientific literature
Module 2: Introducing body image—introduces body image and why it matters in sport; discusses causes and consequences of having negative and positive body image	Tripartite influence model for body image (Keery et al., 2004): understand and identify how society (family, friends, media) create and perpetuate harmful body ideals about women in sport; self-objectification theory (Fredrickson & Roberts, 1997): understand and identify how sexual objectification experiences accumulate over time and foster a self-objectifying attitude among girls in sport	*Understand* what body image is and the potential consequences of having a negative or positive body image; *identify* different concerns athletes can have about their bodies; *reflect* on the influences that might be impacting athletes' body image on and off the sports field	Case study, reflective log, quizzes, links to additional resources and scientific literature
Module 3: Tackling negative body image—teaches how to recognize specific body image concerns among athletes and how to tackle them; emphasizes risk-reduction (i.e., how to identify and address body image concerns) and prevention (i.e., how to prevent or minimize body image concerns)	Tripartite influence model for body image (Keery et al., 2004): understand and identify how society (family, friends, media) create and perpetuate harmful body ideals about women in sport; self-efficacy theory (Bandura, 1977): increase self-efficacy in addressing girls' body image concerns in sport	*Understand* how to recognize negative body image practices in sport; *identify* how own actions can influence athletes' body image concerns; *develop* strategies to prevent and reduce body image concerns among athletes	Case study, reflective log, quizzes, links to additional resources and scientific literature
Module 4: Promoting body confidence—teaches how to promote positive body image among athletes; takes a protective approach (i.e., how to promote body confidence)	Theory of embodiment and positive body image (Menzel & Levine, 2011; Piran, 2019): understand and identify how to promote body positive sport settings by focusing on what the body can do and experience, instead of what it looks like; self-determination theory (Deci & Ryan, 2012):	*Understand* what a positive body image environment looks like within sport; *identify* how own actions can promote body confidence among athletes; *develop* strategies to promote body confidence among athletes and sport environment	Checklist, reflective log, quizzes, links to additional resources and scientific literature

(*continued*)

Table 1. Continued.

Modules	Underpinning theories	Learning objectives	Learning experience
	understand and identify how to promote the three basic psychological needs (autonomy, competence, relatedness) among girls in sport; self-efficacy theory (Bandura, 1977): Increase self-efficacy in addressing girls' body image concerns in sport		
Module 5: Creating body confident communities—Teaches how to create positive body image environments that extend beyond sport; provides resources and knowledge about how to work with other key individuals (e.g., parents, teachers, other coaches)	Self-determination theory (Deci & Ryan, 2012): Understand and identify how to promote the three basic psychological needs (autonomy, competence, relatedness) among girls in sport	*Understand* how to broach body image conversations with parents, guardians, caregivers, teachers, and others; *identify* the roles of athletes, coaches, parents, teachers, and others in promoting positive body image environments; *develop* strategies to create positive body image communities that support athletes' sport experience	Case study, reflective log, quizzes, links to additional resources and scientific literature, 'key takeaways' document containing a summary of the module content and a checklist for best practice

(T1; within one week of starting the intervention), were given access to the training over a two-week intervention period, and then completed the post-intervention self-assessments (T2; within one week of completing the intervention). To get access to the intervention, participants were sent a link via email and asked to log in with their email and a self-created password, which was never revealed to the researchers. Coaches received reminder emails one week after receiving access to the intervention, prompting them to complete the intervention within two weeks and up to two reminder emails to complete the post-intervention survey. Participants in the waitlist control condition completed the baseline self-assessments and a second self-assessment two weeks later, after which they received unmonitored access to the intervention. At completion of the post-intervention survey, all participants received a debrief form outlining the study aims and objectives and additional resources about body image and eating concerns. Lastly, to compensate participants for their time, coaches received an electronic $25 gift voucher (see Figure 1 for an overview of the study process and intervention components).

Measures

Research measures are presented in Table 2. Acceptability and adherence measures were assessed retrospectively and were informed by recent recommendations (Beatty & Binnion, 2016; Beintner et al., 2019; Eaton et al., 2011; Sekhon et al., 2017) and CONSORT EHEALTH guidelines (Eysenbach & CONSORT EHEALTH Group, 2011).

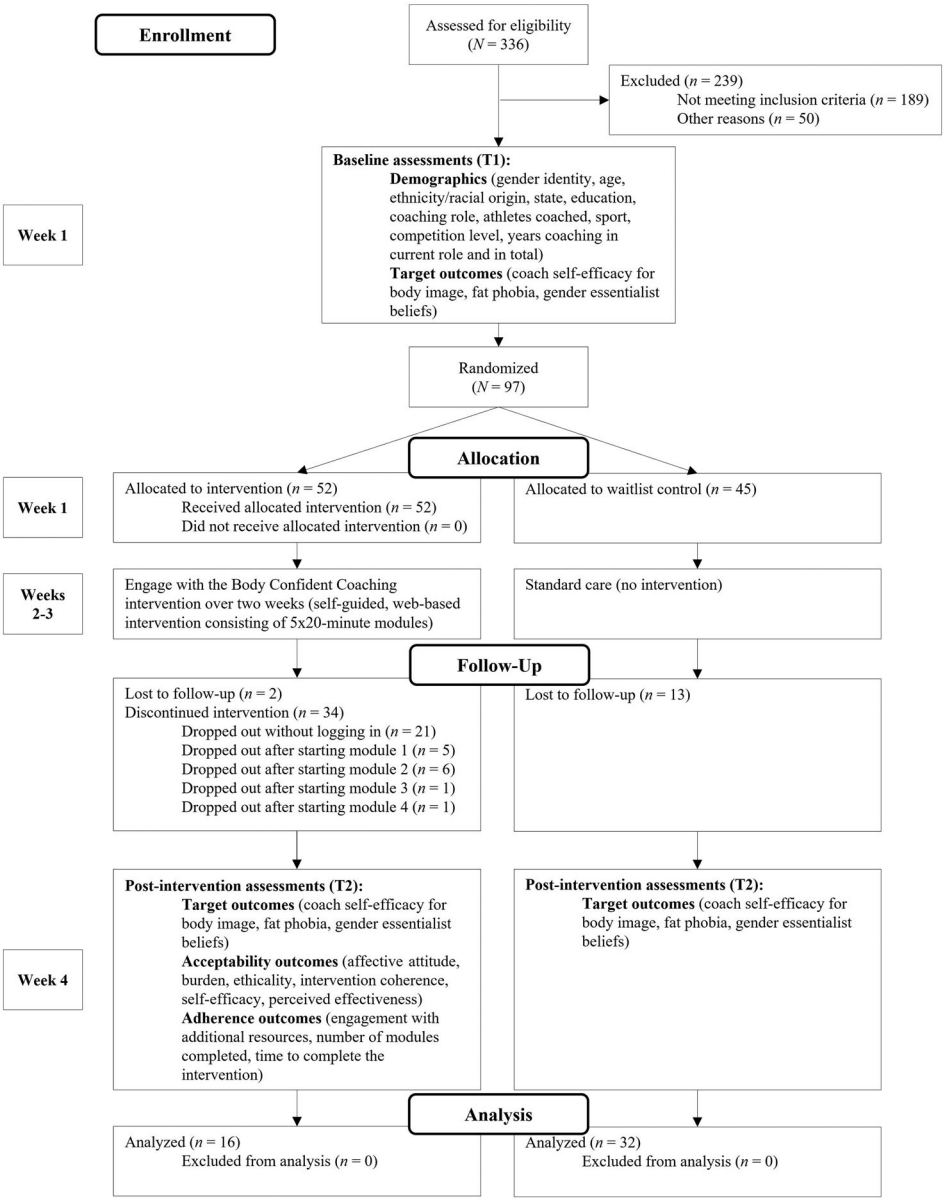

Figure 1. CONSORT flow diagram of participants' progress through the study.

Data analysis

Quantitative and qualitative acceptability and adherence data were collected from the intervention group only at post-test. Given the small sample size and the large number of missing responses (see the Results section for details on attrition), quantitative acceptability and adherence data were summarized exclusively applying descriptive statistics. In order to establish preliminary efficacy, we ran Analyses of Covariance (ANCOVAs) to assess group differences on all primary and secondary outcomes (see Table 2). Randomized arms were compared on primary and secondary outcomes at

Table 2. Research outcomes and internal consistencies.

Outcomes measures	Descriptions & internal consistencies	Time of assessment
Demographic information	Gender identity, age, ethnicity/racial origin, state, education, coaching experience (role, athletes, sports, competition level, coach tenure), previous training around the topic of body image and/or eating disorders.	Baseline (T1)
Efficacy outcomes		
Self-efficacy in recognizing and addressing body image concerns (primary)	Coach Self-Efficacy for Body Image Scale (CSEBIS; Silva-Breen et al., 2022), comprising 27 items across four subscales: *Knowledge* (e.g., "I am confident in my ability to describe why body image is important in sport"), *Recognition* (e.g., "I am confident in my ability to recognize when an athlete feels bad about their body"), *Engagement* (e.g., "I am confident in my ability to normalize discussions around body image with my team"), *Disengagement* (e.g., "I am confident in my ability to refrain from talking about my body in front of my athletes"). Items are rated on an 11-point Likert scale (0 = *No Confidence*, 10 = *Completely Confident*), with higher scores reflecting greater self-efficacy. Internal consistency: $\alpha = .96$.	Baseline (T1) and post-intervention (T2)
Fat phobia (secondary)	Modified Fat Phobia Scale (FPS; Bacon et al., 2001), comprising 14 adjective pairs (e.g., attractive, unattractive; fast, slow) as perceptions toward "obese" or "fat" people. An additional three pairs were added for the purposes of this research (i.e., athletic, not athletic; sporty, not sporty; unfit, fit [reversed]) for a total of 17 adjective pairs. The additional three pairs were combined with four other pairs (i.e., fast, slow; having endurance, having no endurance; active, inactive; weak, strong [reversed]) to create a sport-specific subscale of the FPS. Items are rated on a five-point scale, with higher scores reflecting greater levels of fat phobia. Internal consistency: $\alpha = .89$.	Baseline (T1) and post-intervention (T2)
Gender essentialist beliefs (secondary)	Gender Essentialism Scale (GES; Skewes, 2018), comprising 25 items (e.g., "Differences between women and men's personalities are in their DNA"). Items are rated on a five-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*), with higher scores reflecting greater levels of gender essentialist beliefs. Internal consistency: $\alpha = .89$.	Baseline (T1) and post-intervention (T2)
Intervention acceptability[a]	15 items assessed acceptability of the intervention. Factors included: affective attitude (e.g., "I liked the program"), burden (e.g., "Engaging with the program was too troublesome" [reversed]), ethicality (e.g., "It is important for other coaches to have access to this program"), self-efficacy (e.g., "I am confident that I will use the techniques I learned from the program in my coaching"), perceived effectiveness (e.g., "The program was successful in improving my knowledge about body image"). Items are rated on a five-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*), with higher scores reflecting greater acceptability. Four open-ended questions: "Are there any parts of the program that were not clear (e.g., meaning, relevance, terminology, etc.)?", "Is there anything missing that you think should be included in this program?", "Do you have feedback on the visual design of the modules?", "Do you have any further feedback on this program?".	Post- intervention (T2)

(*continued*)

Table 2. Continued.

Outcomes measures	Descriptions & internal consistencies	Time of assessment
Intervention adherence[a]	4 items assessed adherence to the intervention. Factors included: number of modules completed (digital), time to complete each module (self-report), time to complete entire intervention (self-report), engagement with additional resources (e.g., videos, additional reading, links, reflection exercises; self-report).	Post- intervention (T2)

[a]Intervention group only.

Table 3. Study drop-out rates across time and intervention conditions.

	Total ($N = 97$)		Intervention ($n = 52$)		Control ($n = 45$)	
	T1	T2	T1	T2	T1	T2
CSEBIS *N* (%)	0 (0%)	49 (51%)	0 (0%)	36 (69%)	0 (0%)	13 (29%)
FPS *N* (%)	0 (0%)	49 (51%)	0 (0%)	36 (69%)	0 (0%)	13 (29%)
GES *N* (%)	0 (0%)	49 (51%)	0 (0%)	36 (69%)	0 (0%)	13 (29%)
			Intervention only ($n = 52$)			
Affective attitude *N* (%)			36 (69%)			
Burden *N* (%)			36 (69%)			
Ethicality *N* (%)			36 (69%)			
Self-efficacy *N* (%)			48 (92%)			
Perceived effectiveness *N* (%)			36 (69%)			

post-test (T2), with pretest (T1) levels of each measure included as a covariate. As a first step for each analysis, we checked for the presence of group*pretest interactions. If said interactions were not significant, then we planned to exclude them from the statistical models. Partial eta-squared is reported for each main and interaction effect, where $\eta_p^2 = .01$, .06, and .14 constitute small, medium, and large effect sizes, respectively. Partial eta-squared was selected for its suitability with between and within-subject effects and intervention effects (Alleva et al., 2015). We considered a significance level of $p < .05$ for all outcome measures. We did not adjust for multiple testing given the a priori definition of a single (and not multiple) primary outcome (Vickerstaff et al., 2019).

Results

Sample attrition, missing data, and data preparation

The recruitment resulted in 97 participants willing and eligible to participate in the study. The 97 participants in both the intervention ($n = 52$) and waitlist control groups ($n = 45$) completed all demographic and outcome measures at pretest (i.e., no missing data at pretest). At post-test, 51% (49/97) of participants dropped out from the study and completed no outcome or acceptability measures. In particular, 69% (36/52) of the intervention group and 29% (13/45) of the waitlist control group dropped out at post-test (see Table 3), resulting in a sample of 16 participants in the intervention group and 32 participants in the control group.

A visual exploration of missing data suggested that items were not systematically missed by participants, but rather, missing data was predominantly caused by participants not completing post-test assessments. In order to check whether dropouts were

missing completely at random (MCAR), we compared participants who dropped out at T2 to those who were retained on T1 scores on the CSEBIS (primary outcome). The *t*-test showed no significant differences across arms ($t = -1.13$, df = 95, $p = .26$) or within the intervention arm ($t = .81$, df = 50, $p = .42$). This result suggests that the dropouts were not dependent on baseline outcome levels and were therefore distributed at random. ANCOVA assumptions of normal distribution of residuals, continuous dependent variables, homogeneity of covariance matrices, and absence of outliers were met by all outcome variables. The assumption of homogeneity of regressions slopes was met for all variables apart from the CSEBIS, for which the covariate*group interaction was kept in the model.

Sample characteristics

Of the 97 recruited coaches, the majority (70.1%) identified as women, White (77.3%), had a bachelor's degree (48.5%), worked as a head coach (68.0%), coached competitions at high school level (63.9%), and were based in the Midwest (39.2%). On average, participants were 36.62 years old ($SD = 10.43$), had been in their current role for 5.53 years ($SD = 5.30$), and had 11.38 years of total coaching experience ($SD = 8.01$). All coaches worked with adolescent girls, and 46.4% also coached adolescent boys. The coaches were involved in a variety of sports, with the most frequently reported sports being soccer (18.6%), cross-country (13.4%), and volleyball (10.3%; see Table 4 for a detailed description of the baseline sample). The groups did not differ significantly at baseline for demographic variables or any of the outcome variables, with the only exception of gender essentialism, which was significantly higher in the waitlist control group compared to the intervention group (see Table 5).

Intervention acceptability

The acceptability outcomes presented a high proportion of missing data (69.2%–92.3%). This greatly reduced the reliability of these results, which have therefore not been analyzed with inferential statistics. Of the coaches who completed post-intervention assessments ($n = 16$), the majority scored between 4 (*Somewhat Agree*) and 5 (*Strongly Agree*) on all acceptability measures. Overall, coaches felt satisfied with the intervention and found it enjoyable and not troublesome to follow. Additionally, coaches indicated that they thought BCC was appropriate and that they would recommend participation in this intervention to other coaches. Finally, coaches perceived that the intervention improved their knowledge around body image and coaching girls. Full results of the acceptability outcomes are presented in Figure 2.

In terms of the open-ended feedback, most coaches felt the intervention was clear, easy to follow, and beneficial for their athletes and coaching practice.

> I think that this program achieves exactly what it is supposed to do, without being overly complicated or lengthy. I preferred the sections that had real quotes, scenarios because I think it helps you think about what you would do in that instance. If I worked within an organization that has numerous coaches, I could imagine that this could be a powerful tool to jump start conversations about how we coach young women, how our words impact them, and what we can do better to improve their overall experience with sport. Overall,

Table 4. Characteristics of the baseline sample.

	Total sample ($N = 97$)	Intervention ($n = 52$)	Control ($n = 45$)
Gender *N* (%)			
Women	68 (70.10%)	37 (71.15%)	31 (68.89%)
Men	25 (25.77%)	15 (28.85%)	10 (22.23%)
Non-binary	2 (2.06%)	–	2 (4.45%)
Prefer not to say	1 (1.03%)	–	1 (2.23%)
Prefer to self-describe	1 (1.03%)	–	1 (2.23%)
Age in years *M* (*SD*)	36.62 (10.43)	36.67 (10.78)	36.56 (10.12)
Ethnicity *N* (%)			
Asian	2 (2.06%)	1 (1.92%)	1 (1.92%)
Black or African American	6 (6.18%)	2 (3.84%)	4 (7.69%)
Hispanic, Latino/a, Spanish origin	4 (4.12%)	3 (5.77%)	1 (1.92%)
Native American or Alaska Native	2 (2.06%)	1 (1.92%)	1 (1.92%)
Native Hawaiian or Other Pacific Islander	1 (1.03%)	1 (1.92%)	–
White	75 (77.32%)	40 (76.92%)	35 (67.31%)
Multiracial or Biracial	3 (3.09%)	3 (5.77%)	–
Prefer not to say	2 (2.06%)	–	2 (3.84%)
Prefer to self-describe	2 (2.06%)	1 (1.92%)	1 (1.92%)
Region *N* (%)			
Midwest	38 (39.18%)		
Northeast	15 (15.46%)		
South	17 (17.53%)		
West	27 (27.84%)		
Sport *N* (%)			
Acrobatics and tumbling	2 (2.06%)		
Athletic training	2 (2.06%)		
Baseball	2 (2.06%)		
Basketball	13 (13.40%)		
Badminton	1 (1.03%)		
Bobsleigh	1 (1.03%)		
Bowling	1 (1.03%)		
Cheer	1 (1.03%)		
Climbing/wall climbing	3 (3.09%)		
Cricket	1 (1.03%)		
Cross country	13 (13.40%)		
Crew/rowing	5 (5.15%)		
Curling	1 (1.03%)		
Cycling	1 (1.03%)		
Fencing	1 (1.03%)		
Field hockey	1 (1.03%)		
Figure skating	1 (1.03%)		
Football	1 (1.03%)		
Golf	2 (2.06%)		
Gymnastics	1 (1.03%)		
Ice hockey	3 (3.09%)		
Judo	2 (2.06%)		
Karate	2 (2.06%)		
Lacrosse	3 (3.09%)		
Martial arts	1 (1.03%)		
Nordic skiing	6 (6.18%)		
Rock climbing	3 (3.09%)		
Rugby	2 (2.06%)		
Soccer	18 (18.55%)		
Softball	7 (7.22%)		
Strength and conditioning	3 (3.09%)		
Swimming	7 (7.22%)		
Taekwondo	1 (1.03%)		
Tennis	1 (1.03%)		
Track and field	17 (17.52%)		
Ultimate	2 (2.06%)		
Volleyball	10 (10.31%)		

(*continued*)

Table 4. Continued.

	Total sample ($N = 97$)	Intervention ($n = 52$)	Control ($n = 45$)
Water polo	1 (1.030%)		
Wrestling	1 (1.030%)		
Another sport	4 (4.12%)		
Education *N* (%)			
High school graduate, diploma or equivalent	1 (1.03%)	1 (1.92%)	–
Some college credit, no degree	4 (4.12%)	3 (5.77%)	1 (2.23%)
Trade/technical/vocational training	1 (1.03%)	1 (1.92%)	–
Associate degree	1 (1.03%)	1 (1.92%)	–
Bachelor's degree	47 (48.45%)	24 (46.15%)	23 (51.12%)
Master's degree	38 (39.17%)	19 (36.54%)	19 (42.23%)
Professional degree	4 (4.12%)	3 (5.77%)	1 (2.23%)
Doctorate degree	1 (1.03%)	–	1 (2.23%)
Role *N* (%)			
Head coach	66 (68.04%)	34 (65.38%)	32 (71.12%)
Associate head coach	8 (8.25%)	4 (7.69%)	4 (8.89%)
Assistant coach	16 (16.50%)	11 (21.15%)	5 (11.12%)
Volunteer	1 (1.03%)	1 (1.92%)	–
Other	6 (6.18%)	2 (3.84%)	4 (8.89%)
Coaching pupils *N* (%)			
Young women	20 (20.62%)	9 (17.31%)	11 (24.45%)
Young men	13 (13.40%)	6 (11.54%)	7 (15.56%)
Adolescent girls	97 (100%)	52 (100%)	45 (100%)
Adolescent boys	45 (46.39%)	23 (44.23%)	22 (48.89%)
Competition level *N* (%)			
Club	50 (51.55%)	29 (55.77%)	21 (46.67%)
College/university	9 (9.28%)	5 (9.61%)	4 (8.89%)
High school/secondary school	62 (63.92%)	31 (59.61%)	31 (68.89%)
International	1 (1.03%)	–	1 (2.23%)
Junior/community college	2 (2.06%)	–	2 (4.45%)
Middle/intermediate school/junior high	22 (22.68%)	12 (23.07%)	10 (22.23%)
National/Olympic	1 (1.03%)	–	1 (2.23%)
Recreational/in-house/community leagues	16 (16.50%)	6 (11.54%)	10 (22.23%)
Other	3 (3.09%)	1 (1.92%)	2 (4.45%)
Current role length in years *M* (*SD*)	5.53 (5.30)	5.43 (4.52)	5.65 (6.12)
Coaching length in years *M* (*SD*)	11.38 (8.01)	10.94 (6.22)	11.89 (9.74)
Has received body image training *N* (%)			
Yes	21 (21.65%)	6 (11.54%)	15 (33.34%)
No	70 (72.17%)	44 (84.61%)	26 (57.78%)
Not sure	6 (6.19%)	2 (3.85%)	4 (8.89%)

Note. The two randomized group showed comparable age ($t = -.05$, df = 95, $p = .95$), role length in years ($t = .19$, df = 95, $p = .84$), and coaching length in years ($t = .58$, df = 95, $p = .56$).

> I am glad I participated in this program! I downloaded the "key takeaways" hand out, and I look forward to reviewing it periodically to ensure that I am creating a positive and inclusive environment for young women to participate in sport. (Female softball coach, 30 years old)

> Everything was clear. I really liked the format of starting with definitions to make sure everyone's on the same page. I also really liked the checklist format because it was clear, rather than having a ton of huge paragraphs. It was easy to read through on a computer. And then I liked the scenarios at the end especially, along with the additional resources. I saved some of the articles and will go back to them throughout the year. The organization was clear and effective. (Female track and field coach, 35 years old)

> I learned so much and feel better equipped to coach female athletes. (Female swimming coach, 48 years old)

> I think all coaches should be trained on this. (Female lacrosse coach, 37 years old)

Table 5. Outcome means by group and time points.

		Total sample		Intervention		Waitlist control		
	Score range	T1 ($N = 97$)	T2 ($N = 48$)	T1 ($N = 52$)	T2 ($N = 16$)	T1 ($N = 45$)	T2 ($N = 32$)	*t*-Test comparing groups at baseline
CSEBIS *M* (*SD*)	0–10	7.11 (1.45)	7.74 (1.27)	7.16 (1.35)	8.26 (1.02)	7.06 (1.57)	7.47 (1.32)	$t = -.32$, df = 95, $p = .75$
CSEBIS knowledge	0–10	7.37 (1.66)	8.08 (1.27)	7.46 (1.60)	8.66 (1.04)	7.27 (1.74)	7.80 (1.30)	$t = -.55$, df = 95, $p = .58$
CSEBIS recognition	0–10	6.67(1.74)	7.30 (1.26)	6.73 (1.77)	7.87 (1.17)	6.62 (1.72)	7.01 (1.23)	$t = -.34$, df = 95, $p = .74$
CSEBIS engagement	0–10	6.16 (1.96)	7.13 (1.75)	6.00 (1.95)	7.51 (1.51)	6.35 (1.97)	6.95 (1.85)	$t = .88$, df = 95, $p = .38$
CSEBIS disengagement	0–10	8.31 (1.41)	8.43 (1.29)	8.53 (1.22)	9.00 (0.75)	8.06 (1.60)	8.15 (1.42)	$t = -1.65$, df = 95, $p = .10$
FPS *M* (*SD*)	1–5	3.19 (0.54)	3.06 (0.55)	3.15 (0.54)	2.70 (0.63)	3.23 (0.53)	3.24 (0.40)	$t = .70$, df = 95, $p = .48$
FPS sport	1–5	3.19 (0.71)	3.08 (0.69)	3.15 (0.68)	2.62 (0.79)	3.24 (0.75)	3.30 (0.52)	$t = .60$, df = 95, $p = .55$
GES *M* (*SD*)	1–5	2.64 (0.57)	2.60 (0.57)	2.50 (0.49)	2.34 (0.46)	2.81 (0.60)	2.73 (0.59)	$t = 2.86$, df = 95, $p = .005$
Affective attitude *M* (*SD*)	1–5				4.31 (0.61)			
Burden *M* (*SD*)	1–5				4.58 (0.64)			
Ethicality *M* (*SD*)	1–5				4.70 (0.46)			
Self-efficacy *M* (*SD*)	1–5				4.25 (0.42)			
Perceived effectiveness *M* (*SD*)	1–5				4.34 (0.72)			

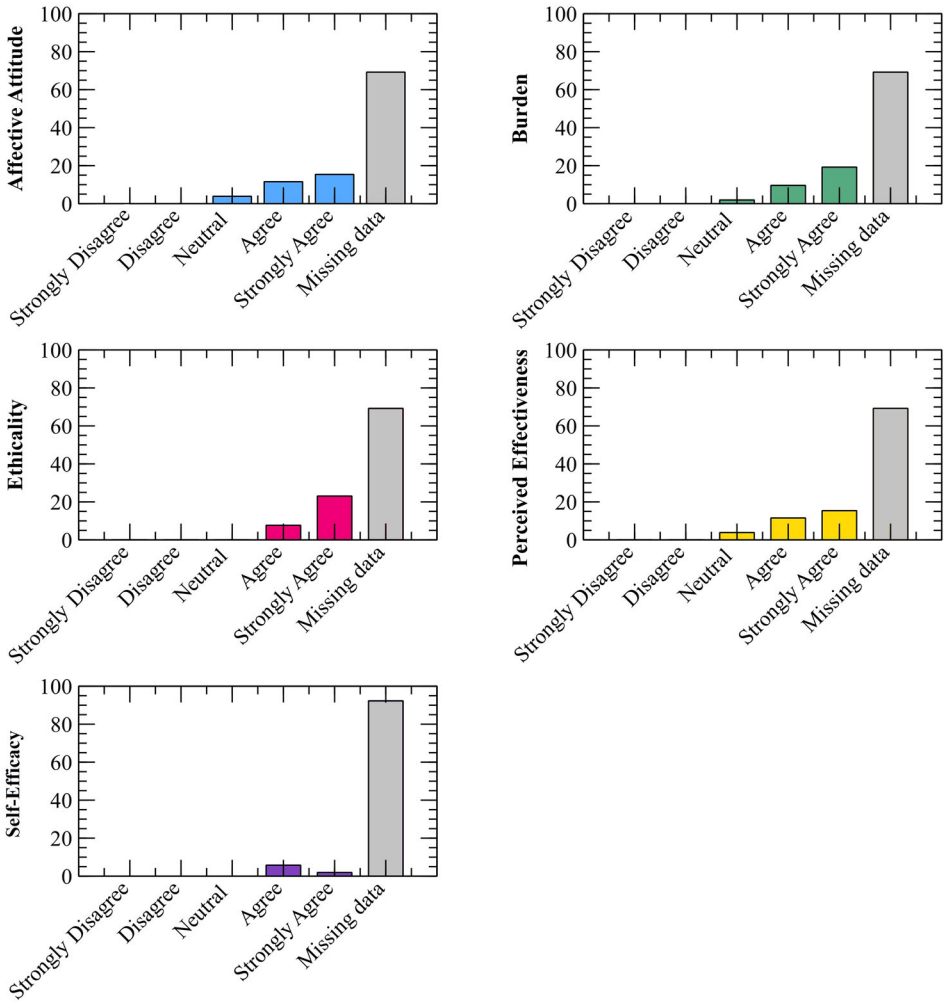

Figure 2. Quantitative findings relating to intervention acceptability.

Additionally, coaches reported that the design was "simple," "nice," "not too overwhelming," and liked having the progress bar to track their progress through the modules. Several coaches noted that they would have liked to have more case studies, scenarios, and example conversations to guide their practice.

> I mentioned this earlier, but I'd love even more scenarios. I totally get that you don't want to bog people down with a ton of the same thing, though, so I do think the number was okay. They were quick to get through, and I like the immediate feedback after you click a response. (Female track and field coach, 35 years old)

> More situational training on how to address certain situations where you have an athlete suffering from body image issues (i.e., you suspect one of your players has an eating disorder, what's the best thing to do? You have a player that seems very focused on the appearance of others and comparing herself to them, what's the best way to address it with her?). (Female volleyball coach, 28 years old)

Intervention efficacy

Coach self-efficacy for body image (CSEBIS)

The ANCOVA showed a significant main effect of randomized group ($F[1, 44] = 10.84$, $p < .01$, $\eta_p^2 = .19$), after controlling for CSEBIS scores at pretest ($F[1, 44] = 29.38$, $p < .001$, $\eta_p^2 = .40$), and for the pretest*group interaction ($F[1,44] = 5.36$, $p = .02$, $\eta_p^2 = .11$). The intervention group showed higher CSEBIS scores at post-test than the control group, with a large effect size. ANCOVA results for the CSEBIS subscales are presented in Appendix A (Supplementary Materials).

Coaches' fat phobia (FPS)

The ANCOVA showed a significant main effect of randomized group ($F[1, 45] = 29.57$, $p < .001$, $\eta_p^2 = .39$), after controlling for FPS scores at pretest ($F[1, 45] = 94.63$, $p < .001$, $\eta_p^2 = .67$). The intervention group showed lower levels of general fat phobia at post-test than the control group, with a large effect size. With regards to items related to sport (FPS sport subscale), the ANCOVA showed a significant main effect of randomized group ($F[1, 45] = 26.18$, $p < .01$, $\eta_p^2 = .37$), after controlling for FPS sport scores at pretest ($F[1, 45] = 79.38$, $p < .001$, $\eta_p^2 = .64$). The intervention group showed lower levels of sport-related fat phobia at post-test than the control group, with a large effect size.

Coaches' gender essentialism (GES)

The ANCOVA showed a significant main effect of randomized group ($F[1, 45] = 11.16$, $p < .001$, $\eta_p^2 = .20$), after controlling for GES scores at pretest ($F[1, 45] = 158.34$, $p < .001$, $\eta_p^2 = .77$). The intervention group showed lower levels of gender essentialism at post-test than the control group, with a large effect size. All efficacy results are presented in Figure 3.

Intervention adherence and completion

All participants who completed the post-test assessments completed all five BCC modules, with most participants reporting completion in less than a week. Most participants who dropped out from the intervention did so without logging in to the intervention platform (see Figure 1). Most coaches reported completing each module in under 20 min ($n = 11$; 68.75%), four in 20–30 min (25%), and one in 30–60 min (6.25%). Similarly, the majority of coaches completed the entire intervention in less than one day ($n = 5$; 31.25%) or in half a week ($n = 5$; 31.25%), one coach completed the intervention in one week (6.25%), three in one and a half weeks (18.75%), and two in two weeks (12.5%). Of the 16 participants who completed the intervention, the majority ($n = 12$, 75%) reported engaging with the additional resources: 10 coaches (62.5%) engaged with links to external articles and videos, 7 coaches (43.75%) engaged with additional reading and further resources at the end of the modules, and 6 coaches (37.50%) engaged with the reflection exercises. Of those who did not engage in the additional materials ($n = 4$, 25%), two participants cited lack of time and two participants reported that they saved the resources to come back to later.

To gain additional feedback, a short follow-up survey was sent to all participants who did not complete the intervention. The survey comprised two questions: (1) "Why did

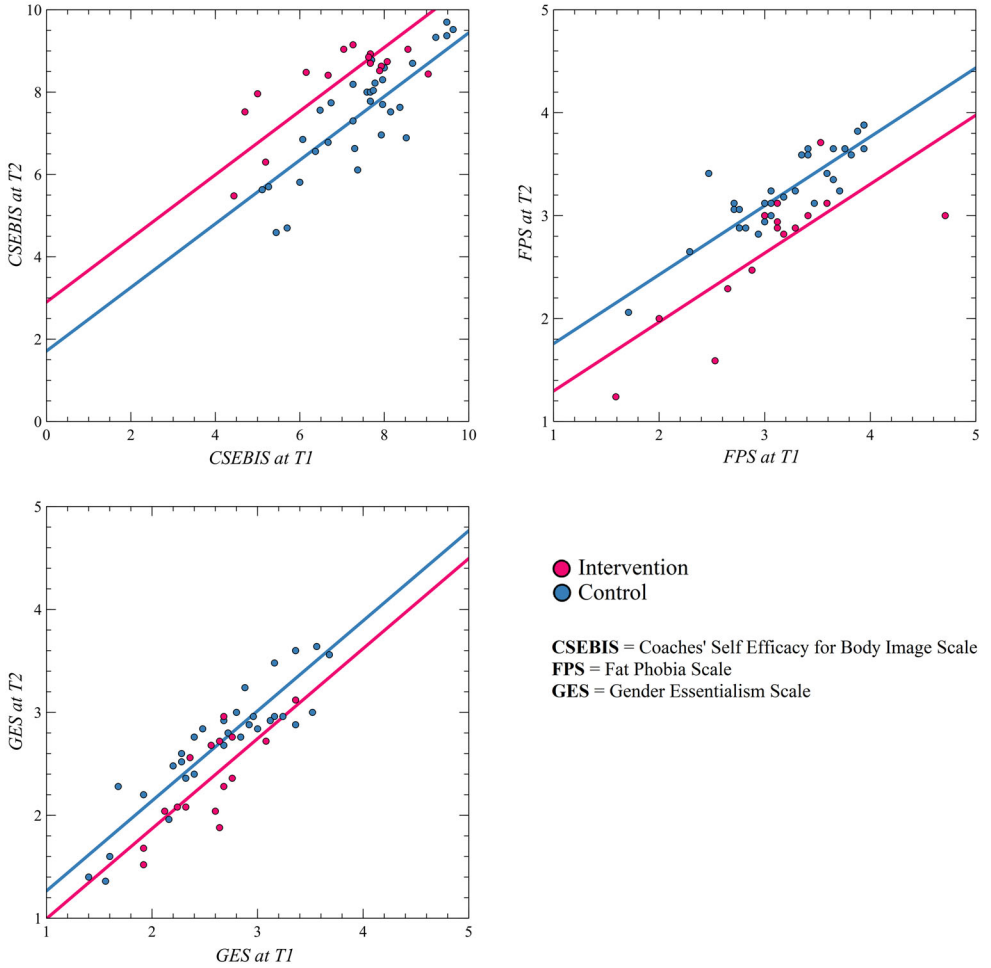

Figure 3. Results of preliminary efficacy analyses.

you not take part in the online program?" and (2) "What could have helped you participate in this program?". Four participants responded to this follow-up survey and three (75%) cited lack of time due to extenuating circumstances as their primary reason for non-completion (e.g., due to a heavy coaching schedule or a family emergency). These participants also reported that having additional time could help them complete the program in the future. The remaining participant cited lack of motivation as a reason for dropping out and suggested that inclusion of more interactive components would have helped them complete the program.

Discussion

This paper described the acceptability and preliminary efficacy testing of a novel web-based body image intervention for coaches of adolescent girls (BCC). Acceptability data showed that coaches who completed the intervention ($n = 16$) found it easy to follow, appropriate,

useful, and enjoyable. Moreover, the majority of coaches reported that the intervention improved their knowledge about body image and coaching girls. In terms of adherence and intervention completion, there was a high dropout rate ($n = 49$; 51%) from pre- to post-intervention; however, most of the coaches who completed the entire intervention also completed the post-intervention assessments ($n = 16$; 89%). Most of these coaches ($n = 12$; 75%) also engaged in the additional resources provided as part of the intervention. Finally, preliminary efficacy analyses indicated that the intervention group ($n = 16$) reported higher levels of self-efficacy toward body image, and lower levels of fat phobia and gender essentialist beliefs at post-intervention, compared to the waitlist control group ($n = 32$). However, efficacy findings should be interpreted with caution due to the small sample size. Overall, this pilot study shows promising results for the acceptability of the BCC intervention for coaches of adolescent girls, but further work is needed to enhance uptake and feasibility.

The high dropout rates resulted in a lack of power for most of the efficacy analyses, which therefore must be interpreted cautiously. High dropout rates are commonly reported in self-guided and web-based interventions (Brouwer et al., 2010; Wangberg et al., 2008), where limited or no in-person components are provided (Linardon & Fuller-Tyszkiewicz, 2020). Previous reviews have found attrition rates of between 40% and 80% as common in web-based interventions (Beatty & Binnion, 2016; Christensen et al., 2009; Linardon & Fuller-Tyszkiewicz, 2020; Melville et al., 2010), which are comparable to that of the current study.

Moreover, attrition is an important consideration for intervention acceptability and feasibility. Limited evidence is currently available regarding which factors consistently predict adherence to, or dropout from, online and web-based interventions (Beatty & Binnion, 2016; Christensen et al., 2009; Linardon & Fuller-Tyszkiewicz, 2020; Melville et al., 2010). Follow-up feedback from participants who did not complete the intervention suggested that lack of time was a primary reason for dropout. This is likely due to the fact that the intervention was held over the summer months, which is typically a busy period for coaches. Relatedly, recruitment proved challenging during this time, which also accounted for a smaller than planned sample size for the current study. However, given that only four of the participants who dropped out from the current study completed the follow-up survey, these propositions are at present speculative and should be interpreted with caution.

To account for the high dropout rate observed in the current study, as well as feedback from coaches who did and did not complete the intervention, several modifications will be made to the existing intervention ahead of a large-scale randomized controlled effectiveness trial. First, the BCC intervention is currently being developed to be more interactive and user-friendly, which can help increase motivation and participant retention. Second, BCC will be condensed into three modules, instead of five. This will allow coaches who are busy to complete the training within an hour (3×20-min modules), thus reducing participant burden, although allowing other coaches the opportunity to delve deeper into key topics through additional resources. Importantly, the core content will be retained, but streamlined to ensure the intervention maintains its effectiveness. Finally, coaches also expressed a preference for more case-studies and scenario-based exercises to enhance their grasp of the key concepts and how to apply them in practice. In line with this finding, we will revise the module content to include more situational training to enable coaches to apply learnings to their own practice.

Strengths and limitations

The findings of this study should be considered in light of several strengths and limitations. The strengths include the randomized controlled design and the rigorous evaluation of acceptability and preliminary efficacy of a novel web-based body image intervention for coaches. Moreover, to enhance the accessibility and scalability of BCC, it was developed to be delivered fully online, with no interaction between coaches or in-person components. Previous research has suggested that web-based CDPs without a practical or interactive component may show limited effectiveness, despite their preferability by coaches due to the flexibility of web-based interventions (Santos et al., 2019; Voldby & Klein-Døssing, 2020). However, results from the current pilot study showed that BCC may be effective at inducing change in target outcomes. Furthermore, this allows the BCC intervention to reach a wide range of users, as well as increases its accessibility and cost-efficiency (Beatty & Binnion, 2016; Wangberg et al., 2008).

Nonetheless, due to the preliminary nature of this study, several limitations should also be noted. First, the sample comprised predominantly White, female coaches from the Midwest. This has implications for the generalizability of the study findings, particularly given that the majority of coaching positions in the United States are currently held by men (National Collegiate Athletics Association, 2021). Future research with large sample sizes should evaluate potential gender differences in the effectiveness of BCC. Second, it is likely that the high dropout rates might have resulted in self-selection bias, with only the most motivated participants reaching the end of the pilot. Small samples are also associated with large variances of the estimated effect, increasing the chances of obtaining large effect sizes, which are likely biased and unlikely to be replicated, due to low power (Szucs & Ioannidis, 2017). Third, given the small sample size and the large number of missing responses, acceptability and adherence data were exclusively summarized by descriptive statistics. Future research should incorporate adherence data in efficacy analyses to establish the dose-response effect of the intervention, as well as the added benefit of engaging in additional resources (e.g., videos, additional reading, links, reflection exercises) alongside the core intervention content. Finally, the dropout rates were relatively higher among the intervention group compared to the waitlist control group. Therefore, the ANCOVAs were run with uneven group sizes (i.e., $N_{\text{Intervention}} = 16$; $N_{\text{Control}} = 32$), which can deteriorate statistical power (Wan, 2020) and suggests the need to apply a more appropriate randomization strategy in future research (e.g., 3:2 intervention:control randomization). In particular, when looking to detect realistic small to medium effect sizes (which are common in similar but well-powered psychology studies; e.g., Diedrichs et al., 2015), an ANCOVA run on unequal groups of 16 and 32 participants with significance levels of alpha = .05 would result in a power level of $1 - \beta = .08$, well below the acceptable threshold of .80 (Noordzij et al., 2010). Therefore, conclusions regarding the efficacy of BCC are still tentative.

Conclusions

BCC is the first evidence-based and empirically-tested CDP that targets coaches of adolescent girls and aims to increase their ability to identify and address body image concerns among their athletes and teams. Preliminary findings from this pilot study show that coaches find BCC easy to follow, appropriate, useful, and enjoyable. Additionally,

BCC may increase coaches' self-efficacy to identify and tackle girls' body image concerns in sport and decrease coaches' fat phobia and gender essentialist attitudes and beliefs. However, further work is needed to ensure the intervention is feasible for coaches to complete. Future research is also required to rigorously and systematically evaluate the intervention to ensure it is suitable for a diverse range of coaches, athletes, and sport settings around the globe. Following intervention modification to enhance feasibility, BCC will undergo further testing for acceptability, adherence, and efficacy. If found to be effective, BCC will be made freely available and embedded within a wider coach education and training framework.

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Jekaterina Schneider: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing—Original Draft, Supervision (Lead), Project Administration. Emily L. Matheson: Conceptualization, Methodology, Investigation, Writing—Review & Editing, Supervision, Project Administration, Funding Acquisition. Aline Tinoco: Conceptualization, Methodology, Investigation, Writing—Review & Editing. Caterina Gentili: Formal Analysis, Data Curation, Writing—Review & Editing, Visualization. Paul White: Formal Analysis, Data Curation, Writing—Review & Editing, Visualization. Courtney Boucher: Investigation, Writing—Review & Editing. Hannah Silva-Breen: Investigation, Writing—Review & Editing. Anna Goorevich: Writing—Review & Editing. Phillippa C. Diedrichs: Conceptualization, Writing—Review & Editing, Supervision, Project Administration, Funding Acquisition. Nicole M. LaVoi: Conceptualization, Writing—Review & Editing, Supervision, Project Administration, Funding Acquisition.

Disclosure statement

PCD is an independent consultant for Dove (Unilever). PCD and ELM are independent consultants for the Social & Community Impact, Nike. PCD was on the Dove Self-Esteem Project Global Advisory Board from 2013 to 2016. The authors declare no other conflicts of interest in relation to this work.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, JS, upon reasonable request.

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