Development and Preliminary Validation of the Coach Self-Efficacy Body Image Scale (CSEBIS)

Abstract

Body image concerns are a commonly cited reason for sport drop out. Researchers have begun to explore the influence of coaches on athletes' body image. However, no measure exists to accurately and easily assess interventions or predict coaches' body image supportive behaviors. Using Self-Efficacy Theory as a conceptual framework, the Coach Self-Efficacy Body Image Scale (CSEBIS) was developed. Content validity was judged by a panel of experts (N=3) and through interviews with coaches (N=4) across various sports and experience levels. Following initial item iteration, the CSEBIS was assessed with 682 coaches for reliability and validity. The 27 items across four subscales (knowledge, recognition, engagement, disengagement) showed good reliability (internal consistency, test-retest reliability, inter-item and item-total correlations), validity (convergent and discriminant validity, differentiation between known groups), factor structure, and model invariance across gender. Developing and initially validating the CSEBIS contributes to the existing literature by providing researchers with a novel scale to measure coaches' confidence in identifying and addressing body image concerns among their athletes. Following further testing, this instrument may be used to assess the effectiveness of body image education and intervention efforts in sport, and the impact of coaches' attitudes and behaviors on athletes' body image.

Keywords: Athletes; Coach confidence; Psychometric testing; Scale validation; Sport.

1. Introduction

Body image, or how one thinks, feels, and perceives their body (Cash & Smolak, 2011) can be positively or negatively affected by numerous psychosocial factors (Neumark-Sztainer et al., 2007; Stice & Whitenton, 2002). Poor body image is associated with increased risk of developing anxiety, depression, eating disorders, and risk-taking behaviors (Beccia et al., 2019; Goldschmidt et al., 2015; Ivezaj et al., 2010; Richard et al., 2016; Walker et al., 2018). Body image concerns have also been cited as a key barrier to sport participation and enjoyment (Slater & Tiggemann, 2011) and can be exacerbated by coaches' beliefs, attitudes, and behaviors (Coppola et al., 2014; Muscat & Long, 2008; Willson & Kerr, 2021). The majority of the existing body image literature is focused on athletes' experiences of body image in sport, and interventions targeting athletes' body image have shown limited long-term effectiveness (Buchholz et al., 2008; Sands & Wettenhall, 2000; Voelker et al., 2019). Such interventions typically employ measures of athlete outcomes and/or observation of coach behavior. While assessing athletes' body image is useful on an individual level, it does not provide information regarding a coaches' impact on athletes' body image. Moreover, observation of coach behavior can be time-consuming and costly, and has limited applicability in large-scale research. Coaches have a wide-reaching impact by interacting with a large number of athletes over a coaching trajectory and due to rosters of athletes changing year-to-year. Thus, developing a cost-effective, accurate, and scalable measure to assess coach attitudes and behaviors is crucial.

1.1. Body Image and Disordered Eating in Sport

Substantial research exists examining the influence of sport participation on athletes' body image and disordered eating behaviors (e.g., restrictive eating, compensatory exercise, binge eating). Past research has focused heavily on aesthetic-focused sports such as gymnastics, dance, figure skating, and wrestling (Krentz & Warschburger, 2011; Satterfield & Stutts, 2021; Van Durme et al., 2012), although recently, disordered behaviors in non-aesthetic-

focused sports (i.e., basketball, soccer) have also been recorded at disturbingly high numbers (Gorrell et al., 2021; McDonald et al., 2020). This pattern suggests that although some sports may have more risk factors than others, sport as a whole is the common denominator. The rate of disordered eating in sport is frightening as eating disorders have the highest mortality rate of any mental illness due to medical complications or suicide (Udo et al., 2019). Athletes commonly cite the introduction or reinforcement of disordered habits from their coaches through behaviors such as commenting on and measuring athletes' bodies, prescribing diets, and inaccurate nutrition counseling (Voelker et al., 2022). Thus, it is important to target coach beliefs and behaviors in the prevention of eating disorders and body image concerns among athletes. Given that body image is a risk factor for disordered eating and eating disorders (Smolak & Levine, 2015), early intervention and prevention efforts are important to reduce the prevalence of body image concerns and disordered eating behaviors in sport settings.

1.2. The Role of the Coach

Coaches are influential role models for athletes, and one coach is likely to interact with hundreds or thousands of athletes throughout their tenure. Addressing body image on an individual level is important; however, targeting and assessing coaches provides the opportunity to shift an entire team culture or sport program for many future athletes. A coach's knowledge and perceptions can have a positive or negative influence on athletes' perceptions of themselves, enjoyment of sport, mental health, and physical health (Horn, 2002; Voelker et al., 2022).

Unfortunately, coaches often believe and promote harmful appearance ideals (Muscat & Long, 2008; Willson & Kerr, 2021), which may lead to detrimental, lasting effects on their athletes. For example, Vani and colleagues (2021) conducted semi-structured interviews with adolescent female athletes to explore the impact of negative body image behaviors on sport enjoyment and participation. Girls within the study referenced multiple negative coach

behaviors, such as making derogatory comments about athletes' bodies and mandating excessive exercise for girls who were perceived as "overweight". Indeed, many of the athletes interviewed who had quit sport cited coach behaviors as a major factor in their decision.

Understanding the system and common causes of body image concerns within sport is the first step; determining what a positive body image sport environment looks like and how it needs to be changed is the next challenge. Currently, the common sport environment involves coaches comparing and openly criticizing athletes' bodies, while ignoring or forgetting to discuss body functionalities and normative body changes (Coppola et al., 2014; Vani et al., 2021; Willson & Kerr, 2021). Some coaches report being aware that body image issues within sport are prevalent, but do not know how, or do not feel confident to, address these issues (Sabiston et al., 2020). By failing to address the issue, coaches may inadvertently cause harm by reinforcing negative body behaviors and ideals. To create a body positive sport environment, coaches need to first be confident in their ability to talk about and address body image concerns (Sabiston et al., 2020).

1.3. Assessing Coach Self-Efficacy

Self-efficacy is the degree of confidence that one is capable of achieving a goal or completing a task and predicts future performance of a task (Bandura, 1977). Applying Self-Efficacy Theory to coaches in relation to body image in sport is important as expectation of achievement may be a more influential predictor of behavior than previous accomplishment alone (Bandura, 1986). For example, if a coach believes they are able to intervene when an athlete is talking negatively about their body or is experiencing body image concerns, that coach is likely to intervene when the moment arises, even if they have never done it before. In contrast, a coach who does not believe that they are capable is less likely to intervene.

Sullivan and colleagues (2012) examined the associations between general coach self-efficacy, perceived behaviors (e.g., “In coaching, I congratulate an athlete after a good play”), competition level, and coach education experience among youth coaches in Canada. The findings showed that self-efficacious coaches were more likely to report engaging in behaviors such as positive feedback, social support, and instruction, whether they were coaching at a recreational or competitive level. Sullivan et al. (2012) also found that coaching education was positively correlated to coach self-efficacy. Similarly, Vaughan and colleagues (2004) assessed athletic trainers’ self-efficacy in supporting female athletes with eating disorders. Almost all the athletic trainers reported having previous experience, but only about one third reported feeling confident in their ability to ask, or even identify, an athlete with an eating disorder.

Additionally, coaches’ self-efficacy may be able to predict athlete perceptions of coach behaviors, although findings are currently mixed. Short and Short (2004) utilized the Coach Efficacy Scale (Feltz et al., 1999) and an adapted version for athletes to examine whether coach and athlete perceptions of coach self-efficacy differed (defined as coaches’ scores falling outside of the 95% confidence intervals around the athletes’ ratings). The results showed that coaches and athletes tended to perceive the coaches’ efficacy comparably. In a similar study, Kavussanu and colleagues (2008) surveyed coaches and their athletes on coach self-efficacy and athlete-perceived coaching effectiveness. Mean team scores were compared with the coaching efficacy scores reported by each team’s coach using 2 (group: coach, athlete) by 4 (dimension: motivation, game strategy, technique, character building) repeated-measures ANOVAs. Findings showed that, on average, coaches rated themselves higher than athletes on all four dimensions. However, it should be noted that this study compared coaches’ perceptions of their *self-efficacy* to athletes’ perceptions of coaches’ *effectiveness*, which are distinct constructs. More recently, Caron (2015) utilized the Coach Efficacy Scale and an adapted version for athletes (Short & Short, 2004) and found that coaches rated their self-efficacy

higher more often than their athletes (i.e., the coaches' scores fell above the 95% confidence intervals around the athletes' ratings). As such, more research is required to determine the association between coaching self-efficacy and athlete outcomes. This may be particularly important in relation to body image, as multiple studies have highlighted that coaches can have both a positive and negative impact on how athletes feel in their bodies during sport (Koulanova et al., 2021; Vani et al., 2021). However, at present, a scale assessing coaches' perceived self-efficacy to identify and address body image concerns among their athletes does not exist.

In light of the above, self-efficacy can be applied to develop a novel measure to assess coaches' impact on athletes' body image that overcomes limitations of more costly (e.g., observation) and indirect tools (e.g., athlete perceptions). Moreover, with the growing need for body image interventions and education targeted towards coaches (Voelker et al., 2022), a scale measuring coach beliefs and behaviors related to body image can be used to assess the effectiveness of future interventions and the overall impact of coaches on athletes' body image.

1.4. The Current Study

Therefore, the purpose of the current study was to develop and validate a novel self-efficacy scale measuring coach beliefs in their ability to intervene and communicate issues related to body image among their athletes. The proposed measure will provide a tool to assess and predict coach behaviors and beliefs, which can be used to evaluate the impact of coaches on athletes' body image and provide an assessment for future body image education and interventions targeted at coaches.

2. Materials and Methods

2.1. Study Design

A mixed-methods study design was utilized to develop and validate the Coach Self-Efficacy Body Image Scale (CSEBIS). Qualitative data were gathered in the development phase of the CSEBIS via expert feedback and cognitive interviews (Phase 1). Quantitative data

were gathered in the testing phase of the CSEBIS via online surveys (Phase 2). All procedures were approved by the University of Minnesota Institutional Review Board (ref no. STUDY00013842). See Figure 1 for a list of procedures and participant recruitment and attrition.

[FIGURE 1 NEAR HERE]

2.2. Phase 1: Development of Scale Items

2.2.1. Item Development

Initial scale items were developed in four waves. Importantly, we did not limit ourselves to a particular structure or item phrasing and considered all possible statements and constructs related to athletes' body image in sport. First, we conducted a review of the existing literature on body image in sport. Several items were therefore added based on constructs identified in previous studies by athletes and coaches as important in influencing athletes' body image, such as coaches commenting on an athlete's appearance (e.g., "I can refrain from making comments about an athlete's appearance – whether positive or negative"). Second, we reviewed related scales (i.e., the Coaching Efficacy Scale [Feltz et al., 1999] and the Athletic Trainer Self-Efficacy Scale [Vaughan et al., 2004]) and adapted the items for the CSEBIS (e.g., "I can ask an athlete if she has an eating disorder" was adapted to: "I can ask an athlete if they have body image concerns"). Third, we followed recommendations on developing self-efficacy measures (Bandura, 1977, 2006). Specifically, we considered all possible domains that can relate to coaches' self-efficacy in affecting athletes' body image beyond simply what coaches say and do (e.g., impact of uniforms, menstruation, comments from significant others). Fourth, several additional items were added as a result of expert knowledge of the core research team, consisting of experienced researchers in the fields of body image, sport, coaching, and public health. The first and last authors also have experience as athletes and coaches (basketball, tennis). For example, we added multiple items related to gender stereotypes as this is likely to

impact athletes' body image experiences in sport (e.g., "I can describe harmful stereotypes associated with girls' and women's bodies in sport"). The initial iteration of the scale was 57 items long, rated on a five-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

2.2.2. Expert Panel

Next, a multidisciplinary panel of experts was recruited to review the initial scale and provide feedback assessing content validity. Four scholars in the fields of body image, eating disorders, athletics, coaching, and scale development were identified and recruited via email to provide feedback on the first draft of the CSEBIS. Three experts provided feedback in time for this study. Based on expert reviews, several items were modified to reduce ambiguity and simplify the phrasing. Additionally, 14 items were removed due to ambiguity or overlaps with simpler-worded alternatives. The feedback from the panel resulted in a second iteration of the CSEBIS, which consisted of 43 items and two expected domains (knowledge and behavior). One expert also suggested including a different answer modality (scale of 0–10) to assess level of confidence instead of the Likert scale.

2.2.3. Cognitive Interviews

Cognitive interviewing is a process aimed at evaluating and improving self-report survey questions (Willis, 2015). Recruitment of coaches for content validity assessment was conducted via convenience sampling and yielded four participants. Recruitment was then halted due to saturation of data and feedback (Willis, 2015). The sample included one male coach (25 years old) and three female coaches (M_{age}=27.0, *SD*=1.2 years), and all coaches identified as White. The sports represented in this sample were cross country, basketball, tennis, and wrestling. All participants reported coaching adolescents at the high school level, and one participant also reported coaching adults. One participant coached only male athletes, one participant coached only female athletes, and two participants coached male and female

athletes. Coach tenure ranged from one year to over ten years (M_{tenure}=4.7, *SD*=3.5 years). Only one of the coaches reported having previously received training or education on body image.

Participants completed the scale ahead of the interview and recalled their thought process during the interviews. Retrospective probing was chosen as it has been recommended for self-administered measures (Willis, 2015). The Cognitive Model of the Survey Response Process (CMSRP) was used as a framework for developing the probing questions (Tourangeau, 1984), as it is recommended for scale items that may be unfamiliar to the target population (Willis, 2015). Questions under the CMSRP focus on identifying comprehension, retrieval of relevant information, judgment of the process, and the response process (Tourangeau, 1984; Willis, 2015). Examples of probing questions included: "Why did you answer the question with 'somewhat agree'?" and "How would you describe 'body image' in your own words?". A full list of interview questions and probes can be found in Appendix A. After the interviews, participants were asked to complete the scale once more to provide further written feedback.

The interview and survey data were analyzed by exploring themes related to item content, item phrasing, and response type preference. Following the cognitive interviews and survey completion, the scale was revised based on the qualitative data collected, which led to modification of several items. Specifically, multiple items were further simplified to remove ambiguity or provide examples of key terms (e.g., item 24: "I am confident in my ability to emphasize body functionality [how the body works and what it can do] over body appearance [how the body looks] when talking with my athletes" and item 38: "I am confident in my ability to advocate for my athletes against stereotypical policies, such as body weight limits or stereotypical uniforms [e.g., skirts only vs shorts only]"). No items were deleted at this stage as coaches believed that several items, although similar in content, tapped into slightly different constructs. Relatedly, coaches were satisfied with the overall scale length and the time it took to complete the scale. Overall, coaches agreed with their score and felt that it was an accurate

representation of their confidence. Moreover, the 0–10 scale was selected as the most appropriate response modality. Prior to testing, the final scale therefore consisted of 43 items across two expected domains (knowledge and behavior), and all items were rated on a scale of 0 (*No Confidence*) to 10 (*Completely Confident*).

2.3. Phase 2: Testing the Scale

2.3.1. Sampling

Sample size was determined *a priori* in line with previous recommendations, which suggest an overall sample size of 200–300 respondents for factor analysis (Boateng et al., 2018; Clark & Watson, 2016; Comrey, 1988). Participant recruitment consisted of social media posts; emails to athletic directors, conference commissioners, and coaches; and advertisements in university and partner newsletters. Inclusion criteria were: (1) being over 18 years old; (2) identifying as a coach (defined as any type of leader, coach, or volunteer of sport, fitness, or physical education); and (3) having coached any sport or physical activity in the last two years. Participants were asked to complete the survey at two timepoints, one week apart. Coaches were offered entry into a random draw for gift vouchers worth $150, $100, and $75 upon completion of the second survey.

2.3.2. Measures

2.3.2.1. Coach Self-Efficacy Body Image Scale (CSEBIS)

The CSEBIS was developed for the purpose of this study. Participants were asked to rate 43 items on a scale of 0 (*No Confidence*) to 10 (*Completely Confident*) following the leading phrase: “I am confident in my ability to…”. Example items included “…describe what body image is” and “…refrain from talking about my body in front of my athletes”. Higher scores on the CSEBIS indicate higher perceived self-efficacy to identify and address body image concerns. The pre-testing iteration of the scale is presented in Appendix B.

2.3.2.2. Coaching Efficacy Scale (CES)

The CES examines individuals' perceived confidence in their sport coaching ability (Feltz et al., 1999) and comprises four subscales: motivation, game strategy, technique, and character building. For the purposes of this study, only the motivation, technique, and character building subscales were used. Participants were asked to rate 17 items on a scale of 0 (*Not At All Confident*) to 9 (*Extremely Confident*) following the leading phrase: "I am confident in my ability to…". Example items included "…build team confidence" and "…motivate my athletes". Higher scores on the CES indicate higher perceived coaching self-efficacy. The CES has shown good validity and reliability in previous research (e.g., Feltz et al., 1999; Hepler et al., 2007; Myers et al., 2005) and in the current study (Cronbach's α=.922).

2.3.2.3. Body Esteem Scale for Adolescents and Adults (BESAA)

The BESAA examines individuals' self-evaluations of their body or appearance (Mendelson et al., 2001) and comprises 23 items across three subscales: appearance, weight, and attributions of one's body. Respondents were prompted to indicate how often they agreed with statements such as "I am proud of my body" and "There are lots of things I'd change about my looks if I could" on a scale of 0 (*Never*) to 4 (*Always*). Higher scores on the BESAA indicate higher levels of body esteem. The BESAA has shown good validity and reliability in previous research (e.g., Cragun et al., 2013; Mendelson et al., 2001) and in the current study (Cronbach's α=.944).

2.3.2.4. Demographic Information

Coaches were asked to report the following demographic information: (1) gender; (2) age; (3) ethnicity; (4) current or most recent coaching role; (5) sport(s) coached; (6) gender of team/athletes; (7) age of team/athletes; (8) competition level coached; (9) current role tenure; (10) total coach tenure; and (11) whether or not they had previously received training on body image and/or eating disorders.

2.3.2.5. Qualitative Feedback

Finally, coaches who completed the Time 2 survey were prompted with two open-ended questions to provide further feedback: (1) “Do you have any feedback for us regarding the logistics of this survey? This may be related to flow of questions, ease of completion, or other functionality issues” and (2) “Do you have any feedback for us regarding the content of this survey? This may be related to types of questions asked, wording of questions, or how questions are answered”.

2.4. Data Analyses

Data analyses were conducted in SPSS (version 27.0) and AMOS (version 28.0; Arbuckle, 2014). Initially, analyses were performed to check for normality (skewness and kurtosis $\geq \pm 2.58$). All questionnaires (i.e., CSEBIS, CES, BESAA) showed normal distributions.

The dataset was split into approximately equal halves for exploratory factor analysis (EFA; first half of the data) and subsequent confirmatory factor analysis (CFA; second half of the data) to examine resultant factor structure. In order to ascertain the factor structure of the CSEBIS, EFA was conducted using a principal component analysis and varimax rotation, considering the Guttman-Kaiser criterion (the number of eigenvalues above 1) (Yeomans & Golder, 1982) and the scree plot to determine how many factors to retain. The minimum factor loading criteria was set to .50. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation.

Subsequently, model fit was assessed via CFA. We fitted the four-factor model suggested by EFA and a one-factor model to assess whether the scale is unidimensional. Measurement invariance tests were used to assess homogeneity across gender (1=male, 2=female) using a hierarchically ordered set of models (i.e., configural, metric) increasing in restrictiveness over each successive step (Wang & Wang, 2019). For configural invariance, equivalence was assumed if model fit criteria were satisfied (outlined below). Metric invariance

is tested by constraining factor loadings (i.e., the loadings of the items on the constructs) to be equivalent across two groups (women and men). The model with constrained factor loadings is then compared to the configural invariance model to determine fit. If the overall model fit is significantly worse in the metric invariance model compared to the configural invariance model, it indicates that at least one loading is not equivalent across the groups, and metric invariance is not supported. If the overall model fit is not significantly worse in the metric invariance model, it indicates that constraining the loadings across groups does not significantly affect the model fit, supporting metric invariance (Putnick & Bornstein, 2016).

Relative and absolute fit indices of the models were computed to determine how many factors to retain and to assess the model fit to the data. The goodness of fit indices included the relative chi-square (χ^2/df: values ≤3 and ≤2 indicate acceptable and good fit, respectively), the Root Mean Square Error of Approximation (RMSEA 90% CI: values ≤.08 and ≤.06 indicate acceptable and good fit, respectively), the Comparative Fit Index (CFI: values ≥.90 and ≥.95 indicate acceptable and good fit, respectively), the Tucker-Lewis Index (TLI: values ≥.90 and ≥.95 indicate acceptable and good fit, respectively), and the Standardized Root Mean Square Residual (SRMR: values ≤.10 and ≤.08 indicate acceptable and good fit, respectively) (Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2015; Streiner, 2006; Tabachnick et al., 2007).

Test-retest reliability was assessed using Pearson's correlation coefficient to evaluate the stability of the subscale and total scale scores from Time 1 to Time 2 (one week later). Internal consistency was evaluated using Cronbach's (1951) alpha (α≥.80 was considered acceptable; Boateng et al., 2018), item-total correlations, and inter-item correlations. Cohen's (1992) guidelines of small (r≥.10), moderate (r≥.30), and large (r≥.50) were used when interpreting correlations.

Convergent and discriminant validity were assessed by correlating the total score of the CSEBIS with the total score of the CES (Feltz et al., 1999) and the BESAA (Mendelson et al.,

2001), respectively. Evidence of convergent validity is evident by moderate to strong correlations of the total scores, while discriminant validity is provided by small correlations between the total scores. Furthermore, we conducted a series of *t*-tests to assess differences in CSEBIS scores based on known groups, including coach gender (1=male, 2=female), previous training on body image and/or eating disorders (1=yes, 2=no), and sport type (1=aesthetic-focused sports, 2=non-aesthetic-focused sports). Aesthetic sports were defined as sports in which leanness is encouraged (Davison et al., 2002), and included both sports in which appearance is evaluated as part of the athlete's or team's performance (e.g., cheer, dance, gymnastics) and weight-dependent sports that divide athletes into weight categories (e.g., wrestling, rowing, cross country). Non-aesthetic sports were defined as sports that do not emphasize a particular physique (e.g., basketball, football, lacrosse). Cohen's (2013) guidelines of small ($d \geq .20$), medium ($d \geq .50$), and large ($d \geq .80$) were used when interpreting *t*-tests. Finally, we conducted simple linear regression to predict CSEBIS scores based on coach tenure.

3. Results

3.1. Participants

Participant recruitment yielded 1,167 responses. Responses were removed prior to analysis due to not providing consent (n=239); providing consent but not continuing (n=8); not continuing after the screening questions (n=157); failing or not answering the screening questions (n=32); failing or not answering the attention check (n=23); and having missing values on the CSEBIS (n=26). The total sample retained for analyses was N=682. The majority of the participants identified as women (n=413, 60.6%), White (n=591, 86.7%), head coaches (n=437, 64.1%), coaches of adolescents (n=313, 45.9%), coaches of female athletes (n=346, 50.7%), coaching at the college level (n=258, 37.8%), and having received previous education or training on the topic of body image and/or eating disorders (n=364, 53.4%). Participants

ranged in age (18–82 years; M_{age}=39.7, *SD*=11.7 years) and coaching experience (0–53 years; $M_{experience}$=15.4, *SD*=10.6 years). The data were split into two independent samples for EFA (sample 1; *N*=354) and CFA (sample 2; *N*=328). Full participant characteristics are presented in Table 1.

[TABLE 1 NEAR HERE]

3.2. Factor Structure and Invariance

3.2.1. Exploratory Factor Analysis

Results of the initial EFA indicated that all communalities were above .50 and there was no cross-loading of items. The size of the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO=.947) revealed that the CSEBIS items had adequate common variance for factor analysis, and the significance of Bartlett's Test of Sphericity, $\chi^2(n=903)=9779.24$, $p<.001$, indicated that the correlation matrix was factorable (Tabachnick et al., 2007). The factor solution derived from this analysis yielded eight factors, which accounted for 67.01% of the variation in the data (factor 1=13.83%; factor 2=13.13%; factor 3=11.48%; factor 4=10.78%; factor 5=5.66%; factor 6=4.63%; factor 7=4.15%; factor 8=3.36%). However, seven items failed to load on any dimension significantly and were removed from further analysis one by one (items 8, 24, 25, 27, 28, 39, 41). EFA was repeated after excluding these items, showing a seven-factor structure (KMO=.946) that explained a total of 68.10% of the variance among the items (factor 1=15.89%; factor 2=14.33%; factor 3=11.83%; factor 4=8.50%; factor 5=7.28%; factor 6=5.57%; factor 7=4.71%). Bartlett's Test of Sphericity proved to be significant, $\chi^2(n=630)=8262.79$, $p<.001$, and all communalities were over the required value of .50.

Subsequently, exploratory reliability analyses were conducted to assess Cronbach's alphas as well as correlations between factors. The original reliability analyses showed subthreshold Cronbach's alpha values ($\alpha<.80$) for factor 5 (3 items), factor 6 (3 items), and

factor 7 (3 items). As such, an additional nine items were removed (items 32, 33, 34, 35, 36, 37, 38, 40, 42). The EFA was repeated after excluding these items. The results confirmed a four-factor dimensional structure (KMO=.957). The four dimensions explained a total of 68.60% of the variance among the items (factor 1=20.93%; factor 2=18.74%; factor 3=17.22%; factor 4=11.71%). Bartlett's Test of Sphericity proved to be significant, $\chi^2(n=351)=7183.17$, $p<.001$, and all communalities were over the required value of .50. Cronbach's alphas, eigenvalues, and correlations of CSEBIS items and factors are shown in Table 2. The final scale post-EFA consisted of 27 items and four subscales: knowledge, recognition, engagement, and disengagement (see Appendix C).

[TABLE 2 NEAR HERE]

3.2.2. Confirmatory Factor Analysis

The initial first order model demonstrated acceptable fit to the data, $\chi^2(318)=765.28$, $p<.001$; $\chi^2/df=2.41$; TLI=.926; CFI=.933; RMSEA=.066, $p<.001$; SRMR=.059. Following a review of the suggested modification indices, covariances were added between error terms within domains. The modified first order model demonstrated good fit to the data, $\chi^2(307)=568.10$, $p<.001$; $\chi^2/df=1.85$; TLI=.955; CFI=.961; RMSEA=.051, $p=.393$; SRMR=.055. The second-order model demonstrated similarly good fit, $\chi^2(309)=596.79$, $p<.001$; $\chi^2/df=1.93$; TLI=.951; CFI=.957; RMSEA=.053, $p=.190$; SRMR=.065. A Chi-square difference test assessed for the best fitting model between a first-order solution (full model) and a second-order solution with a higher-order factor (reduced model). The difference between the models was $\chi^2(2)=28.69$, $p<.001$, which exceeds the .05 critical value of 5.99, leading us to reject the reduced model and opt for a first-order solution. All loadings were strong, ranging from .57–.94 (see Figure 2). When the model was tested for invariance across gender, there was support for factor structure equivalence across women and men, $\chi^2(614)=1147.40$, $p<.001$; $\chi^2/df=1.87$; TLI=.911; CFI=.922; RMSEA=.052; SRMR=.067,

which served as a baseline for further tests of invariance. The Chi-square difference between the unconstrained (configural), $\chi^2(614)=1147.40$, and fully constrained, $\chi^2(641)=1184.02$, models was non-significant ($p=.102$), supporting metric invariance across gender.

[FIGURE 2 NEAR HERE]

3.3. Reliability

All items correlated significantly with the CSEBIS mean (rs=.266–.772, $p<.01$); correlations were weak to moderate for factor 4 (rs=.266–.468, $p<.01$), with all other items showing strong correlations (rs≥.632, $p<.01$) (see Table 2). Reliability analyses showed high Cronbach's alpha values (α≥.820) for all factors and the total CSEBIS (see Table 2). Time 1 and Time 2 factor and total scores showed large, significant correlations (rs=.712–.831, $p<.01$), which indicate high test-retest reliability (see Table 3).

[TABLE 3 NEAR HERE]

3.4. Validity

3.4.1. Convergent Validity

Higher CSEBIS total scores were strongly associated with higher coach self-efficacy as measured by the CES ($r=.505$, $p<.01$). Higher CSEBIS total scores were also moderately associated with the motivation ($r=.498$, $p<.01$), technique ($r=.358$, $p<.01$), and character building ($r=.328$, $p<.01$) subscales (see Table 3). Notably, when individual subscales were considered, only the motivation subscale of the CES was consistently moderately associated with the CSEBIS factors (rs=.374–.443, $p<.01$), while the technique and character building subscales showed small to moderate correlations (rs=.229–.314, $p<.01$). When the data was split by gender, findings were consistent among male (Table S1) and female coaches (Table S2), showing a similar pattern of correlations (see Appendix D).

3.4.2. Discriminant Validity

Only the CSEBIS disengagement subscale was weakly associated with the BESAA appearance subscale (r=.129, p<.05), suggesting that feeling confident in one's ability to disengage from unhelpful body image behaviors is associated with feeling positively about one's physical appearance. All other factors and total scores of the CSEBIS and BESAA were not significantly correlated (rs<.100, p>.05) (see Table 3). Notably, the association between the appearance subscale of the BESAA and the disengagement subscale of the CSEBIS was significant among male coaches only. All other patterns of correlations were consistent across coach gender (see Appendix D).

3.4.3. Differentiation by Known Groups

CSEBIS scores were significantly higher among coaches who had received previous training on body image and/or eating disorders (M=7.96, SD=1.10) than coaches with no previous training (M=7.42, SD=1.45), t(170.05)=3.29, p=.001, d=.44, and among female coaches (M=7.89, SD=1.14) than male coaches (M=7.61, SD=1.34), t(317)=-2.05, p=.041, d=.23. No differences were observed between coaches of aesthetic-focused sports (M=7.90, SD=1.36) and coaches of non-aesthetic-focused sports (M=7.70, SD=1.22), t(78.95)=1.04, p=.304, d=.16. Coach tenure did not predict total CSEBIS scores, F(1,316)=.04, p=.844, R^2=-.003.

3.5. Participant Feedback

Of the 393 coaches who completed the Time 2 survey, 296 provided a response to the open-ended questions. Of the 296 coaches, 133 (44.9%) provided positive feedback about the survey; 62 (21.0%) provided constructive feedback; and 101 (34.1%) provided some other type of response, such as words of support or encouragement for the study, background information about their coaching career, or questions to the researchers. Examples of each are provided in Table 4.

[TABLE 4 NEAR HERE]

4. Discussion

The CSEBIS was developed based on guidelines for scale development and validation (Boateng et al., 2018) and recommendations for developing self-efficacy scales (Bandura, 1977, 2006). The four subscales (knowledge, recognition, engagement, disengagement) comprising 27 items showed good reliability (internal consistency, test-retest reliability, inter-item and item-total correlations), validity (convergent and discriminant validity, differentiation between known groups), factor structure, and model invariance across gender. After item development and review, EFA and CFA showed a structure with four distinct domains. Strong and positive correlations between domains, as well as good model fit across both the first- and second-order models demonstrate that the CSEBIS can be used in future research as a total scale or as individual subscales tapping into different domains of coaches' self-efficacy to identify and recognize body image concerns among their athletes, engage in helpful body image behaviors, and disengage from unhelpful body image behaviors. For example, researchers who are interested in examining coaches' knowledge about body image might opt to use the knowledge subscale only. On the other hand, in intervention studies that aim to change coach attitudes and behaviors, the full CSEBIS scale is recommended. Moreover, by exploring coaches' self-efficacy across the different domains, researchers can determine what areas should be specifically targeted through future interventions.

Although no true comparison measures currently exist to assess the validity of the CSEBIS, convergent and discriminant validity were partially established by correlating the CSEBIS with the CES (Feltz et al., 1999) and the BESAA (Mendelson et al., 2001), respectively. A higher score on the CSEBIS was related to higher general coach self-efficacy scores as measured by the CES. This finding provides preliminary support for the ability of the CSEBIS to tap into the construct of self-efficacy. Furthermore, the association between body image self-efficacy and general coach self-efficacy suggests that coaches who are most

confident in their coaching ability are also more confident in their ability to recognize body image concerns and implement positive body image behaviors when coaching. Less self-efficacious coaches may require targeted interventions or more hands-on techniques to address various influences of self-efficacy. Only one CSEBIS subscale (disengagement) was weakly correlated with the appearance subscale of the BESAA among male coaches only, while the remaining subscales and total scores showed no significant associations. This finding suggests that a coach's individual body image is not related to their confidence in their ability to positively impact athletes' body image.

Observed differences between groups further supported the validity of the CSEBIS, exhibiting expected outcomes. Specifically, female coaches and coaches who indicated that they had previously received training on body image and/or eating disorders scored higher on the CSEBIS than male coaches and coaches with no previous training. This is unsurprising given that body image-related interventions and education programs are often targeted towards women (Alleva et al., 2015; Voelker et al., 2019). Therefore, interventions aimed at male coaches may be warranted. Additionally, these findings suggest that the CSEBIS can be used as a tool to assess the effectiveness of body image programs targeted at coaches, as an alternative to more costly and time-consuming methods of assessment (e.g., observation). Notably, no differences were observed between coaches of aesthetic-focused sports and coaches of non-aesthetic sports or across coach tenure. As such, specific body image education is required to increase coaches' self-efficacy to identify and address body image concerns across all sports and experience levels.

4.1. Strengths, Limitations, and Future Directions

There are multiple strengths to the present research, including: (1) the development and validation of a novel scale using multiple rigorous statistical techniques; (2) the inclusion of a large sample size in line with previous recommendations; and (3) the assessment of follow-up

data to determine test-retest reliability. Additionally, although the CSEBIS was primarily developed as an assessment tool for researchers, coaches can use it as a tool for self-evaluation and to increase awareness of body image concerns. Several items from the CSEBIS provide tangible examples of behaviors that should be avoided (e.g., “I am confident in my ability to refrain from discussing body shape and weight with my athletes”) and behaviors that are encouraged (e.g., “I am confident in my ability to talk with an athlete who has recently had a sudden and drastic change in weight [loss or gain]”). In completing the tool, coaches can gain insight into areas they need most support with. The CSEBIS instructions also provide coaches with an overview and lexicon of body image and related constructs (e.g., appearance, functionality), which may be novel for many coaches.

This is the first study examining the psychometric properties of the CSEBIS, and further studies of its reliability, validity, and factor structure are advisable. Several limitations of the present research should therefore also be considered. Firstly, the participant sample was skewed towards White women, which is not representative or generalizable as the majority of coaching positions in the United States are held by men (NCAA, 2021). Relatedly, the sample was split chronologically, rather than randomly, which resulted in differences in age and gender across the two samples (e.g., older coaches in sample 2; higher proportion of female coaches in sample 1). Future research into the CSEBIS should include larger sample sizes with coaches of color, male coaches, and coaches of male athletes as they were underrepresented in the present study. Moreover, the CSEBIS should be translated to, and validated in, other languages to increase its accessibility to coaches in other countries.

Secondly, as a self-report measure, the CSEBIS is susceptible to responder biases, such as social desirability bias. It is also possible that coaches overestimate the belief that they are competent or capable of these behaviors, also known as the Dunning-Kruger Effect (Dunning, 2011). In attempts to mitigate the presence of such biases, future research using the CSEBIS

could include multiple perspectives, for example by measuring athletes' perceptions of their coaches. There is also potential to develop and validate an athlete version of the CSEBIS to evaluate athletes' perceptions of their coaches' efficacy to identify and address body image concerns. As such, future research should necessarily evaluate whether athletes' ratings are similar to those of coaches to further establish the validity and utility of the CSEBIS.

Thirdly, although convergent and discriminant validity were confirmed using established measures of general coach self-efficacy and body image, gold standard comparison measures were not available, which is a common issue in scale validation research (Boateng et al., 2018). This is an important limitation given the importance of establishing construct validity for new scales (Boateng et al., 2018). Moreover, while we found evidence of convergent validity for the total scale, several CSEBIS factors showed lower than moderate correlations with the CES subscales. To overcome this limitation, we conducted other assessments of construct validity to evaluate our scale, such as differentiation among known groups. However, conclusions regarding construct validity remain tentative. In the future, the CSEBIS should be evaluated in relation to coaches' behaviors and athlete outcomes (e.g., athletes' body image and salient perceptions of coach behaviors and self-efficacy).

Finally, pre- and post-intervention scores were not assessed in this study, which would determine if the CSEBIS is sensitive enough to detect changes in self-efficacy after education or an intervention targeted at coaches. Future research should assess coaches' body image self-efficacy before and after an intervention, to not only evaluate the effectiveness of the intervention, but to determine the pre- and post-test (predictive) validity of the CSEBIS.

4.2. Conclusion

The present research developed and validated the Coach Self-Efficacy Body Image Scale (CSEBIS), which is a novel scale that can be used to measure coaches' perceived self-efficacy to identify and tackle body image concerns among their athletes. The CSEBIS

524 comprises 27 items across four domains: (1) *knowledge* (coaches' self-efficacy in their ability
525 to identify the importance of body image in sport); (2) *recognition* (coaches' self-efficacy in
526 their ability to recognize body image concerns among their athletes); (3) *engagement* (coaches'
527 self-efficacy in their ability to engage in helpful body image behaviors); and (4) *disengagement*
528 (coaches' self-efficacy in their ability to disengage from unhelpful body image behaviors). The
529 results support the initial validity and reliability of the CSEBIS among sport coaches in the
530 United States. Utilizing this measure can enhance insights into what areas of body image self-
531 efficacy coaches most struggle with. In turn, this can facilitate the development of interventions
532 aimed at improving coach knowledge, behaviors, and team culture around positive body image;
533 ultimately promoting sport adherence and enjoyment and reducing physiological and
534 psychological consequences of negative body image and sport dropout.

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Appendices

Appendix A – Cognitive Interview Questions and Probes

Scale Process:
- How long did it take you to complete this questionnaire?
- After reading the introduction/instructions, were you surprised by the scale items?
- Did you prefer the sliding scale (0–10) or the Likert scale? Why?

Q1:
- Why did you answer ____?
- How would you describe 'body image'?

Q2:
- Why did you answer ____?
- What are some of those consequences of feeling bad about your body in sport?

Q3–Q5:
- Why did you answer ____?
- What are some of the positive outcomes?

Q6:
- Why did you answer ____?
- How does body image relate to sport?

Q7:
- Why did you answer ____?
- What would be an example of a harmful stereotype of female athletes?

Q8:
- Why did you answer ____?
- What would be an example of a harmful stereotype of male athletes?

Q9:
- Why did you answer ____?
- Why is body image important in sport?

Q10:
- Why did you answer ____?
- What would be one sign that one of your athletes may have poor body image?

Q11–Q12:
- Why did you answer ____?
- Between Q11 and Q12 which makes the most sense to you or is more relevant?

Q13:
- Why did you answer ____?
- What would be an example of an athlete being critical of their body?

Q14–Q15:
- Why did you answer ____?
- Is there a difference between being self-conscious and not feeling comfortable?
    - If yes: what is the difference?

Q1–Q15:
- Looking at the past 15 questions, are there any you think were confusing, hard to understand, or irrelevant?
- Anything you would like to add about this section before we move on?

Q16–Q20:
- Take a few minutes to review the next 5 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?

- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Q21–Q25:

- Take a few minutes to review the next 5 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?
- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Q26–Q30:

- Take a few minutes to review the next 5 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?
- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Q31–Q35:

- Take a few minutes to review the next 5 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?
- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Q36–Q40:

- Take a few minutes to review the next 5 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?
- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Q41–Q43:

- Take a few minutes to review the next 3 questions.
- In your opinion, are any of these behaviors not possible in a sport setting or in your program?
- Are any of these behaviors not relevant?
- Are any of these behaviors unfamiliar or confusing?

Scale Review

- What are your impressions of the scale as a whole?
- Do you think this scale measures what we are trying to measure (confidence in ability in sport context)?
- Overall, your score would hypothetically indicate you have ____ confidence in your ability to discuss and tackle these issues related to body image. Would you agree or disagree with that assessment? Why?
- Anything else you would like to add, comment on, or questions you may have?

Appendix B – Pre-Testing Iteration of the CSEBIS Comprising 43 Items Across Two Domains

Instructions: This survey asks about your confidence in recognizing and dealing with body image concerns your athletes face. **Body image** refers to how we think, feel, and behave in relation to our bodies (e.g., being happy about your hair, weight, height, or appearance). Body image includes both the **appearance** and **functionality** of the body (e.g., how the body works and what it can do). We can have both **positive** (e.g., "my legs are strong") and **negative** (e.g., "my legs are too big") thoughts and feelings about our bodies.

Please think about your specific sport settings and the athletes you coach (rather than your family members or friends) when answering these questions. If you haven't experienced the body image examples described, answer to the best of your ability how confident you think you would be in that situation.

Please indicate on a scale of 0 (*No Confidence*) to 10 (*Completely Confident*) how confident you are in the following statements. Remember, there are no right or wrong answers, so please answer as honestly as possible.

I am confident in my ability to…

Expected Domains	Suggested Items
Knowledge *"I am confident in my ability to..."*	1. ...describe what body image is
	2. ...identify the consequences feeling bad about your body can have in sport
	3. ...identify the positive outcomes that having good body image can have on an athlete's sport **performance**
	4. ...identify the positive outcomes that having good body image can have on an athlete's sport **enjoyment**
	5. ...identify the positive outcomes that having good body image can have on an athlete's overall **well-being**
	6. ...describe how body image relates to sport
	7. ...describe harmful stereotypes associated with girls' and women's bodies in sport
	8. ...describe harmful stereotypes associated with boys' and men's bodies in sport
	9. ...describe why body image is important in sport
	10. …identify signs of poor body image among my athletes
	11. ...recognize when an athlete feels bad about their body

	12. ...recognize when an athlete doesn't like their body
	13. ...recognize when an athlete is being critical of their body
	14. ...recognize when an athlete is self-conscious about their body
	15. ...recognize when an athlete is not comfortable in their body
Behavior *"I am confident in my ability to..."*	16. ...have a discussion with an individual athlete about their body image
	17. ...normalize discussions around body image with my team
	18. ...discuss body functions with my athletes (e.g., menstruation)
	19. ...talk with my staff to help determine whether an athlete has body image concerns
	20. ...ask an athlete if they have body image concerns
	21. ...talk with an athlete who has recently had a sudden and drastic change in weight (loss or gain)
	22. ...talk with an athlete who has recently and suddenly started wearing very ill-fitting clothing (baggy or tight)
	23. ...talk about athletes without mentioning their body weight or shape
	24. ...emphasize body functionality (how the body works and what it can do) over body appearance (how the body looks) when talking with my athletes
	25. ...provide support if an athlete is being critical about their body
	26. ...prohibit critical comments or body shaming from others towards my athletes
	27. ...redirect conversations when I hear other coaches talk about athletes' appearance
	28. ...redirect conversations when I hear parents talk about an athlete's appearance
	29. ...refrain from making comments about an athlete's appearance - whether positive or negative
	30. ...refrain from talking about my body in front of my athletes
	31. ...refrain from talking about others' appearance in front of my athletes

32. ...model positive body behaviors while I'm coaching
33. ...challenge feminine stereotypes on my team and with my athletes
34. ...challenge masculine stereotypes on my team and with my athletes
35. ...adjust my practice plan if my athletes are telling me they are thirsty or tired
36. ...adjust my practice plan if an athlete tells me they are on their period/menstruating
37. ...advocate for my athletes against objectifying policies, such as uncomfortable or sexualized uniforms
38. ...advocate for my athletes against stereotypical policies, such as body weight limits or stereotypical uniforms (e.g., skirts only vs shorts only)
39. ...help make my athletes feel comfortable in their bodies while practicing and competing
40. ...allow my athletes to choose their uniform size and style, when possible
41. ...focus on my athletes' performance and well-being, rather than what their body looks like
42. ...refrain from weighing my athletes
43. ...refrain from discussing body shape and weight with my athletes

Appendix C – Final Iteration of the CSEBIS Comprising 27 Items Across Four Domains

Instructions: This survey asks about your confidence in recognizing and dealing with body image concerns your athletes face. **Body image** refers to how we think, feel, and behave in relation to our bodies (e.g., being happy about your hair, weight, height, or appearance). Body image includes both the **appearance** and **functionality** of the body (e.g., how the body works and what it can do). We can have both **positive** (e.g., "my legs are strong") and **negative** (e.g., "my legs are too big") thoughts and feelings about our bodies.

Please think about your specific sport settings and the athletes you coach (rather than your family members or friends) when answering these questions. If you haven't experienced the body image examples described, answer to the best of your ability how confident you think you would be in that situation.

Please indicate on a scale of 0 (*No Confidence*) to 10 (*Completely Confident*) how confident you are in the following statements. Remember, there are no right or wrong answers, so please answer as honestly as possible.

I am confident in my ability to…

Scale	Items	0 ---------- 10
1	1. ...describe what body image is	0 1 2 3 4 5 6 7 8 9 10
2	2. ...identify signs of poor body image among my athletes	0 1 2 3 4 5 6 7 8 9 10
3	3. ...ask an athlete if they have body image concerns	0 1 2 3 4 5 6 7 8 9 10
2	4. ...recognize when an athlete feels bad about their body	0 1 2 3 4 5 6 7 8 9 10
3	5. ...have a discussion with an individual athlete about their body image	0 1 2 3 4 5 6 7 8 9 10
1	6. ...describe why body image is important in sport	0 1 2 3 4 5 6 7 8 9 10
4	7. ...talk about athletes without mentioning their body weight or shape	0 1 2 3 4 5 6 7 8 9 10
4	8. ...prohibit critical comments or body shaming from others towards my athletes	0 1 2 3 4 5 6 7 8 9 10
2	9. ...recognize when an athlete is being critical of their body	0 1 2 3 4 5 6 7 8 9 10
1	10. ...identify the consequences feeling bad about your body can have in sport	0 1 2 3 4 5 6 7 8 9 10
4	11. ...refrain from talking about my body in front of my athletes	0 1 2 3 4 5 6 7 8 9 10
4	12. ...refrain from discussing body shape and weight with my athletes	0 1 2 3 4 5 6 7 8 9 10
3	13. ...talk with an athlete who has recently and suddenly started wearing very ill-fitting clothing (baggy or tight)	0 1 2 3 4 5 6 7 8 9 10

4	14. ...refrain from talking about others' appearance in front of my athletes	0	1	2	3	4	5	6	7	8	9	10
1	15. ...identify the positive outcomes that having good body image can have on an athlete's sport **performance**	0	1	2	3	4	5	6	7	8	9	10
3	16. ...talk with an athlete who has recently had a sudden and drastic change in weight (loss or gain)	0	1	2	3	4	5	6	7	8	9	10
1	17. ...identify the positive outcomes that having good body image can have on an athlete's sport **enjoyment**	0	1	2	3	4	5	6	7	8	9	10
2	18. ...recognize when an athlete doesn't like their body	0	1	2	3	4	5	6	7	8	9	10
3	19. ...normalize discussions around body image with my team	0	1	2	3	4	5	6	7	8	9	10
4	20. ...refrain from making comments about an athlete's appearance - whether positive or negative	0	1	2	3	4	5	6	7	8	9	10
1	21. ...identify the positive outcomes that having good body image can have on an athlete's overall **well-being**	0	1	2	3	4	5	6	7	8	9	10
2	22. ...recognize when an athlete is not comfortable in their body	0	1	2	3	4	5	6	7	8	9	10
3	23. ...talk with my staff to help determine whether an athlete has body image concerns	0	1	2	3	4	5	6	7	8	9	10
1	24. ...describe how body image relates to sport	0	1	2	3	4	5	6	7	8	9	10
2	25. ...recognize when an athlete is self-conscious about their body	0	1	2	3	4	5	6	7	8	9	10
3	26. ...discuss body functions with my athletes (e.g., menstruation)	0	1	2	3	4	5	6	7	8	9	10
1	27. ...describe harmful stereotypes associated with girls' and women's bodies in sport	0	1	2	3	4	5	6	7	8	9	10

Scoring: Average values across subscale scores and total scores.

Knowledge Scale (1)	Recognition Subscale (2)	Engagement Subscale (3)	Disengagement Subscale (4)
1, 6, 10, 15, 17, 21, 24, 27	2, 4, 9, 18, 22, 25	3, 5, 13, 16, 19, 23, 26	7, 8, 11, 12, 14, 20

Appendix D – Convergent Validity, Discriminant Validity, and Test-Retest Reliability of the CSEBIS Split by Gender

Table S1

Convergent Validity, Discriminant Validity, and Test-Retest Reliability of the CSEBIS Among Male Coaches

	Range	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	Time 2
1. Knowledge	-	-	-													.734**
2. Recognition	-	-	-	.652**												.774**
3. Engagement	-	-	-	.578**	.698**											.807**
4. Disengagement	-	-	-	.294**	.284**	.244**										.733**
5. CSEBIS Total	2.81–10.00	7.61	1.34	.845**	.868**	.858**	.486**									.833**
6. Motivation	-	-	-	.296**	.446**	.368**	.464**	.477**								
7. Technique	-	-	-	.214**	.318**	.257**	.380**	.349**	.548**							
8. Character	-	-	-	.159*	.290**	.238**	.279**	.293**	.476**	.352**						
9. CES Total	117.00–153.00	142.08	8.84	.298**	.457**	.378**	.484**	.489**	.908**	.802**	.652**					
10. Appearance	-	-	-	.021	.030	.034	.182*	.065	.204*	.192*	.111	.222**				
11. Attributions	-	-	-	-.014	-.042	-.060	-.014	-.044	.039	.066	.071	.066	.440**			
12. Weight	-	-	-	.101	.061	-.019	.146	.076	.137	.150	.044	.152	.834**	.429**		
13. BESAA Total	14.00–90.00	55.89	15.86	.043	.029	-.008	.145	.050	.168*	.170*	.101	.192*	.939**	.635**	.933**	

Note. BESAA = Body Esteem Scale for Adolescents and Adults; CES = Coach Efficacy Scale; CSEBIS = Coach Self-Efficacy Body Image Scale.

**p<.01.

*p<.05.

Table S2

Convergent Validity, Discriminant Validity, and Test-Retest Reliability of the CSEBIS Among Female Coaches

	Range	***M***	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Time 2**
1. Knowledge	-	-	-													.807**
2. Recognition	-	-	-	.529**												.668**
3. Engagement	-	-	-	.468**	.554**											.760**
4. Disengagement	-	-	-	.630**	.295**	.253**										.696**
5. CSEBIS Total	5.00–10.00	7.89	1.14	.843**	.779**	.799**	.634**									.828**
6. Motivation	-	-	-	.498**	.421**	.433**	.439**	.577**								
7. Technique	-	-	-	.348**	.357**	.385**	.188*	.430**	.498**							
8. Character	-	-	-	.329**	.196*	.315**	.331**	.378**	.576**	.493**						
9. CES Total	85.00–153.00	138.97	11.86	.498**	.430**	.471**	.398**	.586**	.904**	.791**	.746**					
10. Appearance	-	-	-	.100	.084	.150	.070	.138	.132	.107	.107	.141				
11. Attributions	-	-	-	.038	.129	.071	.032	.088	.098	.086	.084	.107	.477**			
12. Weight	-	-	-	.057	-.004	.066	-.020	.042	.016	.011	.016	.018	.842**	.442**		
13. BESAA Total	5.00–83.00	51.12	15.88	.046	.060	.111	-.014	.077	.084	.073	.068	.092	.946**	.643**	.936**	

Note. BESAA = Body Esteem Scale for Adolescents and Adults; CES = Coach Efficacy Scale; CSEBIS = Coach Self-Efficacy Body Image Scale.

**p<.01.

*p<.05.

Tables

Table 1

Participant Demographics Across Analyzed Samples

	Sample 1 (*N*=354)		**Sample 2 (*N*=328)**		**Test-Retest (*N*=393)**	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age (Years)	35.6	9.6	44.1	12.3	39.6	12.8
Total Tenure (Years)	11.8	9.6	19.3	10.3	15.5	10.6
Position Tenure (Years)	6.0	6.6	10.7	8.4	8.5	8.2
	n	%	*n*	%	*n*	%
Gender						
Gender Fluid	1	.3	0	0	1	.3
Men	92	26.7	156	48.9	153	38.9
Non-Binary	2	.6	0	0	1	.3
Women	250	72.5	163	51.1	238	60.6
Ethnicity						
Asian/Pacific Islander	9	2.6	2	.6	8	2.0
American Indian/Alaska Native	1	.3	1	.3	2	.5
African American/Black	11	3.2	5	1.6	5	1.3
Caucasian/White	299	86.7	292	91.5	359	91.3
Hispanic/Latino	10	2.9	10	3.1	8	2.0
Mixed/Multiracial	15	4.3	9	2.8	11	2.8
Position						
Assistant Coach	104	30.1	37	11.6	76	19.3
Associate Head Coach	19	5.5	11	3.4	16	4.1
Head Coach	185	53.6	252	79.0	268	68.2
Other	104	30.1	10	3.1	20	5.1
Volunteer	18	5.2	9	2.8	13	3.3
Athlete Age						
Both Adolescents & Adults	58	16.9	48	15.0	57	14.5
Adolescents Only	193	56.1	120	37.6	187	47.7
Adults Only	93	27.0	151	47.3	148	37.8
Athlete Gender						
Boys/Men Only	35	10.1	55	17.2	47	12.0
Coed	122	35.4	106	33.2	146	37.2
Girls/Women Only	188	54.5	158	49.5	200	50.9
Competition Level						
Club	47	13.6	21	6.6	43	10.9
College	98	28.4	160	50.2	151	38.4
High School	133	38.6	107	33.5	142	36.1
International	1	.3	0	0	0	0
Junior/Community College	4	1.2	13	4.1	9	2.3
Middle School/Junior High	19	5.5	4	1.3	13	3.3
National/Olympic	2	.6	0	0	2	.5
Non-Competition	18	5.2	3	.9	17	4.3
Other	11	3.2	4	1.3	10	2.5
Recreation/In-House	12	3.5	7	2.2	6	1.5
Previous Training						
No	146	42.3	104	32.6	151	38.4
Not Sure	22	6.4	28	8.8	23	5.9
Yes	177	51.3	187	58.6	219	55.7

Table 2

Cronbach's Alphas, Eigenvalues, and Correlations of Items and Factors for the CSEBIS

	K	R	E	D	T	λ	α (Total)	α (Men)	α (Women)
K	-					5.469	.933	.902	.945
R	.634	-				4.965	.954	.949	.958
S	.670	.611	-			4.901	.927	.930	.930
P	.431	.389	.428	-		3.408	.820	.792	.829
T	.871	.825	.875	.629	-	-	.953	.940	.959

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	-																										
2	.60	-																									
3	.62	.72	-																								
4	.64	.72	.76	-																							
5	.61	.68	.74	.80	-																						
6	.65	.65	.67	.66	.64	-																					
7	.53	.63	.62	.68	.61	.68	-																				
8	.56	.58	.58	.59	.58	.69	.54	-																			
9	.42	.49	.51	.49	.52	.48	.48	.56	-																		
10	.42	.51	.49	.53	.54	.50	.48	.58	.80	-																	
11	.38	.47	.49	.48	.50	.47	.43	.57	.81	.87	-																
12	.41	.43	.40	.46	.44	.45	.43	.51	.71	.69	.68	-															
13	.37	.47	.47	.46	.51	.46	.41	.55	.79	.83	.83	.68	-														
14	.41	.48	.52	.45	.49	.48	.44	.55	.78	.84	.84	.68	.81	-													
15	.45	.43	.50	.49	.43	.52	.45	.55	.50	.48	.49	.43	.47	.44	-												
16	.47	.50	.48	.55	.47	.57	.50	.56	.49	.45	.42	.41	.43	.44	.71	-											
17	.45	.50	.53	.51	.49	.52	.45	.51	.46	.44	.42	.37	.41	.41	.58	.59	-										
18	.41	.43	.46	.51	.45	.45	.41	.49	.49	.43	.44	.42	.46	.41	.63	.64	.58	-									
19	.39	.42	.46	.44	.40	.49	.40	.53	.55	.52	.56	.42	.51	.48	.76	.65	.59	.64	-								
20	.41	.41	.46	.46	.40	.50	.41	.51	.52	.48	.48	.39	.48	.45	.77	.69	.63	.64	.75	-							
21	.39	.45	.43	.40	.39	.44	.31	.50	.54	.49	.53	.34	.50	.48	.63	.59	.58	.58	.72	.69	-						
22	.17	.20	.27	.31	.26	.25	.26	.28	.22	.24	.20	.27	.26	.22	.26	.26	.20	.26	.21	.23	.21	-					
23	.27	.30	.36	.37	.32	.26	.31	.29	.30	.30	.27	.30	.29	.30	.37	.41	.36	.41	.31	.37	.29	.40	-				
24	.23	.27	.27	.27	.23	.28	.22	.31	.29	.28	.33	.29	.27	.27	.26	.23	.24	.20	.35	.27	.34	.50	.35	-			
25	.18	.29	.33	.29	.28	.21	.21	.25	.28	.22	.25	.30	.27	.25	.23	.21	.16	.22	.22	.16	.27	.38	.41	.48	-		
26	.21	.29	.36	.32	.30	.23	.29	.29	.26	.22	.21	.29	.26	.25	.29	.25	.27	.27	.28	.27	.24	.51	.43	.50	.49	-	
27	.16	.25	.30	.34	.26	.18	.24	.22	.17	.23	.24	.22	.24	.19	.18	.16	.14	.21	.18	.10	.16	.44	.39	.42	.41	.46	-

Note. K = Knowledge subscale; R = Recognition subscale; E = Engagement subscale; D = Disengagement subscale; T = Total score. All correlations: $p<.01$.

Table 3

*Range, Means (*M*), Standard Deviations (*SD*), and Pearson's Correlation Coefficients for the CSEBIS, CES, and BESAA at Baseline and After One Week*

	Range	***M***	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Time 2**
1. Knowledge	-	-	-														.776**
2. Recognition	-	-	-	.608**													.725**
3. Engagement	-	-	-	.529**	.630**												.779**
4. Disengagement	-	-	-	.432**	.275**	.244**											.712**
5. CSEBIS Total	2.81–10.00	7.76	1.24	.846**	.832**	.830**	.542**										.831**
6. Motivation	-	-	-	.374**	.386**	.390**	.443**	.498**									
7. Technique	-	-	-	.252**	.290**	.314**	.266**	.358**	.526**								
8. Character	-	-	-	.238**	.229**	.274**	.311**	.328**	.542**	.436**							
9. CES Total	85.00–153.00	140.43	10.58	.371**	.392**	.414**	.429**	.505**	.908**	.799**	.708**						
10. Appearance	-	-	-	.033	.017	.083	.129*	.076	.178**	.166**	.114*	.193**					
11. Attributions	-	-	-	.008	.033	.001	.008	.015	.072	.076	.077	.088	.451**				
12. Weight	-	-	-	-.060	.001	.017	.066	.043	.080	.088	.034	.089	.841**	.431**			
13. BESAA Total	5.00–90.00	53.44	16.02	.022	.010	.043	.070	.042	.132*	.135*	.089	.149**	.943**	.632**	.936**		

Note. BESAA = Body Esteem Scale for Adolescents and Adults; CES = Coach Efficacy Scale; CSEBIS = Coach Self-Efficacy Body Image Scale.

***p*<.01.

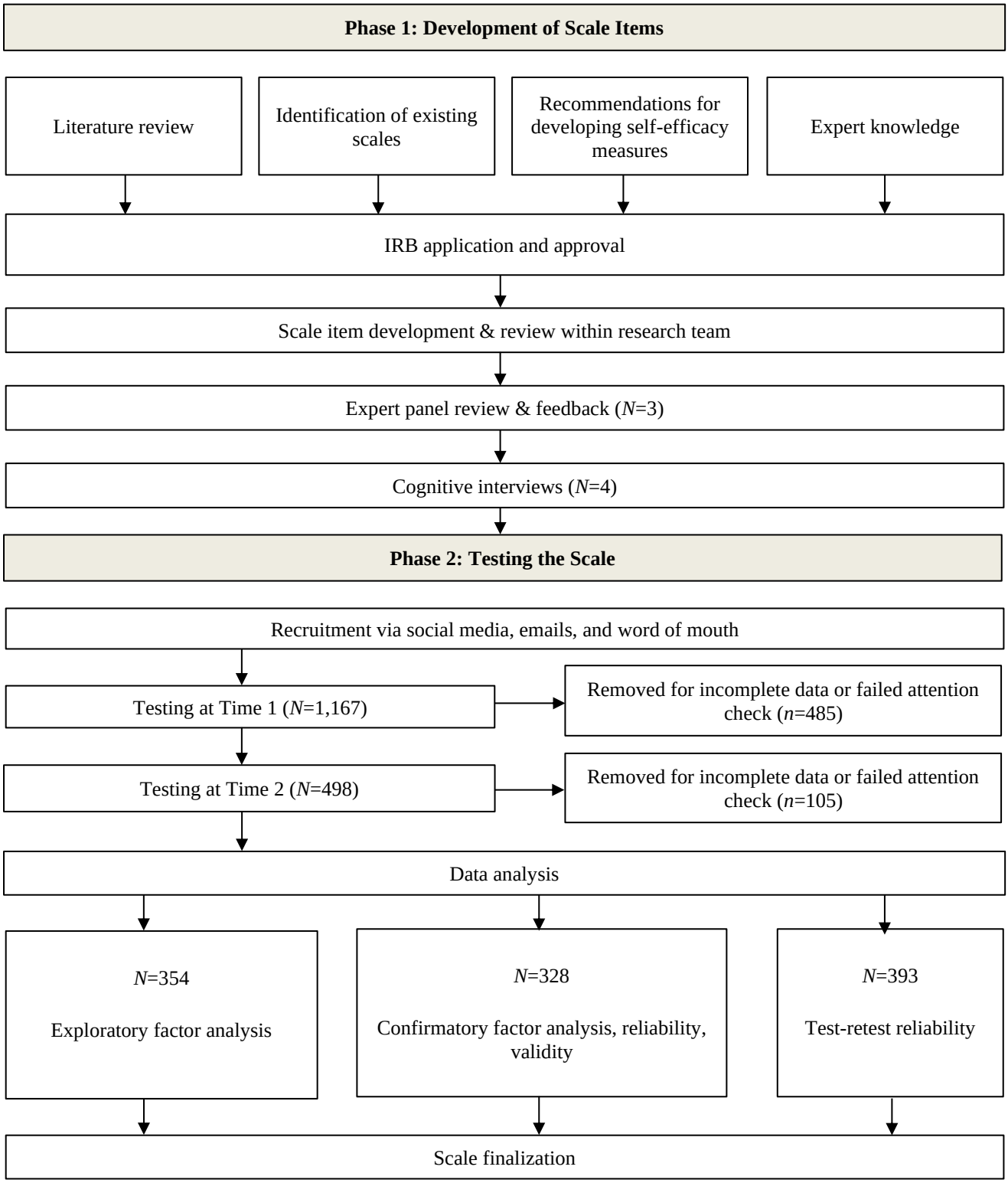
**p*<.05.

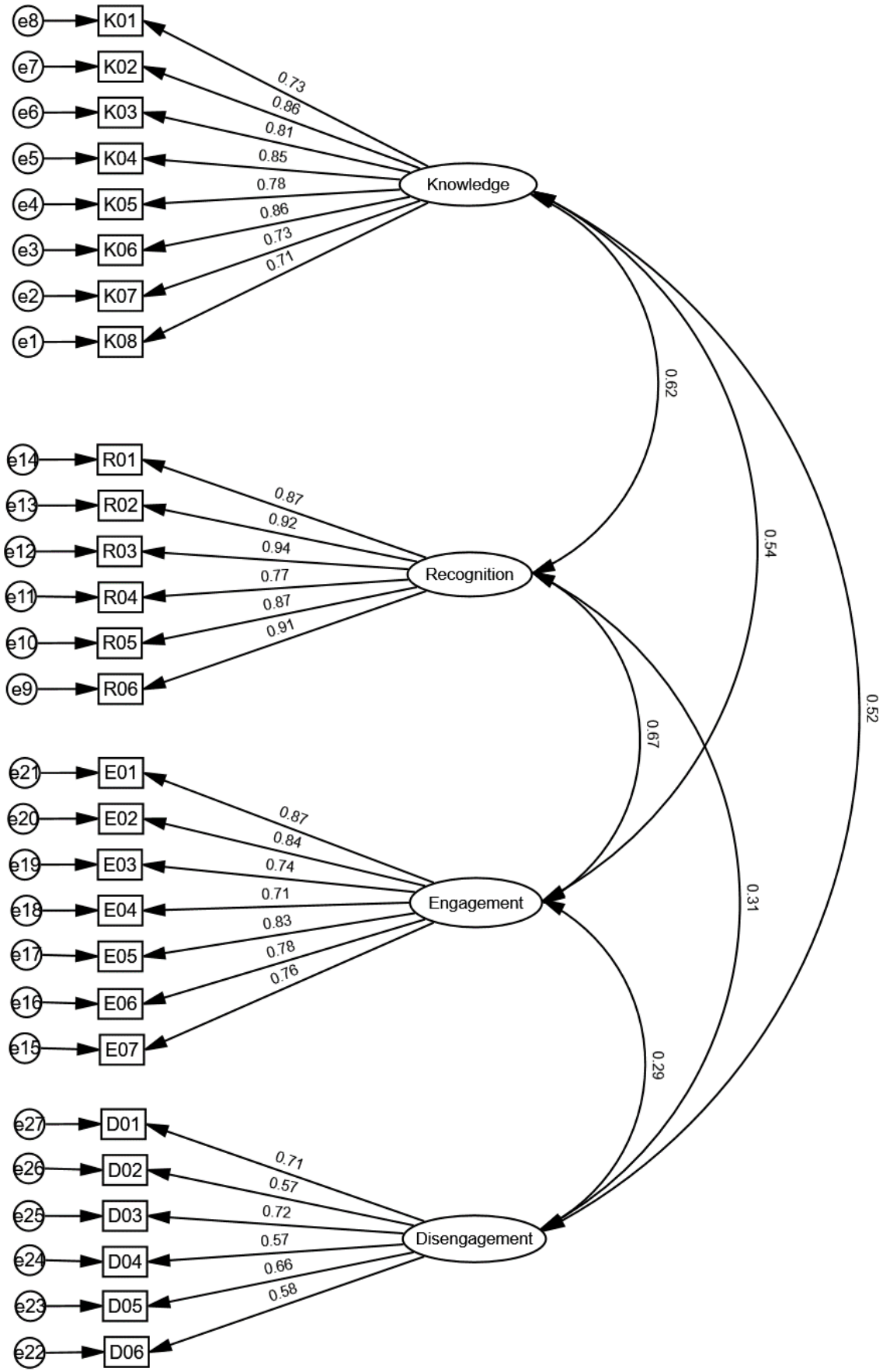
Table 4

Type of Feedback and Example Quotes from Coaches who Completed the Time 2 Survey (N=296)

Type of Feedback	***n (%)***	**Examples of Feedback**
Positive Survey Feedback	133 (44.9)	"Very easy to complete and the questions were easy to follow, and the flow was simple." "A great survey, really looking forward to the results." "Great questions. Adding another tool in my coaching belt. Thank you!"
Constructive Survey Feedback	62 (21.0)	"Dragging the slider was more annoying than clicking a radio button." "Generally ok but would be good to have an option to provide clarification such as I was not happy with my weight and worked with a health professional to lose because of health reasons, not vanity." "Mainly good to reflect on, but a few [questions] were redundant."
Other Responses	101 (34.1)	"I hope this survey helps further the discussion and improves how body image is viewed in athletics!" "I think what is difficult as a coach, sometimes body shape plays a role into performance. So, when a college athlete gains weight and can't move as well as they once did, this is always a difficult conversation." "Weight-related questions can be tough when my sport has weight classes."

Figures


Phase 1: Development of Scale Items
Literature review
Identification of existing scales
Recommendations for developing self-efficacy measures
Expert knowledge
IRB application and approval
Scale item development & review within research team
Expert panel review & feedback (N=3)
Cognitive interviews (N=4)
Phase 2: Testing the Scale
Recruitment via social media, emails, and word of mouth
Testing at Time 1 (N=1,167)
Removed for incomplete data or failed attention check (n=485)
Testing at Time 2 (N=498)
Removed for incomplete data or failed attention check (n=105)
Data analysis
N=354
Exploratory factor analysis
N=328
Confirmatory factor analysis, reliability, validity
N=393
Test-retest reliability
Scale finalization


e8
K01
e7
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K08
0.73
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0.81
0.85
0.78
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0.73
0.71
Knowledge
e14
R01
e13
R02
e12
R03
e11
R04
e10
R05
e9
R06
0.87
0.92
0.94
0.77
0.87
0.91
Recognition
e21
E01
e20
E02
e19
E03
e18
E04
e17
E05
e16
E06
e15
E07
0.87
0.84
0.74
0.71
0.83
0.78
0.76
Engagement
e27
D01
e26
D02
e25
D03
e24
D04
e23
D05
e22
D06
0.71
0.57
0.72
0.57
0.66
0.58
Disengagement
0.62
0.54
0.52
0.67
0.31
0.29

Figure Captions

Figure 1. Study Procedures, Recruitment, and Attrition.

Figure 2. First-Order Model with Four Subscales and Factor Loadings for the CSEBIS.

Note. For clarity purposes, correlations between error terms have been omitted: e2→e8=.24; e3→e8=.16; e4→e5=.43; e4→e6=.48; e5→e6=.29; e5→e8=-.16; e9→e14=-.24; e11→e12=-.18; e15→e16=.30; e15→e17=.26; e18→e21=-.16.