Development and Validation of the Greek Version of Weight Pressures in Sport—Females Questionnaire

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Weight Pressures in Sport—Females (WPS-F) questionnaire measures sport-related pressures that female athletes experience regarding body weight, shape, size, and appearance. In order to examine the psychometric properties of the Greek version of the inventory, two different studies were conducted. In the first study, using a sample \((n = 225)\) of female Greek athletes aged 12–20 years, exploratory factor analysis produced two factors (Factor 1: Pressures From Coaches and Sports About Weight and Factor 2: Pressures Regarding Appearance and Performance) and supported the original factor structure. In the second study, using a different sample \((n = 318)\) of female Greek athletes aged 11–18 years, confirmatory factor analysis provided support for the two-factor structure. Weight Pressures in Sport—Females questionnaire was demonstrated to be a valid and reliable instrument for Greek female athletic populations. Future studies should further test the factorial structure in younger and older athletes and in larger samples.

**Keywords**: disordered eating, athletes, inventory, reliability, validity

Many famous young female athletes around the world, such as Russian figure skater Yulia Lipnitskaya and Italian 2020 Olympic swimmer Ilaria Cusinato, have admitted to struggling with eating disorders (EDs) while competing at the highest levels in their respective sports. Studies illuminate that athletes, especially those in esthetic and weight-sensitive sports, are at risk of developing EDs and disordered eating (DE), with estimated prevalence in female athletes ranging from 5% to 45%...
In addition to the well-documented health-related consequences, EDs and DE can negatively impact an athlete’s performance and typically emerge in mid-adolescence (Kelly et al., 2016; Kontele & Vassilakou, 2021; Mountjoy et al., 2018; Nattiv et al., 2007; Sundgot-Borgen et al., 2013). Although EDs and DE are multifactorial disorders, depending on genetic, biological, psychological, socio-cultural, and environmental factors, specific parameters in sport environments may contribute to their development (Collier & Treasure, 2004; Sundgot-Borgen et al., 2013; Wells et al., 2020). In particular, pressures to achieve or maintain a low body weight and/or a lean body shape are considered important variables among the sport-specific factors correlated to EDs and DE (Anderson et al., 2012; de Bruin et al., 2011; Kong & Harris, 2015; Petrie & Greenleaf, 2012; Scott et al., 2019; Teixidor-Batlle et al., 2021; Voelker et al., 2014).

The most common pressures within sports environments are comments from coaches, teammates, and judges regarding weight and body shape, the requirements to fall into a specific weight class/category to compete, the perception that low weight is associated with performance advantages, and the revealing nature of the training or competition uniform (Reel et al., 2013).

Coaches seem to have one of the most important roles regarding the pressure to maintain low body weight, as well as the athlete’s belief that low weight is associated with better performance (Ranby et al., 2009). A high percentage of female athletes report having received negative comments by their coaches regarding their weight or body shape, and those athletes are more likely to develop EDs (Anderson et al., 2012; Francisco et al., 2012; Kerr et al., 2006; Kong & Harris, 2015). In many studies, athletes identify coaches as the primary source of weight pressure, that is characterized not only by comments, but also by weight monitoring, food monitoring, and body comparisons (de Bruin & Oudejans, 2018; McGannon & McMahon, 2019; Voelker & Reel, 2015). A recent systematic review regarding coaches’ role on DE development indicated a positive association between athletes’ eating pathology and specific coaching behaviors, such as negative body comments, body comparisons, body gazing, body pinching, weight and body measurements, food monitoring, and diet advice (Voelker et al., 2022).

Teammates are another source of weight pressures within the sport environment. Teammates may influence eating attitudes in a positive and in a negative way. It is reported that teammates often promote positive eating practices to their peers and support them against DE attitudes (Scott et al., 2019). On the other hand, studies have found that teammates can negatively influence eating attitudes by making comments about body shape or body weight, normalizing pathogenic weight control methods and comparing body weight or setting goals for the most extreme weight loss between them (Scott et al., 2019).

Moreover, athletes who believe that a low weight will improve their performance have a higher risk of EDs (Krentz & Warschburger, 2013). These pressures seem to be more pervasive in sports where low body weight or leanness is valued for performance, such as gymnastics, figure skating, and cheerleading (Giel et al., 2016; Kong & Harris, 2015; Mancine et al., 2020; Tan et al., 2016; Teixidor-Batlle et al., 2021). At the same time, perceived pressures for a low weight seem to be greater in sports where a revealing uniform is required, as athletes may feel that any
flaw in their body is exposed to the judges and spectators (Torres-McGehee et al., 2012).

Currently, the Weight Pressures in Sport–Female (WPS-F) questionnaire (Reel et al., 2013) is the only validated survey instrument to quantify unique pressures experienced by female athletes within the sports environment. Developed by Reel et al. (2010), this scale measures pressures that female athletes across various sports may experience from teammates, coaches, and others regarding weight, body size and shape, and appearance. The initial study examined the psychometric properties of WPS-F and identified the following four factors using exploratory procedures: (a) weight pressures from coach/teammates/sport (e.g., weight pressures associated with comments from coach and teammates), (b) self-consciousness of weight and appearance (e.g., uniform as a weight pressure), (c) importance of weight and appearance (e.g., importance of weight and appearance to family and friends), and (d) weight limit (e.g., weight requirements for sport; Reel et al., 2010). In that study, the factors’ internal consistency was established using a sample of 204 female collegiate athletes from 17 sports (Reel et al., 2010). However, the authors did not validate the four-factor structure of WPS-F, and sport pressures were not examined in relation to general sociocultural pressures about weight and appearance.

Reel et al. (2013) examined further the psychometric properties of the scale to determine the factors underpinning weight and body pressures that female athletes experience within the sport environment and to examine the reliability, convergent, and concurrent validity, as well as incremental validity of the WPS-F factors in relation to DE and body image disturbances (Reel et al., 2013). In the second study, using a sample of 414 female collegiate athletes, only two factors were produced (Reel et al., 2013). Following exploratory factor analysis, the first factor (Coach and Sport Pressures about Weight) contained 10 items reflecting external pressures such as coaches’ comments, and the second factor (Pressures Regarding Appearance and Performance) contained eight items regarding internal pressures or an athlete’s perception of certain pressures in sport (Reel et al., 2013). The confirmatory factor analysis of this two-factor model indicated that the model fit was just adequate, and a second two-factor model that contained six items for the first factor and five items for the second factor was tested (Reel et al., 2013). The fit of the shortened two-factor model was considered satisfactory. Moreover, the two factors demonstrated adequate convergent and concurrent validity. Finally, regarding incremental validity, it was found that sport pressures contributed uniquely to explaining female athletes’ body dissatisfaction, dietary intent, and bulimic symptoms. The researchers concluded that pressures within sport environments differ from the general daily sociocultural pressures women face and are important for understanding how female athletes feel about their bodies. The shortened two-factor 11-item model is considered a valid and reliable measure of sport pressure that can be used in research and clinical settings to assess weight-related pressures for female athletes in a short amount of time (Reel et al., 2013).

Recently, WPS-F was translated into Spanish and was validated in a study of 193 female collegiate athletes. A 15-item two-factor structure was proposed, by conducting an exploratory factor analysis with oblimin rotation. The first factor (coach and sport-specific pressures on weight) contained eight items and the second factor (pressures from teammates and the sports uniform) contained seven
items. Convergent validity was also adequate, as the sport pressures factors were correlated to EDs symptomatology, while the internal consistency was also adequate ($\alpha = .881$; Teixidor-Batlle et al., 2017).

In Greece, research in the field of ED has mainly focused on the prevalence of adolescent populations, as well as in athletic populations. Yannakoulia et al. (2004) found that 20% of adolescent girls living in Athens presented DE behaviors. Another study on adolescents living in Patras, in Western Greece, found the same results (Bilali et al., 2010), while a more recent study indicated a prevalence of 17.8% of DE in adolescent girls (Bacopoulou et al., 2018). Regarding athletic populations, DE and EDs in athletes have been studied for almost 20 years. DE prevalence in a number of sports athletes has been reported to be 46.3% in artistic swimming, 17.5% in water polo females (Douka et al., 2008), 11% in female basketball players (Kampouri et al., 2019), 19% in adolescent dancers (Chaikali et al., 2023), and 30% in artistic and rhythmic gymnasts (Theodorakou & Donti, 2013). More recently, Donti et al. (2021) found that 41.5% of Greek adolescent rhythmic gymnasts at the international-level and 14.6% of recreational-level gymnasts scored $\geq 20$ in EAT-26.

Although a large number of studies have examined the prevalence of DE and EDs in athletic populations in Greece, research regarding their underlying causality is sparse. Anxiety and perfectionism, as well as training experience and competition level, are some of the factors related to the prevalence of DE and EDs in Greek athletes (Costarelli & Stamou, 2009; Donti et al., 2021; Michou & Costarelli, 2011; Theodorakou & Donti, 2013). Nevertheless, weight pressures in the sport environment have been recognized anecdotally, but they have not been evaluated. Therefore, they should be included in Greek studies along with other factors that contribute to the development of DE and EDs.

Considering the lack of screening tools regarding the evaluation of weight pressures in the sports environment for clinical sport psychologists in Greece, the aims of the current study were (a) to examine the factorial structure of the WPS-F and (b) to assess the internal consistency of the WPS-F in Greek female athletes.

**Method**

**Design**

In order to examine the psychometric properties of the Greek version of WPS-F questionnaire, two different studies were carried out. In the first study, using a sample of 225 female Greek athletes, exploratory factor analysis was conducted, while in the second study, using a different sample of 318 female Greek athletes, confirmatory factor analysis was performed.

**Participants**

**First Study—Exploratory Factor Analysis**

National- and international-level female athletes ($n = 225$) aged 12–20 years old ($M = 16.27, SD = 2.39$), from 16 individual and team sports (Artistic Gymnastics,
Rhythmic Gymnastics, Trampoline, Acrobatic Gymnastics, Aerobic Gymnastics, Gymnastics for All, Ballet/Dancing, Track and Field, Basketball, Volleyball, Water Polo, Artistic Swimming, Karate, Tae Kwon Do, Kick Boxing, and Canoe Kayak) participated in this study to perform exploratory factor analysis. They had 1–16 years ($M = 7.82, SD = 3.76$) of training experience. Their body mass index was 14.84–26.23 kg/m$^2$ ($M = 20.00, SD = 2.45$).

Second Study—Confirmatory Factor Analysis

Confirmatory factor analysis was performed in a different sample of female athletes ($n = 318$), aged 11–18 years old ($M = 13.89, SD = 1.75$), from six disciplines of Gymnastics (Artistic Gymnastics, Rhythmic Gymnastics, Trampoline, Tumbling, Acrobatics, and Aerobic Gymnastics). Regarding their training experience, 37% declared training for 5 years or less, 36% declared training for 6–8 years, and 27% declared training for more than 8 years. Their body mass index was 13.87–28.04 kg/m$^2$ ($M = 19.01, SD = 2.49$).

Measurement Instrument

The WPS-F questionnaire (Reel et al., 2013) is an 11-item self-report instrument designed to assess sport-specific pressures experienced by female athletes regarding their weight, body shape and size, and appearance. Responses are given on a 6-point Likert-type scale ranging from 1 (never) to 6 (always). The items in the WPS-F are grouped into two factors: Pressures From Coaches and Sports About Weight (six items) and Pressures Regarding Appearance and Performance (five items). Along with WPS-F, athletes provided information regarding their age, sport, training experience, weekly training hours, number of competitions per year, and major achievements. They self-reported their height and weight, and BMI was calculated as kilogram per meter squared.

Procedure

Participants completed a Greek version of the WPS-F (Supplementary Material S1 [available online]). Permission to translate and use the WPS-F was granted by the authors of the original instrument. A translation and back translation had been conducted by field experts to ensure the accuracy of meaning and language in the Greek text. The translation indicated the need for minor syntax corrections to better reflect the content of the items in the Greek language. Then, a pilot study with 10 female athletes was carried out to ensure a proper understanding of the questions.

Prior to the study, athletes were fully informed about the purpose and procedures, and informed consent was obtained from all adult (18 and older) participants. In addition, written parental consent was given for each adolescent athlete, and every athlete completed a consent form. It was emphasized that participation was voluntary with the right to withdraw at any time. No financial compensation was provided for participation. The researchers and assistants surveyed the participants before starting a training session at their training ground. They read the questions on their own in the presence of the researcher who was available to provide clarification if needed.
Ethical Permission

The study contributed to the eating habits, weight pressures, and DE attitudes of adolescent female gymnastic athletes in Greece project approved by the Ethics Committee of the University of West Attica (reference no. 52760/21-7-2020) and by the Hellenic Gymnastics Federation (reference no. 3151/28-8-2020).

Data Analysis

Descriptive statistics, correlations, analysis of internal consistency, and the exploratory factor analysis were carried out using IBM SPSS Statistics (version 25.0). The confirmatory factor analysis was performed with the computer program IBM SPSS Amos (version 26; Arbuckle, 2019) and Mplus (version 7; Muthén & Muthén, 1998–2012).

In order to perform an initial investigation and extract the greatest proportion of variation from the fewest possible factors, an exploratory factor analysis with principal components as extraction method was performed. Free selection of factors that had eigenvalues over one was chosen. The scree plot that was produced from the analysis was also examined. It was decided to also try different models, in order to define and confirm the optimal structure of the questionnaire. Deleting items with factor loadings of less than 0.40 was further decided as a criterion for item retention.

During confirmatory factor analysis, a three-factor model was compared to the default two-factor model (the list of models is presented in Table 1). The goodness-of-fit indices used to assess the model fit were the chi-square ratio ($\chi^2/df$; adequate fit $< 5$, excellent fit $\leq 2$), the comparative-fit index and the Tucker–Lewis index (acceptable fit $\geq .9$, excellent fit $\geq .95$), and the root mean square error of approximation (adequate fit $< .08$, excellent fit $< .06$) and its 90% confidence interval (Hooper et al., 2008; Hu & Bentler, 1998).

Results

Exploratory Factor Analysis

The mean total score of the WPS-F questionnaire in the first sample was 3.23 ($SD = 1.04$). Bartlett’s test of sphericity ($\chi^2 = 928.041$, $df = 55$, $p = .000$) and the Kaiser–Meyer–Olkin measure of sampling adequacy (0.83) confirmed that the

Table 1  List of Models Tested

<table>
<thead>
<tr>
<th>Model</th>
<th>Factors</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-factor model</td>
<td>Factor 1: Pressures From the Sport and Coaches About Weight</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Factor 2: Pressures Regarding Appearance and Performance</td>
<td>5</td>
</tr>
<tr>
<td>Three-factor model</td>
<td>Factor 1: Pressures From Coaches and Teammates About Weight</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Factor 2: Pressures Regarding Appearance and Body From Uniform</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Factor 3: Pressures Regarding Body Weight in Sport</td>
<td>2</td>
</tr>
</tbody>
</table>
choice of exploratory factor analysis was justified, while the correlation matrix showed that there was no multicollinearity in the data (determinant = .015).

Principal component analysis with free selection produced two factors with loadings from 0.47 to 0.82 and communalities from 0.31 to 0.71 (Table 2). The two factors with eigenvalues over one explained 54.12% of the total variance. All factors contained all the items of the initial scale. Factor 1 represented *Pressures From Coaches and Sport About Weight* and included six items. Factor 2 represented *Pressures Regarding Appearance and Performance* and included five items. Scree plot of the model is presented in Supplementary Material S2 (available online).

**Exploratory Factor Analysis for the Extraction of Three Factors**

The previously reported exploratory factor analysis produced two factors, but a third factor had an eigenvalue of 0.99; thus, it was decided to perform again exploratory factor analysis for the extraction of three factors. Bartlett’s test of sphericity ($\chi^2 = 928.041, df = 55, p = .000$) and the Kaiser–Meyer–Olkin measure of sampling adequacy (0.83) confirmed that the choice of exploratory factor analysis was justified, and the correlation matrix showed that there was no multicollinearity in the data (determinant = .015). Principal component analysis with a three-factor extraction produced factors with loadings from 0.41 to 0.82 and communalities from 0.34 to 0.73. The three factors explained 63.12% of the total variance (Table 3). All factors contained all the items of the initial scale. Factor 1

**Table 2  Exploratory Factor Analysis of the Greek Version of WPS-F With Two Factors**

<table>
<thead>
<tr>
<th>WPS-F item</th>
<th>Factor loading</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Q9</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Q10</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Q11</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td></td>
<td>0.79</td>
</tr>
<tr>
<td>Q5</td>
<td></td>
<td>0.76</td>
</tr>
<tr>
<td>Q4</td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>Q2</td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>Q1</td>
<td></td>
<td>0.47</td>
</tr>
<tr>
<td>Eigen values</td>
<td>4.48</td>
<td>1.47</td>
</tr>
</tbody>
</table>

*Note.* The extraction method was principal component analysis axis with a Varimax rotation with Kaiser Normalization. Factor 1: *Pressures From Coaches and Sport About Weight*; Factor 2: *Pressures Regarding Appearance and Performance*. WPS-F = Weight Pressures in Sport—Females.
represented Pressures From Coaches and Teammates About Weight and included five items. Factor 2 represented Pressures Regarding Appearance and Body From Uniform and included four items. Factor 3 represented Pressures Regarding Body Weight in Sport and included two items.

**Internal Consistency**

Table 4 shows means and SDs of each of the 11 items as well as item-total correlations for the entire sample. Missing responses were minimal for all the items. Intercorrelations of the 11 items are provided in the Supplementary Material S3 (available online).

Cronbach’s α value for the total questionnaire was .85. For the two-factor model, Cronbach’s α value for Factor 1 (Pressures from Sport and Coaches About Weight) was .85, and for Factor 2 (Pressures Regarding Appearance and Performance) was .72. For the three-factor model, Cronbach’s α value for Factor 1 (Pressures From Coaches and Teammates About Weight) was .84, for Factor 2 (Pressures Regarding Appearance and Body From Uniform) was .72, and for Factor 3 (Pressures Regarding Body Weight in Sport) was .59.

**Confirmatory Factor Analysis**

The mean total score of the WPS-F questionnaire in the second sample was 2.78 (SD = 1.06). Confirmatory factor analysis of the two-factor model showed loadings from 0.47 to 0.75. In particular, the loadings of the items per factor ranged at
satisfactory levels: (a) Pressures From Sport and Coaches About Weight with standard loadings from 0.62 to 0.75 ($M = 0.68$) and (b) Pressures Regarding Appearance and Performance with standard loadings from 0.47 to 0.73 ($M = 0.65$) (Figure 1 and Table 5). For the three-factor model, the loadings of the items ranged from 0.50 to 0.85. In particular, the loadings of the items per factor ranged (a) Pressures from Coaches and Teammates About Weight with standard loadings from 0.50 to 0.77 ($M = 0.64$), (b) Pressures Regarding Appearance and Body From Uniform with standard loadings from 0.61 to 0.77 ($M = 0.69$), and (c) Pressures Regarding Body Weight in Sport with standard loadings from 0.76 to 0.85 ($M = 0.81$) (Table 6).

Fit indices from the application of the two models to the data set (complete responses) are shown in Table 7. For the two-factor model, all the indices received acceptable and satisfactory values. For the three-factor model, most of the indices received acceptable and satisfactory values. However, the standardized root mean square residual index did not receive satisfactory value.

### Discussion

The purpose of the present study was to examine the psychometric properties of the Greek version of WPS-F questionnaire in Greek female athletic population. The WPS-F is designed to assess the unique pressures experienced by female athletes within the sports environment regarding their weight, body size and shape, and appearance.

A total of 624 Greek female athletes from individual and team sports participated in the study, of which the majority scored in the mild pressure range, consistent with other community studies of athletes from different countries using the WPS-F (Reel et al., 2013; Teixidor-Batlle et al., 2017; Voelker et al., 2014).

<table>
<thead>
<tr>
<th>Items</th>
<th>$M$</th>
<th>$SD$</th>
<th>Item-total correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>3.55</td>
<td>1.77</td>
<td>.444</td>
</tr>
<tr>
<td>Q2</td>
<td>2.60</td>
<td>1.35</td>
<td>.379</td>
</tr>
<tr>
<td>Q3</td>
<td>2.54</td>
<td>1.65</td>
<td>.616</td>
</tr>
<tr>
<td>Q4</td>
<td>4.14</td>
<td>1.66</td>
<td>.464</td>
</tr>
<tr>
<td>Q5</td>
<td>2.34</td>
<td>1.55</td>
<td>.409</td>
</tr>
<tr>
<td>Q6</td>
<td>3.87</td>
<td>1.71</td>
<td>.541</td>
</tr>
<tr>
<td>Q7</td>
<td>3.23</td>
<td>1.65</td>
<td>.603</td>
</tr>
<tr>
<td>Q8</td>
<td>3.65</td>
<td>1.70</td>
<td>.611</td>
</tr>
<tr>
<td>Q9</td>
<td>3.04</td>
<td>1.62</td>
<td>.669</td>
</tr>
<tr>
<td>Q10</td>
<td>3.49</td>
<td>1.72</td>
<td>.632</td>
</tr>
<tr>
<td>Q11</td>
<td>3.07</td>
<td>1.73</td>
<td>.515</td>
</tr>
</tbody>
</table>

*Note.* WPS-F = Weight Pressures in Sport—Females.
The WPS-F showed good internal consistency, using Cronbach’s $\alpha$ as a measure. The exploratory factor analysis produced two factors with eigenvalues over one, and with free selection of factors. The first factor included six items that were related to the pressures that come from coaches and the nature of the sport; the second factor included five items that were related to the pressures regarding the appearance and the performance of the athlete. A three-factor model that considered the pressures that are related to the nature of the sport as a separate factor was also examined. Further analysis via confirmatory factor analysis supported the initial two-factor structure for the overall model, as all the fit indices received acceptable and satisfactory values. For the three-factor model, Standardized Root Mean Square Residual indicator did not receive acceptable and satisfactory values. Therefore, it was concluded that the two-factor model offers the best fit with the data.

Figure 1 — The two-factor model of the confirmatory factor analysis of the WPS-F questionnaire. WPS-F = Weight Pressures in Sport—Females; e1 to e11 = item1 to item 11 of the questionnaire.
Table 5  Descriptive Statistics of the Items of the Two Factors During the Confirmatory Factor Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Items</th>
<th>Standardized weights</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressures Regarding Appearance and Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>0.62</td>
<td>.38</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>0.47</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>0.75</td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>0.69</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>0.73</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>Pressures From the Sport and Coaches About Weight</td>
<td>Q3</td>
<td>0.62</td>
<td>.39</td>
</tr>
<tr>
<td>Q6</td>
<td>0.63</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>0.72</td>
<td>.52</td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>0.75</td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>Q10</td>
<td>0.69</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>Q11</td>
<td>0.65</td>
<td>.42</td>
<td></td>
</tr>
</tbody>
</table>

Table 6  Descriptive Statistics of the Items of the Three Factors During the Confirmatory Factor Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Items</th>
<th>Standardized weights</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressures From Coaches and Teammates About Weight</td>
<td>Q2</td>
<td>0.50</td>
<td>.25</td>
</tr>
<tr>
<td>Q3</td>
<td>0.69</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>0.63</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>0.77</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>0.74</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td>Pressures Regarding Appearance and Body From Uniform</td>
<td>Q1</td>
<td>0.61</td>
<td>.37</td>
</tr>
<tr>
<td>Q4</td>
<td>0.77</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>0.70</td>
<td>.49</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>0.73</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>Pressures Regarding Body Weight in Sport</td>
<td>Q10</td>
<td>0.85</td>
<td>.72</td>
</tr>
<tr>
<td>Q11</td>
<td>0.76</td>
<td>.58</td>
<td></td>
</tr>
</tbody>
</table>

Table 7  Fit Indices of the WPS-F Models From Confirmatory Factor Analyses

<table>
<thead>
<tr>
<th>Sample</th>
<th>$\chi^2$</th>
<th>$\chi^2$/df</th>
<th>CFI</th>
<th>GFI</th>
<th>NNFI (TLI)</th>
<th>RMSEA</th>
<th>90% RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-factor model</td>
<td>318</td>
<td>188.95</td>
<td>4.39</td>
<td>.91</td>
<td>.90</td>
<td>.08</td>
<td>.07–.09</td>
<td>0.08</td>
</tr>
<tr>
<td>Three-factor model</td>
<td>318</td>
<td>118.15</td>
<td>2.88</td>
<td>.94</td>
<td>.94</td>
<td>.08</td>
<td>.06–.09</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Note. WPS-F = Weight Pressures in Sport–Female; CFI = comparative-fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; GFI = goodness-of-fit index; NNFI = non-normed fit index.
Relatively few studies have examined the factorial structure of the WPS-F in sport competitive samples and their results are inconclusive. WPS-F has been used in studies in the United States (Reel et al., 2010, 2013; Voelker et al., 2014), and it was recently translated and validated in Spanish (Teixidor-Batlle et al., 2017). The first version of the inventory consisted of 16 items and four factors were identified (Reel et al., 2010), but it was later improved into a condensed two-factor, 11-item inventory (Reel et al., 2013). The Spanish version also presents a two-factor structure but consists of 15 items (Teixidor-Batlle et al., 2017).

The results of the present study are in line with previous research regarding the psychometric properties of the two-factor, 11-item WPS-F questionnaire. The two-factor model of Reel et al. (2013) was supported in this study with Greek female athletes, and the weight pressures in the sport environment were divided into two types: pressures that come from the nature of the sport and the coaches, and pressures that are related to athletes’ performance and their appearance including body and uniform elements. In conclusion, the use of this inventory may help researchers to understand the specific pressures affecting the risk of DE development in Greek female athletes and to define these pressures within sport environment.

Clinical Implications

Research indicated that the distinction between athletes with ED from those who have many of the EDs symptoms without meeting all the criteria for diagnosis is often difficult (Petrie et al., 2009). From an empirical observation, the majority of DE behaviors presented by athletes were considered to be subclinical in nature or less severe; however, the symptoms often lead to deeper pathology and can still result in negative health consequences (Reardon et al., 2019). Therefore, sport psychologists and coaches should understand the variety of DE patterns that might fit along this continuum.

The pressure for low body weight in esthetic sports (e.g., gymnastics, artistic swimming, diving), as well as in sports with body weight categories (e.g., judo, taekwondo, etc.), is very high and affects many athletes. It is also known that the preoccupation with body weight and pressures about weight and shape from the coach or the sports environment in general often creates a psychological and emotional burden and may lead to EDs or DE. In addition, it is also well known that, in competitive sports, athletes may be at risk of being excluded from a program or a team if their eating problem is revealed. Thus, it is readily acknowledged that athletes with EDs or DE are often very secretive and not willing to share information until the problem becomes almost disastrous, and professional help is necessary (Kerr et al., 2006).

The validation of the WPS-F questionnaire in Greek athletic population was a necessity, as it can be used for research purposes to identify the specific factors that make female athletes feel pressure regarding their weight and body shape. It should be noted that this pressure may be different depending on the type of sport. For example, pressures regarding appearance are expected to be more strongly related to DE in “esthetic” sports, like gymnastics and artistic swimming, while pressures that are related to sport may be more important in weight-class sports, like Taekwondo and Judo.
Although a significant number of studies have indicated that EDs and DE are frequent in the Greek athletic population, no known interventions have taken place until now. In fact, the provision of psychological counseling is neglected in sport environment in the country. Sport psychology is a part of the curriculum in the Universities’ Schools of Physical Education. Moreover, a couple of Postgraduate Programs in Sport Psychology are available for psychologists and physical education teachers. However, the national federations of various sports are typically separate entities that rarely collaborate with sports psychologists. In recent years, it has become more common for athletes and their coaches to seek professional psychological counseling for themselves. Moreover, the popularity of sport psychology has increased in some areas, and regional sport clubs may invite sport psychologists to inform athletes regarding various subjects. The value of sport psychology in athlete’s health and performance has started to emerge, but more training, research, and a large number of practitioners are needed. The recent revelations of athletes in Greece and all around the world, regarding physical and psychological abuse in sport environment highlighted the emerging need for collaboration with sport psychologists.

The use of WPS-F questionnaire in Greek sport populations’ studies will offer important information that sport psychologists can use in educational and prevention programs addressed to coaches and other individuals in the sports environment (e.g., judges). As coaches seem to have one of the most important roles in an athlete’s life and, specifically, regarding the pressures about weight and shape (Anderson et al., 2012; Ceballos et al., 2019; Coker-Cranney & Reel, 2015; di Cagno et al., 2018; Voelker et al., 2022), their education and improved information should be a priority. After all, studies have shown that a relationship between coach and athlete that is characterized by communication, empathy, and trust can protect against eating pathology (de Bruin & Oudejans, 2018; Francisco et al., 2012). Coaches should be educated regarding the provision of foundational nutrition advice and appropriate communication with athletes about nutrition and weight issues (Voelker et al., 2022).

Sports psychologists may include WPS-F in the initial evaluation and screening of female athletes across sports. WPS-F is a useful tool for the early identification of signs of DE or EDs. After all, as ancient Greek therapist and philosopher Hippocrates used to say, “Prevention is better than cure.”

Future Directions

Strengths of the present study include the extensive testing of a large sample (624 athletes) in order to elucidate the structure of the WPS-F questionnaire and extend the findings to this relatively large population. A limitation of this study is that the participants were selected through convenience sampling with most coming from a major metropolitan area (Athens). However, it is also true that half or so of the Greek population resides in Athens, the Capital city. Another limitation of this study is the risk of bias when measures are based on self-reported perceptions. Clinical interviews are more accurate when collecting psychological data, although the WPS-F questionnaire has been designed to be self-answered. One way to minimize the effect of self-answered questionnaires is the simultaneous
administration of a social desirability scale. Another limitation of the study is that
the athletes’ anthropometric characteristics (height and weight) were self-reported.

Future research should examine the psychometric properties of the WPS-F
questionnaire in different sport types, leanness sports as well as nonleanness sports,
and larger samples. Moreover, future studies could examine the validation of the
inventory at different competition levels and in different age groups. Finally, it
should be noted that this study did not examine the convergent and concurrent
validity of the questionnaire. That should be examined in future research. Moreover, WPS-F could be used in epidemiological studies examining the
prevalence of weight pressures and DE in youth sports.

Conclusion

In conclusion, the present study indicates that the Greek version of WPS-F
questionnaire presents adequate psychometric properties for the female athletic
population. Therefore, it is a valid and reliable tool for assessing the pressures that
originate from the sports environment and are experienced by female athletes
regarding their weight and shape. By developing a better understanding of these
pressures, sport and health professionals will be able to inform coaches and sports
specialists about the adverse effect of weight pressures and on the risk of
developing DE and EDs in Greek female athletes.

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review, organized the data sets, and drafted the manuscript. Vassilakou wrote and revised the
manuscript. Psychountaki participated in forming the concept of the study and the adaptation
procedures of the inventory, and assisted in revising the manuscript. Reel reviewed, edited,
and revised the manuscript. Donti organized the data sets, carried out the analyses, and
assisted in writing and revising the manuscript.

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