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RESEARCH ARTICLE

Factorial Equivalence and Validation of three Versions of the Body Shape Questionnaire

Hamzeh Dodeen[1,*] and Yahya Nassar[1]

[1]*Psychology Program, College of Humanities and Social Sciences, United Arab Emirates University, United Arab Emirates*

Abstract:

Background:

Body image refers to a person's perceptions, thoughts, or feelings about their own body, which affect their psychological health considerably, particularly their body shape dissatisfaction. Body image dissatisfaction was observed to be highly correlated with eating disorders, with psychological functioning, and with quality of life. Such dissatisfaction has grown worldwide, especially among young people, which has increased psychological interest in its assessment and studying.

Objectives:

One commonly used scale to study and assess body shape dissatisfaction is the Body Shape Questionnaire (BSQ) by Cooper *et al*. This study aimed to compare the three widely used versions of the BSQ (the BSQ-34, BSQ-14, and BSQ-8C) in terms of validity, reliability, and usability and then to recommend the most appropriate version. The study also aimed to cross-validate the scales to identify their factor structure and psychometric properties.

Methods:

In total, 402, 326, and 373 students from a public university in the United Arab Emirates responded to the BSQ-34, BSQ-14, and BSQ-8C, respectively. The three scales were evaluated through several statistical procedures and tests, including reliability and exploratory factor analysis. The convergent validity and the discriminant validity of the scales were assessed by correlating them with appropriate scales.

Results:

The three scales demonstrated high internal reliability. The results indicated the existence of a three-factor solution for the BSQ-34. The BSQ-14 produced one factor that explained more than 60% of the variance. As for the BSQ-8C, one factor which explained 55.10% of the variance was extracted. While the results showed that the three BSQ scales had high and acceptable levels of convergent validity, the discriminant validity showed that the BSQ-14 is better than the other two scales.

Conclusion:

The findings confirmed the superiority of the version BSQ-14 over the other two versions in terms of their psychometric properties. With 14 items, the scale is not as lengthy as the BSQ-34, which requires more time and effort, nor is it as short as the BSQ-8C, which may exclude some aspects of the construct. Thus, the study recommends using the BSQ-14 to assess body dissatisfaction among young participants.

Keywords: Body shape questionnaire, Body shape, Body image, Body dissatisfaction, Psychometric properties, Demographic variables.

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1. INTRODUCTION

A person's body image pertains to their perceptions, attitudes, and experiences regarding their body, particularly its appearance and psychical characteristics [1]. Body image is influenced by several factors, such as one's life experiences, physical development, peer groups, family, and cultural background. Additionally, demographic variables such as gender, age, education, weight, and length shape an individual's attitudes and perceptions toward their body image [2 - 9]. The prevalence of body image or body shape concerns and dissatisfaction reportedly begins in high school and college, especially among girls [10 - 12]. Moreover, body

* Address correspondence to this author at the Psychology Program, College of Humanities and Social Sciences, United Arab Emirates University, P. O. Box 15551, Khalifa Road, Al Ain, UAE; E-mail: hdodeen@uaeu.ac.ae

image dissatisfaction was observed to be highly correlated with eating disorders [13]; for example, body image concerns have been identified as the basic diagnostic features of two major eating disorders: anorexia nervosa and bulimia nervosa [14]. In addition, scholars have observed that an individual's perceptions of their body affect their psychological functioning and quality of life [15].

The aforementioned factors and other issues have increased the interest of researchers in general and psychologists in particular in studying and measuring body image or body shape dissatisfaction. Consequently, several instruments and questionnaires have been developed and published; one of the most common scales in this field is that of Cooper *et al*. [16], the Body Shape Questionnaire (BSQ). Since its publication, the BSQ has been translated, adapted, validated, and used in many studies in several countries and languages, as discussed in the next section. Because the original version of the BSQ is relatively long (34 items) and measures only one construct-body shape dissatisfaction-several short forms of the BSQ have been suggested, extracted, evaluated, and used in different languages. Among these, the BSQ-14 and BSQ-8C showed appropriate psychometric properties [17, 18]. Thus, the present study aims to develop and validate an Arabic version of the BSQ and compare the three versions mentioned previously (the BSQ-34, BSQ-14, and BSQ-8C) in terms of validity, reliability, and usability so as to recommend the best one.

1.1. Body Shape Questionnaires

1.1.1. The BSQ-34

The original BSQ, developed by Cooper *et al*. [16] is a one-dimensional questionnaire that comprises 34 items, which measure a person's dissatisfaction, concerns, and attitudes toward their body. The questionnaire items, which describe a person's state in the past four weeks, use a six-item Likert-type scale (where 1 = never and 6 = always), and the total score of the questionnaire ranges between 34 and 204. The items are negatively worded so that the total score measures body image dissatisfaction; the higher an individual's total score is, the greater their level of dissatisfaction is. Originally developed in English, the instrument comprises only one factor: body shape dissatisfaction; its authors reported acceptable reliability and validity indices. Several studies have since validated and used the BSQ in many languages and cultures, including German, French, Spanish, Swedish, Portuguese, Norwegian, and Turkish.

For instance, a Portuguese version of the BSQ-34 was validated using a sample of 386 adolescents (aged 10-18 years old) of all genders in Brazil [19]. The results showed high internal reliability for both the overall population and each gender. Regarding discriminant validity, significant differences were observed among the four weight groups who responded to the scale. The study concluded that the scale demonstrated a high validity and reliability and recommended the BSQ for evaluating young people's attitudes toward their body image. Similarly, a Kurdish version of the BSQ-34 was validated and administered to 160 students in Kurdistan, Iraq and indicated a high internal reliability (.98) and high values for all item-total correlation coefficients, with the principal component analysis resulting in a four-dimension solution [20]. A French version adapted the 34-item scale and found good psychometric properties in terms of the internal reliability (r = .95), test-retest reliability ($r \geq .93$), and concurrent validity ($r \geq .70$) with the body dissatisfaction subscale and acceptable discriminant validity between women [21]. Silva *et al*. [15] reported that the BSQ produced satisfactory goodness-of-fit indices and adequate concurrent validity with university students from Brazil and Portugal samples. In another study, Silva *et al*. [22] tried to determine the extent to which BSQ-34 scores are sex invariant. Portuguese-speaking women (n = 1,6130 and men (n = 871) were asked to complete the BSQ-34. Confirmatory factor analysis (CFA) indicated that a hypothesized 34-item model of BSQ scores and shorter versions have acceptable fit indices in women and men populations separately.

A Turkish version of the BSQ was adapted and validated among female high school students [23]. The researchers reported an acceptable test-retest reliability as well as high convergent and discriminant validity values and recommended the BSQ as a tool to evaluate teenagers' body image concerns. Finally, a Korean version of the BSQ was evaluated and showed satisfactory results in terms of test-retest reliability, internal consistency, and validity [24]. The Indonesian version [25] of the Body Shape Questionnaire (BSQ34) was reported as valid and reliable scale in a cross-sectional diagnostic study with 300 female students at the Faculty of Medicine, University of North Sumatra. The version BSQ-34 showed a strong positive correlation with Eat Attitudes Test-26.

1.1.2. The BSQ-14 and BSQ-8C

Since the BSQ measures only body image dissatisfaction, some researchers observed that the scale is long, particularly if used repeatedly and/or in conjunction with other scales and instruments [17, 25]. Therefore, several short versions of the BSQ have been suggested, extracted, validated, and used. Generally, short scales are preferred over lengthy ones because they reduce the response time, minimize the respondents' burden, increase the response rate, and decrease the respondents' fatigue, which usually improves the assessment process [26]. Although several short versions of the BSQ-34 have been developed, the BSQ-14 and BSQ-8C, in particular, have shown good psychometric properties and are highly recommended for measuring body image dissatisfaction in both field application and research [17, 18].

The BSQ-14 and BSQ-8C are condensed versions of the original scale, thereby promoting the scale's ease of use and increasing its usability. Ghaderi and Scott [27] evaluated the BSQ-14 using data from a representative sample of Swedish women and reported acceptable psychometric values. Further, a Norwegian version of the BSQ-14 was developed and validated using clinical and nonclinical samples of young men and women [28]. Regarding the BSQ-8C, a Swedish version was created and verified using an undergraduate student sample and a general population sample [29]. The results indicated high test-retest reliability, internal consistency, and convergent validity values. Pook *et al*. [30] compared the full 34-item version of the BSQ with seven of its short versions in

terms of factorial validity and treatment sensitivity and subsequently recommended the BSQ-8C for its satisfactory divergent validity, internal reliability, and concurrent validity indices. In the Arabic context, Mousa *et al*. [31] used an Arabic version of the BSQ-34 to assess body image dissatisfaction levels among 15 adolescent schoolgirls (aged 10-16 years old) in Jordan. They only assessed the internal reliability of their translated version because of its small sample.

The psychometric properties of the short version of the Body Shape Questionnaire (BSQ-8C) were examined in a sample of Iranian women with eating disorders [32]. The data were collected using BSQ-8C, Body Dysmorphic Meta Cognition Questionnaire (BDMCQ), and Yale-Brown Obsessive-Compulsive Scale for Body Dysmorphic Disorder (YBOCS-BDD). Results revealed that the coefficients of Cronbach's alpha and split half were 0.79 and 0.74, respectively. In a similar study [33], the Body Shape Questionnaire was validated *via* assessing the relationship between body shape perceptions and body image disorders in African populations. Anthropometric measures of 80 Cameroonians and 81 Senegalese (both sexes included 40.1% females overall) were taken for three body shape criteria: somatotype components, body mass index (BMI), and waist-to-hip ratio. The scale was administered twice (2 weeks apart) on 106 participants (aged 31.2 ± 12.6 years) to assess its reliability. In addition, a questionnaire measuring different aspects of body shape (*e.g*., musculature) was also administered (n = 597; aged 36.7 ± 15.6 years) to assess convergent validity. The validation protocol showed good validity and reliability for evaluating body shape perceptions in African populations

The goal of this study was to compare the three widely used versions of the BSQ (the BSQ-34, BSQ-14, and BSQ-8C) in terms of validity, reliability, and usability and will then recommend the most appropriate version. Additionally, the study aimed to cross-validate the scales using Arabic samples to identify their factor structure and to evaluate their psychometric properties.

2. METHODOLOGY

2.1. Instruments

2.1.1. The BSQ-34, BSQ-14, and BSQ-8C

The BSQ was independently translated from English into Arabic by two bilingual experts who were native Arabic speakers (forward translation). Subsequently, the two translated versions were compared, and both translators reconciled the version that delivered the best meaning for each item. A third bilingual expert translated this reconciled version into English (back-translation). The two English versions (the original and the final translated versions) were subsequently compared to evaluate the accuracy of the translation process. From this assessment, the final Arabic version of the scale (BSQ-34) was produced along with its short versions, the BSQ-14 and the BSQ-8C, with the former comprising Items 2, 9, 12, 14, 17, 19, 20, 21, 23, 24, 25, 29, 31, and 34 and the latter including Items 4, 6, 13, 16, 19, 23, 29, and 33.

2.1.2. The Eating Disorder Examination-Questionnaire (EDE-Q)

The EDE-Q is a self-report scale that evaluates signs of eating disorders and other diet-related psychological issues [34]. It has four subscales: Dietary Restraint, Eating Concern, Weight Concern, and Shape Concern. To measure the convergent validity of the BSQ scales, the present study used the eight-item Shape Concern subscale, which is similar to the BSQ scales, as all of these assess the same construct: body image dissatisfaction. The items of the Shape Concern subscale are also negatively worded; thus, a higher score indicates a higher body shape dissatisfaction. Examples of the subscale's items are as follows: "Have you had a definite desire to have a flat stomach?" (Item 1), "Have you had a definite fear that you might gain weight?" (Item 3), and "Has your shape influenced how you think about (judge) yourself as a person?" (Item 5).

2.2. Participants

In total, 1,101 students from a public university in the United Arab Emirates (UAE) were divided into three sample groups of 402, 326, and 373 students, which answered the BSQ-34, BSQ-14, and BSQ-8C, respectively, in addition to the EDE-Q. The participants were representative of all the genders and colleges in the university. For each version of the BSQ, the sample size was large enough to meet the requirements of the statistical procedures used in the analysis, particularly the factor analysis. Before the questionnaires were administered, ethical approval was obtained from the university's research ethics committee. Data were collected online with no identification information. A link of the study scales was sent to students asking them to patriciate in the study. The students, then opened the link and read the clear instructions, which thanked them for accepting to participate in this study. They also were assured that their participation was voluntary and that the collected data would be confidential and would be used solely for research purposes. Each scale and sample underwent several statistical procedures, including an exploratory factor analysis (EFA), an internal reliability analysis, a test for convergent validity, and a test for discriminant validity.

2.3. Procedure

The responses to each of the three versions (the BSQ-34, BSQ-14, and BSQ-8C) were analyzed *via* several statistical analyses. First, each participant's body mass index (BMI) was calculated from the mass and height values. The BMI is defined as the body mass divided by the square of the body height. BMI refers to a person's body fat content relative to their height and weight. Based on their BMI values, the participating students were classified into four groups: underweight (<18.5), normal (18.5-24.9), overweight (25-29.9), and obese (≥30). These four groups are commonly used both in research as well as in real-life applications.

Second, the statistical procedures used in this study included the following:

(1) Estimating the internal reliability of the BSQ scales and the performance of each item using Cronbach's alpha.

(2) Assessing the construct validity of the BSQ's scales

through an exploratory factor analysis (EFA).

(3) Evaluating the convergent validity of the BSQ's using the correlation with the EDE-Q's Shape Concern subscale.

(4) Assessing the discriminant validity of the BSQ's scales by comparing the body image dissatisfaction levels of the four BMI groups.

To confirm the results, some of these analyses were conducted for the overall sample as well as separately for men and women.

3. RESULTS

The data were first examined for possible outliers or extreme cases. Table **1** summarizes the participants' demographic variables for each version of the BSQ.

In total, 402, 326, and 373 students responded to the BSQ34, BSQ14, and BSQ-8C, respectively, and all participants responded to the EDE-Q. All samples had more female students than male students, reflecting the higher proportion of women in the university (81% women *vs*. 19% men). All colleges were represented in the three samples; the highest percentage was from the College of Humanities and Social Sciences, which is the largest college in the university (comprising 30% of the student population). The average age in the three samples was a little over 21 years, and the average grade point average was approximately 3.0 (out of 4.0 in the unweighted system). The ranges of the GPA were 2.50, 2.70, and 2.78 for the BSQ34, BSQ14, and BSQ-8C, respectively.

Each scale's internal reliability was assessed using Cronbach's alpha; Table **2** presents the results.

All three scales demonstrated high internal reliability. Because the number of items generally affects reliability values, this factor was crucial when comparing the scales.

To explore each scale's factor structure, one must examine the appropriateness of conducting an EFA for each scale and on each sample. This is usually done by conducting two statistical tests: the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, in which values above .70 are generally acceptable, and Bartlett's test of sphericity, which examines whether the items in each scale are correlated. Since the null hypothesis of Bartlett's test assumes that the variables are not correlated, rejecting it indicates that the data can undergo a factor analysis. An EFA was conducted for each scale using an eigenvalue greater than 1.00 and a loading of .40 or above as basic inclusion criteria for an item in a factor [35]. The BSQ-34 had a KMO value of .97 and a Bartlett's test value of 9892.67 ($P < .001$), indicating that the data were appropriate for a factor analysis. Three factors were extracted from the BSQ-34: the first dominant factor explained 50.29% of the variance, the second factor 6.53%, and the third 3.09%. Most items were highly loaded on the first factor, with loading values above .45; however, four items (Items 4, 8, 25, and 26) were highly loaded on the first and second factors. Item 11 was loaded on the first and third factors. These results indicated the existence of a three-factor solution for the BSQ-34, which is different from the factorial structure of the original BSQ [16], which had only one dimension.

Table 1. Participants' demographic information for each BSQ version.

-		BSQ-34 N (%)	BSQ-14 N (%)	BSQ-8C N (%)
Gender	Male	106 (26.4%)	49 (15%)	35 (9.4%)
	Female	295 (73.45)	277 (85%)	338 (90.6%)
College	Humanities	187 (46.5%)	56 (17.2%)	111 (28.9%)
	Business	19 (4.7%)	41 (12.6%)	44 (11.8%)
	Sciences	35 (8.7%)	62 (19.0%)	77 (20.6%)
	Education	23 (5.7%)	14 (4.3%)	10 (2.7%)
	Engineering	39 (9.7%)	76 (23.3%)	66 (17.7%)
	Agriculture	31 (7.7%)	15 (4.6%)	6 (1.6%)
	Information	38 (9.5%)	24 (7.4%)	29 (7.8%)
	Law	24 (6.0%)	19 (5.8%)	20 (5.4%)
BMI group	Underweight	34 (8.5%)	36 (11.0%)	65 (17.4%)
	Normal	241 (60%)	163 (50.0%)	198 (53.1%)
	Overweight	75 (18.7%)	86 (26.4%)	66 (17.7%)
	Obese	36 (9.0%)	37 (11.3%)	40 (10.7%)
Age	Mean	21.26	21.31	21.14
	SD	2.18	2.54	2.64
GPA	Mean	3.02	3.09	2.99
	SD	0.51	0.52	0.50
	Range	2.50	2.78	2.70
Total sample size (N)		402	326	373

Table 2. Internal reliability of each BSQ scale.

	BSQ-34	BSQ-14	BSQ-8C
Number of items	34	14	8
Sample size	402	326	373
Cronbach's alpha	.97	.95	.88

Table 3. Exploratory factor analysis results for the BSQ-34, BSQ-14, and BSQ-8C.

BSQ-34				**BSQ-14**			**BSQ-8C**		
Extracted Factors				**Extracted Factor**			**Extracted Factor**		
	Eigenvalue	% of variance		Eigenvalue	% of variance		Eigenvalue	% of variance	
F-1	17.10	50.29	F-1	8.42	60.15	F-1	4.41	55.10	
F-2	2.22	6.53							
F-3	1.05	3.09							
Item loadings				Item loadings			Item loadings		
Item	F-1	F-2	F-3	Item	F-1		Item	F-1	
BSQ_01	.72	−.13	−.12	BSQ_02	.82		BSQ_04	.76	
BSQ_02	.80	−.34	.09	BSQ_09	.78		BSQ_06	.72	
BSQ_03	.71	−.21	.19	BSQ_12	.72		BSQ_13	.65	
BSQ_04	**.64**	**−.47**	.28	BSQ_14	.84		BSQ_16	.76	
BSQ_05	.63	−.34	.12	BSQ_17	.73		BSQ_19	.83	
BSQ_06	.66	−.25	.27	BSQ_19	.77		BSQ_23	.78	
BSQ_07	.75	.17	−.07	BSQ_20	.81		BSQ_29	.80	
BSQ_08	**.64**	**.43**	.16	BSQ_21	.90		BSQ_33	.62	
BSQ_09	.76	−.16	.04	BSQ_23	.74				
BSQ_10	.76	.00	.06	BSQ_24	.83				
BSQ_11	**.61**	.35	**.41**	BSQ_25	.63				
BSQ_12	.70	−.16	−.18	BSQ_29	.80				
BSQ_13	.75	.16	.02	BSQ_31	.74				
BSQ_14	.85	−.15	.00	BSQ_34	.72				
BSQ_15	.77	−.02	−.09						
BSQ_16	.75	.05	−.00						
BSQ_17	.75	−.16	.16						
BSQ_18	.73	.37	−.08						
BSQ_19	.80	.13	.02						
BSQ_20	.81	.04	−.12						
BSQ_21	.80	−.17	.05						
BSQ_22	.59	−.20	.24						
BSQ_23	.76	−.10	−.08						
BSQ_24	.73	−.11	−.30						
BSQ_25	**.65**	**.41**	.00						
BSQ_26	**.61**	**.55**	.16						
BSQ_27	.71	.33	.09						
BSQ_28	.78	−.01	−.13						
BSQ_29	.75	.04	−.27						
BSQ_30	.60	.13	−.26						
BSQ_31	.45	.20	−.34						
BSQ_32	.59	.32	.11						
BSQ_33	.71	−.04	−.16						
BSQ_34	**.61**	**−.43**	−.21						

Further, the BSQ-14 produced a KMO value of .95 and a Bartlett's test value of 3377.28 (P < .001), meaning the data were appropriate to undergo factor analysis. The results in Table **3** indicate that only one factor was extracted from the BSQ-14, which had an eigenvalue of 8.42 and by itself explained more than 60% of the variance. All the 14 items of

this scale were highly and positively loaded on the factor (all loading values were above .70). Moreover, most of the loading values of the BSQ-14 were observed to be higher than those of the BSQ-34.

Finally, a similar analysis was performed for the BSQ-8C, with a KMO value of .90 and a Bartlett's test value of 1329.98 (P < .001). From the data, only one factor was extracted, with an eigenvalue of 4.41; this factor explained 55.10% of the variance. As shown in the last column of Table **3**, all eight items were loaded highly and positively on this factor, but most of the loading values were lower than those of the BSQ-14.

The convergent validity of the body image dissatisfaction scales was assessed by correlating them with the EDE-Q's Shape Concern subscale. Table **4** shows the correlation values between each of the three BSQ scales and the Shape Concern subscale for both the entire sample and each gender.

As seen in Table **4**, all correlation coefficients are highly positive and statistically significant ($P < .001$). This means that the three BSQ scales showed high and acceptable levels of convergent validity.

Further, the discriminant validity was measured by comparing the scales' results over several participant groups based on their BMI. The four BMI groups expected different levels of body image dissatisfaction because of the strong association between body image dissatisfaction and BMI [36 - 39]. Table **5** summarizes the means and standard deviations of the BMI groups for the BSQ-34, BSQ-14, and BSQ-8C scales. The results clearly show that the different BMI groups had varying levels of body image dissatisfaction. For example, for the BSQ-34, the mean body image dissatisfaction level increased from 75.82 for the underweight group to 93.90 for the normal group and 117.63 for the overweight group, finally reaching an extremely high value for the obese group (148.08). These noticeably large differences are indicative of the scale's ability to discriminate between different BMI groups. In addition, the enormous differences in mean scores between the four BMI groups are supported by the statistically significant analysis of variance (ANOVA) results. The results of the BSQ-14 are even better than those of the other BSQ scales, as its F-test value of 57.87 was higher than those of the BSQ-34 (33.40) and the BSQ-8C (42.09). Additionally, the ANOVA effect size (Eta-squared) was calculated for each scale over the four comparison groups and the results were listed in the last row of Table **5**. The effect size values for the BSQ-34, BSQ-14, and BSQ-8C were .21, .35. and .26, respectively. The effect size of the BSQ-14 is bigger than the other two values, and it means that 35% of the variance in the dependent variable (level of image dissatisfaction) is accounted for by the independent variable (BMI four groups). These results confirm the discriminant validity of the three BSQ scales.

4. DISCUSSION

Body image greatly affects people's psychological health and is commonly influenced by several sociodemographic and environmental variables. It is also highly related to eating disorders and body shape dissatisfaction, which has increased worldwide, especially among young people [40]. Dissatisfaction and negative feelings about body shape have substantially harmful consequences, such as low self-esteem, depression, and the emergence of unhealthy weight control behaviors [41].

The present study performed several statistical procedures and tests to evaluate the performance and psychometric properties of the BSQ-34, BSQ-14, and BSQ-8C and to develop an Arabic version of the BSQ. First, the internal reliability was measured *via* Cronbach's alpha, and the results showed a high and acceptable internal reliability for each of the three scales. However, relatively speaking and given the item count in each scale, the alpha value for BSQ-14 (.95), in particular, indicates a remarkably high and acceptable internal reliability. Second, the EFA showed notable results for all

Table 4. Convergent validity of BSQ-34, BSQ-14, and BSQ-8C with the shape concern subscale.

BSQ-34		BSQ-14		BSQ-8C	
Sample	Correlation	Sample	Correlation	Sample	Correlation
Overall	.89**	Overall	.83**	Overall	.90**
Male	.92**	Male	.91**	Male	.92**
Female	.89**	Female	.81**	Female	.90**

** significant at .001.

Table 5. Means, standard deviations, and ANOVA results for the BSQ-34, BSQ-14, and BSQ-8C over BMI groups.

	BSQ-34		BSQ-14		BSQ-8C	
Group	Mean	SD	Mean	SD	Mean	SD
Underweight	75.82	37.07	21.78	7.20	17.82	7.71
Normal	93.90	38.07	34.39	14.63	22.44	9.94
Overweight	117.63	33.65	51.33	16.03	29.20	8.69
Obese	148.08	30.89	56.08	17.25	36.38	8.93
ANOVA Test	F(3, 382) = 33.40, p < .001		F(3, 318) = 57.87, p < .001		F(3, 365) = 42.09 p < .001	
Effect Size (Eta -Squared)	.21		.35		.26	

scales; for instance, for the BSQ-34, three factors were extracted, with the first factor being dominant and explaining only 50% of the variance. It was also observed that some items in this scale were loaded on more than one factor. This means that the BSQ-34 must be used cautiously, as the assumed one-factor solution has not been apparent. In comparative terms, the best EFA results were generated by the BSQ-14, from which only one factor was extracted, which explained more than 60% of the variance. Moreover, the scale's 14 items were highly and positively loaded only on this factor. For the BSQ-8C, however, while only one factor was extracted, it explained 55% of the variance, and its loading values were lower than those of the BSQ-14. Thus, when compared, the variance explained by the unique factor in the BSQ-14 was greater than those of the other scales, and its loadings were higher than those of the other two scales. These results confirm that the BSQ-14 is preferable over the BSQ-34 and BSQ-8C. In addition, another advantage of the BSQ-14 is the relative adequacy of its size. With 14 items, the scale is not as lengthy as the BSQ-34, which requires more time and effort to complete, nor is it as short as the BSQ-8C, which may exclude some aspects of the construct.

This study also evaluated the convergent validity of the BSQ-34, BSQ-14, and BSQ-8C by correlating them with the Shape Concern subscale of the EDE-Q. All correlation coefficients were highly positive and statistically significant, indicating an acceptable level of convergent validity for each BSQ scale. The discriminant validity was also assessed by comparing the scales' results over the four BMI groups. The ANOVA results generated high levels of discriminant validity for the three scales. However, the results of the BSQ-14 were found to be better than those of the BSQ-34 and the BSQ-8C.

The findings herein have demonstrated that the three scales have acceptable psychometric properties. Moreover, the present study confirmed the superiority of the BSQ-14 over the BSQ-34 and the BSQ-8C and thus recommended it for measuring the body dissatisfaction levels of young people.

CONCLUSION

The results herein have global and local implications. Internationally, the present research can be considered general cross-validation of the BSQ scales. As with other studies that used the same scales, such as Ghaderi and Scott [26] and Kapstad *et al*. [27], this study supports the use of the BSQ-14 to assess body shape dissatisfaction, as it has the appropriate psychometric properties, particularly in terms of its high reliability and substantial convergent and discriminant validity. Locally, and for the Arabic population, the study confirmed the superiority of the BSQ-14 over other commonly used versions, namely, the BSQ-34 and the BSQ-8C. Thus, the BSQ-14 can be administered to young people in this culture as well as similar cultures and populations to measure their body shape dissatisfaction.

One limitation of the study pertains to the sample of students who responded to the scales. Although three different samples with sufficient participants were used, all the respondents were from a single public university in the UAE, which may negatively affect the representativeness and generalizability of the study. Hence, further research would benefit from including participants from other universities and colleges. In addition, future studies should continue validating these scales using data from individuals who are of different ages, from different cultures, and at different educational levels.

LIST OF ABBREVIATION

BMI = Body Mass Index

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Data were collected online with no identification information; the participants were assured that their participation was voluntary and that the collected data would be confidential and would be used solely for research purposes.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this study are available within the article.

FUNDING

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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Declared none.

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