Validity and Reliability of the Turkish Version of the Body, Eating, and Exercise Comparison Orientation Measure in Turkish Female University Students

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Abstract

Introduction: Body comparison intervention may be a key way of preventing the risk of eating disorders; however, no validated measure exists to evaluate this construct in Turkey. This study translates the body, eating, and exercise comparison orientation measure (BEECOM) into the Turkish language and assesses its reliability and validity among Turkish university students.

Methods: This study was conducted with 388 female university students in a single center in Ankara, Turkey, between November 2018 and March 2019. Participants with a diagnosis or history of eating disorders were excluded. Reliability, validity, and test-retest relationships were examined. Cronbach's alpha analysis was performed to evaluate reliability and Pearson correlation analysis was conducted to determine the test-retest reliability. The validity of the scale was evaluated with confirmatory factor analysis (CFA).

Results: The Cronbach's alpha coefficient of the BEECOM was 0.841 and the test-retest reliability was 0.716. The results of the confirmatory factor analysis (χ^2/df = 0.828) and satisfactory model fit statistics (RMSEA = 0.000, GFI = 0.991) were sufficient. When the confirmatory factor analyses are examined, all subscales, body, eating, and exercise, are statistically significant.

Conclusion: The results of this study showed that the Turkish version of the BEECOM is a valid and reliable measurement and can be used to investigate social comparisons related to body, eating, and exercise among Turkish women.

Keywords: Body comparison, Eating disorder, Exercise, Obesity

Introduction

Social comparison theory was introduced in 1954 by Leon Festinger; it states that humans are innately drawn to evaluate their own abilities and characteristics.[1] In the absence of objective standards (which are not often available), individuals compare themselves to available others, such as their friends and peers.[2] This self-assessment takes place across all life domains. Eating disorder-related social comparison is conceptualized as comparing one's body and eating and exercise behaviors.[3]

Comparisons of appearance, such as body shape and weight, have been associated with body dissatisfaction.[4] While eating comparisons are related to the amount and nutritional value of food consumed, exercise-related comparisons involve measuring the amount or intensity of exercise.[5]

There were 42 newly diagnosed eating disorder cases reported at a single adolescent clinic between January 1 and December 31, 2020, in Ankara (39 female and 3 male adolescents).[6] In a study of university students in Sivas, Turkey, 2.2% were found to have an eating disorder, including 1.57% who had bulimia nervosa and 0.31% who had binge-eating disorder.[7] A recent Turkish study using the Eating Attitudes Test-26 and the Sick, Control, One, Fat and Food questionnaire, Eating Disorders Scale, estimated that between 20.1% and 28.6% of university students in Turkey are at risk of an eating disorder.[8] A study evaluating the eating attitude and body image of high school students in our country showed that eating attitudes were related to body image.[9]

The body, eating, and exercise comparison orientation measure (BEECOM) is the only scale that evaluates three different aspects of social comparison in the literature. The original

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BEECOM was developed and validated among American college women.[3] Recently, it was validated in a non-Western sample of Iranian students, suggesting that the construct of eating disorder-related social comparison extends beyond Western cultures.[10]

Given the links between body image, social anxiety, and eating disorders, body comparison scales become extremely important in revealing pathologies and planning interventions. Although several body image scales have been validated for Turkish

samples (e.g., body appreciation scale and body esteem scale for adolescents and adults),[11,12] there has been no scale to assess appearance-related social comparisons in the Turkish language. However, social comparisons related to eating and exercise have been found to be more predictive of eating disorder cognitions and symptomology.[13] Thus, it is important to quantitatively measure a social comparison related to eating disorders (a robust risk factor for eating disorders) in Turkish samples. This study aimed to evaluate the validity and reliability of the BEECOM among Turkish female university students.

METHODS

Participants

In this study, 400 female students from a large metropolitan university in the capital city of Turkey, Ankara, were invited to participate. Male students were excluded from the study due to their small total number ($n = 28$). A total of 388 students aged 18–25 years (M = 19.13, SD = 0.95) agreed to participate, yielding a response rate of 97%. Based on self-reported weight and height measurements, participants' body mass index (BMI) ranged between 15.41–34.45 kg/m^2 (M = 21.26, SD = 3.28). Data were collected between November 2018 and March 2019.

When adapting a scale to another culture, the sample size reportedly should be 5–10 times the number of items in the scale.[14] The BEECOM consists of 18 items; therefore, 90–180 participants were required for this study. A sample size of 388 was sufficient based on existing recommendations for the factor analysis.[15] In addition, the Kaiser–Meyer–Olkin measures the sampling adequacy and found that 0.916 was more than sufficient.[16]

The first 28 participants who completed the Turkish version of the BEECOM (BEECOM-Tr) at baseline and after 2 weeks provided evidence of test-retest reliability, thus surpassing the recommended minimum number of 22 in the literature.[17] Written informed consent was obtained from each participant.

Demographic Information

Participants' age, weight and height, and their department were obtained in person by one reporter to avoid selection bias. BMI (kg/m^2) was calculated, and classifications were compiled according to the World Health Organization (2000) criteria.[18]

Social Comparison Orientation Measure

The social comparison orientation measure assesses how people perceive themselves compared to others. The original form was developed by Gilbert and Trent,[19] and then, it was translated and adapted for the Turkish population.[20]

Body, Eating, and Exercise Comparison Orientation Measure

The BEECOM comprises body, eating, and exercise subscales. Each subscale consists of 6 questions, resulting in a total of 18 items. The original BEECOM version contains 18 items consisting of 3 subscales: body comparison orientation (6 questions); eating comparison orientation (6 questions); and exercise comparison orientation (6 questions).

Scores were consistent over a 1-year period, demonstrating predictive validity and temporal stability.[21] The test-retest reliability was high for the total score and subscales.[3] In addition, strong relationships have been found between eating disorders (rs = 0.53–0.72), body dissatisfaction (rs = 0.38–0.75), and BMI (rs = 0.14–0.20) in the literature.[3,4]

The Brislin method was used in the translation process.[22] Three native Turkish speakers translated the BEECOM into Turkish, and three native English speakers translated the BEECOM back into English. Nutrition and dietetics, physical therapy and rehabilitation, and midwifery department professionals compared the translations with the original BEECOM. Finally, all items were found to be understandable in Turkish.

For the construct validity of the scale, confirmatory factor analyses (CFA) were applied.[23] To determine reliability, Cronbach's alpha coefficient was calculated, and at least 0.70 was considered acceptable.[24] The relationship between the Turkish version of the BEECOM (BEECOM-Tr) test-retest and social comparison orientation was evaluated using the Pearson correlation coefficient, and the closer the r value is to ±1, the higher the reliability.[25,26]

Statistical Analyses

R-project software (R Core Team, 2020) was used for all statistical analyses within the scope of the study. The R package "lavaan"[27] was used during the analysis process.

RESULTS

The mean age, weight, height, and BMI were 19.13 ± 0.95 years, 57.22 ± 9.20 kg, 164.13 ± 6.25 cm, and 21.26 ± 3.28 kg/m^2, respectively. The results indicated that 33.2% of students studied midwifery, and 28.5% studied nutrition and dietetics. A total of 12.9% studied occupational therapy, 13.4% studied physiotherapy and rehabilitation, 3.1% studied social services, and 9.0% studied audiology.

Descriptive statistics and Cronbach's alpha reliability analysis results from the subdomains of the BEECOM are provided in Table 1. All the unattenuated correlation coefficients for the items of the subdomains of the BEECOM-Tr were positive. Furthermore, there

Table 1: The results of the reliability analysis body, eating, and exercise comparison orientation measure

Domain	Item	Mean	SD	AR2	AIID	Alpha
Body	B2	3.802	1.744	0.568	0.723	0.767
	B4	3.781	1.559	0.618	0.717	
	B9	3.833	2.639	0.469	0.754	
	B12	3.913	2.797	0.433	0.772	
	B13	3.548	1.769	0.574	0.721	
	B17	3.247	1.633	0.598	0.719	
Eating	B1	3.404	1.673	0.443	0.521	0.591
	B3	3.008	3.417	0.251	0.608	
	B7	2.663	1.554	0.500	0.511	
	B8	3.730	3.108	0.228	0.605	
	B11	3.260	2.644	0.316	0.551	
	B16	3.177	1.683	0.529	0.495	
Exercise	B5	2.897	1.628	0.556	0.684	0.738
	B6	3.005	1.869	0.494	0.696	
	B10	2.478	1.663	0.461	0.706	
	B14	2.766	3.032	0.310	0.805	
	B15	2.769	1.574	0.646	0.665	
	B18	2.658	1.592	0.646	0.664	

SD: Standard deviation, AR2: Adjusted R2, AIID: Alpha if item deleted
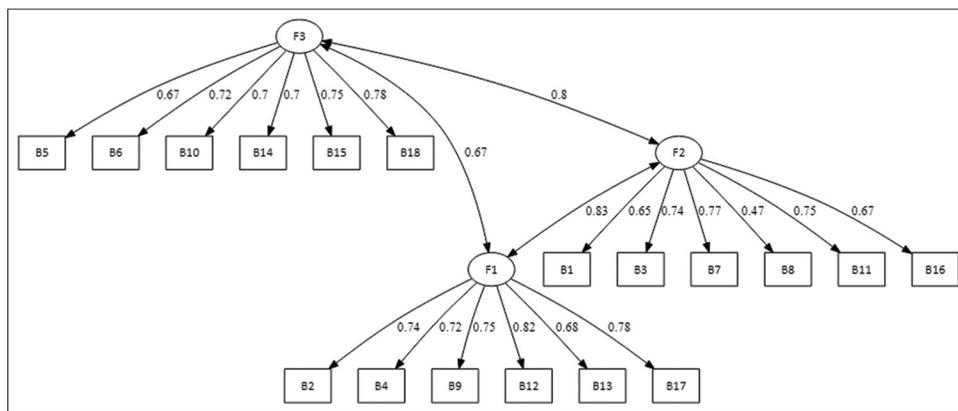
Figure 9: Lepidium sativum mucilage

Table 2: Confirmatory factor analysis on body, eating, and exercise comparison orientation measure

Domain	Item	Beta	SE	Z score	P-value
Body	B2	1			
	B4	0.865	0.041	21.057	<0.001
	B9	0.977	0.046	21.321	<0.001
	B12	1.023	0.047	21.864	<0.001
	B13	0.934	0.045	20.622	<0.001
	B17	0.983	0.046	21.179	<0.001
Eating	B1	1			
	B3	1.042	0.051	20.417	<0.001
	B7	1.097	0.053	20.704	<0.001
	B8	0.732	0.044	16.478	<0.001
	B11	1.162	0.056	20.823	<0.001
	B16	1.038	0.053	19.763	<0.001
Exercise	B5	1			
	B6	1.060	0.056	19.007	<0.001
	B10	0.988	0.054	18.200	<0.001
	B14	0.942	0.050	18.775	<0.001
	B15	1.085	0.057	18.916	<0.001
	B18	1.137	0.059	19.286	<0.001

SE: Standard error

Table 3: The relationship between the body, eating, and exercise comparison orientation measure test-retest, subscales and social comparison orientation measure

	1	2	3	4	5
Body	0.690*				
Eating	0.501*	0.579*			
Exercise	0.529*	0.536*	0.696*		
BEECOM-Tr	0.826*	0.827*	0.823*	0.716*	
SCO	0.340*	0.180*	0.195*	0.294*	-

1: Body, 2: Eating, 3: Exercise, 4: BEECOM-Tr, 5: SCO, SCO: social comparison orientation measure, *p<0.01

was no significant increase in the reliability coefficient when items were deleted from the subdomains of the scale. The Cronbach's alpha coefficients for the body, eating, and exercise subscales of the BEECOM-Tr were 0.767, 0.591, and 0.728, respectively. The overall Cronbach's alpha coefficient of the scale was 0.841.

Different indices were used to evaluate the model fit. Accordingly, the Chi-squared statistic/degrees of freedom (χ^2/df) value of 0.828 was <2. An investigation of other compliance index values indicated that the adjusted goodness-of-fit index, goodness-of-fit index, comparative fit index, and Tucker–Lewis index values were above 0.975 and that the root mean square error of approximation and standardized root mean squared residual

values were below 0.05. In general terms, the validity results for the BEECOM-Tr suggested a perfect fit.

Confirmatory factor analysis was used to assess the construct validity of the BEECOM-Tr and indicated that three-factor structure best fit the data ($P < 0.05$). The CFA statistics from the BEECOM-Tr are displayed in Table 2.

The CFA results of the BEECOM are illustrated in Figure 1. Upon CFA, the graphical construct indicated that the standardized load values of all the items were above 0.40, which was within acceptable limits. No items were removed from the scale.

Table 3 shows the results of the Pearson correlation test, which investigated the relationship between the BEECOM-tr test-retest, subscales and social comparison orientation measure. The test–retest reliability coefficients with two weeks were acceptable ranges, and there was a correlation among the BEECOM-Tr and subscales and the social comparison orientation measure.

Discussion

University students are prone to low self-esteem and unrealistic perceptions of an ideal body image.[28] Body dissatisfaction experienced during this period leads to dietary restrictions, resulting in body weight loss and eating disorders.[29] Determination of body image, eating behaviors and exercise comparison is important, so we aimed to demonstrate the validity and reliability of the BEECOM among Turkish female university students.

In this study, Cronbach's alpha reliability analysis was performed to investigate the internal consistency of the BEECOM-Tr, and CFAs were also used to test the reliability of the scale. The diagonal weighted smallest squares technique was employed during the prediction phase of CFA due to ordinal (Likert) data.

The last stage was the test-retest relationship of the scores to examine the time invariance feature. Since the data met the normal distribution assumption, the Pearson correlation test was used to examine the direction and strength of the relationship between two numerical measurements.

The Cronbach's alpha coefficient was 0.841. For reliability, an alpha coefficient of 0.70 stated an acceptable threshold, and 0.841 was mentioned as perfectly good.[24] Additionally, the subscale scores were correlated with each other and were above 0.50.[25] This indicates that the scale can measure body, eating, and exercise comparisons as a whole.

For an acceptable model fit, the criteria were identified as χ^2 2 sd ≤ χ^2 ≤ 3 sd, χ^2/df ≤ 5 and different fit indicators as suggested.[30]

In our study, the fit index results were as suggested and supported the applicability of obtaining accurate results using this scale.

In this study, the social comparison orientation scale was found to be correlated with BEECOM-Tr. The significant correlations among BEECOM-Tr, subscales of BEECOM-Tr, and social comparison orientation scale support the validity of BEECOM-Tr for Turkish female university students.

In Turkey, eating disorders among university students are common and are associated with various social and physical comparisons.[8] Hence, the BEECOM-Tr is a useful addition to the existing validated measures (Turkish version of the body appreciation scale, Body Image Scale in Turkish ostomy patients, Turkish version of the Liebowitz Social Anxiety Scale) for identifying the social-cognitive correlates of eating disorders.

It was shown that social attractiveness was significantly lower among 640 university students in Turkey who had unhealthy body descriptions.[31] Indeed, it was determined that females in urban Turkey tend to perceive themselves as fat, and their perceived weight was different from their actual weight.[32] In a study conducted with university students in Turkey, body image anxiety was more common among female university students; among these women, 3.1% were on drugs for weight loss, and 21.8% reported exercising in the previous 3 months.[33] In addition, there was a likely correlation between the risk of eating disorders and social physique anxiety and depression.[34,35] With BEECOM-Tr, it is possible to define body, eating, and social comparison behaviors in Turkish female university students.

Adapting to a new environment following matriculation to the university, being accepted in the social environment, being uncertain about their upcoming professional life, and having stress, depression, and anxiety often resulted in the students' experiencing many emotional burdens.[36] Eating disorders (often triggered by the high number of stressful factors and the lack of knowledge about coping strategies among students) are widespread on university campuses and can cause significant physical, psychological, social, and academic problems if left untreated.[37] Indeed, it has been determined that the risk of eating disorders is high among university students and is closely related to stress and depression.[36] Our findings also showed a relationship between the eating subscale of the BEECOM-Tr and the social comparison scale measurement.

Studies conducted in Turkey have found that eating disorders are associated with different variables, such as being female, exhibiting obsessive-compulsive symptoms, and having problem-solving skills.[38,39] Tomori *et al*.[40] found that the use of laxatives was higher in female students (0.8%) than in males (0.2%). Moreover, the authors pointed out that females tend to use weight loss methods more than males. An Australian study evaluating young adult females stated that social comparison in women harms body image and increases the risk of bulimic behaviors.[41] In this study, validity and reliability studies were carried out among young adult females in Turkey.

Conclusion

This is the first study to adapt the BEECOM to the Turkish language and validate it among Turkish female university students. The results show that the 18-item BEECOM-Tr seems to be a valid instrument for comparing body, eating, and exercise among Turkish female university students. Further work needs to be done with different age and sex groups to reach a definitive conclusion about the reliability and validity of the BEECOM-Tr for Turkish populations.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to research, authorship, and/or publication of this article

References

1. Festinger L. A theory of social comparison processes. Hum Relat 1954;7:117-40.
2. Lubbers MJ, Kuyper H, van der Werf MP. Social comparison with friends versus non-friends. Eur J Soc Psychol 2009;39:52-68.
3. Fitzsimmons-Craft EE, Bardone-Cone AM, Harney MB. Development and validation of the body, eating, and exercise comparison orientation measure (BEECOM) among college women. Body Image 2012;9:476-87.
4. Fitzsimmons-Craft EE, Ciao AC, Accurso EC. A naturalistic examination of social comparisons and disordered eating thoughts, urges, and behaviors in college women. Int J Eat Disord 2016;49:141-50.
5. Fitzsimmons-Craft EE. Eating disorder-related social comparison in college women's everyday lives. Int J Eat Disord 2017;50:893-905.
6. Kanbur N, Akgul S, Akdemir D. The role of culture on parenting boys as a potential risk factor in the development of male eating disorders during adolescence in Turkey. Turk J Pediatr 2021;63:533-7.
7. Kugu N, Akyuz G, Dogan O, Ersan E, Izgic F. The prevalence of eating disorders among university students and the relationship with some individual characteristics. Aust N Z J Psychiatry 2006;40:129-35.
8. Kartal FT, Aykut MK. Relationship between social physique anxiety, depression and the risk of eating disorders in university students. J Nutr Diet 2019;47:20-9.
9. Uskun E, Şabapli A. The relationship between body image and eating attitudes of secondary school students. TAF Prev Med Bull 2013;12:519-28.
10. Sahlan RN, Saunders JF, Fitzsimmons-Craft EE, Taravatrooy F. The validity and reliability of the Farsi version of body, eating, and exercise comparison orientation measure (F-BEECOM) among Iranian male and female student. Body Image 2020;34:72-84.
11. Swamia V, Özgen L, Gökçen E, Petrides KV. Body image among female university students in Turkey: Concurrent translation and validation of three body image measures. Int J Cult Ment Health 2015;8:176-91.
12. Arslan UE, Özcebe LH, Ünlü HK, Üner S, Yardim MS, Araz O, *et al*. The validity and reliability of the Turkish version of the body esteem scale for adolescents and adults (BESAA) for children. Turk J Med Sci 2020;50:471-7.
13. Saunders JF, Eaton AA, Fitzsimmons-Craft EE. Body-, eating-, and exercise-related comparisons during eating disorder recovery and validation of the BEECOM-R. Psychol Women Q 2019;43:494-508.
14. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: A primer. Front Public Health 2018;6:149.
15. Myers ND, Ahn S, Jin Y. Sample size and power estimates for a confirmatory factor analytic model in exercise and sport: A Monte Carlo approach. Res Q Exerc Sport 2011;82:412-23.
16. Pett MA, Lackey NR, Sullivan JJ. Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research. 1st ed. New York, NY, USA: SAGE Publications, Inc.; 2003.
17. Bujang MA. A simplified guide to determination of sample size requirements for estimating the value of intraclass correlation coefficient: A review. Arch Orofac Sci 2017;12:1-17.
18. World Health Organization. Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation. Switzerland: World Health Organization; 2000. Available from: https://apps.who.int/iris/handle/10665/42330 [Last accessed on 2023 May 04].
19. Allan S, Gilbert P. A social comparison scale: Psychometric properties

and relationship to psychopathology. Pers Individ Dif 1995;19:293-9.

20. Şahin NH, Durak A, Şahin N. Sosyal karşilaştırma Ölçeği: Bilişsel-davranişçi Terapilerde Değerlendirme. Ankara: Türk Psikologlar Derneği; 1993.

21. Fitzsimmons-Craft EE, Bardone-Cone AM, Bulik CM, Wonderlich SA, Crosby RD, Engel SG. Examining an elaborated sociocultural model of disordered eating among college women: The roles of social comparison and body surveillance. Body Image 2014;11:488-500.

22. Brislin RW, Leibowitz HW. The effect of separation between test and comparison objects on size constancy at various age-levels. Am J Psychol 1970;83:372-6.

23. Simon D, Kriston L, Loh A, Spies C, Scheibler F, Wills C, *et al*. Confirmatory factor analysis and recommendations for improvement of the Autonomy-Preference-Index (API). Health Expect 2010;13:234-43.

24. Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika 1951;16:297-334.

25. Mukaka MM. Statistics corner: A guide to appropriate use of correlation coefficient in medical research. Malawi Med J 2012;24:69-71.

26. Osborne JW, Fitzpatrick DC. Replication analysis in exploratory factor analysis: What it is and why it makes your analysis better. Pract Assess Res Eval 2012;17:15.

27. Rosseel Y. Lavaan: An R package for structural equation modeling. J Stat Softw 2012;48:1-36.

28. Liu X, Ren X, Li Z, Lin Y, Pan C, Li T, *et al*. Disordered eating attitudes among university students: The role of psychological distress. Altern Ther Health Med 2021;27:58-60.

29. Vaquero-Cristobal R, Alacid F, Muyor JM, Lopez-Minarro PA. Body image; literature review. Nutr Hosp 2013;28:27-35.

30. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Model 1999;6:1-55.

31. Oksuz E. Unhealthy body perception among Turkish youths: Socioeconomic status and social comparisons. Coll Antropol 2008;32:5-13.

32. Tozun M, Unsal A, Ayranci U, Arslan G. Prevalence of disordered eating and its impact on quality of life among a group of college students in a province of west Turkey. Salud Publica Mex 2010;52:190-8.

33. Kutlu R, Civi S. Evaluation of eating habits, body perception and depression status of university students. Gulhane Med J 2013;55:196-202.

34. Alcaraz-Ibáñez M, Sicilia Á, Paterna A. Exploring the differentiated relationship between appearance and fitness-related social anxiety and the risk of eating disorders and depression in young adults. Scand J Psychol 2019;60:569-76.

35. Jin Y, Xu S, Chen C, Wilson A, Gao D, Ji Y, *et al*. Symptom association between social anxiety disorder, appearance anxiety, and eating disorders among Chinese University students: A network analysis to conceptualize comorbidity. Front Public Health 2022;10:1044081.

36. İkiz F, Otlu Ö. The problems faced in the process of adapting the university life and the ways of dealing with these problems. Manisa Celal Bayar Univ J Soc Sci 2015;13:36-52.

37. Fitzsimmons-Craft EE, Karam AM, Monterubio GE, Taylor CB, Wilfley DE. Screening for eating disorders on college campuses: A review of the recent literature. Curr Psychiatry Rep 2019;21:101.

38. Arslantaş H, Adana F, Öğüt S, Ayakdaş D, Korkmaz A. Relationship between eating behaviors of nursing students and orthorexia nervosa (obsession with healthy eating): A cross-sectional study. J Psychiatr Nurs 2017;8:137-44.

39. Duran S, Ergun S, Çalişkan T, Karadaş A. The relationship between the eating behaviours and problem solving skills among nursing students. STED 2016;25:6-12.

40. Tomori M, Rus-Makovec M. Eating behavior, depression, and self-esteem in high school students. J Adolesc Health 2000;26:361-7.

41. Donovan CL, Uhlmann L. Looking at me, looking at you: The mediating roles of body surveillance and social comparison in the relationship between fit ideal internalisation and body dissatisfaction. Eat Behav 2022;47:101678.