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Psychometric properties of the Turkish version of the addiction-like eating behavior scale for university students

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Abstract
The aim of study was to conduct an evaluation of the psychometric properties of the Turkish version of the Addiction-Like Eating Behavior Scale for university students. The sample consisted of 884 university students. Factor analysis, Cronbach's alpha, SEM-based MacDonald's omega test, analysis of variance, and item-total score correlation were used to evaluate the data. The scale consisted of 15 items and two subscales. The scale explained 50.4% of the total variance. Explanatory and confirmatory factor analysis revealed factor coefficients that were over 0.30, and the fit indices were over 0.90. Cronbach's alpha for the whole scale and subscales were higher than 0.70. According to the results, the Addiction-Like Eating Behavior Scale for university students is a valid and reliable tool in the Turkish sample.

Keywords Eating · Addiction · Behavior · Eating addiction

Introduction

The prevalence of obesity is increasing in developed and developing countries, and it affects a wide range of the population, including children (Tedik 2017; World_health_organization 2015). Classified as a noncommunicable disease, obesity is a crucial health problem that should be considered in terms of its medical, social, and economic aspects. The issue of obesity should be emphasized because it has recently become an increasingly common health problem. Obesity is usually accompanied by certain medical complications, such as cardiovascular disease, diabetes, metabolic syndrome, and psychiatric disorders; furthermore, it has a negative impact on health and shortens lifespans (Sahoo et al. 2015; Serin and Şanlıer 2018; Tedik 2017).

Food consumption is essential for survival, healthy growth, and development. While eating is a source of pleasure, it can also lead to problems such as addiction and overeating disorders (Benn 2014; Ferrario 2017; Oyekcin and Deveci 2012). The concept of eating addiction has emerged due to developments such as the increased prevalence of obesity; excessive consumption of processed foods rich in and pleasing nutrients such as sugar, fat, starch, and salt; and the observation of eating behaviors (Ferrario 2017; Oyekcin and Deveci 2012). The concept of eating addiction has gained the attention of researchers in recent years. Evidence has suggested that eating addiction tends to exist in individuals who are obese and those who display overeating behaviors. Some researchers have investigated whether individuals who have these conditions suffer from some form of addiction (Ferrario 2017; Oyekcin and Deveci 2012; Ruddock et al. 2017; Schulte et al. 2015, 2016). Recent animal and human brain imaging studies have discovered certain neurobiological and behavioral similarities between eating addiction and other dependencies (Carter et al. 2016; Kalon et al. 2016; Volkow et al. 2012). Additionally, some studies have revealed that the reward system serves as a risk factor for addictive behavior development (Kalon et al. 2016; Munno et al. 2016; Rogers 2017).

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The increased prevalence of worldwide obesity and the expanding role of processed foods in daily life in the twenty-first century have made food and eating addiction a major focus of study (Ferrario 2017; Oyekcin and Deveci 2012). There is an ongoing debate over whether obese individuals and individuals with overeating disorders experience something similar to food and eating addiction, and further evidence-based studies are needed to clarify this issue (Schulte et al. 2016; Ruddock et al. 2017). The necessity for the development of a scale to measure addiction-like eating behaviors to be used in such studies has been acknowledged (Carter et al. 2016; Gearhardt et al. 2013; Kalon et al. 2016; Ruddock et al. 2017). Following a previous qualitative study, young adults were asked to state whether they perceived themselves as "food addicts" so as to identify behaviors that are relevant to food addiction among adults. The result of this study revealed that six factors were commonly associated with food addiction among both those who perceived themselves as food addicts and those who did not perceive themselves in this way (Ruddock et al. 2015, 2017). These factors included the inclination to eat for reward, a constant desire to eat, a lack of self-control with regard to food, engagement in food and eating, weight gain and unhealthy diet, and difficulty controlling the intake of unhealthy foods (Ruddock et al. 2015, 2017). This study seeks to use qualitative data to test the validity of the Addiction-Like Eating Behavior Scale (ALEBS) and adapt it to the Turkish context (Ruddock et al. 2015, 2017).

Turkish-based studies conducted to measure addiction-like eating behaviors among Turkish university students have lacked a reliable and valid scale to measure these behaviors. The present study aimed to adapt the ALEBS to the Turkish context and investigate of the psychometric properties for university students.

Methods

Study Design

This methodological descriptive study was planned to adapt the ALEBS from English to Turkish and to investigate the psychometric properties of university students.

The Sample

The present study was conducted between September 2018 and December 2018 in two universities, one in western Turkey and the other in central Turkey. Sample sizes for scale development studies have been reported as follows: excellent, up to 1000; very good, up to 500; good, up to 300; fair, up to 200; and poor, up to 100 (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018). Therefore, the researchers planned to include at least 300 students aged between 18 and 25, selected through convenience sampling of students who attended the two aforementioned universities and agreed to participate in the study voluntarily. The resulting study sample consisted of 869 students who agreed to participate voluntarily.

Tools

Data was collected with a student information form and the ALEBS. The selected universities were visited between September 2018 and January 2019, and the scale and consent forms were distributed to the students. The height and weight measurements of the students who filled in the consent forms and came with the questionnaires were recorded and noted on the questionnaire forms.

The Student Information Form This form, which was completed by students, consisted of nine items regarding each student's age, grade, gender, height, body weight, economic status, perception of their own body height and weight, and healthy eating habits.

The Addiction-like Eating Behavior Scale This scale was developed by Ruddock et al. (2017) to evaluate the addiction-like eating behaviors of individuals. The first 10 items of the scale are presented in a five-point Likert format, and the response options range from "1-Never" to "5-Always." Items 11, 12, 13, 14, and 15 are also presented in a five-point Likert format, and their response options range from "1-Strongly Disagree" to "5-Strongly Agree". The scoring options of the scale range between 1 ("Never" and "Strongly Disagree") and 5 ("Always" and "Strongly Agree") for each statement. Items 6, 11, 12, 13, and 14 are scored inversely. The entire score and the two subscale scores are calculated by summing these points (maximum score = 75). The appetitive drive subscale (maximum score = 45) includes items 1 to 5, 7, 9, 14, and 15, and the low dietary control subscale (maximum score = 30) includes items 6, 8, 10, 11, 12, and 13. The Cronbach's alpha coefficient (CAC) was 0.70. The data was divided into two groups for analysis. The CAC of the two subscales in Group 1 were $\alpha = 0.90$ for the appetitive drive subscale and $\alpha = 0.85$ for the low dietary control subscale. The coefficients of the two subscales in Group 2 were $\alpha = 0.85$ for the appetitive drive subscale and $\alpha = 0.83$ for the low dietary control subscale (Ruddock et al. 2017).

Procedure

Written permission for the Turkish adaptation and use of the ALEBS was obtained through e-mail. Three linguists independently translated the scale into Turkish. After the scale was translated into Turkish, the Turkish translations of the scale were rearranged by the researchers. Then, the scale

was revised by a Turkish language expert. The Turkish scale was then back-translated into English by a different linguist.

In determining the content validity of a scale, at least three experts should be queried for their opinions (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018). A total of eight experts, including four instructors from the Department of Pediatric Nursing, two dieticians, and two academicians from the Department of Psychiatry, were asked to evaluate the scale. The draft form of the scale and its original English version were given to the experts, and they were asked to score the scale from 1 to 4 (1 = not appropriate at all, 4 = totally appropriate) to evaluate the appropriateness of the items. These scores were evaluated using a content validity index (CVI). The draft form of the scale was then revised according to the expert opinions.

Next, it was recommended that the scale be administered to 20 to 30 people who had characteristics similar to those of the study subjects and who were not included in the study sample (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018). The draft form of the scale, which was revised according to the expert opinions, was applied to 20 students who met the study sampling criteria, and a decision was made to proceed with the study since no negative feedback was received. The 20 students who were involved in the pilot study were excluded from the main sample, and the study was conducted with 849 students. Reliability and validity analyses of the scale were performed.

Ethics of the Study

In order to carry out the present study, ethical approval was first obtained from the Non-Interventional Clinical Research Ethics Committee (IRB: 4219-GOA-2018/21–10). Then, the necessary institutional approval was obtained from both universities. In addition, participants were informed of the study's purpose and their written and verbal consent were obtained prior to their participation in the study. All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Statistical Analyses

Percentages, numbers, and means were calculated and recorded as descriptive statistics. According to the Shapiro-Wilk test, the data was normally distributed. Cronbach's alpha, an SEM-based MacDonald's omega test, an item-total score analysis, and a split-half analysis were used for the reliability analysis; a Hotelling T^2 analysis was used to determine response bias within the scale (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018).

The CVI for the analysis of the fit between expert opinions, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), analysis of variance (ANOVA) for known group comparison (according to BMI); and floor/ceiling effect for determining the validity of the scale and the subscales that were used for the validity analysis. For the factor analysis, the data was divided into two halves: an EFA was performed with one half of the data, and a CFA was performed with the other half. The ANOVA was used to compare scores on the eating addictions scale according to BMI. A Scheffe test was used for post-hoc analysis. World Health Organization (WHO) classification standards were used for BMI classification; <18.50 was classified as underweight, 18.50 to 24.99 was classified as normal weight, 25.00 to 29.99 was classified as overweight, and ≥ 30.00 was classified as obese (World_health_organization 2015). The significance level was taken as $p = 0.05$.

Results

The mean student age was 19.80 ± 1.58 years. Of all the participants, 72.8% ($n = 618$) were female, 46.2% ($n = 392$) were first-year students, and 56.9% ($n = 483$) stated that they had equal income and expenses. In addition, 67.8% ($n = 576$) evaluated their own weights as normal. Of the students participating in the study, 10.7% ($n = 91$; BMI range, 14.88 to 18.50) had underweight BMIs, 71.8% ($n = 610$; BMI range, 18.52 to 24.98) had normal-weight BMIs, 13.8% ($n = 117$; BMI range, 25.00 to 29.99) had overweight BMIs, and 3.7% ($n = 31$; BMI range, 30.01 to 40.18) had obese BMIs.

The fit between the expert opinions was analyzed using the CVI. The item-based CVI was found to vary between 0.89 and 0.99, whereas the scale-based CVI was 0.96. The results of the EFA showed that the Kaiser-Meyer Olkin (KMO) coefficient was 0.845, the Bartlett X^2 was 2795.876, and $p < 0.01$. According to the EFA results, the scale consisted of two subscales that explained 50.4% of the total variance. The appetitive drive subscale explained 30.3% of the total variance, whereas the low dietary control subscale explained 20.1%. The factor loadings of the appetitive drive and low dietary control subscales were determined to vary from 0.38 to 0.85 and from 0.48 to 0.79, respectively (Table 1).

According to the results of the CFA, the fit indices were determined as follows: $X^2 = 260.941$, $df = 81$, X2/$df = 3.221$, RMSEA = 0.072, GFI = 0.92, CFI = 0.93, TLI = 0.91, NFI = 0.90, IFI = 0.93, and RFI = 0.88 (Table 2). The results of the CFA also showed that the factor loads of the appetitive drive subscale ranged from 0.33 to 0.81 and the factor loads of the dietary control subscale ranged from 0.37 to 0.66 (Fig. 1, Table 2).

The mean ALEBS scores of the university students were 40.43 ± 8.35 for those with underweight BMIs, 41.66 ± 8.83

Table 1 Results of the exploratory factory analysis ($n = 425$)

Items	Factor loads	
	Appetitive drive sub-dimension	Low dietary control sub-dimension
1	0.75	
2	0.82	
3	0.76	
4	0.83	
5	0.85	
6		0.60
7	0.61	
8		0.48
9	0.56	
10		0.55
11		0.79
12		0.77
13		0.75
14	0.44	
15	0.38	
Eigenvalue	4.544	3.023
Explained variance (%)	30.3	20.1

for those with normal-weight BMIs, 45.15 ± 9.41 for those with overweight BMIs, and 46.77 ± 10.67 for those with obese BMIs. The difference between the mean ALEBS scores of the student groups, grouped according to their BMIs, was statistically significant ($p < 0.001$). A post-hoc analysis was conducted to determine significant differences between the groups, and the results revealed a significant difference between the overweight and underweight groups' weights ($p < 0.001$). Significant differences were also revealed between the underweight group and the obese group, between the normal-weight group and the overweight group, and between the obese group and the normal weight group ($p < 0.001$; Table 3). The effect size of the study according to BMI was calculated to be 0.24.

The CAC of the overall scale was determined to be 0.86. The CACs of the appetitive drive and low dietary control subscales were 0.85 and 0.78, respectively. The SEM-based MacDonald's omega coefficient of the overall scale was determined to be 0.88. The SEM-based MacDonald's omega coefficients of the appetitive drive and low dietary control subscales were 0.82 and 0.75, respectively. In addition, the split-half analysis yielded a CAC of 0.77 for the first part and 0.80 for the second part. The Spearmen Brown coefficient was 0.77, the Guttman-split-half coefficient was 0.77, and the correlation coefficient between the two parts was found to be 0.63. No floor/ceiling effect was determined for the whole scale. The floor and ceiling effects were 0.2% and 0.0% for the appetitive drive subscale, respectively, and 0.4% and 0.2% for the low dietary control subscale, respectively. A Hotelling T^2 test was employed to test for the existence of response bias in the scale, and the Hotelling T^2 value was 1669.338 ($F = 117.410$, $p < 0.01$); this result indicated that the scale did not exhibit any response bias (Table 4).

The item-total score correlations ranged between 0.40 and 0.76, and the item-subscale score correlations ranged between 0.49 and 0.83 (Table 5).

Discussion

The results of the content validity analysis indicated a high level of fit among the expert opinions and also indicated satisfactory item representation of the intended areas (DeVellis 2016; Erkuş 2016; Jonhson and Christensen 2014). The

Table 2 Results of the confirmatory factory analysis ($n = 424$)

	X^2	DF[a]	X^2/DF	RMSEA[b]	GFI[c]	CFI[d]	IFI[e]	RFI[f]	NFI[g]	TLI[h]
Two-factor model	260.941	81	3.221	0.072	0.92	0.93	0.93	0.87	0.90	0.91

[a] Degree of Free; [b] RootMeanSquareError of Approximation; [c] Goodness of Fit Index; [d] Comparative Fit Index; [e] Incremental Fit Index; [f] Relative Fit Index; [g] Normed Fit Index; [h] TLI = Trucker-lewis Index

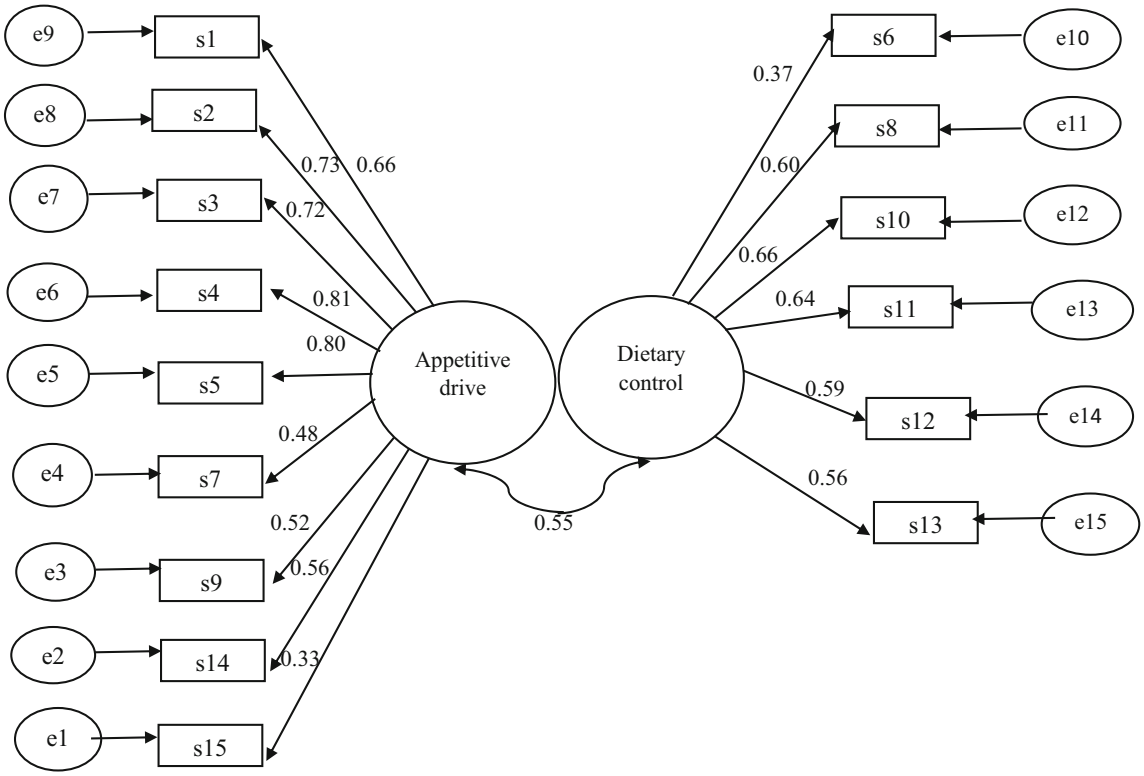

Fig. 1 Addiction-like eating behavior scale PATH analysis

results supported the content validity of the Turkish version of the ALEBS for a Turkish sample and demonstrated that its content validity was similar to that of the original scale (Ruddock et al. 2017).

According to the Bartlett chi-square test and the KMO coefficient, the data and the sample size were adequate for EFA (DeVellis 2016; Jonhson and Christensen 2014). The EFA result indicated that the scale consisted of two subscales, which explained more than 50% of the total variance in the Turkish version. Previous studies have indicated that 50% or more explained variance is sufficient for a multidimensional scale (DeVellis 2016; Kartal and Bardakçı 2018; Karagöz 2016). Similarly, the original scale consisted of two subscales that explained more than 50% of the total variance (Ruddock et al. 2017). The total variance of the Turkish scale adaptation developed in this study was found to be similar to the total variance of the original scale (Ruddock et al. 2017). This result indicated that the construct of the Turkish version of the ALEBS resembled the construct of the original scale.

The factor loadings of the appetitive drive and low dietary control subscales of the Turkish version were determined to be 0.30 and above. Similarly, all factor loads on the original scale were found to be over 0.30 (Ruddock et al. 2017). Statistics experts have suggested that the factor load of an item should be at least 0.30 in order for that item to be included in a scale (Jonhson and Christensen 2014; Kartal and Bardakçı 2018; Karagöz 2016). The results of the EFA demonstrated that the factor loads of the Turkish version preserved the original construct, owing to their resemblance to the factor loads in the original scale, and displayed valid and strong construct validity for the Turkish sample (Ruddock et al. 2017).

According to field experts, the conduction of a CFA is recommended for the evaluation of construct validity, especially if an intercultural adaptation is conducted since performing only an EFA is not considered sufficient in such cases (DeVellis 2016; Jonhson and Christensen 2014; Kartal and Bardakçı 2018; Karagöz 2016). For the Turkish version of the ALEBS, the fit of the factor structure determined by EFA was evaluated using a CFA. The CFA results revealed that the division of the degree of freedom based on the chi-square value was less than five, the RMSEA was less than 0.08, the fit indexes were greater than 0.90, and the factor loads of all the items were greater than 0.30. In the original study (Ruddock et al. 2017), all indexes were higher than 0.90, the RMSEA was lower than 0.08, and all factor loads, except for

Table 3 Comparison of the scale means of the student who grouped according their BMIs (known group comparison, $n = 849$)

BMI	n	M ± SD	F	p
Under weight	91	40.43 ± 8.35	13.454	< 0.001
Normal weight	610	41.66 ± 8.83		
Overweight	117	45.15 ± 9.41		
Obese	31	46.77 ± 10.67		

*BMI: Body Mass Index; M: Scale total score mean; SD: standart deviation, F = Anova, p = *p* value

Table 4 The reliability analysis results concerning the whole scale and subscales ($n = 849$)

Scale and sub-scale	Cronbach α ($n = 849$)	SEM-based McDonald ($n = 424$)	Split-half analysis ($n = 849$)				$M \pm SD$ (Min-Max) ($n = 849$)	Floor effect %	Ceiling Effect %
			First half of Cronbach α	Second half of Cronbach α	Spearman-Brown	Gutman split-half	Correlation between two halves			
Scale total	0.86	0.88	0.77	0.80	0.77	0.77	0.63	41.97 ± 9.33 (18–70)	–	–
Appetitive sub-scale	0.85	0.82						24.02 ± 6.70 (9–43)	0.2	–
Dietery control sub-scale	0.78	0.75						17.91 ± 4.23 (6–30)	0.4	0.2

one item, were greater than 0.30 in both subscales. The CFA results of the current study and the original study (Ruddock et al. 2017) were found to be consistent with each other. Statisticians have suggested that CFA is appropriate to determine the fit of the construct determined by EFA in real life. The CFA results validated the two-factor construct of the Turkish scale; the items in each subscale identified their own factors adequately, and they adequately measured the concept that was to be assessed (DeVellis 2016; Kartal and Bardakçı 2018; Karagöz 2016). These results proved that the structure of the Turkish version of the ALEBS was similar to the original structure and that the scale had a good factor structure for the Turkish sample.

Comparison of the known groups is recommended for use in determining the validity of a scale. In this method, intergroup differences are determined by comparing the scale scores of groups that may attain different scores (DeVellis 2016; Jonhson and Christensen 2014; Kartal and Bardakçı 2018; Karagöz 2016). For the Turkish version of the ALEBS, the scores that students attained, grouped according to their BMI levels, were used for the known groups comparison. A significant difference was found between the scale scores of the student groups, which were grouped according to their BMI levels ($p < 0.01$). The scores of the overweight and obese students were significantly higher than those of the students with normal and underweight BMIs ($p < 0.01$). This result indicated that the scale was able to distinguish between groups that were expected to be different in terms of the characteristics that the scale intended to measure, thus revealing that the scale had strong construct validity. Ruddock et al. (2017) discovered a significant relationship between students' BMIs and their scale scores; the scale scores were significantly able to predict overweight BMI and obesity. The results concerning the Turkish version were consistent with the original scale results (Ruddock et al. 2017) and supported the construct validity of the scale.

The CAC was found to be higher than 0.70 for the whole scale and the subscales with the Turkish sample. The reliability coefficients found in this study were close to and greater than 0.80, demonstrating that the scale had a good level of reliability. In addition, the alpha values of both subscales used in the original study (Ruddock et al. 2017) were higher than 0.70; thus, the alpha values found in the two studies were consistent with each other.

Statisticians have suggested that when the items of a scale have a congeneric structure—that is, when the error variances of the items are not equal—the classical reliability coefficients, such as alpha, may provide lower values than the actual reliability coefficients (Dunn et al. 2014; Green and Yang 2015; Trizano-Hermosilla and Alvarado 2016). In this case, the use of the omega reliability coefficient is recommended. The omega reliability coefficient is evaluated as alpha and is recommended to be over 0.70 (Dunn et al. 2014; Green and

Table 5 Item-total and item-sub total score correlations ($n = 849$)

Items	Item-total score correlation *(r)**	Item-subscale total score correlation *(r)**
1	0.65	0.73
2	0.65	0.76
3	0.69	0.78
4	0.76	0.83
5	0.75	0.83
6	0.40	0.58
7	0.45	0.55
8	0.60	0.67
9	0.53	0.55
10	0.62	0.69
11	0.52	0.76
12	0.53	0.74
13	0.45	0.69
14	0.61	0.60
15	0.47	0.49

*Significant at $p < .001$ level

Yang 2015). For the Turkish version of the ALEBS, the omega coefficients of the whole scale and the subscales were determined to be higher than 0.70. The omega coefficient of the whole scale was higher than the alpha coefficient and higher than the omega coefficients of the subscales. However, the omega and alpha coefficients were found to be very close to each other for the Turkish version of the ALEBS; this result proved that the scale had good reliability. Also, both the omega values and the alpha values above 0.70 in revealed that the items were associated with each other. As the omega coefficient of the original scale was not provided, no comparison was made with the results for the Turkish version.

The split-half method was also used to assess reliability in the present study. For this method, it is suggested that the alpha coefficients of the two parts, the Spearman-Brown and Guttman half coefficients, should be higher than 0.70 and that there should be a strong relationship between these two parts (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018). In the present study, all coefficients were found to be greater than 0.70 and a strong relationship was discovered between the two parts. These results indicated that each item was highly correlated with the scale and with other items in the scale. Furthermore, these results suggested that the scale adequately measured the addiction-like eating behaviors of the students and that the item reliability of the scale was good.

Response bias is another important factor affecting validity and reliability. Response bias occurs when respondents respond to the items in a scale in line with the expectations of society or those of the researchers rather than their views. In cases of response bias, homogeneity of the scale deteriorates and both reliability and validity are affected (Kartal and Bardakçı 2018; Özdamar 2016; Seçer 2018). Response bias was analyzed using the Hotelling T^2 method, and no response bias was discovered for the scale. This result supported the assumption that the scale was a reliable and valid measurement tool. As no response bias values were provided for the original scale, response bias could not be compared.

Evaluation of the floor and ceiling effect is often recommended in reliability and validity studies. A floor and ceiling effect of less than 20% is considered acceptable (Kartal and Bardakçı 2018; Karagöz 2016; Özdamar 2016; Seçer 2018). The floor and ceiling effect values of the scale designed for the present study were found to be close to zero. These low floor and ceiling effect values indicated that the scale was a reliable measurement tool and that it adequately assessed the construct that was to be measured (Jonhson and Christensen 2014; Kartal and Bardakçı 2018; Karagöz 2016). As no floor and ceiling effect values were provided for the original scale, the floor and ceiling effect results could not be compared.

Another tool used for reliability estimations was item-total score analysis. An item-total score analysis indicates the degree to which the items in a scale correlate with the scale or subscale and with each other and whether they measure the quality that is to be measured (DeVellis 2016; Kartal and Bardakçı 2018; Karagöz 2016; Özdamar 2016). In an item-total score analysis, the resulting correlation is expected to be positive and higher than 0.20 (Kartal and Bardakçı 2018; Özdamar 2016). In the Turkish version of the ALEBS, the item-total score correlations were all positive and higher than 0.20. This finding indicated a high level of correlation between the items and the scale and subscales. Therefore, the results revealed that the scale items adequately measured the desired property to be assessed and that the scale items were highly reliable. For the original scale, the results of the item-total score analysis were not provided (Ruddock et al. 2017); therefore, these results could not be compared.

The present study had a few limitations despite its many strengths. The first limitation involved the use of a convenience sampling method. The generalizability of the scale may have been affected by the use this method. In addition, more than half of the participants were female. Due to the fact that women's eating attitudes may differ from men's, there may be some limitations involved in using the scale to assess addiction-like eating attitudes in men.

Conclusion

The results of the present study suggested that the Turkish version of the ALEBS demonstrated good validity and reliability with a Turkish sample. Using this scale, researchers can identify the addiction-like eating behaviors of students and can plan programs to reduce negative behaviors and promote healthy eating behaviors. Researchers can also conduct cross-cultural comparative studies using this scale. As the psychometric analyses of the scale were performed with a community sample, determining its reliability-validity in individuals with clinical obesity diagnoses or overweight problems is recommended. Currently, this scale has no cut-off point. Establishing a gold standard to determine the cut-off points of the scale for healthy and overweight individuals is recommended.

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Authors' Contributions DD and MB conceptualized and designed the study, acquired, analyzed and interpreted the data, and drafted the manuscript. DD, MB, SD and IB designed the study, search literature and revised the manuscript. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all the individual participants that were included in the study.

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