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Original article

Validity and Reliability of the Turkish Version of the Adult Picky Eating Questionnaire

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Abstract. *Background and aim:* Picky eating (PE) is generally expressed as a behavior seen in childhood, approximately one out of every three adults have been reported to exhibit PE behavior. Also, it is one of the determinant eating behaviors in the diagnosis of eating disorder-Avoidant/Restrictive Food Intake Disorder (ARFID). The aim of the present study was to translate, adapt and validate the Adult Picky Eating Questionnaire (APEQ) into Turkish. *Methods:* This study included 1135 adults (556 male, 579 female) with a mean age of 30.54 ± 11.73 (ranged from 18 to 63 years old). The APEQ was translated and adapted to Turkish according to the Beaton guideline. Eating Attitudes Test-Short Form (EAT-26) was used in the evaluation of eating behavior, and Kessler Psychological Distress Scale was used for psychological evaluation. *Results:* Items 2 and 3 were removed from the scale because total item correlation of these items was below 0.30. The Cronbach's alpha for the total scale of the APEQ-Tr was 0.731, with 0.630, 0.602, 0.627, and 0.671 for Meal presentation, Food variety, Meal disengagement and Taste aversion, respectively. APEQ-Tr, which is related to eating disturbance and psychological distress, showed an acceptable reliability with all its subscales. *Conclusions*: In conclusion, the Turkish version of APEQ (APEQ-Tr) can be used to evaluate PE in the Turkish population.

Key words: Adult picky eating, eating attitude, psychological distress, eating behaviour, eating disorders

Introduction

Picky eating (PE) is defined as limited food consumption due to the rejection of both traditional and unfamiliar foods (1). PE is typically characterized with limited consumption of foods, difficulty in trying new foods, rejection of foods due to their sensory features (taste, smell, aroma, and appearance), and rigidity in selecting foods based on their preparation and/or presentation modes (2).

Although it is generally expressed as a behavior seen in childhood, approximately one out of every three adults have been reported to exhibit PE behaviour (3,4). PE is generally thought to be of familial origin. It is stated that negative childhood experiences may cause the avoidance of certain foods or food groups in adulthood. It was reported that PE in childhood generally continues in adulthood, and these individuals experience high anxiety when trying new or different foods (5).

The effects of PE behavior, from mild to severe, varies according to its severity. PE in adults has been associated with reduced consumption of vegetables and fruits, low variety in the diet, various psychosocial morbidity such as depression, social eating anxiety, obsessive-compulsive disorder, psychological rigidity, and experiential avoidance (3-7). Severe PE may cause nutritional deficiency, loss of body weight and psychosocial disorders (8). Severe PE is also referred as one of the three models of eating disorders, namely, PE/food neophobia, lack of appetite/apathy to food, and restricted eating due to the fear of the negative consequences of eating, all of which cause the Avoidant/Restrictive Food Intake Disorder (ARFID) symptoms (9, 10). The ARFID, recently diagnosed in the fifth edition of the Diagnostic and Statistical Manual

of Mental Disorders (DSM-5), is defined as an eating disorder that is not related to shape and weight concerns specific to other eating disorders and causes insufficient energy and food intake and/or psychosocial disorder (9). The prevalence of PE is relatively high and it is one of the determinant eating behaviors in the diagnosis of the ARFID. However, surprisingly there is scanty academic literature regarding the definition and measurement of PE and assessing its relationship with eating disorders. It is considered that this may be due to the lack of standard measurement tools that define and evaluate PE in adults (11).

Until recently, various measurement techniques and methods have been used in PE research in both children and adults. This has yielded ambiguous and inconsistent results regarding the health effects of PE (11). In these studies, in general, individual and parental views were evaluated (1,7); however, in some other studies, short scales focusing on food neophobia (refusing to consume unfamiliar food) and also on limited food variety (12-15), but not evaluating behaviors and attitudes, have been used.

In order to understand the psychosocial consequences lacking in the evaluation of PE in adults, and to create a functional scale, the Adult Picky Eating Questionnaire (APEQ) was developed by Ellis et al. in 2017 (3). The APEQ is a multidimensional self-report scale that evaluates PE behaviors and attitudes in adults, and consists of 16 items under 4 main categories, namely, strict behaviors and attitudes regarding meal preparation or presentation, limited food variety and food neophobia, avoidance of mealtime, and rejection of foods with bitter or sour taste (3).

The nutritional and psychosocial relationships of PE in adults have generally been studied in Western societies. In Turkey, although there are studies evaluating PE behaviors in children (15,16), there exist no studies on adult PE. It is thought that this may be partly due to the lack of a valid scale in Turkish. Considering the importance of PE behavior and the ARFID and potential cultural differences in this structure, a valid Turkish scale is needed to evaluate PE in adults.

In this study, we aimed to translate, adapt and validate the APEQ into Turkish, to establish its validity and reliability, and to introduce such a scale that will facilitate further studies in Turkish.

Methods

Participants

This study is a cross-sectional study which included 1135 adults (556 males, 579 females) aged 18–64 years. Data were collected using a self-administered online questionnaire. The online survey was created through Google online survey platform and distributed to participants via WhatsApp™ and e-mail. Participants also contributed to the dissemination of the survey. The approval was obtained from the individuals to participate in the study. All participants were Turkish-speaking and Turkish national adults living in Turkey. Non-Turkish individuals, non-adult individuals, and those who did not agree to participate were not included in the study. All adults who agreed to participate in the study were included in the study. Power analysis was performed using G*power software to determine the number of individuals to be included in the sample before starting the study. Based on power analysis, 165 or more individual had to be included in the study [error type 1 (alpha)=0.05, test power (1-error type 2 (beta)) = 0.80]. Body mass index (kg/m^2) was calculated using participants' self-reported weight and height.

Translation and adaptation of Adult Picky Eating Questionnaire (APEQ)

Author's permission has been obtained to use the original English version of APEQ. The translation and adaptation procedure of Adult Picky Eating Questionnaire was made according to the protocol created by Beaton et al. (17). The original English version of the questionnaire was translated into Turkish by two independent translators speaking both Turkish and English. One of the translators had a medical and clinical background while the other did not. Then, a single form was created by evaluating the translation of two translators. This last Turkish version of the questionnaire was translated into English by two bilingual native speakers and compared with the original version. The final Turkish form of the questionnaire was created by a team of translators and researchers. In the last stage, the final version of the questionnaire was tested on 30 individuals to determine its understandability.

Measures

Turkish validity and reliability scales were used to evaluate the validity and reliability of APEQ (3). Eating Attitudes Test-Short Form (EAT-26) (18,19) was used in the evaluation of eating behavior, and Kessler Psychological Distress Scale (20,21) was used for psychological evaluation.

Adult Picky Eating Questionnaire (APEQ)

The APEQ, which was developed by Ellis et al., is a 16-item self-report scale evaluating picky eating behaviors and attitudes in adults (3). This scale has four subscales: "Meal Presentation (items 1,5,9,12,14,15 and 16), Food Variety (items 2,6, 10 and 13), Meal Disengagement (items 3,7 and 11), and Taste Aversion (items 4 and 8)". Each item is scored on a 5- point Likert scale from 1-"Never" to 5-"Always,". Higher total score was associated with higher levels of pick eating behaviors and attitudes.

Eating Attitude Test-26 (EAT-26)

Eating Attitudes Test-Short Form (EAT-26) used for measuring eating disturbance was developed by Garner et al. (18) and adapted to Turkish by Ergüney-Okumuş et al. (19). The Cronbach's alpha for EAT-26 (Turkish version) was measured as 0.84. Although each item in EAT-26 is scored on a 6-point Likert scale, first 25 items are scored from 0 (never) to 3 (always). The last item is scored in the opposite direction (3 (never) to 0 (always)). Higher total scores of EAT-26 mean higher risk for an eating disorder risk. In this study, the Cronbach's alpha coefficient of EAT-26 was measured as 0.764.

Kessler Psychological Distress Scale (K10)

Kessler Psychological Distress Scale (K10) was developed by Kessler et al. (20) (Cronbach's alpha:0.93), Turkish validity and reliability of the scale was made by Altun et al. (21) (Cronbach's alpha:0.92). A five-point Likert-type scale (from "1-never" to "5-always") is used to evaluate the level of depressive symptoms for the last 4 weeks. Total higher scores indicate more psychological distress levels. The Cronbach's alpha coefficient of K10 was measured as 0.926 in this study.

Ethical Statement

Ethics committee approval was obtained by Gaziosmanpaşa University Clinical Research Ethics Committee with the decision number 20-KAEK-321 dated 31.12.2020.

Statistical Analysis

The data obtained in the study were analyzed using the SPSS v25.0. The reliability and internal consistency of the scale was evaluated with Cronbach's Alpha (22). A value of Cronbach's alpha should be at least 0.60 to be acceptable, and the good value is considered to be 0.70 or above (23). The CFA was performed using the AMOS-24 software. The following parameters were examined within the scope of CFA: multiple fit indices including RMSEA (Root Mean Square Error of Approximation), GFI (Goodness-of-Fit Index), AGFI (Adjusted Goodness-of-Fit Index), CFI (Comparative Fit Index), NFI (Normed Fit Index), TLI (Tucker–Lewis Index). In CFA, $\chi^2/df \leq 5.0$, $0.85 \leq AGFI$, $0.85 \leq CFI$, $0.80 \leq NFI$ and $0.80 \leq TLI$, indicate acceptable fit, and $RMSEA \leq 0.05$, $GFI \geq 0.90$ indicate good fit for Model Confirmatory Factor Analysis Fit Indices (24).

Spearman correlation coefficient was used to evaluate the correlation in parameters. The correlation effect values of 0.10, 0.30, and 0.50 could be considered as small, medium, and large correlations, respectively (25). All tests of significance were two-sided, and a $p < 0.05$ was considered statistically significant.

Results

This study included 1135 adults with a mean age of 30.54 ± 11.73 (ranged from 18 to 63 years old). While the mean age of males was 32.5± 11.67 years, the mean age of females was 28.6±11.48 years. The mean body mass index (BMI) based on self-reported was 24.3±4.28 kg/m^2.

Confirmatory factor analysis

The model-fit statistics were as follows: $\chi 2$ /df = 3.78; GFI = 0.96, AGFI = 0.95, CFI = 0.92, RMSEA = 0.05, NFI=0.89, TLI=0.89. RMSEA and GFI were assessed to show good fit based on recommended thresholds. The other indices reached acceptable fit levels (24).

The minimum value for the item total correlation must be as 0.30 (26). Items below 0.30 for which we examined total item correlations were not included in the analysis. Items 2 and 3 were removed from the scale as they did not meet this condition. Item-total test correlation values of all items vary between 0.30 and 0.51. As can be seen in the item-total test correlation in Table 2, all items were found to be related to each other. At the same time, Confirmatory factor analysis of APEQ-Tr is shown in Figure 1.

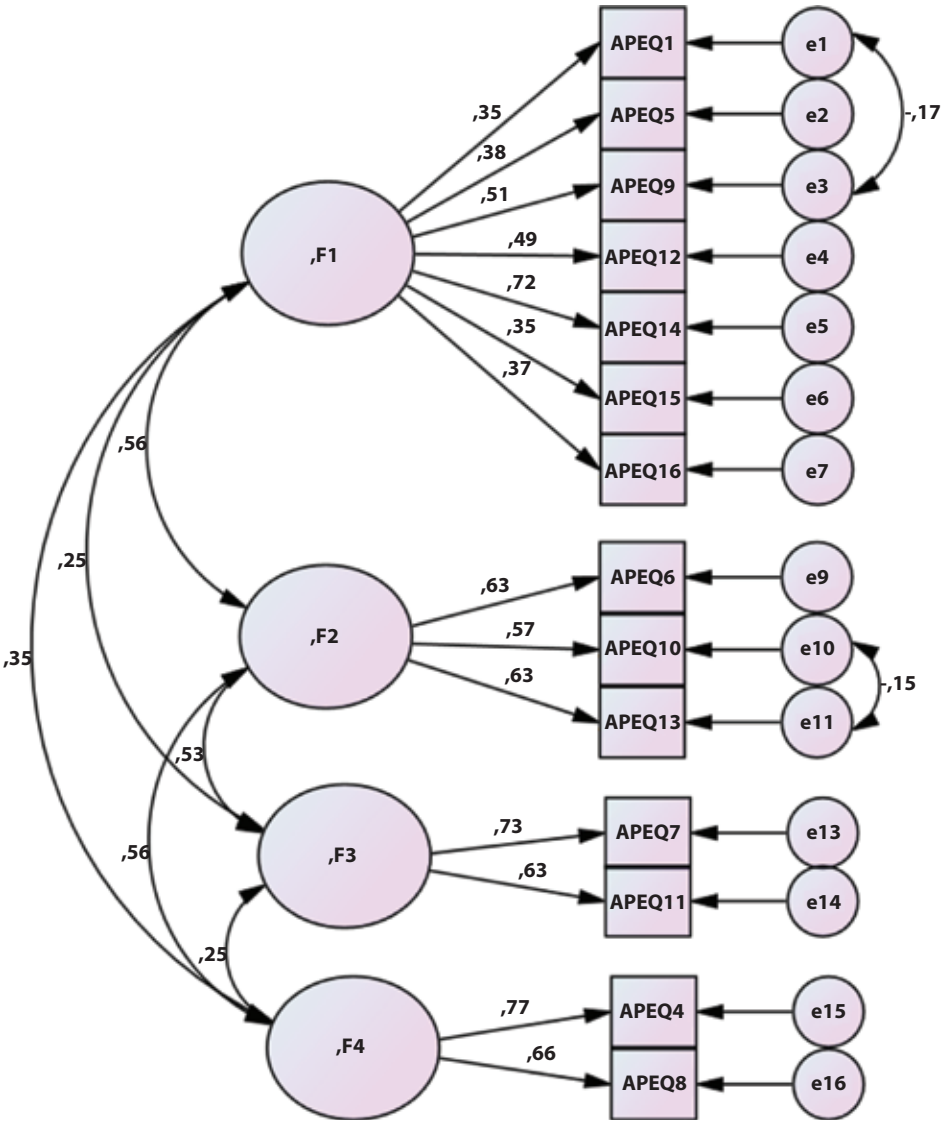

Figure 1. Confirmatory factor analysis of APEQ-Tr. *(F1: Meal Presentation, F2: Food Variety, F3: Meal Disengagement, F4: Taste Aversion)*

Reliability

Cronbach's alpha values and item total correlation for the scale were shown in Table 1. The Cronbach's alpha for the total scale of the APEQ-Tr was 0.731, with 0.630, 0.602, 0.627, and 0.671 for Meal presentation, Food variety, Meal disengagement and Taste aversion, respectively. APEQ-Tr showed an acceptable reliability with all its subscales.

Convergent validity

The correlations with eating and psychology measures were given in Table 2. The subscales of APEQ-Tr showed a large positive correlation with APEQ except for meal disengagement. There was a moderate correlation between meal disengagement and APEQ-Tr (r:0.474 p<0.01). The APEQ-Tr total score showed a positive and small association with eating disturbance and psychological distress (r :0.113, p<0.01, r:0.197 p<0.01 respectively). Furthermore, meal presentation alone, which is a subscale of APEQ-Tr, showed little correlated with eating disturbance (r:0.174, p<0.01). All subscales of APEQ-Tr showed little correlation with psychological distress (p<0.01). There was no correlation between BMI and APEQ-Tr/subscales of APEQ-Tr. Body mass index showed a moderate positive correlation with psychological distress (r:0.221, p<0.01)

Table 1. Cronbach's alpha and item total correlations

	Item total correlation	**t**	**p value**
Meal Presentation (Cronbach's Alpha =0.630)			
APEQ1	0,32	16,277	<0.01
APEQ5	0,30	17,550	<0.01
APEQ9	0,31	15,203	<0.01
APEQ12	0,38	21,095	<0.01
APEQ14	0,51	28,181	<0.01
APEQ15	0,30	20,108	<0.01
APEQ16	0,30	19,864	<0.01
Food Variety (Cronbach's Alpha =0.602)			
APEQ6	0,48	31,094	<0.01
APEQ10	0,35	27,094	<0.01
APEQ13	0,42	33,096	<0.01
Meal Disengagement (Cronbach's Alpha = 0.627)			
APEQ7	0,46	44,040	<0.01
APEQ11	0,46	36,088	<0.01
Taste Aversion (Cronbach's Alpha = 0.671)			
APEQ4	0,51	37,127	<0.01
APEQ8	0,51	40,126	<0.01
APEQ-Tr *(Cronbach's Alpha* = 0.731)			
APEQ: Adult Picky Eating Questionnaire			

Table 2. The correlations with eating and psychology measures

	Mean	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. APEQ total score	2,35	,50	1							
2. Meal Presentation	2,50	,61	0,787*	1						
3. Food Variety	2,17	,80	0,719*	0,332*	1					
4. Meal Disengagement	2,57	,91	0,474*	0,116*	0,323*	1				
5. Taste Aversion	1,87	,87	0,537*	0,205*	0,385*	0,173*	1			
6. Eating disturbance	9,31	7,45	0,113*	0,174*	0,000	0,013	-0,050	1		
7. Psychological Distress	24,68	8,48	0,197*	0,118*	0,167*	0,149**	0,119*	0.141*	1	
8. BMI	24.36	4.28	0,007	-0,007	-0,014	0,003	0,049	-.051	-0.221*	1

APEQ:Adult Picky Eating Questionnaire, BMI:Body Mass Index.
r: Spearman correlation coefficient * p<0.01

Discussion

In the present study, we aimed to adapt APEQ into Turkish and provide its validity and reliability. Although there is a scale evaluating picky eating in children in our country (15, 16), there is no scale evaluating this in adults. In previous studies, APEQ validity and reliability was conducted in college or university students. (27, 28). In present study was conducted only with the participation of adults. The Turkish version of APEQ provides good validity and reliability. This scale can be used in further studies about picky eating in adults.

Although original APEQ contains 16 items (3), Turkish version of APEQ (APEQ-Tr) consist of 14 items. Since the item total correlation is less than 0.30 (26) item 2 under Food Variety subscale and 3 under Meal Disengagement subscale were removed from the Turkish version of APEQ (APEQ-Tr). The Cronbach's alpha for the total scale of APEQ-Tr was 0.731, with 0.630, 0.602, 0.627, and 0.671 for Meal presentation, Food variety, Meal disengagement and Taste aversion, respectively. In Chinese version of APEQ which includes 16 items, the Cronbach's alpha coefficient was 0.874 and Cronbach's alpha values for "Meal presentation", "Food variety", "Meal disengagement" and "Taste aversion" were found to be 0.788, 0.798, 0.673 and 0.763, respectively (27). The number of studies about the validity and reliability of APEQ are limited (27, 28). Therefore it is thought that this study will contribute to the literature. Picky eating in adults is associated with psychosocial morbidity (3-7). In addition severe picky eating, which is one of the symptoms of ARFID, can cause nutritional deficiency, loss of body weight and psychosocial disorders (8-10).

Although pharmacological and cognitive behavioral therapies are included in the treatment of ARFID, there is no clear approach in treatment (29). The use of tools evaluated both eating and psychological disturbance may be useful for treatment and prevention of ARFID. In this study, The APEQ-Tr showed a positive association with eating disturbance and psychological distress (Table 2) like Chinese version of APEQ (28). However there was no correlation between BMI and APEQ-Tr (Table 2). Similarly, it was shown that there is no relationship between BMI and APEQ total score both in original and the Chinese version of APEQ (3, 27). Body mass index showed a moderate positive correlation with psychological distress (Table 2). In the previous study, no relationship was found between BMI and psychological distress (27). Further studies examining the relationship between BMI and APEQ are needed.

Understanding the mechanisms that cause picky eating and using screening tools more frequently can contribute to the treatment and prevention of ARFID. In addition picky eaters consume more carbohydrate foods and snacks but less vegetables and fruits than non-picky (30). Adequate consumption of fruits and vegetables is very important in health promotion. The education about healthy nutrition may contribute to increasing awareness of picky eater.

There are insufficient data on the differences in food avoidance behavior across cultures. Cultural norms may be effective in underlying psychological structures, such as fear, disgust and body dissatisfaction, causing symptoms differing between countries. Further research in this field is needed to be conducted learning more about the prevalence of various eating disorders in globally, creating advanced assessment tools and developing culturally appropriate interventions. We consider the current study a first step toward making instrument available for picky eating research in Turkish adults, which is a population underrepresented in the eating disorders literature. The high number of participants from whom research data were collected (n = 1135) is a desirable situation for the validity and reliability analyses. Also, the numbers of males and females are similar, which can be shown as the strength of this study.

Conclusion

Also adults participated in this study are thought to reflect the Turkish population, APEQ-Tr can be used to assess picky eating in adults. In addition, APEQ-Tr is related to eating disturbance and psychological distress. Further studies evaluating the relationship between nutritional deficiencies and BMI and APEQ are needed. We think that this scale will help the assessment of picky eating in adults and will shed light on future studies.

Limitations

The some limitations of this study. Firstly it was conducted online, and the data of study were taken as a self-report. Secondly, there was any evaluation of clinical and medical condition before the study. All adults who met the inclusion criteria and agreed to participate in the study were included. Further studies can be planned using the face-to-face method and evaluating medical condition.

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