Progress in Nutrition 2021; Vol. 23, N. 1: e2021021 DOI: 10.23751/pn.v23i1.9295

Original article

Food neophobia scale (FNS): testing the validity and reliability of the Turkish version in school-age children

Cemre Elmas, Seray Kabaran

Department of Nutrition and Dietetics, Faculty of Health Sciences, Eastern Mediterranean University, Famagusta, T.R. North Cyprus via Mersin 10, Turkey

Abstract. *Introduction:* The aim of this study was to test the validity and reliability of the Turkish version of the Food Neophobia Scale (FNS). *Materials and Methods:* The study was conducted with school age children aged between 9-11 years (n=781) who were studying in primary schools in Turkish Republic of Northern Cyprus (TRNC) in the 2018-2019 academic year. The language validity, content validity, construct validity and reliability analyses of the scale were implemented. The standard Brislin procedure was applied for language validity studies. Exploratory Factor Analysis (EFA) was used to evaluate the construct validity of the scale. Cronbach alpha value was calculated in order to evaluate the reliability of the scale and test-retest method was applied since there was no other comparable scale. *Results:* In this study, Eigenvalue was found to be 4.873. This value shows that the scale has one factor in this study. In the one factor analysis, Kaiser-Meyer-Olkin (KMO) value was found to be 0.907. Bartlett's test value was found to be significant ($\chi^2(36)=3309.10$, $p<0.001$). For the reliability of the scale, Cronbach alpha value, which was calculated by applying the whole sampling (n=781), was found to have a very good reliability with 0.890. After that, the value of the re-test applied to 50% (n=390) of the sample, and was again found to be very good with 0.885. *Conclusion:* The Turkish version of the FNS, consisting of 9 questions, including a 5-point-Likert-type assessment, is an appropriate scale for primary school students and supports the idea that FNS can be used to assess food neophobia status in this population.

Keywords: Food neophobia, Validation, Turkish, School age children, Dietary behaviour

Introduction

Food neophobia is referred to the unwillingness to eat and reject unknown or novel foods. Although studies have shown that the prevalence of neophobia is higher in childhood than in adulthood, it is also an issue that can be encountered in all age groups. However, the reasons for food neophobia may differ between age groups. While the main reason for the underlying mechanism in the adults is the concern that new foods may be harmful to human health, it has been suggested that this may be a perceptual, non-cognitive and nutrient specific intuitive response in early childhood (1-3). The most important reason of food neophobia between the ages of 8-11 is that children exhibit biased behaviour about the appearance of unknown foods (4).

It is known that the avoidance of new foods may persist in later life regardless of the reason that started in childhood (5). More importantly, the results of the study suggest that this behaviour in childhood may be related to insufficiencies in nutritional diversity due to its direct effect on food preferences and that general nutritional status may be negatively affected (6-8). For that reason, the increase in food neophobia may decrease the quality of diet (9).

It is known that genetic factors may also be effective in shaping the nutritional behaviour of children (10). It is also known that environmental pressure

applied in childhood through high control based parenting styles, such as restricting certain kinds of food and forcing to eat, can create an emotionally negative atmosphere on children's nutrition (11, 12). Therefore, society plays an important role in shaping a child's nutritional behaviour (13).

Identification of eating disorders in children and adolescents is important in preventing these problems. Food choices are influenced by a person's attitude towards food. It is important to measure food neophobia in order to reduce food neophobia, to be able to identify the causes and effects of food neophobia, change unhealthy eating behaviours and develop effective intervention strategies. Food neophobia can be associated with various factors such as; inadequate food diversity, inadequate nutrient intake, unfamiliar food and inability to obtain food. Different tools are necessary to identify these problems and to measure food neophobia in different target groups (14).

In 1992, Pliner and Hobden developed the Food Neophobia Scale (FNS) in order to measure the characteristics of food neophobia of people (1). The scale consists of 10 questions. Endpoints include 7-point bipolar ratings, "disagree" and "strongly agree" (1). This scale was also adapted and applied in different countries (15, 16). The validity study of the scale was conducted among Italian children aged between 6 and 9 years old. The orginal scale was studied with the adult group, while the study in Italy was conducted with the child age group. This situation necessitated the adaptation of the scale to children (16). In different countries, the Spanish validity study of the scale in Spain (15), the Brazilian Portuguese validity study was conducted in Brazil with a sample group of 21-55 age group (17) and in addition, in order to measure the attitude of children aged 2-6 years against new foods, Portuguese validity studies of the scale were also conducted by working with the families of these children and these are included in the literature (18). However, no studies based on this topic was found within the Turkish children. In this study, the Turkish validity and reliability of the scale on food neophobia have been tested and it will be gained in the literature and it is aimed to compare the studies and findings in Turkish Republic of Northern Cyprus (TRNC) with those in other countries more easily.

Materials and methods

Study population and design

The research was conducted in the 2018-2019 academic year with face to face interviews with 9-11 year-old school age children in primary schools in TRNC during school hours.

According to the data received from the TRNC Ministry of National Education, the number of students within the 9-11 age range in primary schools in TRNC is 11553. Reaching whole students would be difficult in terms of time, cost and control. Therefore, the sample was calculated considering the total number of students (n=11553), tolerated error of 1% and a 99% confidence level, resulting in a minimum sample of 629 children (19-21). In the study, the regions where the study will be carried out in the TRNC (Nicosia, Famagusta, Kyrenia) were selected for the study by applying cluster sampling method. The schools in which these studies will be conducted and the students to be included in the study were randomly selected from both the district centre and the villages connected to that region, proportional to the second selection step of the sample.

The criteria for inclusion in the study are to be a 3rd, 4th and 5th grade students (9-11 years) in primary schools in the TRNC, volunteering to participate in the study, having permission of the parents of the students, not having a special diet, not having any food allergy, and not having any kind of taste or odour related disorders. Based on this, a total of 781 students were included in the study. Of the total 781 students, 399 (51.1%) were boys and 382 (48.9%) were girls; 32.1% of the students are 9 years old, 33.2% are 10 years old and 34.7% are 11 years old.

Ethical review and participant approval

Written informed consent was obtained from all children's parents or guardians after inviting them to participate in the study. The protocol of the present study, conducted according to the guidelines laid down in the Declaration of Helsinki. This study was approved by the ethics committee (date 21.05.2018, ruling no: 2018/59-24). Official permission was also

obtained from TRNC Ministry of National Education. The permission was obtained from who developed the Food Neophobia Scale in 1992, via email in order to adapt the scale into Turkish.

Regulation of the scale

The Food Neophobia Scale, developed by Pliner, P. and Hobden K., includes a 7-point Likert-type assessment (1). However, when studies conducted with children are examined, it is seen that 3 or 5 grade evaluations are used (22-24). Therefore in this study, FNS was arranged as a 5-grade Likert-type assessment, considering that children could better understand and respond more clearly since it would be used with school aged children. At the same time, taking into account the age range of the sample group, necessary adaptations were made with scale emojis in order to keep the children interested. Nowadays, there are many studies in which similar adaptations are made (16, 22-24).

Validity and Reliability Assessment of the Scale

Language validity

Translation - back translation techniques were used to develop language - specific versions of FNS. In the translation techniques, the standard procedure recommended by Brislin was followed, where the scale was translated from English to the target language (Turkish) by researchers who know English and Turkish well. The original English version of the questionnaire was translated into Turkish by a total of three people: one who speaks English in the field of nutrition, a graduate of English language literature and an expert graduated from an English-language university (25). Afterwards, the translated scale was back translated by a jury of academics independent of the authors' institutions, who were well equipped in both languages. The back translated versions were then compared to the original English version and inconsistencies, errors, prejudices and incompatibilities were determined. As suggested by Bracken and Barona, these inconsistencies have been remedied by repeating the back translation comparison process until the versions are the same (26).

Content validity

It was noted that the final version of the translation should be such that it would not exhibit any inconsistency with the original English version of the FNS when back translated. The translated tools were independently reviewed by 6 experts to confirm whether each item served the purpose of the scale (27). Content Validity Index was used to evaluate expert opinions (28). Content validity index; Item Validity Index was calculated for all items and Survey validity index was calculated for the whole survey. In this research, opinions were obtained from 6 experts and Item Validity Index and Survey validity index were found to be 0.95.

Cultural adaptation

For cultural adaptation, the FNS was tested on the pilot participant with the number of samples (n = 78), which constituted 10% of all participants and their opinions were noted and arrangements were made for unclear and inconsistent sections. At this stage, the word "new" in questions 2 and 6 of the scale was changed to "not tried before" in order to prevent misunderstandings. In addition, it was concluded that children could better understand the scale with emojis and the scale was arranged in this way for them (16, 29-31). The latest FNS version is available for validity and reliability study.

Reliability assessment of the scale

The test was determined by cluster sampling method to determine reliability and applied to randomly selected participants (n = 781). After 2-4 weeks following the initial application, 50% (n = 390) of the sample was re-tested. Since there was no other scale similar to the scale whose validity and reliability was intended, the reliability was determined by comparing with the test-retest method.

Statistical data analysis

The Turkish validity and reliability analyzes of FNS were performed. Exploratory Factor Analysis (EFA) was used for construct validity.

Two methods were used to measure the reliability of the FNS. First of all, internal consistency was calculated with Cronbach alpha coefficient. The reliability of the scale was calculated by applying test re-test method to 50% (n = 390) of the students (32, 33).

In the evaluation of Cronbach alpha (α) coefficient;

$0.00 \leq \alpha < 0.40 \rightarrow$ scale not reliable

$0.40 \leq \alpha < 0.60 \rightarrow$ scale with low reliability

$0.60 \leq \alpha < 0.80 \rightarrow$ scale is fairly reliable

$0.80 \leq \alpha < 1.00 \rightarrow$ scale is considered highly reliable.

SPSS 20 (Statistical Package for Social Sciences) software was used for suitable statistical analyses. Continuous variables (quantitative variables) obtained by measurement are presented with mean ± standard deviation, minimum and maximum value. Frequency and percentage values were used for the presentation of categorical variables (qualitative variables). In quantitative binary group comparisons, t-test was used as a statistical method in cases where parametric assumptions were provided, and "Mann Whitney U Test" was used in cases where parametric assumptions were not provided. If two groups were dependent, Wilcoxon Matched-Paired Sign Ranked Test "was used when comparing the means. In case of a presence of more than two independent groups, "One way ANOVA" was used in the case of parametric assumptions and "Kruskal-Wallis Test" was used as the statistical method in the case of parametric assumptions were not provided. "Spearman rho" coefficient was used to calculate the relationship between test re-test and all data. Significance level was recognized as "$p \leq 0.05$" in all statistical analyses (32, 33).

Results

The items of the FNS answered by 781 students who participated in the study are given in Table 1 with their translated form into Turkish.

Results of the Validity Study

Exploratory Factor Analysis was used to test the construct validity of the scale. At the beginning of the analysis, items 4 and 10 showed a high correlation (0.895) between each other. The item 10 was excluded from the study because it showed higher relevance with other items. The analysis was repeated with nine items and the Scree plot was used to determine the number of factors. Eigenvalue was found to be 4.873. This value show that the scale has a one factor in this study. In the one factor analysis, Kaiser-Meyer-Olkin (KMO) value was found to be 0.907. This value, which was expected to be 0.7 or higher, was much higher for the data set in the study. Bartlett's test value was found to be significant ((36) = 3309.10, $p<0.001$). The prerequisites for factor analysis, KMO and Bartlett's test, provided the conditions. The one factor found in the analysis explains 54.15% of the total variance. The one factor was that everyone in the sample was based on the same basis and that the scale was one-dimensional. It shows that all items measure the same purpose. Factor loads of the substances are given in Table 2.

Confirmatory factorial analysis (CFA) is used to examine the factor structure of a scale. The fact that the factor structure of a scale is in accordance with theoretical knowledge is a desirable situation in the validity and reliability studies. Conformity index values according to the CFA results are given in Table 3. The one factor solution described in EFA was used as the model. Some of the conformity indexes of the model were valid and some were found to be well. It was found that the data in the study showed a valid conformity to the one factor model (Table 3).

Results of the Reliability Study

The mean and standard deviation values of the second test performed to test the invariance of the scale over time are given in the table (Table 4). According to the statistical test results, there was no difference between the first and second test scores of all items ($p> 0.05$) (Table 4). This shows that the scale presented the same results when repeated. It was found that there was a positive and statistically significant correlation

Table 1. Original and Turkish Version of FNS

English Items	Turkish Items
1. I am constantly sampling new and different foods (R)	1. Yeni ve farklı besinleri sık sık denerim.
2. I don't trust new foods	2. Daha önce denemediğim besinlere güvenmem.
3. If I don't know what a food is, I won't try it	3. Eğer bir yemeğin içerisinde ne olduğunu bilmiyorsam, o yemeği denemem.
4. I like foods from different Cultures (R)	4. Farklı ülkelere ait yemekleri severim.
5. Ethnic food looks weird to eat	5. Farklı kültürlere ait yemekleri yemek, bana oldukça garip gelir.
6. At dinner parties, I will try new foods (R)	6. Partilerde, daha önce denemediğim bir besin deneyebilirim.
7. I am afraid to eat things I have never had before	7. Daha önce denemediğim besinleri yemekten korkarım.
8. I am very particular about the foods I eat	8. Yiyeceğim besinler konusunda çok seçiciyim.
9. I will eat almost anything (R)	9. Neredeyse her türlü besini yiyebilirim.
10. I like to try ethnic restaurants (R)	10. Farklı kültürlere ait restoranları denemeyi severim.

Items 1, 4, 6, 9 and 10 on the FNS used in the study were reverse coded. The items are evaluated with Likert type ranging from 1 to 5.

Table 2. Factor loads of the substances found as a result of EFA

Items	Factor 1
1.	0,773.
2.	0,788.
3.	0,796.
4.	0,740.
5.	0,708.
6.	0,799.
7.	0,600.
8.	0,676.
9.	0,718.

between total scale scores obtained by reapplication of the scale ($r = 0.795$; $p < 0.001$).

At the same time, Cronbach's alpha value was calculated to measure the internal consistency of the scale with 9 questions remaining. The Cronbach alpha value of the scale, which was applied to 781 students during the first stage, was found to be very good with 0.890. Then, the value of the second test was found to be very good with 0.885. This shows that the reliability of the scale is high.

3.3. Results Based on Age and Gender

The comparison of the total scale scores of the 781 students included in the study between age groups is given in Table 5. The mean and standard deviation values of the total scale scores belonging to three different age groups are given. The total scores of the scale differ between the age groups ($p < 0.05$). As a result of the paired comparison, it was found that 10-year-old children had a difference between the others and had a lower FNS score (Table 5).

The comparison of the distribution of total scale scores of 382 girl and 399 boy students is given in Table 6. The total scores of the scale showed no difference in terms of gender ($p > 0.05$). The scores have similar distribution for boys and girls (Table 6).

Table 3. Conformity index values of the CFA results

Model	χ^2	df	p	BIC	CFI	RMSEA	GFI
One factor	306,701.	27.	0.00.	424,205.	0,898.	0,123.	0,911.

BIC =Bayesian Information Criteria; CFI= Comparative Fit Index; RMSEA =Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; GFI= Goodness of Fit Index

Table 4. Descriptive statistics and comparison of first and second test total scores of FNS

Item	FNS Test	FNS Re-test	p Value
	Mean Scores ± SD	Mean Scores ± SD	
1.	3.2±0.9	3.1±0.9	0,355.
2.	2.9±1.3	2.8±1.3	0,861.
3.	2.9±1.3	2.8±1.3	0,765.
4.	3.2±1.2	3.1±1.1	0,511.
5.	2.8±1.3	2.8±1.2	0,703.
6.	3.0±1.2	2.9±1.1	0,887.
7.	3.1±1.3	3.1±1.3	0,102.
8.	2.6±1.3	2.6±1.3	0,599.
9.	2.6±1.3	2.6±1.2	0,896.
10.	3.2±1.2	3.2±1.2	0,435.

p Value: Wilcoxon Matched-Paired Sign Ranked Test

Table 5. Distribution of total scale scores of students according to age groups

FNS Test Total Score	N	X ± SD	Minimum	Maximum	p	Paired Comparison	p
Age 9	251.	27.2±8.7	9.	45.	0.012*	10 – 11	0,062.
Age 10	259.	25.2±8.3	11.	45.		10 – 9	0.016*
Age 11	271.	26.6±7.3	10.	45.		11 – 9	1.00.

X: Mean; SD: Standard deviation; p: Kruskal Wallis Test

Table 6. Distribution of students' total scale scores according to gender

FNS Test Total Score	N	X ± SD	Minimum	Maximum	p
Girl	382.	25.8±7.9	10.	45.	0,076.
Boy	399.	26.9±8.3	9.	45.	

X: Mean; SD: Standard deviation; p: Mann Whitney U Test

Discussion

This study investigates the validity and reliability of the Turkish version of the FNS in school-age children. It is known that this scale is widely used and provides reliable results (14). Although similar studies have been conducted in many different countries regarding the scale, there are no previous studies on this subject in Turkish (15-18). This study confirms that the Turkish version of FNS is valid and reliable in children.

Pliner worked with participants aged 18-74 in their study on the food neophobia scale (1). However, the validity and reliability studies of this scale were conducted with different age groups in different countries (15-18, 34). Adults with age groups similar to the original scale were studied in Brazil. The sample group of the study, which was conducted in Brazilian

Portuguese validity study in Brazil, consisted of participants between the ages of 21-55 (17). Similarly, the Spanish validity study of the scale was conducted with the adult sample group in Spain and similar study in Italy with the adult group aged 18-73 years was conducted as well (15, 34). It is known that the Turkish validity and reliability study was conducted with similar age groups, with the Italian children aged between 6-9 years of age and the validity study of the scale was conducted in Italy (16). The Portuguese validity studies of the scale were conducted with the children of 2-6 years and their families in Italy (18). The fact that the studies consisted of different age groups indicates that scales were developed according to the cognitive abilities of the sample participants.

In the original scale, the Likert-type assessment scale, which is a widely used quantitative measure and the total rating scale, was used to evaluate the attitudes of individuals in the scoring system of the items. The original study of the scale, a 7-point Likert-type scale was included as adults were included (1). However, in the Turkish validity and reliability study of the scale, when the sample age group was taken into consideration, a Likert-type scale consisting of a 5-point scale was used to answer the items, because it was studied with children. The cognitive abilities of the children were taken into consideration while this adaptation was made and it was made considering that they could better choose the correct answer with a 5-point rating. Defining multi-choice items was thought to be time-consuming and complex for children. When literature review is conducted, it is seen that this idea is supported and similar adaptations are made in similar studies with children and in such evaluations, 5-point is used with children and even 3-point is used when younger children are included (16, 35-39).

In the Turkish validity and reliability study, the reverse coded questions (1, 4, 6, 9) were left in the same way as in the original scale and no change was made in this regard (Table 1). Similar applications have been applied in the studies of the scale in different languages (15, 16, 18). The aim here is to resolve any disputes that may arise and to make received data comprehensible in a better way.

Exploratory Factor Analysis was applied to test the construct validity of the scale and the number of questions was reduced to 9. In a study of FNS in Portugal, construct validity was calculated using EFA as well (18). In this study, in which the Turkish study of the scale was conducted, the scale was re-analysed with nine items and the scree plot was used to determine how many factors the scale would be divided into (Eigenvalue value 4.873). In a study of FNS in Portugal, the scale had two factors (Eigenvalue value 1.457) (18). In a study conducted with French children, it was concluded that the scale had two factors (22). In a Portuguese study, KMO value was determined as 0.82; while in the Turkish study, the one factor was 0.907, which was well above the commonly recommended value. In the Turkish study, Bartlett's test value was found to be significant ((36) = 3309.10, p<0.001). The prerequisites for factor analysis, KMO and Bartlett's test, provided the conditions. These tests are frequently used to assess the construct validity of the tools. For example, these tests were used to assess the construct validity of the Early Childhood Appetite and Satiety Tool (ECAST), a tool used to assess children's appetite. The statistical criteria of KMO = 0.73 and Bartlett's sphericity test [χ^2 (253) = 755.791, p <0.001] indicated that the raw data were suitable for the application of factor analysis (39).

The one factor found in the analysis of the Turkish study explains 54.15% of the total variance. In the Portuguese study, factor structure explained 56.11% of the total variance (18). This is the only factor that shows that everyone in the sample is based on the same basis and that the scale is one-dimensional. It shows that all items measure the same purpose.

The results of the statistical test to test the reliability of the Food Neophobia Scale showed that the scale provides the same results when repeated (r = 0.795; p <0.001). The Cronbach alpha value, which was calculated to measure the internal consistency of the scale, showed that the scale had very good reliability both in the first test (0.890) and in the retest (0.885). When the scale reliability studies in the literature are examined, it is seen that Cronbach alpha value and test-retest method are frequently used (15-18, 22, 35, 38, 40-43).

When these different studies were examined, it was seen that Cronbach alpha value was used in the validity and reliability study of Children's Eating Behavior Questionnaire (CEBQ) which was used to

investigate early symptoms of food neophobia in children and this value was found to be high (⁒=0.74-0.91). This shows that it is a reliable tool to measure the eating behaviour of children through family (35). Fruit and Vegetable Neophobia Instrument (FVNI), which is one of the tools used to measure children's eating behavior, is a tool that can be applied directly by 8-10 years old children, unlike CEBQ. In the validity and reliability study of this instrument, Cronbach alpha value was used. The value was found to be high and it was found to be a reliable tool for measuring food-specific measurement of neophobia (α=0.83-0.92) (38). Jones et al. also reported that Cronbach's alpha value was 0.91 in their studies on different branches of nutrition, which they developed to measure nutritional knowledge levels of adults and tested validity and reliability of their scale. Test-retest method was used in reliability studies (r = 0.95) (40). In their reliability study, Turconi et al. investigated the nutritional information, habits and behaviours of adolescents living in Italy and reported that Cronbach's alpha coefficient ranged between 0.55 and 0.75 (41). In validity study of Bottcher et al. found that internal validity (Cronbach's Alpha = 0.653) and test-retest reliability (r = 0.853) as acceptable (42). It was concluded that the reliability of ECAST, a tool used to evaluate children's appetite, was calculated using Cronbach's alpha coefficient and test-retest and was a reliable tool (39).

In the Spanish version of the scale (15), the Cronbach alpha value was 0.82; in the study conducted with French children (22), 0.87; in the Brazilian Portuguese study (17) 0.91; in the Portuguese study, α = 0.8; the test-retest reliability coefficient was determined as rs = 0.92 p <0.01 and the scale was found to be highly reliable in these languages (18). Cronbach's alpha value was found to be 0.79 in the German study and 0.71 in the Italian study and although it value seems to be lower than other countries, it is still very reliable (16, 43). When the original version of the scale was examined, it was found that Cronbach alpha value was used and this value was found to be 0.88, and test-retest correlations were found to be r (59) = 0.82 p <0.01 (1).

While the scale total scores of the students included in the study showed no difference between the genders (p> 0.05) (Table 6); There was a significant difference between age groups (p <0.05). It was found that ten years old children had a lower FNS score (Table 5). While there was no significant difference between genders in the Spanish version of the scale (p <0.062), there was a significant difference between the age groups and it was found that neophobia score increased directly proportional with age (p <0.003) (15). In the study of FNS in Italy, no significant difference was found between Italian Child Food Neophobia Scale (ICFNS) score and age groups (p <0.05) (16). In a study conducted with French children, it was found that there was no significant difference between the scores of children based on age and gender (22). In this scale, which was validated in Portugal, no difference was observed between gender and age groups as well (18). Tuorila & Cardello's study showed that women tend to be less neophobic than men (44). In another study conducted in Scandinavia, it was found that men scored higher than women (45). Different results in studies investigating the relationship between food neophobia and gender and age groups may be attributed to FNS being a tool that measures personal preferences independent from gender and age group.

Conclusion

As a result of the study, it was found that the scale had a one factor. The only factor is that everyone in the applied sample is on the same basis, that the scale is one-dimensional and that all items measure the same purpose. It was found that the data in the study showed a valid conformity to the one factor model. The reliability of the scale was concluded to as high. These findings support the idea that the Turkish version of the FNS is an appropriate scale for primary school students and that FNS can be used to assess the food neophobia status in this population.

Acknowledgements: We are grateful to the participants for their willingness to participate in this study.

Formatting of funding sources: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Abbreviations

Food Neophobia Scale (FNS)
Turkish Republic of Northern Cyprus (TRNC)
Kaiser-Meyer-Olkin (KMO)
Exploratory Factor Analysis (EFA)
Statistical Package for Social Sciences (SPSS 20)
Confirmatory factorial analysis (CFA)
Bayesian Information Criteria (BIC)
Comparative Fit Index (CFI)
Root Mean Square Error of Approximation (RMSEA)
Standardized Root Mean Square Residual (SRMR)
Goodness of Fit Index (GFI)
Standard deviation (SD)
Early Childhood Appetite and Satiety Tool (ECAST)
Children's Eating Behavior Questionnaire (CEBQ)
Fruit and Vegetable Neophobia Instrument (FVNI)
Italian Child Food Neophobia Scale (ICFNS)

References

1. Pliner P, Hobden K. Development of a scale to measure the trait of food neophobia in humans. Appetite. 1992;19(2):105-120.
2. Brown SD, Harris G. A theoretical proposal for a perceptually driven, foodbased disgust that can influence food acceptance during early childhood. Int J Child Health Nutr. 2012;1:1–10.
3. Maiz E, Balluerka N. Trait anxiety and self-concept among children and adolescents with food neophobia. Food Res Int. 2018;105:1054-1059.
4. Maratos FA, Staples P. Attentional biases towards familiar and unfamiliar foods in children. The role of food neophobia. Appetite. 2015;91:220–225.
5. Maiz E, Balluerka N. Nutritional status and Mediterranean diet quality among Spanish children and adolescents with food neophobia. Food Qual. Prefer. 2016;52:133–142.
6. Howard AJ, Mallan KM, Byrne R, Magarey A, Daniels LA. Toddlers' food preferences. The impact of novel food exposure, maternal preferences and food neophobia. Appetite. 2012;59:818–825.
7. Antoniou E, Roefs A, Kremers S, et al. Picky eating and child weight status development: A longitudinal study. J Hum Nutr Diet. 2015.
8. Laureati M, Bertoli S, Bergamaschi V, et al. Food neophobia and liking for fruits and vegetables are not related to Italian children's overweight. Food Qual. Prefer. 2015;40:125–131.
9. Kral TV. Food neophobia and its association with diet quality and weight status in children. In Food Neophobia 2018;287-303.
10. Cooke L. Genetic and environmental influences on food neophobia. In Food Neophobia. Woodhead Publishing; 2018;237-254.
11. Kaar JL, Shapiro AL, Fell DM, Johnson SL. Parental feeding practices, food neophobia, and child food preferences: What combination of factors results in children eating a variety of foods? Food Qual. Prefer. 2016;50:57–64.
12. Webber L, Cooke L, Hill C, Wardle J. Associations between children's appetitive traits and maternal feeding practices. J Am Diet Assoc. 2010;110:1718–1722.
13. Lafraire J, Rioux C, Giboreau A, Picard D. Food rejections in children: Cognitive and social/environmental factors involved in food neophobia and picky/ fussy eating behavior. Appetite. 2016;96:347–357.
14. Damsbo-Svendsen M, Frøst MB, Olsen A. A review of instruments developed to measure food neophobia. Appetite. 2017;113: 358-367.
15. Fernández-Ruiz V, Claret A, Chaya C. Testing a Spanish-version of the food neophobia scale. Food Qual. Prefer. 2013;28(1):222-225.
16. Laureati M, Bergamaschi V, Pagliarini E. Assessing childhood food neophobia: Validation of a scale in Italian primary school children. Food Qual Prefer. 2015;40:8-15.
17. Ribeiro de Andrade Previato HD, Behrens JH. Translation and validation of the Food Neophobia Scale (FNS) to the Brazilian Portuguese. Nutr Hosp. 2015;32(2).
18. Gomes AI, Barros L, Pereira AI, Roberto MS, Mendonça M.. Assessing children's willingness to try new foods: Validation of a Portuguese version of the child's food neophobia scale for parents of young children. Food Qual. Prefer. 2018;63:151-158.
19. TRNC Ministry of National Education and Culture, Department of Education Common Services, 2017-2018 Statistical Yearbook (Turkish)
20. Akşahoğlu, G. Veri Çözümlemenin Temeli, Sağlıkta Araştırma ve Çözümleme. İzmir: Dokuz Eylül Üniversitesi Yayınları. 2. bs. 2006. (Turkish)
21. Murphy KR, Myors B. Satistical power analysis, a simple and general model for traditional and modern hypothesis test. London: Lawrence Erlbaum Associates; 2004.
22. Rioux C, Lafraire J, Picard D. The Child Food Rejection Scale: Development and validation of a new scale to assess food neophobia and pickiness among 2-to 7-year-old French children. Eur Rev Appl Psychol. 2017;67(2):67-77.
23. Thomson JL, McCabe-Sellers BJ, Strickland E, et al. Development and evaluation of WillTry. An instrument for measuring children's willingness to try fruits and vegetables. Appetite. 2010;54(3):465-472.
24. Machado BC, Dias P, Lima VS, Campos J, Gonçalves S. Prevalence and correlates of picky eating in preschool-aged children: A population-based study. Eating Behav. 2016;22:16-21.
25. Brislin RW. The wording and translation of research instruments. In WJ. Lonner, JW Berry (Eds.), Field methods in educational research Newbury Park, CA, USA: Sage; 1986 (pp. 137-164).
26. Bracken BA, Barona A. State of the art procedures for translating, validating and using psychoeducational tests in

cross-cultural assessment. Sch Psychol Int. 1991;12:119-132.
27. Brislin RW. Understanding culture's influence on behavior. Fort Worth, TX: Harcourt, Brace and Johanovich; 1993.
28. Polit DF, Beck CT. The content validity index: are you sure you know what's beingg reported? Critique and recommendations. Res Nurs Health. 2006;29:489-497.
29. Suzuki M, Kurimoto S, Shinohara T, Tatebe M, Imaeda T, Hirata H. Development and validation of an illustrated questionnaire to evaluate disabilities of the upper limb. J Bone Jt Surg. British volume 2010;92(7):963-969.
30. Barros MV, Assis MAAD, Pires MC, Grossemann S, Vasconcelos FDAGD, Luna MEP, Barros SSH. Validity of physical activity and food consumption questionnaire for children aged seven to ten years old. Rev Bras Saude Matern Infant. 2007;7(4):437-448.
31. Deierlein AL, Bihuniak JD, Nagi E, et al. Development of a Technology-Assisted Food Frequency Questionnaire for Elementary and Middle School Children: Findings from a Pilot Study. Nutrients. 2019;11(5):1103.
32. Özdamar K. SPSS ile Biyoistatistik, 10, Eskişehir: Nisan Kitabevi Yayınları; 2015 (Turkish)
33. Büyüköztürk, Ş. Sosyal Bilimleri İçin Veri Analizi El Kitabı, 21, Ankara: Pegem Akademi; 2015 (Turkish)
34. Guidetti M, Carraro L, Cavazza N, Roccato M. Validation of the revised Food Neophobia Scale (FNS-R) in the Italian context. Appetite. 2018;128:95-99.
35. Wardle J, Guthrie CA, Sanderson S, Rapoport L. Development of the children's eating behaviour questionnaire. J Child Psychol Psychiatry. 2001;42(7):963-970.
36. Kaiser LL, Schneider C, Mendoza C, et al. Development and use of an evaluation tool for taste-testing activities by school-aged children. J Acad Nutr Diet. 2012;112(12):2028-2034.
37. Loewen R, Pliner P. The food situations questionnaire: a measure of children's willingness to try novel foods in stimulating and non-stimulating situations. Appetite. 2000;35(3):239-250.
38. Hollar D, Paxton-Aiken A, Fleming P. Exploratory validation of the fruit and vegetable neophobia instrument among third-to fifth-grade students. Appetite. 2013;60: 226-230.
39. Nahar B, Hossain M, Ickes SB, et al. Development and validation of a tool to assess appetite of children in low income settings. Appetite. 2019;134:182-192.
40. Jones AM, Lamp C, Neelon M, Nicholson Y, Schneider C, Swanson PW, Zidenberg-Cherr S. Reliability and validity of nutrition knowledge questionnaire for adults. J Nutr Educ Behav. 2015;47(1):69-74.
41. Turconi G, Celsa M, Rezzani C, Biino G, Sartirana MA, Roggi C. Reliability of a dietary questionnaire on food habits, eating behaviour and nutritional knowledge of adolescents. Eur J Clin Nutr. 2003;57(6):753-763.
42. Bottcher, M. R., Marincic, P. Z., Nahay, K. L., Baerlocher, B. E., Willis, A. W., Park J, Greene MW. Nutrition knowledge and Mediterranean diet adherence in the southeast United States: Validation of a field-based survey instrument. Appetite. 2017;111:166-176.
43. Siegrist M, Hartmann C, Keller C. Antecedents of food neophobia and its association with eating behavior and food choices. Food Qual. Prefer. 2013;30(2):293-298.
44. Tuorila H, Cardello AV. Consumer responses to an off-flavor in juice in the presence of specific health claims. Food Qual. Prefer. 2002;13(7-8):561-569.
45. Bäckström A, Pirttilä-Backman AM, Tuorila H. Dimensions of novelty: a social representation approach to new foods. Appetite. 2003;40(3):299-307.

Correspondence:
Cemre Elmas
Department of Nutrition and Dietetics, Faculty of Health Sciences, Eastern Mediterranean University, Famagusta, T.R. North Cyprus via Mersin 10 Turkey
Tel: 0392 630 3124
E-mail: cemre.elmas@emu.edu.tr; cemre-91@hotmail.com