The child food rejection scale for children aged 2-7

2-7 yaş arası çocuklar için gıda reddetme ölçeği

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ABSTRACT

Aim: This study aims to translate the Child Food Rejection Scale into the Turkish version and then test its validity and reliability in parents.
Methods: This study was carried out methodologically, cross-sectionally with 111 parents between February and March 2020. First of all, the language validity of the scale, then validity and reliability analyzes were made. Content validity for validity study, explanatory factor analysis and confirmatory factor analysis methods were used. Internal consistency analysis and test-retest method were used for reliability evaluation.
Results: The mean age of the parents was determined as 33.76 ± 5.40. The mean age of the children is 4.31 ± 3.04, half of them are girls. It was determined that the scale has 9 items and two subcomponents likert scale. The measurement tool explains 63% of the total variance. Goodness-of-fit indices were found to be 0.92 by confirmatory factor analysis. The Cronbach alpha coefficient of the scale is 0.87.
Conclusion: The Child Food Rejection Scale for children is a valid and reliable measurement tool for the Turkish sample.

Keywords*: child; eating; food; reliability; validity*

ÖZET

Amaç: Bu çalışma Çocuk Gıda Reddi Ölçeği'nin Türk çocuklar için geçerlilik güvenirliğinin değerlendirilmesi amacıyla yapılmıştır.
Yöntem: Bu çalışma metodolojik, kesitsel olarak 111 ebeveyn ile Şubat-Mart 2020 tarihleri arasında yapılmıştır. Ölçek geçerliliği ise kapsam geçerliliği, doğrulayıcı ve açıklayıcı faktör analizi ile yapılmıştır. Son olarak iç tutarlılık analizi yöntemi ile ölçeğin güvenirlik analizi gerçekleştirilmiştir.
Bulgular: Ebeveynlerin yaş ortalaması 33.76 ± 5.40'tır. Çocukların yaş ortalaması 4.31 ± 3.04 olup, bunların yarısı kızdır. Likert ölçeğin 9 maddeden ve iki alt bileşenden oluştuğu belirlenmiştir. Ölçme aracı toplam varyansın %63'ünü açıklamaktadır. Doğrulayıcı faktör analizi ile uyum iyiliği indeksleri 0.92 olarak bulunmuştur. Ölçeğin Cronbach alfa katsayısı 0.87'dir.
Sonuçlar: Çocuk Gıda Reddi Ölçeği, Türk çocuklar için geçerli ve güvenilir bir değerlendirme aracıdır.

Anahtar kelimeler*: çocuk; geçerlilik; gıda; güvenilirlik; yemek yeme*

Introduction

Children's eating behaviors are formed in the first years of their lives (Addessi et al., 2005; Barrena & Sánchez, 2012). The most common eating behavior problems in early childhood are food selectivity and rejection (Barrena & Sánchez, 2012; Trofholz et al., 2017). Growth developments and nutritional status of children are negatively affected by this eating behavior problems (Brown et al., 2018; Folkvord, 2019; Kermen & Aktaç, 2018).

It is defined as food rejection that children refrain from eating foods they have never seen or tasted before, and not tasting new foods by displaying reluctant behavior (Addessi et al., 2005; Folkvord, 2019; Olsen, 2019). It is defined as food selectivity is children consume foods that are familiar or unfamiliar to a limited extent or eat by choosing (Barrena & Sánchez, 2012; Carstairs et al., 2020; Kermen & Aktaç, 2018). Food rejection includes food selectivity (Kutbi, 2019). Food selectivity and rejection are most common in children aged 2-6 years. Studies have reported that 50% of children aged 2 and older have food selectivity and rejection (Barrena & Sánchez, 2012; Olsen, 2019). In a study conducted between 3-7 years old children; It was reported that 98.6% of children had food neophobia and 89.8% had food pickiness (Barrena & Sánchez, 2012). In our country, the prevalence of food selectivity and rejection in childhood is approximately 70% (Kermen & Aktaç, 2018; Toprak & Samur, 2019).

In the daily diet, food selectivity and food rejection are mostly seen in vegetable and fruit groups. Thus the daily food intake of children in the age of growth and development is not sufficient and balanced and the risks of unhealthy nutrition increase (Kermen & Aktaç, 2018). It is very important to evaluate food selectivity and food rejection in children (Zhao et al., 2020). In addition, eating behaviors acquired in childhood can also cause various health problems in adulthood (García-Gómez et al., 2020). Trainings given to parents of children found to have food selectivity and food rejection can improve healthy eating behavior of children (Lafraire et al., 2016; Rioux, Leglaye et al., 2018).

The Child Food Rejection Scale for children was developed by Rioux and his friends and tested in France (Rioux et al., 2017). In our country, there is no measurement tool that can evaluate food rejection and food selectivity of children aged 2 to 7 years. Therefore, this study to adapt the Child Food Rejection Scale make applicable to Turkish children. A cultural measurement tool can help parents, educators, health employees, managers, and researchers to developing healthy eating behavior of Turkish children.

Methods

Purpose of research

The research was conducted to adapt the Child Food Rejection Scale (CFRS) to Turkish culture.

Study Design

Sample population

The research was conducted with parents of students in a primary school in eastern Turkey between February and March 2020. While determining the sample; The 5's, 10's, and 100's rule is used. In the literature, in the validity and reliability studies of a measurement tool, it is considered sufficient to adapt the measurement tool with a sample size of 5 times the total number of items (Şencan, 2005). However, if the sample is easily accessible, it is recommended to include 10 people for each item in the sample. For this reason, the sample size of the study was calculated as at least 10 parents (11x10=110) for each item, and the study was completed with 111 parents.

Ethical issues

Before starting the study, approval was prevailed from the authors who developed the scale, to adapt the scale to Turkish culture. The Non-Clinical Research Ethics Committee found the study ethically appropriate (Date: 18.02.2020 and Decision No: 2020/397). Informed consent was obtained from the parents that the participation was voluntary. All the data obtained was treated confidentially and used exclusively for research purposes.

Data collection tools

The study's data were collected by Personal Information Form and Child Food Rejection Scale.

The personal information form

This form contains ten questions about age, gender, weight, height, appetite status, parent's income status, education status and nutrients that the parent does not eat.

The Child Food Rejection Scale (CFRS)

The scale, developed by Rioux et al. (2017) for French children, consists of 11 items and explains the food rejection of children. The scale has food phobia and food pickness sub-dimensions. Each item is scored between 1 and 5 in the Likert-type scale. The score range of the scale is 11-55. As the score of the scale increases, also children's rejection of nutrients increases (Rioux et al., 2017). In this study, the Cronbach's alpha value of the measurement tool was 0.87.

Preliminary test

The scale was administered to 30 parents. Scale items were correctly and easily understood by parents. Therefore, no item changes were made in the scale. The data of the pre-applied group were not included in the sample.

Data analysis

The analysis of the research was done with SPSS 25.0 and Amos 25.0 program. Describing the data process were used while evaluating the data. The suitability of the sample size for the evaluation of the data set by factor analysis was examined with the Kaiser Mayer Olkin Index (KMO) and the Bartlett Test of Sphericity. The construct validity of the scale was evaluated with exploratory and confirmatory factor analysis. Cronbach's alpha was used to determine reliability, and mean correlation between items and test-retest were used for internal consistency. Statistically significant value was accepted as $p<0.050$.

Results

Respondent characteristics

The average age of the parents was calculated as 33.76 ± 5.40. The average age of the children is 4.31 ± 3.04 and 50% of them are girls.

Table 1. Explanatory factor analysis (n= 111).

Items	Sub-dimensions	
	Food Rejection	Food Selectivity
1	0.81	
2	0.78	
3	0.75	
4	0.75	
5	0.75	
6	0.52	
7		0.77
8		0.74
9		0.68
Explained variance (%)	38.10	24.89
Kaiser-Meyer Olkin coefficient (KMO)	0.83	
Barlett test	465.17 (p =0.000)	

Validity analyses

The content validity index of the scale was 0.98, and it was determined that the indexes of the items ranged between 0.88 and 0.99.

Table 1 shows the results of scale exploratory factor analysis. Factor loads were found to be between 0.52 and 0.81 and 0.68 and 0.77 in the sub-dimensions of food rejection and food selectivity, respectively (Table 1).
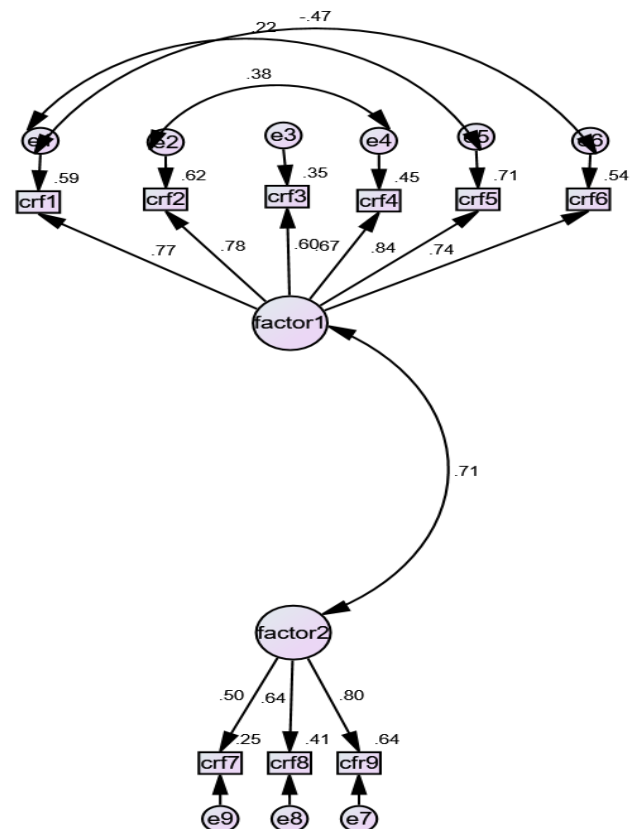

Figure 1. Confirmatory Factor Analysis for the Food Rejection Scale

Confirmatory factor analysis (CFA) of two structures was performed as a result of the explanatory factor analysis. According to the CFA analysis of the first established model, it has been decided to remove the 6th and 11th items where t values are not significant, from the scale. The final CFA analysis is given in Figure 1 after the substances are removed.

Table 2 shows the confirmatory factor results of the model. It was determined that the results obtained were related to the scale structure. Response bias of the scale has been evaluated with Hotelling T², as a result of the test, Hotelling T² was determined as 79.56, p =0.000, and there was no reaction bias on the scale (Table 2).

The whole scale, sub-dimension's Cronbach α Reliability Coefficients, means and standard deviations are given in Table 3. The CFRS reliability coefficient is α = 0.87. The reliability coefficients of the sub-dimensions of food rejection and food selectivity are 0.79 and 0.83, respectively (Table 3).

Table 2. Confirmatory analysis and internal reliability consistency

	Structural Model Values	Recommended Values
FI	0.96	>0.90
LI	0.94	>0.90
MSEA	0.07	≤ 0.08
FI	0.93	≥0.80
FI	0.96	≥0.80
FI	0.92	≥0.80
CMIN/df:1.66, p<0.000		

The result of correlation analysis is given in Table 4. Since the correlation coefficient of 9 items was above 0.30, two items were excluded. The final version of the 9-item scale was obtained. (Table 4).

Table 3. The reliability analysis of the scale and sub-dimensions (n= 111)

Sub-Dimension	Cronbach α	Correlation between two halves	Mean ± SD (Min-Max)
Scale Total	0.87	0.87	62.99±14.92
Food neophobia	0.79		20.86±5.58
Food pickness	0.83		10.63±2.75

Discussion

In this study, it was determined that the internal consistency of the scale items was above 0.80 after expert opinion. When the relevant literature is examined, this result is proof that the measurement tool can adequately evaluate the desired area (Karakoç & Dönmez, 2014; Yeşilyurt & Çapraz, 2018). This result shows that the measurement tool used in the study adequately describes the subject.

Bartlett sphericity test and KMO were used to determine whether the number of data was sufficient for factor analysis. In the literature, it is reported that the Bartlett's Sphericity Test should be statistically significant and the KMO value should be 0.60 and above in order to evaluate the data set with factor analysis (Çapık et al., 2018; Karaçam, 2019; Yurdabakan & Çüm, 2017). In this study, the value of Barlett test is p = 0.000

Table 4. Correlations of the item–total score (n= 111)

Items	Item–total score correlation	
	r	p
1. My child is constantly looking for familiar foods	0.65	0.000
2. My child gets upset at the sight of a novel food	0.58	0.000
3. My child is suspicious of new foods	0.48	0.000
4. My child rejects a novel food before even tasting it	0.60	0.000
5. My child only likes the food he/she knows	0.38	0.000
6. My child won't try a novel food if it is touching another food he/she does not like	0.54	0.000
7. My child can accept a food one day and refuse it the next day	0.75	0.000
8. My child sorts his/her food on the plate	0.66	0.000
9. My child refuses certain foods due to their tex-ture	0.75	0.000

and KMO value is 0.83. It was determined that the database of scale is suitable for factor analysis. In this study, it was seen that the scale had two sub-dimensions and explained 63% of the total variance. When the literature is examined, it is required that non-unidimensional scales explain at least half of the total difference of opinion and that the factor loads should be at least 0.30 (Çapık et al., 2018; Karaçam, 2019; Karakoç & Dönmez, 2014; Yeşilyurt & Çapraz, 2018). In this study, the variance explained by the measurement tool is high. These results support the discriminant validity of the scale.

In the literature, scale and sub-dimension matching determined with EFA is requested to prove with CFA. In EFA, especially factor loads are desired to be greater than 0.30. RMSEA, which is one of the main fit indices, desired to be less than 0.08 and other fit indices to be greater than 0.90 (Çapık et al., 2018; Slater & Edwards, 2018; Yurdabakan & Çüm, 2017). When the EFA results were examined, it was confirmed that the established structural equation modeling had a two-dimensional structure. It has been determined that these two sub-dimensions are related to the whole scale. In addition, it was determined that the subscales adequately defined the items that were intended to measure each item. The EFA and CFA results in this study support the construct validity of the scale.

It shows the internal consistency validity, which explains whether the items in the Cronbach Alpha sub-dimensions determine the same characteristics in likert scales and whether the items are related to the subject to be evaluated. A reliability coefficient close to 1 in an assessment tool can be considered sufficient for reliability (Çapık et al., 2018; Orcan, 2018). When the literature is examined, it is stated that the scale is not reliable if the Cronbach's Alpha Reliability Coefficient is 0.00≤ α <0.40, it is reliable between 0.60≤α<0.80, and if it is between 0.80≤α<1, the scale is highly reliable (Çapık et al., 2018; Karaçam, 2019; Tavşancıl, 2002). The Cronbach Alpha coefficient in this study is highly reliable as it is 0.87. Similar to our study, the Cronbach Alpha was found to be highly reliable on the original scale developed by Rioux et al (Camille Rioux et al., 2019). Cronbach Alpha coefficient values in this study; It shows that the scale items

adequately measure food rejection and is a reliable assessment tool.

Another method used for reliability analysis is to determining exactly what size of the scale's substances have (Gözüm & Aksayan, 2002; Şencan, 2005; Tavşanel, 2002; Tezbaşaran, 1997). The fact that each item of the scale has a high level of relationship with the total score is an indication that the item has a high level of relationship with the measured conceptual structure and that the item can adequately measure the targeted subject (Gözüm & Aksayan, 2002; Şencan, 2005; Tavşanel, 2002; Tezbaşaran, 1997). The lower limit for the item-total score correlation value is generally considered to be 0.30 (Çapık et al., 2018; Howard, 2016; Karaçam, 2019; Tavşancıl, 2002). As a result of the item total score correlation analysis of this study, it was determined that the items between items 1-9 were above the correlation coefficients 0.30. As a result of the item total score correlation analysis of this study, it was determined that the items between items 1-9 were above the correlation coefficients 0.30. As a result of the item total score correlation analysis of this study, it was determined that the items between items 1-9 were above the correlation coefficients 0.30. Thus, 9 items of the scale showed a high correlation with the total score and the total score of the sub-components. The results showed that it has high item reliability on the scale and subscales. Similarly to our study, item total score correlation analysis of the original scale developed by Rioux and colleagues (2017) was also found to be high. The results of our study show that our scale has a high internal consistency, as well as the internal consistency of the original scale.

Conclusion

The results of our study show that, as with the original consistency of the original scale, our scale also has a high internal consistency. The results of this study support that The Child Food Rejection Scale is an appropriate measurement tool for Turkish children aged 2-7 years. In addition, it may be recommended to plan comparative studies with the versions of the scale in different cultures.

Conflict of Interest

There is no conflict of interest.

Ethics Committee Approval

This study was approved by Ethics committee of İnönü University Health Sciences Non-Invasive Clinical Research (Approval no: 2020/397, Date: 18.02.2020).

Informed Consent

Informed consent was obtained from parents who participated in this study.

Peer-review

Externally peer-reviewed.

Author Contributions

A.A.S: Concept, Materials, Data Collection and/or Processing, Literature Search, Analysis and/or Interpretation, Writing Manuscript

M.Y: Concept, Materials, Data Collection, Analysis and/or Interpretation, Writing Manuscript

E.H.Y.: Design, Supervision, Critical Review, Writing Manuscript.

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