

Psychometric Properties of the Child Feeding Scale in Turkish Mothers

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Purpose The objective of this study was to adopt the Child Feeding Scale (CFS) to the Turkish language and culture and to assess the validity and the reliability of the Turkish version of the scale.

Methods The research was methodological study design. A convenience sample of 158 mothers at a primary health care center completed a structured questionnaire including the CFS for mothers in 2008.

Results In the assessment of construct validity, seven factors were identified; they related to Perceived Responsibility, Perceived Parent Weight, Perceived Child Weight, Concern About Child Weight, Pressure to Eat, Restriction, and Monitoring. The seven factors explained 57.6% of the total variance. The overall internal reliability coefficient of this scale was .75.

Conclusions The present study provides evidence of the CFS's validity and reliability. The scale has potential applications for use in research. The CFS can be used to assess aspects of child-feeding perceptions, attitudes, and practices and their relationships to children's developing food acceptance patterns, the control of food intake and obesity. [*Asian Nursing Research* 2010;4(3):111–121]

Key Words attitude to health, child, feeding behavior, obesity, parent-child relations

INTRODUCTION

Increasing trends in the prevalence of childhood obesity have been reported throughout the developed and developing world (Ebbeling, Pawlak, & Ludwig, 2002). In addition, the distribution of body mass index has shifted so that the heaviest children have become heavier, thus further compounding the potential physical and psychosocial consequences of obesity (Flegal & Troiano, 2000). Obesity is a complex health problem determined by personal and social factors. It is rapidly increasing in the world

and in all age groups (Bekem Soylu & Soylu, 2008). Obesity is an energy metabolism disorder that can be defined as an excessive body fat accumulation. Obesity in childhood is not only a medical problem in the developing world but also it is a major public health problem that has social and economic consequences (Karasalihoğlu, 2005).

There are wide geographical variations in being overweight. Comparing reported prevalence of being overweight during childhood in Europe, Lobstein and Frelut (2003) point out that children residing in central and Eastern Europe have a lower level of



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being overweight than children from other parts of Europe, especially from Southern Europe. Average prevalence in Eastern Europe ranges from 10% to 18% among children aged 7–11 years, whereas values around 20–35% have been reported from countries like Greece and Spain (Krassas, Tzotzas, Tsametis, & Konstantinidis, 2001; Lobstein & Frelut).

In Turkey, it is estimated that today, 13.8% of Turkish children are overweight or obese (Cinaz & Bideci, 2003; Öner et al., 2004). Obesity in childhood is likely to continue in adulthood and leads to many problems, including an increased risk for development of chronic diseases. The prevalence of the metabolic syndrome is increasing, especially among obese children and adolescents (Duncan, Li, & Zhou, 2004; Esmailzadeh, Mirmiran, Azadbakht, Etemadi, & Azizi, 2006; Kim, Park, Kim, & Kim, 2007).

Studies showed significant correlations between parent and child for reported nutritional behavior like food intake, eating motivations, and body dissatisfaction/satisfaction. Parents create environments for children that may foster the development of healthy eating behaviors and weight, or that may promote overweight and aspects of disordered eating. In conclusion positive parental role model may be a better method for improving a child's diet than attempts at dietary control (Fredriks, van Buuren, Hira Sing, Maarten Wit, & Verloove-Vanhorick, 2005; Garipagaoglu et al., 2009).

Parents can play a central role in shaping the family's eating environment, which provides a context for the child's early eating experience (Birch & Fisher, 1998). Parents' feeding attitudes and practices can shape what foods the child is offered, exert control over the timing, size, and social context of meals and snacks, and set the emotional tone of eating occasions (Birch & Fisher, 1995). So, the Child Feeding Scale (CFS) has been used in a few studies in various community. Birch and colleagues (2001) tested the CFS for mothers in Pennsylvania and they found that the questionnaire's reliability or validity can be acceptable. Scaglioni, Salvioni and Galimberti (2008) used the CFS successfully for determining of influence of parental attitudes in the development of children eating behavior. Spruijt-Metz, Lindquist,

Birch, Fisher and Goran (2002) used for evaluation of relation between mothers' child-feeding practices and children's adiposity.

The CFS is a self-report measure that assesses parental beliefs, attitudes and practices regarding child feeding, with a focus on obesity proneness in children. The CFS is applied to mothers with children aged 2–11 years. The original scale was developed by Birch et al. (2001). The CFS contains 31 items, loading on seven factors. Four factors measure parental beliefs related to child's obesity proneness. These factors are described in details below. (a) Perceived Responsibility, consisted of three items ($\alpha = .88$) and explained 97% of the total variance. The factor assesses parents' perceptions of their responsibility for child feeding. (b) Parent Perceived Weight, consisted of 4 items ($\alpha = .71$) and explained 10% of the total variance. This factor appraises parents' perceptions of their own weight status history. (c) Perceived Child Weight, consisted of 3 items ($\alpha = .83$) and explained 19% of the total variance. This factor evaluates parents' perceptions of their child's weight status history. (d) Parents' Concerns About Child Weight, consisted of 3 items ($\alpha = .75$) and it explained 1.5% of the total variance. This factor evaluates parents' concerns about the child's risk of being overweight (Birch et al.).

Three factors measure parental control practices and attitudes regarding child feeding. These factors are described as follows. (e) Monitoring, consisted of 3 items ($\alpha = .92$) and explained 75% of the total variance. This factor assesses the extent to which parents oversee their child's eating. (f) Restriction, consisted of 8 items ($\alpha = .73$) and explained 78% of the total variance. This factor evaluates the extent to which parents restrict their child's access to foods. (g) Pressure to Eat, consisted of 4 items ($\alpha = .70$) and explained 78% of the total variance. This factor assessed parents' tendency to pressure their children to eat more food, typically at mealtimes. All items were measured using a 5-point Likert-type questionnaire, with each point on the questionnaire represented by a word anchor (Birch et al., 2001).

Healthcare researchers who work with culturally diverse communities need to be aware that the

measurement of child feeding may vary in different cultural groups. Therefore, the CFS may be the best representation of the constructs of child feeding from a Turkish perspective, and thus may be culturally sensitive. Because these commonly described Turkish cultural values may influence the measurement of child feeding, this study was conducted to determine whether the questionnaire structure of the CFS in its present form taps into these culturally salient values, and thus whether it is appropriate for use with Turkish mothers.

The objective of this study was to adopt the CFS to the Turkish language and culture and to assess the validity and the reliability of the Turkish version of the scale.

METHODS

Design

The research was methodological study design.

Setting and sample

The population for this study consisted of mothers in Erzurum, Turkey. A convenience sample was recruited from mothers with 2- to 11-year-old children attending one primary healthcare center in the town. One hundred fifty-eight mothers were requested to participate in the study by the researchers and to complete the CFS during their appointment. The literature stresses that it is adequate to include persons 5–10 times of the scale item number in studies of validity and reliability (Akgül, 2003; Davis & Robinson, 1995). The number of mother recruited were five times of that of the scale items in this study. For this reason, the sample size of the research is adequate.

Cross cultural adaptation process

In the first instance, the CFS was translated into Turkish and the Turkish version was then translated into English by two Turkish lecturers, who worked independently on the translation. The lecturers both worked as professors who teach English language at the Atatürk University. The two translated versions

were compared by the researchers and there was a consensus with the initial translation. Their initial translation into Turkish was back-translated into English by two different independent bilingual translators whose native language was Turkish. Both were pursuing doctoral studies in England, and neither had participated in the previous phase of the study. The translation phase had the purpose of checking for discrepancies between content and meaning of the original version and the translated instrument. The researchers analyzed and compared all versions to achieve the final version.

To test item clarity and content validity, the translated version was submitted to a panel of five specialists. They were informed about the measures and concepts involved by the author. This multidisciplinary panel comprised two public health nursing specialists, three experts who had published papers on child feeding and care. Each of the panel members was asked to evaluate the content of the final translated version of the CFS compared to the original instrument. As a result of this evaluation, the panel did not suggest any modification or changes in the scale and approved the item clarity and content validity. Thus, social validity of the scale was provided for Turkish population. Also, the experts were asked to evaluate each item at the questionnaire using a 5-point Likert scale, with each point on the questionnaire represented by a word anchor.

The final version of the translated instrument was pretested with a pilot group of 20 mothers from the center. The pretest was conducted at the primary health care center where the main study was to be carried out. To simplify doubts and suggestions about the scale, a questionnaire requesting general information from the interviewee, such as age, monthly income, education level and occupation situation was used. An open-ended question to record doubts and suggestions was provided for each of the items.

The panel experts were asked to rate each item of the Turkish version of the CFS based on relevance, clarity and simplicity as 1 (*not relevant*), 2 (*somewhat relevant*), 3 (*relevant*), or 4 (*very relevant*). The average content validity index, or proportion agreement method, based on the experts' rating was

3.68/4 (92%) in the final version. According to Polit and Beck (2004), a content validity index higher than 80% is considered indicative of good content validity.

Data collection

Data were collected in 2008. The researcher visited the center on 5 working days every week and conducted interviews with the mothers. The questionnaire was explained to the mothers, who then read it and marked their answers on the sheets. The questionnaire took approximately 20 minutes to complete and could be understood by people with minimal reading ability. It was given to mothers in a separate quiet room in the center. All mothers completed the questionnaire.

Ethical considerations

The study was approved by the ethics committee of Atatürk University and informed consent was verbally obtained from each mother according to advice of the ethics committee. The mothers were informed about the purpose of the research, and assured of their right to refuse to participate or to withdraw from the study at any stage. Anonymity and confidentiality were guaranteed.

Data analysis

Internal consistency and homogeneity Cronbach's alpha was calculated to determine internal consistency. Clark and Watson (1995) indicated that internal consistency may be a necessary condition for homogeneity or unidimensionality of a scale and Cronbach's alpha should be .70 or higher. Item-total correlations and mean inter-item correlations were included in the analysis. Clark and Watson recommend using the inter-item correlation as a criterion for internal consistency. This should be .15 or higher for independent and dependent samples of 30 and above. They pointed out that this average value could be biased and all individual inter-item correlations (r) should be between .15 and .50. Unidimensionality can only be assured if all individual inter-item correlations are clustered closely around the mean inter-item correlation. Eigenvalue was selected higher than 1.

In the data analysis, M , SD , median and mode were used to summarize the data. Pearson's product-moment correlation was used to determine correlation scores of items and the total scale. Factor analysis was used to establish the construct of the scale and factor loadings of items of the scale. Cronbach's alpha was calculated to find internal consistency reliability.

RESULTS

Participant demographics

Demographic characteristics of the mothers were shown in Table 1. The mean age of the mothers was 32.8 ± 6.6 years and their mean monthly income was $US\$562.42 \pm 478.9$. The majority of the mothers (65.8%) graduated from primary school, and 87.2% of them were unemployed. All mothers in the sample group were married. Of the mothers, 31.6% have two children. The mean age of the referent children was 5.8 ± 4.2 years and 66.4% of the children were female.

Validity and reliability

The translated questionnaire, consisting of 31 items, was judged by the expert panel for relevance and phrasing of the items. For each item, the experts could suggest possible improvements in phrasing. Subsequent revisions of the Turkish version were made and discussed again by the panel members until agreement.

The instruments completed by 158 parents were used for the analyses. The Turkish CFS had an overall coefficient alpha of .75 (Table 2). The corrected item-total correlations were acceptable (Munro, 1993). The inter-item correlations ranged from .24 to .83, but indicated a nonunidimensional scale.

The Kaiser-Meyer-Olkin (KMO) was .68 with a p value $< .001$, indicating that the sample was large enough to perform a satisfactory factor analysis and that the sample size was sufficient for psychometric testing of a 31-item questionnaire. The first step of the factor analysis was a principal component analysis revealing seven factors with an eigenvalue of higher

Table 1

<i>Demographic Characteristics of Participating Mothers and Referent Children (N = 158)</i>		
	<i>n</i>	<i>%</i>
Education		
Primary school	104	65.8
Secondary school	18	11.4
High school	20	12.7
University degree	16	10.1
Occupation situation		
Employed	22	12.8
Unemployed	136	87.2
No. of children		
One	28	17.7
Two	50	31.6
Three	48	30.4
Four	18	11.4
Five or more	14	8.9
Child age group		
2–6 yr	97	61.4
7–11 yr	61	38.6
Child sex		
Male	53	33.6
Female	105	66.4
Total	158	100.0
		<i>M ± SD</i>
Age (yr)		32.8 ± 6.6
Child age (yr)		5.8 ± 4.2
Monthly income (US\$)		562.42 ± 478.9

than 1 (see Table 2). The seven factors together explained 57.6% of the variance. Internal consistency reliability was .75 for the whole questionnaire. For the first factor, with an alpha of .68, factor loadings were found for items which deal primarily with the Perceived Responsibility Subscale, which assesses parents' perceptions of their responsibility for child feeding. This factor explained 16.2% of the variance. On the second factor (alpha = .65), loadings were found which refer the Perceived Parent Weight Subscale, which assesses parents' perceptions of their own weight status history. For this factor, the explained variance was 10.3%. The third factor with an alpha of .74 exclusively referred to items which deal

with the Perceived Child Weight Subscale, which assesses parents' perceptions of their child's weight status history. The explained variance of the third factor was 7.6%. The fourth factor with an alpha of .63 was Concern About the Child Weight Subscale, which assesses parents' concerns about the child's risk of being overweight and this factor explained 7.1% of the total variance. The fifth factor was the Restriction Subscale, which assesses the extent to which parents restrict their child's access to foods. Internal consistency reliability of this factor was .65 and it explained 5.8% of the total variance. The sixth factor with an alpha of .74 was the Pressure to Eat Subscale, which assesses parents' tendency to pressure their children to eat more food, typically at mealtimes. This factor explained 5.5% of the total variance. The seventh factor was the Monitoring Subscale, which assesses the extent to which parents oversee their child's eating. Internal consistency reliability of this factor was .76 and it explained 5.1% of the total variance. All of factor loadings were above .40 and factor loading of the items ranged from .40 to .77 in the current study. Table 2 shows principal components analysis followed by varimax rotation factor loadings of items of the scale.

Factor-factor correlations were shown in Table 3. Perceived Child Weight was slightly correlated with Perceived Parent Weight. Concern About Child Weight was strongly correlated with Perceived Responsibility. Scores on Restriction also correlated with Perceived Responsibility and Concern About Child Weight. Pressure to Eat was correlated with Responsibility, Concern About Child Weight, and Restriction. Thus parents who were more likely to be restrictive in their feeding practices. Monitoring was average correlated with Responsibility, Concern About Child Weight, Restriction, and Pressure to Eat.

DISCUSSION

The translated scale, consisting of 31 items, was judged by the expert panel on relevance and phrasing of the instrument items. For each item, experts could suggest possible improvements in wording.

Table 2

Principal Components Analysis Followed by Varimax Rotation Factor Loadings and Item-total Correlations of Items of the Scale (N = 158)

Items of the scale and the items of factors	Perceived Responsibility	Perceived Parent Weight	Perceived Child Weight	Concern About Child Weight	Restriction	Pressure to Eat	Monitoring
1. When your child is at home, how often are you responsible for feeding her?	.586						
2. How often are you responsible for deciding what your child's portion sizes are?	.629						
3. How often are you responsible for deciding if your child has eaten the right kind of foods?	.613						
4. Your childhood (5–10 years old)		.682					
5. Your adolescence		.741					
6. Your 20s		.494					
7. At present		.454					
8. Your child during the first year of life			.491				
9. Your child as a toddler			.725				
10. Your child as a preschooler			.683				
11. Your child from kindergarten through second grade			.770				
12. Your from child third grade through fifth grade			.686				
13. Your child from sixth through eighth grade			.604				
14. How concerned are you about your child eating too much when you are not around her?				.562			
15. How concerned are you about your child having to diet to maintain a desirable weight?				.654			
16. How concerned are you about your child becoming over weight?				.569			
17. I have to be sure that my child does not eat too many sweets (candy, icecream, cake or pastries)					.607		
18. I have to be sure that my child does not eat too many high-fat foods					.699		
19. I have to be sure that my child does not eat too much of her favorite foods					.569		
20. I intentionally keep some foods out of my child's reach					.483		
21. I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior					.488		

22. I offer my child her favorite foods in exchange for good behavior	.583						
23. If I did not guide or regulate my child's eating, she would eat too many junk foods	.456						
24. If I did not guide or regulate my child's eating, she would eat too much of her favorite foods	.505						
25. My child should always eat all of the food on her plate	.494						
26. I have to be especially careful to make sure my child eats enough	.749						
27. If my child says "I'm not hungry," I try to get her to eat anyway	.408						
28. If I did not guide or regulate my child's eating, she would eat much less than she should	.626						
29. How much do you keep track of the sweets (candy, icecream cake, pies, pastries) that your child eats?	.417						
30. How much do you keep track of the snack food (potato chips, Doritos, cheese puffs) that your child eats?	.644						
31. How much do you keep track of the high-fat foods that your child eats?	.722						
Eigenvalue		5.0	3.2	2.3	2.2	1.8	1.7
Variance		16.2	10.4	7.6	7.1	5.8	5.8
Cumulative variance		16.2	26.6	34.2	41.3	47.1	52.6
Alpha		.68	.65	.74	.63	.65	.74

Table 3
Correlations Between the Child Feeding Questionnaire Subscales (N = 158)

Factor	1	2	3	4	5	6
1. Perceived Responsibility						
2. Perceived Parent Weight	-.119					
3. Perceived Child Weight	.015	.237**				
4. Concern About Child Weight	.663**	-.010	-.043			
5. Restriction	.447**	-.069	.012	.635**		
6. Pressure to Eat	.189*	-.018	-.058	.192*	.422**	
7. Monitoring	.304**	-.068	.068	.487**	.525**	.298**

* $p < .05$. ** $p < .01$.

Subsequent wording revisions of the Turkish instrument were made and discussed each time by the panel members till agreement about the content was reached. Then, the panel reviewed regarding the content of Turkish version of the CFS until there was no need to modify its translation and content. The results of this study showed that the psychometric characteristics of the Turkish version of the CFS were promising. The panel review regarding the content of Turkish version of the CFS indicated that there was no need to modify its translation and content.

The Cronbach's alpha, range of individual inter-item correlations (.24–.83) and the homogeneity of the CFS seemed to be sufficient. The literature suggests that the acceptable minimum point for individual inter-item correlations is .15 (Erefe, 2002; Polit & Beck, 2004). Internal consistency and inter-item correlations was adequate in the current study. Translated instruments might have lower reliability scores, altered distribution of scores and question of validity.

Before conducting the factor analysis, the KMO measure of sampling adequacy and Bartlett's test were calculated to evaluate whether the sample was large enough to perform a satisfactory factor analysis. The KMO measures the sampling adequacy and the p value should be greater than .05 for a satisfactory factor analysis to proceed. With varimax rotation the factor analysis indicated that, with regard to the content, seven factors could be discerned: Perceived Responsibility, Perceived Parent Weight, Perceived Child Weight, Concern About Child Weight,

Restriction, Pressure to Eat and Monitoring subscale in this study. In the original questionnaire (Birch et al., 2001), seven factors were found to have same content: Perceived Responsibility, Perceived Parent Weight, Perceived Child Weight, Concern About Child Weight, Restriction, Pressure to Eat and Monitoring in the original questionnaire. The CFS was developed from diverse race/ethnicity recruited from multiple communities that are non-Hispanic White (85–90%), African American (9%), or Hispanic women living in United States. The population of the original study's mean education was 10.4 years, average age of the population was 35.4 years (Birch et al.). It is also possible to argue that population of this study is similar to that the original study. Thus, indirectly, mothers' child feeding practices are likely to be similar. Thus, it is possible to claim that seven factors have been found to have same content with content of the original questionnaire.

In the study, the seven factors all together explained 57.6% of the total variance. Birch et al. (2001) did not report the total variance of all seven factors, however, individual variance of seven factors ranging from 10% to 97% was reported. Cronbach's alpha was .75 for the total scale. Birch et al. did not report internal consistency reliability for the total scale. Alpha coefficients are affected by many factors and therefore may be unsatisfactory in some study groups. George and Mallery (2003) stated that an alpha of .60–.65 may be dissatisfactory, and if the alpha coefficient is .65–.70 it may be acceptable at a minimal

level. In this study, internal consistency and explained total variance had adequate criteria (Erefe, 2002; Polit & Beck, 2004). In the current study, internal coefficients were adequate for the whole scale and its subscales.

If the items in the Turkish scale were compared with the original scale, the scale was found to be same to the original scale. This result also questions the procedure of the KMO which was .68 in this study. This finding indicated that the sample was average enough for performing a satisfactory factor analysis and that further validation (factor solution) could proceed with a similar sample size in the current study. Sample size in this study was adequate for factor analysis. To attain the best fitting structure and the appropriate number of factors, the following criteria were used, eigenvalues higher than 1.0, factor loadings higher than .40 and the so-called elbow criterion for the eigenvalues (De Heus, Van der Leeden, & Gazendam, 1995). Factor analysis yielded that all of factor loadings were above .40 and factor loading of the items in the scale ranged from .40 to .77. Factor loadings were reported factor loading ranged from .37 to .95 for original scale (Birch et al., 2001). Acceptable minimum point was .40 for factor loading (Polit & Beck, 2004). In this study, all items met these criteria and factor loadings were high. Therefore, construct validity of the scale was obtained.

Factor-factor correlations were not similar to those reported in previous study (Birch et al., 2001). Factor to factor correlation showed some factors to be independent. Concern About Child Weight was strongly correlated with Perceived Responsibility indicating that parents perceived responsible about their child's weight. Scores on Restriction also correlated with Perceived Responsibility and Concern About Child Weight. Pressure to Eat was correlated with Responsibility, Concern About Child Weight, and Restriction. Thus parents who were more likely to be restrictive in their feeding practices. Monitoring was average correlated with responsibility, Concern About Child Weight, Restriction and Pressure to Eat. Mothers felt more responsible about feeding their child, monitored their child's intake, were concerned about their child's weight and were more

controlling on feeding their child. This finding showed that there is correlation between parental beliefs related to child's obesity proneness and parental control practices and attitudes regarding child feeding. Beliefs and attitudes are components supporting each other, and these components together create practices (Ajzen, 1991). It is possible that high correlation present some subscales among because this scale consisted of beliefs, attitudes and practices.

The findings must be interpreted cautiously because of the study limitations. The sample was selected by convenience sampling. Statistical interpretation of the results was difficult due to the small sample. We conducted the study to generalize to the population.

CONCLUSION

This study confirmed the reliability and validity of the scale in this sample of Turkish mothers. The development of valid scales is a complex procedure. The CFS is very important because it provides standardized data regarding parental concerns and beliefs regarding a child's risks for obesity. To ensure the quality of adapted instruments, international norms should be followed. The application of a methodology accepted by the scientific literature makes available the comparison of the data obtained in different languages. In Turkey, the results of this study have to be taken into consideration in the related areas of this issue.

This scale should be further evaluated with a large enough sample size in different regions of Turkey and in diverse populations. Once a valid and reliable scale is ready, it can be used to measure outcomes in an intervention study. It has to be tested in different cultures. The existing Turkish scale can be used for further validation and also the usage of the scale will be available at outcome research. Further study and development may lead to the identification of parental beliefs related to child's obesity proneness and control practices and attitudes regarding child feeding that would improve the Turkish version of the CFS.

The scale has useful implications in clinical practice. The Turkish version of the CFS will enable identification of parental beliefs or attitude related to child's obesity proneness, and parental control practices and attitudes regarding child feeding. Assessment of the CFS of mothers should be an essential part of healthcare practice.

Use of the CFS can aid health professionals in educating mothers about how to deal with an overweight child or to prevent obesity. Nurses and other health care providers can provide education to mothers that teaches them the healthy feeding of children, as these would determine the parental beliefs or attitude related to a child's obesity proneness, and parental control practices and attitudes regarding child feeding.

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