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Study on the Validity and Reliability of Turkish Cooking and Food Skills Confidence Measure

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Abstract

Background: The present study aimed to adapt the cooking and food skills confidence measures developed by Lavelle *et al*. (2017) to Turkish cuisine and investigate its reliability and validity. **Materials and Methods:** A total of 300 adults aged between 22.0 and 34.0 years who live in Ankara were included in the study. The data were collected using the Turkish version of the cooking and food skills confidence measures (composed of 33 items), and a questionnaire form, which measured the level of knowledge on cooking (17 items) and food storage methods (11 items). **Results:** The respective Cronbach alpha coefficients for the cooking and food skills confidence measures in general and their subdomains were 0.880, 0.772, and 0.852, respectively. The results of confirmatory factor analysis (CFA) have indicated that the standardized load values of all items were above 0.20. In addition, participants' body mass index (kg/m^2) values were negatively correlated with cooking skills scale score. Cooking and food skills confidence measures total score was found positively correlated with cooking and food storage methods knowledge score ($P < 0.01$). **Conclusion:** The Turkish language version of the cooking and food skills confidence measures can be used as a screening tool to evaluate healthy nutrition-related studies in Turkey.

Keywords: Cooking skills, Obesity, Validity and reliability

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Introduction

Home-prepared food consumption promotes increased dietary quality and better body weight control[1-3] and is connected to increased consumption of fruits and vegetables.[4] A relevant study has also reported that it was associated with increased adherence to healthy dietary recommendations and less nutritional waste.[5] It was found that among the elderly, eating at home was associated with lower death risk.[6]

It was emphasized that all the likely methods to reduce the increased prevalence of obesity should be considered and all the initiatives aimed to implement such methods should be used. Furthermore, encouraging cooking at home was suggested as an important step. In this, many risk factors were suggested, including lack of necessary skills to prepare food[7,8] lack of time, longer working hours, difficulty in accessing healthy food, dislike of cooking, impact of previous negative experiences, enjoying eating outside, and takeaway options.[9-12] It was suggested that these risk factors could be significantly eliminated by improving one's cooking skills.[13,14] Cooking skills stand out as an important factor with room for improvement that encourages individuals to cook.[4] Cross-sectional studies have shown that possessing good cooking skills was associated with less consumption of processed food.[12,15,16] Interventional studies have reported that improving cooking skills increased self-confidence in cooking and consumption of a healthy diet.[17,18]

Cooking skills are defined including cooking methods (e.g., frying) and food preparation techniques (e.g., peeling vegetables). They also include perceptual skills, such as the ability to understand if the chicken is cooked based on its color.[13,14,19] Importantly, it is important that cooking skills are accompanied by nutritional skills.[20,21] Food skills include shopping, label reading, and meal planning.[20-22] Cooking and food skills constitute the fundamental requirements for preparing food in a home environment.[20]

Lavelle *et al*.[23] developed the cooking and food skills confidence measures that are suitable for different study samples and genders and encompass both cooking (e.g., cooking and food preparation methods) and food skills (e.g., shopping, label reading, and meal planning). The measures were found to be valid, reliable, and consistent over time.[23]

According to the data from the Ministry of Health (2019) in Turkey, the prevalence of obesity was 21.1% and it was pointed out that the tendency to eat outside had increased.[24] It is very important to have a tool that can measure relevant skills in the context of the measures to be taken to prevent obesity. This is especially true considering that cooking and food preparation skills are associated with healthy eating and will provide protection against the risk of obesity. Therefore, in the present study, the Turkish language version of "cooking and food skills confidence measures," which was developed by Lavelle *et al*.[23] was adapted to investigate its validity and reliability.

Methods

Sample and Procedure

A sample size that is 5–10 times the number of the items included in the measures would be sufficient.[25] The Turkish version of

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cooking and food skills measurement consists of 33 items. At least 165 participants were required for this study and 300 adults, who signed the voluntary consent form, were included in the study. The study data were collected between March and June 2020.

Data Collection

The data were collected by the researchers from the individuals who agreed to participate in the study through face-to-face interviews using the Turkish language version of the cooking and food skills confidence measures, and the questionnaire form, which measured the participants' level of knowledge on cooking (17 items) and storage methods (11 items).

The study was approved by the Istanbul Arel University's Ethics Committee during its meeting dated January 27, 2020, and No. 2020/01.

Measures

Turkish version of cooking and food skills confidence measure

The cooking and food skills confidence measures consist of 14 cooking and 19 food skills items and is a Likert-type scale that asks individuals to rate how good they are at each specified topic from 1 to 7 (1 = very poor bad, 7 = very good). It also offers the "none" option if they have no such skills at all. Higher scores are associated with higher skill levels.[23]

The permission required for the use of cooking and food skills confidence measures in Turkey was obtained from Fiona Lavelle through e-mail. For language validity, the measures were separately translated into Turkish by two faculty members from the field of nutrition and dietetics and a linguist, who are all fluent in English and Turkish. Thereafter, the translations were compared and a common opinion was reached on the items. Thus, the Turkish version of the scale was developed. It was then back-translated from Turkish to English by three linguists, to assess the consistency of its meaning. No semantic difference between the items in the original scale and back-translated version was found. The Turkish version of the scale was finalized. The final version of the scale was reassessed by an expert who held a degree in Turkish Language and Literature, in terms of its Turkish language suitability.[26] On completion of its linguistic validity, the scale was preliminarily applied to 15 adults for the face validity of the scale; they were asked to evaluate the scale items according to their comprehension. On review, the final version of the scale was attained. The above group of adults was not included in the study.

Cooking and food storage measure

The level of knowledge about cooking and food storage methods was determined using the items developed by the researchers. They include questions such as "*When should salt be added during cooking?*" and "*Which method should be used to cook meat and meat products?*" The items intended for measuring the level of knowledge about food preservation included questions such as "*How should salt be stored in a container?*" and "*Which container should be used to preserve acidic food?*"

Statistical Analysis

In the first stage, the Confirmatory Factor Analysis (CFA) was used to test the validity of the scale. During the prediction phase of CFA, the Diagonal Weighted Least Squares (DWLS) technique was preferred due to the Likert-type data. The Cronbach's alpha reliability analysis was used to investigate the internal consistency of the scale.

The compatibility of the data with the x^2/df model, Root Mean Error Square of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) were all evaluated and accepted in accordance with the literature.[27,28]

Table 1: Sociodemographic variables of the participants (n: 300)

Variables	*n*	*%*
Gender		
Female	250	83.3
Male	50	16.7
BMI (kg/m^2)		
<18.5	26	8.7
18.50–24.99	118	39.3
25.00–29.99	69	23.0
>30	87	29.0
Marital Status		
Married	277	92.3
Single	23	7,7
Educational Status		
Undergraduate	284	94.6
Master's degree	6	5,4

Table 2: CFA statistics for cooking and food skills confidence measures

Domain	*Item*	*Beta*	*SE*	*z statistics*	*P*
Cooking Skills	CS1	1	-	-	-
	CS2	1.730	0.191	9.035	<0.001
	CS3	0.603	0.101	5.985	<0.001
	CS4	1.711	0.184	9.314	<0.001
	CS5	1.626	0.183	8.895	<0.001
	CS6	2.150	0.228	9.442	<0.001
	CS7	1.308	0.155	8.442	<0.001
	CS9	1.471	0.176	8.371	<0.001
	CS10	0.761	0.116	6.579	<0.001
	CS11	1.899	0.209	9.085	<0.001
	CS12	1.805	0.200	9.014	<0.001
	CS13	2.346	0.249	9.411	<0.001
	CS14	1.955	0.206	9.505	<0.001
Food skills	FS1	1	-	-	-
	FS2	0.871	0.067	12.974	<0.001
	FS3	1.172	0.083	14.174	<0.001
	FS4	1.330	0.092	14.425	<0.001
	FS5	1.422	0.095	15.017	<0.001
	FS6	1.549	0.102	15.259	<0.001
	FS7	1.182	0.084	14.049	<0.001
	FS8	1.096	0.082	13.372	<0.001
	FS9	0.870	0.075	11.664	<0.001
	FS10	0.423	0.054	7.900	<0.001
	FS11	0.670	0.066	10.196	<0.001
	FS12	1.149	0.080	14.310	<0.001
	FS13	1.233	0.086	14.405	<0.001
	FS14	1.354	0.094	14.426	<0.001
	FS15	0.936	0.077	12.185	<0.001
	FS16	0.735	0.062	11.816	<0.001
	FS17	1.069	0.082	13.081	<0.001
	FS18	0.836	0.073	11.407	<0.001
	FS19	0.729	0.065	11.289	<0.001

Beta: Coefficient, SE: Standard error

Table 3. Reliability Analysis Results for the Cooking and Food Skills Confidence Measures

Domain	*Item*	*X*	*SS*	*AC*	*MSA*	*Alpha*
Cooking Skills	SB1	4.180	2.268	0.300	0.767	0.772
	SB2	4.407	2.205	0.473	0.750	
	SB3	2.007	2.000	0.203	0.775	
	SB4	4.487	1.869	0.481	0.751	
	SB5	2.580	2.215	0.427	0.755	
	SB6	3.513	2.178	0.516	0.746	
	SB7	3.880	2.117	0.379	0.759	
	SB9	3.583	2.520	0.310	0.768	
	SB10	4.723	2.151	0.217	0.775	
	SB11	3.690	2.387	0.506	0.746	
	SB12	2.580	2.392	0.454	0.752	
	SB13	2.597	2.533	0.518	0.744	
	SB14	5.340	2.018	0.386	0.759	
Food Skills	SI1	2.757	2.036	0.431	0.845	0.852
	SI2	2.513	1.850	0.393	0.847	
	SI3	4.247	2.000	0.495	0.842	
	SI4	3.837	2.233	0.549	0.840	
	SI5	4.227	2.073	0.567	0.839	
	SI6	4.207	2.146	0.636	0.836	
	SI7	4.980	2.088	0.531	0.841	
	SI8	4.273	2.208	0.499	0.842	
	SI9	4.243	2.163	0.401	0.847	
	SI10	1.587	1.920	0.173	0.855	
	SI11	2.703	2.078	0.275	0.852	
	SI12	4.097	1.876	0.543	0.841	
	SI13	4.233	2.025	0.499	0.842	
	SI14	3.680	2.235	0.509	0.842	
	SI15	4.677	2.212	0.317	0.850	
	SI16	5.803	1.788	0.390	0.847	
	SI17	4.927	2.202	0.495	0.842	
	SI18	4.090	2.276	0.358	0.849	
	SI19	3.783	1.947	0.367	0.848	

SS: Standard deviation, AC: Adjusted correlation, MSA: Alpha if Item Deleted

Table 4: Reliability analysis results for the cooking and food skills confidence measures

Domain	*Item*	*X*	*SS*	*AC*	*MSA*	*Alpha*
CS	CS1	4.180	2.268	0.300	0.767	0.772
	CS2	4.407	2.205	0.473	0.750	
	CS3	2.007	2.000	0.203	0.775	
	CS4	4.487	1.869	0.481	0.751	
	CS5	2.580	2.215	0.427	0.755	
	CS6	3.513	2.178	0.516	0.746	
	CS7	3.880	2.117	0.379	0.759	
	CS9	3.583	2.520	0.310	0.768	
	CS10	4.723	2.151	0.217	0.775	
	CS11	3.690	2.387	0.506	0.746	
	CS12	2.580	2.392	0.454	0.752	
	CS13	2.597	2.533	0.518	0.744	
	CS14	5.340	2.018	0.386	0.759	
FS	SI1	2.757	2.036	0.431	0.845	0.852
	SI2	2.513	1.850	0.393	0.847	
	SI3	4.247	2.000	0.495	0.842	
	SI4	3.837	2.233	0.549	0.840	
	SI5	4.227	2.073	0.567	0.839	
	SI6	4.207	2.146	0.636	0.836	
	SI7	4.980	2.088	0.531	0.841	
	SI8	4.273	2.208	0.499	0.842	
	SI9	4.243	2.163	0.401	0.847	
	SI10	1.587	1.920	0.173	0.855	
	SI11	2.703	2.078	0.275	0.852	
	SI12	4.097	1.876	0.543	0.841	
	SI13	4.233	2.025	0.499	0.842	
	SI14	3.680	2.235	0.509	0.842	
	SI15	4.677	2.212	0.317	0.850	
	SI16	5.803	1.788	0.390	0.847	
	SI17	4.927	2.202	0.495	0.842	
	SI18	4.090	2.276	0.358	0.849	
	SI19	3.783	1.947	0.367	0.848	

SS: Standard deviation, AC: Adjusted correlation, MSA: Alpha if Item Deleted

In the final stage, the direction and magnitude of the relationship between the two numerical measurements were investigated. For this purpose, the conformance of the measurement scores that were obtained during the selection of the hypothesis test to the normal distribution was examined using the Shapiro–Wilk test. It was seen that the measurement scores conformed to the normal distribution ($P > 0.05$). In light of these results, the relationships between the two numerical measurements were examined using the Pearson correlation test.

The margin of error was set to 5% in the evaluation of statistical hypothesis results. All the CFA results were obtained using the R-Project program[29] and lavaan[30] software package. Other analysis results were obtained using the IBM Statistical Package for the Social Sciences (SPSS) v.26 software.

Results

The study included 300 adults with a mean age of 28.20 ± 1.75 years (22.0–34.0 years) and a mean BMI of 26.25 ± 5.47 kg/m^2 (19.0–33 kg/m^2), of which 83.3% were female and 16.7% were male participants. It was found that 29% of the participants were obese, 92.3% were married, and 94.6% had an undergraduate degree [Table 1].

Cooking and Food Skills Confidence Measures

The CFA statistics for the cooking and food skills confidence measures are shown in Table 1. According to the results obtained during the final stage, all the subitems of the cooking and food skills scale were statistically significant ($P < 0.05$) [Table 2].

Table 5: Percentage of accurate responses of individuals (*n*=300)

Item	*True*		*False*	
Cooking methods	*n*	*%*	*n*	*%*
At what stage should salt be added to meals?	108	34.7	192	65.3
How long should raw milk be boiled?	163	54.3	137	45.7
What is the most suitable thawing method for frozen meat?	132	44.0	168	66.0
When boiling eggs, how long after the water starts to boil should the eggs be removed?	135	45.0	165	55.0
What is the healthiest cooking method for meat products?	117	39.0	183	61.0
Should chicken be washed before cooking or during preparation?	104	34.7	196	65.3
Is a heavy chopping board required to chop meat products?	266	88.7	34	11.3
What is the most appropriate cooking method to minimize nutrient losses when cooking pasta?	121	40.3	179	59.7
Which is the best method to remove flatulent elements without a detrimental effect on the nutrient content of haricot bean?	230	76.7	70	23.3
What is the healthiest cooking method for haricot bean?	119	39.7	181	60.3
What is the healthiest preparation method before cooking vegetables?	217	72.3	83	27.7
Which is the best pot for frying?	128	42.7	172	57.3
How many times can the frying oil be used?	119	39.7	181	60.3
What is the most suitable oil alternative for frying?	186	62.0	114	38
Which cooking method ensures that bread is rich in nutrient content?	229	76.3	71	23.7
What is the cooking method that minimizes the loss of nutrients when cooking rice?	187	62.3	113	37.7
Which process in pastry making increases the loss of nutrients?	146	48.7	154	51.3
Food storage methods	*n*	*%*	*n*	*%*
In which container is it recommended to preserve salt to prevent the loss of iodine?	31	10.3	269	89.7
In which container is it recommended to preserve milk to prevent nutrient loss?	80	26.7	220	73.3
What is the most suitable storage recommendation for eggs?	226	75.3	74	24.7
Which of the following foodstuff can be preserved as frozen without any risk factor?	294	98.0	6	2.0
Which method should be used in the drying process of the tarhana soup making?	49	16.3	251	83.7
Is it appropriate to re-freeze thawed meat?	249	83.0	51	17.0
How many times can the meal in the refrigerator be heated over and over again?	160	53.3	140	46.7
What is the most suitable storage environment for fruits?	131	43.7	169	56.3
In which container should vegetable oils be preserved?	220	73.3	80	26.7
In which container should acidic foods be stored?	215	71.7	85	28.3
What is the most suitable storage container for pickles?	231	77.0	69	33.0

Table 6: Correlation between cooking skills, food skills, cooking and food skills confidence measures, cooking methods knowledge, food storage methods knowledge, total scores from knowledge level on cooking and food storage, BKI (kg/m^2), and test-retest scores

	1	*2*	*3*	*4*	*5*	*6*
1. Cooking skills	0.818**					
2. Food skills	0.515**	0.864**				
3. Cooking and food skills confidence measures	0.833**	0.903**	0.894**			
4. Cooking methods knowledge	0.257**	0.193**	0.253**	-		
5. Food storage methods knowledge	0.006	−0.030	−0.016	0.184**	-	
6. Total scores from knowledge level on cooking and food storage	0.227**	0.164**	0.219**	0.857**	0.608**	-
7. BMI (kg/m^2)	−0.141*	−0.045	−0.103	−0.088	−0.027	0.065

*P<0.05, **P<0.01

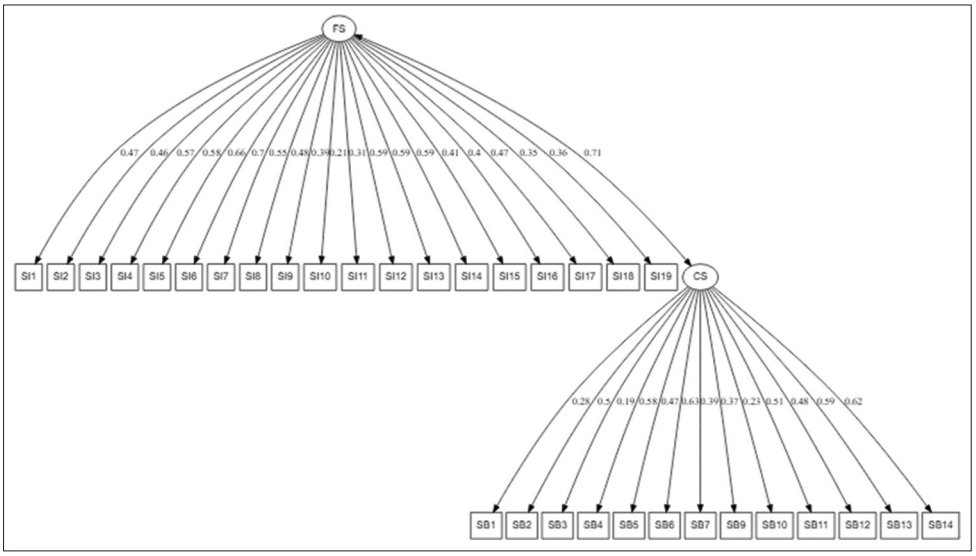

Figure 1. CFA results for the Cooking and Food Skills Confidence Measures

Table 3 shows the goodness of fit index of the CFA results pertaining to the cooking and food skills confidence measures. Pursuant to the goodness of fit indexes, the value of Chi-square statistics/sd = 2.122 varied between two and five. A review of other fit indexes indicated that the GFI, AGFI, TLI, and CFI were above 0.9, where the Standardized Root-Mean-Square Residual (SRMR) was below 0.10 and RMSEA were below 0.08. These goodness-of-fit index values are considered to be within acceptable limits [Table 3].

Figure 1 shows the CFA results from the cooking and food skills confidence Measures. According to the graphical construct obtained as a result of CFA, the standardized load values of all the items are above 0.20.

Table 4 shows the descriptive statistics from the subscales of the cooking and food skills confidence measures and the results of Cronbach's alpha reliability analysis. All the adjusted correlation coefficients for the subscale items of the scale were positive. In addition, when an item was deleted, there was no significant increase in the reliability coefficient in the subscales. In light of these above results, the Cronbach's Alpha coefficients for the cooking and food skills confidence measures in general and as regards its subdomains were 0.880, 0.772, and 0.852, respectively, [Table 4].

The level of knowledge of the participants on cooking and food storage methods was measured. Accordingly, the mean scores for cooking, food storage, and the mean total scores were 9.11 ± 2.72 (1.00–17.00), 6.46 ± 1.64 (1.00–11.00), and 15.63 ± 3.45 (4.00–25.00), respectively. The distribution of participants by percentage of correct answers is shown in Table 5.

Table 6 shows the total scores from the cooking and food skills confidence measures and its subscales, as well as from the levels of knowledge on cooking and food storage methods. It also shows the results of the Pearson Correlation test that shows the direction and magnitude of the relationship between the test-retest scores.

The test-retesting relationship of the participants' cooking and food skills scores from the cooking and food skills confidence measures was positive and high (r = 0.818, P < 0.01, r = 0.864, P < 0.01).

In line with these results, cooking and food skills confidence measures was correlated with cooking skills, food skills, cooking methods knowledge, and total score form knowledge level on cooking and food storage. In addition, there was a negative correlation between the participants' BMI (kg/m^2) values and their cooking skills scale score.

Discussion

The present study investigated the validity and reliability of the Turkish version of the cooking and food skills confidence measures and was found valid and reliable among adults in Turkey. It can be used by clinicians or researchers to study cooking and food skills.

The reliability coefficient of the whole Turkish version of the cooking and food skills confidence measures was correlated with Lavelle *et al*.,[23] and lay within a range that is considered to be highly reliable.

It was found that there was a high level test-retest relationship between the scores from the cooking and food skills confidence and was similar to the correlation results of the original scale developed by Lavelle *et al*.[23]

The highest scores achievable from the food skills, cooking skills, and overall scale are 134, 98, and 232, respectively.[23] In the present study, scale scores are close to the average of food skills, cooking skills, and overall scale. Our study sample has average cooking and food skills.

The level of knowledge of the participants about cooking and food storage methods was measured within the scope of the study. According to their score, knowledge of cooking methods was higher than knowledge of food storage methods. Consistently, there was a correlation between the total score based on accurate responses to the items measuring the level of knowledge on cooking and storage methods and the total score from the cooking and food skills confidence measures. It was shown that as individuals' knowledge level increased, along with their cooking and food skills. In community practice, if we want to improve skills, it must be done with effective education models.

In the present study, we found that BMI (kg/m^2) values decreased as cooking skills scale scores increased. Cooking skills make it possible to provide a protective effect against obesity, which is very important.

In a study of adults in Australia, found that greater food and cooking skills are related with higher diet quality and less consumption of takeaway food.[31] According to Dave *et al*.,[32] individuals who do not like cooking prefer ease of non-cooking and ready-to-eat foods frequently consume fast-foods and so their BMI values increased. It has been considered that 2.2 billion people could be overweight by 2030 if the trends of consuming processed and high-fat food and eating outside continue.[33]

A study which investigated the effect of cooking at home on nutrient intake and obesity in adults, found that the dinner meal that is prepared and consumed at home was associated with improvement in nutrient intake and decreased prevalence in obesity.[34] Another study reported that having more than two dinners per week at home was associated with lower consumption of energy, carbohydrate, fat.[1]

Acquiring these food and cooking skills at the school age is important for healthy eating habits to sustain healthy eating habits. In a study, it was found that acquired food and cooking skills in early age-related with diet quality positively.[35]

Mothers' knowledge of nutrition and types of food and cooking skills also affect the kitchen and are especially reflected in the nutritional status of the child. In both cities and rural areas, the responsibility for nutrition is with the mother, irrespective of her employment status. It has been determined that the children of mothers who are skilled and self-confident in cooking also consume much less processed food.[36,37]

Conclusion

In conclusion, the Turkish version of the cooking and food skills confidence measures, which consists of 14-item cooking and 19-item food skills subdomains, was valid and reliable. Today, the preference for eating outside is increasing, resulting in increased body weight and unhealthy food selection. Therefore, it is important to make an early assessment of the individuals who are at risk and establish preventive education and training classes.

The study sample was comprised mostly of individuals with normal body weight and a relatively high level of education. Hence, it cannot be considered to be representative of the general Turkish population, studies with different sample groups will contribute to a better understanding of the research topic.

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