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ORIGINAL RESEARCH

Adaptation of the Colonoscopy Satisfaction and Safety Questionnaire to Turkish Language and Determination of Its Psychometric Properties

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ABSTRACT

Aim: This study was conducted to adapt the Colonoscopy Satisfaction and Safety Questionnaire into Turkish and evaluate its psychometric properties.

Method: The study was conducted with a methodological design recruiting a sample of 181 individuals scheduled for colonoscopy procedures.

Results: Content validity index for a single dimension yielded a satisfactory score of 0.95. The study also revealed strong and consistent time-dependent invariance correlation coefficients ranging from 0.82 to 0.97, indicating reliability over time. A robust and positive relationship was detected between the item scores recorded during the pretest and posttest assessments. After item analysis, three items were removed from the questionnaire, resulting in a 13-item scale that displayed good internal consistency with a Cronbach's alpha coefficient of 0.86.

Conclusion: The findings suggest that the Turkish version of the Colonoscopy Satisfaction and Safety Questionnaire is well-suited for use in research related to patients undergoing colonoscopy procedures. As a result of this study, it was determined that it is an appropriate tool for assessing the satisfaction of patients undergoing colonoscopy.

1 | Introduction

Colorectal cancer (CRC) has a high morbidity and mortality rate across the world, but its incidence exhibits distinct differences depending on regional variety. In some countries in Eastern Europe and Asia (Slovakia, Czech Republic, Singapore and Japan), increases have been observed in cancer incidence due to reasons closely related to diet and lifestyle (El Zoghbi and Cummings 2016). Preference for foods that are rich in proteins and fats but poor in fibres, which is called a western-style diet, is seen as the cause of the increase in these countries (Ng and Wong 2013). In addition, due to limited health resources, CRC-related death rates have increased in some countries (Brazil, Mexico and Romania) (El Zoghbi and Cummings 2016).

In addition to environmental factors, family history is important in hereditary diseases such as cancer. Therefore, screening programmes are an important tool for early diagnosis. Besides, despite all the efforts of modern medicine, the prognosis of CRC depends on the stage of the disease at diagnosis. It is possible to detect tumours that have not yet displayed symptoms through screening methods (Koc 2017; Marcuello et al. 2019). As screening tests, sigmoidoscopy, faecal occult blood tests (FOBTs), faecal DNA test, colonoscopy, computerized tomography and

Summary

What is Already Known About This Topic?

- Colon cancer is a common type of cancer.
- Although colonoscopy is an important tool for the early detection of colon cancer, it can be an uncomfortable procedure for patients.
- Patient satisfaction is essential for the success of the procedure.

What This Paper Adds?

- The results demonstrate a valid and reliable instrument to measure patients' satisfaction with colonoscopy in Turkey.

The Implications of This Paper:

- Measuring patients' satisfaction with colonoscopy supports development of improvements in health care.
- Nurses can use this tool to evaluate the satisfaction of patients with the education they give about colonoscopy, which may help in organizing educational activities.
- Findings serve as a guiding reference for encouraging further research in this field.

capsule endoscopy are recommended (Liu and Zhang 2024; Marcuello et al. 2019).

1.1 | Background

CRC screening is recommended to individuals over the age of 50 years in various countries including Turkey. Within the scope of screening programmes, FOBTs are repeated every 2 years in routine practice after the age of 50 years, while colonoscopy is performed once every 10 years. Individuals with CRC in their first-degree relatives are recommended to get the same screening tests performed after the age of 40 years (Tuncez et al. 2021).

CRC screening methods have an important place in early diagnosis and treatment, but the rate of these tests is rather low in Turkey. In their studies, Pirincci et al. (2015) determined that 20.5% of the participants had previously participated in CRC screening programmes. Similarly, Sahin and Uner (2015) found that 7.7% of the participants had undergone a CRC test within the last year, and 5.4% had undergone a colonoscopy within the last 10 years. In their systematic review, Aytepe and Donmez (2022) determined the reasons for individuals not participating in CRC screening programmes as embarrassment due to the procedure, insufficient privacy, fear of being diagnosed with cancer, lack of knowledge and the painful nature of the procedure.

Informing individuals about CRC screening programmes and providing quality screening services can significantly contribute to increasing participation in CRC screening programmes and patient satisfaction. Colonoscopy is a method used in the diagnosis and treatment of other gastrointestinal diseases, in addition to CRC screening. For this reason, it is considered the 'gold standard' in gastrointestinal system diseases and is frequently applied. Thus, patient information about colonoscopy and patient satisfaction have become even more important (Brotons et al. 2024; Latos et al. 2022). Gálvez et al. (2017) reported that satisfaction levels of patients who were informed about bowel preparation through short phone calls increased. They also determined that, as a result of the information provided, polyps were detected more easily during colonoscopy, and the rate of repeat colonoscopies decreased, thereby increasing the quality of the procedure. Lee et al. (2015) reported that patients who did not receive sufficient information before colonoscopy felt more worried, and that their quality of sleep and satisfaction levels decreased. Fernandez-Landa et al. (2019) determined that satisfaction levels for patients who waited less before colonoscopy and who experienced less pain and discomfort were higher. Similarly, Loftus et al. (2013) found that the technical skill of the physician performing the endoscopy and patients not feeling pain during the procedure increased both patient satisfaction and patients' willingness to undergo endoscopy again.

Studies show that the provision of information prior to the procedure, reduced waiting time, better physician technical skills during the procedure and less pain felt by patients are directly associated with satisfaction. Increases in patient satisfaction increase individuals' willingness to participate in screening programmes. As a result, encouraging participation in screening programmes by increasing patient satisfaction is important in terms of the early diagnosis of cancer.

However, there is not yet a Turkish scale to assess patients' satisfaction with their colonoscopy, although the scale developed by Brotons et al. (2024) for patients undergoing colonoscopy for all indications has potential for usability. Therefore, the present study was conducted in order to adapt the Colonoscopy Satisfaction and Safety Questionnaire (CSSQP) for Colorectal Cancer Screening developed by Brotons et al. (2019) and to determine its psychometric properties.

1.2 | Research Questions

What is the Turkish language equivalent of the Colonoscopy Satisfaction and Safety Questionnaire?

What are the psychometric properties of the Turkish language version of the Colonoscopy Satisfaction and Safety Questionnaire?

2 | Methods

The guidelines established by the World Health Organization (WHO) were followed in the conduct of this research (WHO 2018).

2.1 | Research Design

The study was conducted with a methodological and relational screening design in the colonoscopy unit of the general surgery department of a university hospital.

2.2 | Study Sample

In scale validity and reliability studies, it is recommended that the sample size should be at least 5–10 times the number of items of the scale (Buyukozturk 2002; Esin 2014). In the present study, the sample size was calculated to be 10 times the number of the items on the scale ($n = 180$). Considering potential data loss, the sample size was increased by 10%, and verbal and written consents were obtained from 198 participants; 17 participants later decided not to participate in the study, so the study was completed with 181 participants. Test–retest evaluation was made with 45 participants.

Inclusion criteria for the study were determined as being at least age 18 years, scheduled for routine colonoscopy procedures, not having a mental disability, being literate and being able to communicate in Turkish.

2.3 | Data Collection Tools

The study data were collected through the 'Patient Information Form' and the 18-item 'Colonoscopy Satisfaction and Safety Questionnaire'.

2.3.1 | Patient Information Form

The form developed by the researchers in line with the relevant literature consisted of 12 items (Fernandez-Landa et al. 2019; Brotons et al. 2019). The questions inquired about the patients' individual characteristics (age, gender, marital status, choice of profession) and colonoscopy-related experiences (time of previous colonoscopy, satisfaction with previous experience, difficulty in bowel cleansing, etc.).

2.3.2 | The Colonoscopy Satisfaction and Safety Questionnaire—CSSQP

The Colonoscopy Satisfaction and Safety Questionnaire consists of 18 items in total, 13 items on colonoscopy satisfaction, two items on colonoscopy safety and additional questions (supplementary items).

The first 13 items on the scale involve a satisfaction subscale and are scored on a 5-point Likert-type scoring system. Items 1, 2, 7, 10 and 11 measure satisfaction with the provision of colonoscopy information; Items 3, 5, 8, 12 and 13 measure patients' satisfaction with care; and Items 4, 6 and 9 measure patients' satisfaction with the comfort of the colonoscopy unit. These items are scored between 1 and 5 as: inadequate (1), adequate (2), good (3), very good (4), excellent (5). There are also two supplementary items for the colonoscopy satisfaction scale. These items are scored on a 5-point Likert-type scale. These items are confirmatory for the items in the scale and are general statements regarding patient satisfaction. For example, general satisfaction with the treatment and services provided during the procedure. On the safety subscale of the questionnaire, there are two response options (yes or no). There is also one supplementary item in the security section to make the questions more understandable. The purpose of the supplementary items is to ensure that participants understand the questions and provide consistent responses. Supplementary items are scored according to the scoring system of the section they are included in and named as a, b.

2.4 | Stages of Preparation for Use of the Scale

In this methodological study, the scale was prepared for use and the results were obtained in two stages. The first stage included adaptation, and the second stage included psychometric tests (Samur et al. 2020).

2.4.1 | Stage 1: Adaptation of the Scale

A scale needs to go through a number of stages before it can be implemented. These stages were prepared in line with the steps established by the WHO (2018).

2.4.1.1 | Translation of the Scale. The scale was translated into Turkish by two academicians who had mastery of the terminology and were knowledgeable in the field. It is recommended that this stage be carried out by health professionals who are familiar with the terminology of the area covered by the scale and who have interviewing skills. During translation, care was taken to ensure that the words in the scale had conceptual equivalents. The original terms in the scale were considered and translated into Turkish in the most relevant way. Care was taken to ensure that the words were simple and understandable. Long and complex sentences were avoided. (WHO 2018). Both translators could speak both languages. The native language of the translating academicians was Turkish. The academics who did the translation were knowledgeable about the cultural and grammatical differences between the two languages. The translations were then shown to experts who did not know the original version of the scale and who spoke both languages. The Turkish form of the scale was translated back to English by two linguists who were native speakers of English and were proficient in Turkish. Both the original version of the scale and its English translation were evaluated by the researchers, and any necessary corrections were made.

2.4.1.2 | Expert Panel. Next, experts should identify any expressions and concepts that are inadequate in the translation and should also identify and resolve any inconsistencies in the translation. To do this, the experts can question the expressions in the scale or make suggestions (WHO 2018). It is recommended to obtain the opinions of at least three experts to ensure the content validity of the results obtained from the experts (Esin 2014). For the content validity of the translated scale, the opinions of 10 academicians who are experts in the field of surgical nursing were taken.

2.4.1.3 | Pilot Study. When conducting validity and reliability, 10–30 participants are sufficient for a pilot study (Johanson and Brooks 2010). Following expert opinions, the scale was applied to 20 patients who met the inclusion criteria as a pilot study. The pilot study patients did not give any negative feedback

regarding the comprehensibility and clarity of the scale items. Thus, it was determined that each item and choice were comprehensible. Therefore, no correction was made to the scale. As a result, the scale was found to be comprehensible, and its application was extended to the whole sample. The findings related to these 20 patients were not included in the dataset for the analyses.

2.4.2 | Stage 2: Psychometric Testing of the Scale

Reliability is the consistency of the responses given to the scale items by the participants (Köneş et al. 2021). Validity indicates whether the measurement has been made in line with the rules accurately and whether it reflects the property of the data that is aimed to be measured (Köneş et al. 2021).

2.4.2.1 | Reliability. Test–retest and internal consistency were used for reliability (Aci et al. 2024; Samur et al. 2020).

2.4.2.1.1 | Test–Retest. It has been determined that a sample size of 40–50 is sufficient for test–retest. A correlation coefficient of 0.70 was considered satisfactory (Kennedy 2022). Pearson moments multiplication correlation coefficients were examined for test–retest reliability analysis performed on a 45-patient sample group. The reliability of a scale is achieved by retesting it on the same sample after a 2-week interval (Köneş et al. 2021; Samur et al. 2020). Therefore, there was a 2-week interval between the test and the retest. The Pearson correlation test was employed in order to check the relationship level between two continuous variables.

2.4.2.1.2 | Internal Consistency. Cronbach's alpha coefficients were determined in order to measure the reliability of the scale. If the Cronbach alpha value was 0.70 and above, the scale was considered to have internal consistency (Aksoy et al. 2019; Martino et al. 2019). In order for the item-total correlation to have high discrimination, this value was considered sufficient if it was greater than 0.30 (Martinez-Martin et al. 2013; Yilmaz and Altinkurt 2013).

2.4.2.2 | Validity. Language validity, content validity and construct validity were used to test for validity (Aci et al. 2024).

2.4.2.2.1 | Language Validity. After the translation and back translation stages, the Turkish version of the scale and the original were compared. Language validity was checked. In addition, culturally inappropriate expressions were reviewed.

2.4.2.2.2 | Content Validity. Scale items were evaluated according to expert opinions. To assess the item internal validity index (IVI), the experts were asked to score each item between 1 and 4 and to evaluate the suitability of the scale items (1: Not appropriate, 4: Very appropriate). In calculating the IVI, the number of experts who gave 3 or 4 points for the suitability of each item is divided by the total number of experts. The content validity ratio (CVR) was calculated with the formula recommended by Lawshe (1975). If the number of experts included in the panel is more than 5, the item IVI value should not be lower than 0.78 (Lynn 1986).

2.4.2.2.3 | Construct Validity. In order to determine construct validity of the scale, confirmatory factor analysis (CFA) was performed. The satisfaction questionnaire was analysed through goodness of fit index (GFI) and comparative fit index (CFI) obtained from CFA, root-mean square error of approximation (RMSEA) and standardized root mean square residual (S-RMR). CVR was interpreted by considering the critical values table developed by Wilson et al. (2012). According to the CVR calculated for between 5 and 40 experts, the CVR for the 10 experts participating in the study was 0.52.

The analyses used are summarized in Table 1 (Aci et al. 2024).

2.5 | Data Collection Process

The study data were collected from patients who presented to the colonoscopy unit of the general surgery outpatient clinic of a university hospital and met the inclusion criteria. Data collection was conducted between January 2022 and November 2022. The participants were requested to fill in their names and phone numbers. Following the colonoscopy procedure (within 24–72 h), the patients were called using the phone numbers they provided, and the study data were collected. The patients were called using the researcher's phone number, as specified in the written consent form, and no other phone was used. The telephone interviews lasted approximately 10–15 min.

2.6 | Data Analysis

In the analysis of the data, statistical analyses were performed through SPSS (Statistical Package for the Social Sciences) Version 25.0 (IBM Corp., Armonk, NY, USA) and LISREL 8.50 programmes. Normal distribution of the scores obtained from continuous variables was analysed with descriptive, graphic

TABLE 1 | Statistical methods used in examining validity and reliability of the colonoscopy satisfaction and safety scale.

Reliability	Internal consistency	Cronbach's alpha reliability coefficient
	Test–retest	Pearson's correlation analysis
Validity	Language validity	Translation from English to Turkish Back-translation from Turkish to English
	Content validity	Taking expert opinions (10 experts) Content validity ratio (CVR) using the Lawshe technique
	Construct validity	Confirmatory factor analysis (CFA)

and statistical methods. Normality of the scores obtained from a continuous variable through statistical methods was tested with the Kolmogorov–Smirnov test. Cronbach's alpha coefficients were determined in order to measure the reliability of the scale. Descriptive statistical methods were also used in the evaluation of the study data (number, percentage, standard deviation, etc.). Pearson correlation test was employed in order to check the relationship level between two continuous variables. For validity analyses, CFA and goodness of fit statistics were used. In addition, linear regression modelling was used to estimate the predictive capacity of the scale scores. The results were evaluated at a 95% confidence interval and a significance level of $p < 0.05$.

2.7 | Ethical Aspect of the Study

Written permission was obtained by email from the author of the scale in order to conduct a validity and reliability study of the Turkish version of the questionnaire. The authors of the present study delivered the necessary data on the scale and stages to the author who developed the scale.

Ethical approval was obtained from the ethics committee of the university where the study was conducted (Aproval number: 2021/250 Date: 09.11.2021), and institutional permission was also obtained. The patients were informed about the study before the data collection. They were assured that the data obtained would be kept confidential, and their verbal and written consents were obtained.

3 | Findings

3.1 | Descriptive Characteristics of Participants

The mean age of the 181 patients who underwent coloscopy was 54.4 ± 12.9 years (range: 18–87), 53% were female, 47% were male, 82.3% were married, 54.7% had primary school education level and 64.1% were unemployed. When the reasons for colonoscopy were analysed, it was determined that 56.9% had colonoscopy done due to a symptom, 43.1% for screening or check-up purposes and that 53% of the patients had a previous colonoscopy experience (Table 2).

TABLE 2 | Descriptive characteristics ($n = 181$).

Variables	*n* (%)
Age, mean (Sd)	54.4 (12.9)
Gender	
Female	96 (53.0)
Male	85 (47.0)
Marital status	
Married	149 (82.3)
Single	32 (17.7)
Educational status	
Elementary school	99 (54.7)
High school	43 (23.8)
University	39 (21.5)
Income status	
Income lower than expenses	40 (22.1)
Income equal to expenses	135 (74.6)
Employment status	
Homemaker/retired	116 (64.1)
Actively working	65 (35.9)
Reason for the procedure	
Symptom	103 (56.9)
Screening/check-up	78 (43.1)
Previous colonoscopy	
Yes	96 (53.0)
No	85 (47.0)

Abbreviation: Sd, standard deviation.

3.2 | Reliability Analyses

3.2.1 | Time Invariance (Test–Retest)

When the relationship between pretest and posttest was examined, it was determined that Pearson correlation coefficients varied between 0.82 and 0.97. A highly positive relationship was found between pretest–posttest item scores ($p < 0.001$) (Table 3).

3.2.2 | Internal Consistency Analysis

When the Cronbach's alpha coefficients of the satisfaction questionnaire total scale and subscales were examined, the reliability coefficient was found to be $\alpha = 0.86$ for the total scale, $\alpha = 0.82$ for the information subscale, $\alpha = 0.69$ for the care subscale and $\alpha = 0.718$ for the service environment and facilities subscale. These findings indicated that the reliability level of the satisfaction questionnaire was rather high. When the correlation of the item-total scores for the 13 items on the scale was analysed, the correlation coefficients ranged from $r = 0.300$ to $r = 0.706$, indicating a positive and sufficient relationship between the items. As the item-total correlation value of the items in the safety subscale was under 0.30, these items were removed from the scale (Table 4).

3.3 | Validity Analyses

3.3.1 | Content Validity

In the evaluation of the items on the total scale, the mean score given by 10 experts was found to be 3.70 ± 0.22 over 4 points for 18 items. In addition, the mean score given by the 10 experts regarding the adaptation of the title of the scale was found to be 3.90 ± 0.32 over 4 points. In item IVI calculation, all 10 experts evaluated the whole 18 items. Of the 18 items, 14 received 3 or 4 points from all experts. It was determined that item IVI was

TABLE 3 | Colonoscopy satisfaction and safety scale test–retest correlation analysis.

Findings regarding the validity and reliability of the scale reliability analyses time invariance			
Item no.	**Statements on the satisfaction questionnaire**	***r***	***p*-value**
1	Comprehensibility and usefulness of the information received during preparation for colonoscopy	0.908	< 0.001*
2	Explanations regarding the risks of colonoscopy and why it has been recommended	0.919	< 0.001*
3	Time spent in the endoscopy waiting room until being called for the procedure	0.948	< 0.001*
4	Comfort of the waiting room in the endoscopy waiting room	0.914	< 0.001*
5	The attitudes of the endoscopy unit employees while replying to my concerns and questions before colonoscopy	0.843	< 0.001*
6	Comfort and security of the dressing room, wardrobes and lockers	0.825	< 0.001*
7	Information provided about what I should do on the day of colonoscopy and what I could feel during the procedure (feelings, potential discomfort, etc.)	0.967	< 0.001*
8	Effectiveness of the methods used during colonoscopy in order to alleviate the pain	0.961	< 0.001*
9	Comfort and privacy of the resting room where I stayed after the procedure	0.846	< 0.001*
10	Information about the results received from the relevant physician immediately after the procedure is completed	0.863	< 0.001*
11	Receiving information about how I would feel when I get home after the colonoscopy and what I should do in case of an emergency (phone number to be called in emergency)	0.971	< 0.001*
12	Recommendations received from the healthcare professionals (nurses and assistants) on the day of the procedure about the treatment and behaviours	0.941	< 0.001*
13	Approach of the physician performing the procedure and the treatment applied	0.877	< 0.001*
A	General satisfaction with the treatment and services provided during the procedure...	0.867	< 0.001*
B	The time that passed from the colonoscopy recommendation by the physician till the colonoscopy procedure	0.813	< 0.001*

Note: r, Pearson correlation test.
*$p < 0.001$.

higher than 0.78 for each item. Assuming that the scale used in the study had one dimension, the IVI value for one dimension was calculated as 0.95.

CVR values were obtained over the opinions of the 10 experts regarding the items. There were no items with 0 or negative (lower than 0) CVR values. Accordingly, the CVR value for the 10 experts participating in the study was 0.520. As a result, it was decided to keep the 18 items on the scale.

3.3.2 | Construct Validity (Factor Analysis)

With CFA, the RMSEA value of the model was found to be 0.063. The chi-square value was found to be statistically significant ($\chi^2 = 102.87$; $n = 181$, SD = 60, $\chi^2/df = 1.71$, $p < 0.001$); χ^2/df (102.87/60) = 1.71 was determined in the model. In addition, when the *t* values of the model were examined, it was seen that all items were significantly predicted by their subscales (Table 5, Figure 1).

According to CFA results, factor loads of the scale items of the satisfaction questionnaire varied between 0.50 and 0.97. According to control variables (waiting time [B] and general satisfaction [A]), satisfaction questionnaire subscales achieved sufficient estimation capacity ($p < 0.001$). The subscales were named as information, care, and service environment and facilities. While the satisfaction questionnaire total scale score was calculated as 2.74 ± 0.66, this value for the subscales was calculated as 2.67 ± 0.86 for information, 3.33 ± 0.75 for care and 2.20 ± 0.79 for service environment and facilities. The lowest satisfaction level was found in the subscale of service environment and facilities (Table 6).

4 | Discussion

To ensure a measurement tool is of sufficient quality for use, its validity and reliability must be tested, and the tool should be deemed suitable. The consistency of a measurement tool is tested by applying it to the same participants at different times. As a result, time invariance of the findings obtained is determined. Scales that are applied in order to measure the attitudes of the participants are usually applied again 2 or 3 weeks later (Coskun 2020). In the literature, 0.70 has been reported to be a sufficient value for the reliability coefficient (Karakoc and

TABLE 4 | Item-total score correlation coefficients of the Colonoscopy Satisfaction and Safety Questionnaire and Cronbach's alpha values of the subscales.

Internal consistency			
	Statements on the satisfaction questionnaire	**Cronbach's alpha**	**Total**
Item no.	**Information (F1)**	**$\alpha = 0.829$**	***r***
1	Comprehensibility and usefulness of the information received during preparation for colonoscopy		0.575
2	Explanations regarding the risks of colonoscopy and why it has been recommended		0.621
7	Information provided about what I should do on the day of colonoscopy and what I could feel during the procedure (feelings, potential discomfort, etc.)		0.693
10	Information about the results received from the relevant physician immediately after the procedure is completed		0.502
11	Receiving information about how I would feel when I get home after the colonoscopy and what I should do in case of an emergency (phone number to be called in emergency)		0.675
	Care (F2)	$\alpha = 0.690$	
3	Time spent in the endoscopy waiting room until being called for the procedure		0.538
5	The attitudes of the endoscopy unit employees while replying to my concerns and questions before colonoscopy		0.554
8	Effectiveness of the methods used during colonoscopy in order to alleviate the pain.		0.300
12	Recommendations received from the healthcare professionals (nurses and assistants) on the day of the procedure about the treatment and behaviours		0.688
13	Approach of the physician performing the procedure and the treatment applied		0.706
	Service environment and facilities (F3)	$\alpha = 0.718$	
4	Comfort of the waiting room in the endoscopy waiting room		0.524
6	Comfort and security of the dressing room, wardrobes and lockers		0.432
9	Comfort and privacy of the resting room where I stayed after the procedure		0.421
	CSSQP satisfaction total	$\alpha = 0.866$	

Note: r, Pearson correlation test.

TABLE 5 | Colonoscopy satisfaction questionnaire confirmatory factor analysis goodness of fit results.

Validity analyses			
Construct validity (factor analysis)			
Fit criteria	**Good fit**	**Acceptable limit**	**Goodness of fit results**
Chi-square	0 < chi-square < 2 df	2 sd < chi-square < 3 df	Chi-square = 102.87 < 2 df = 60
Chi-square/df	0 < chi-square/df < 2	2 < chi-square/df < 3	Chi-square/df = 0 < 1.71 < 2
RMSEA	0 < RMSEA < 0.05	0.05 < RMSEA < 0.08	0.063 (90% CI = 0.042–0.083)
SRMR	0 < SRMR < 0.05	0.05 < SRMR < 0.10	0.053
NFI	0.95 < NFI < 1.00	0.90 < NFI < 0.95	0.95
NNFI	0.97 < NNFI < 1.00	0.95 < NNFI < 0.97	0.97
CFI	0.97 < CFI < 1.00	0.95 < CFI < 0.97	0.97
GFI	0.95 < GFI < 1.00	0.90 < GFI < 0.95	0.92
RFI	0.90 < RFI < 1.00	0.85 < RFI < 0.90	0.93

Abbreviations: Comparative fit index (CFI), goodness of fit index (GFI), normed fit index (NFI), non-normed fit index (NNFI), relative fit index (RFI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR).

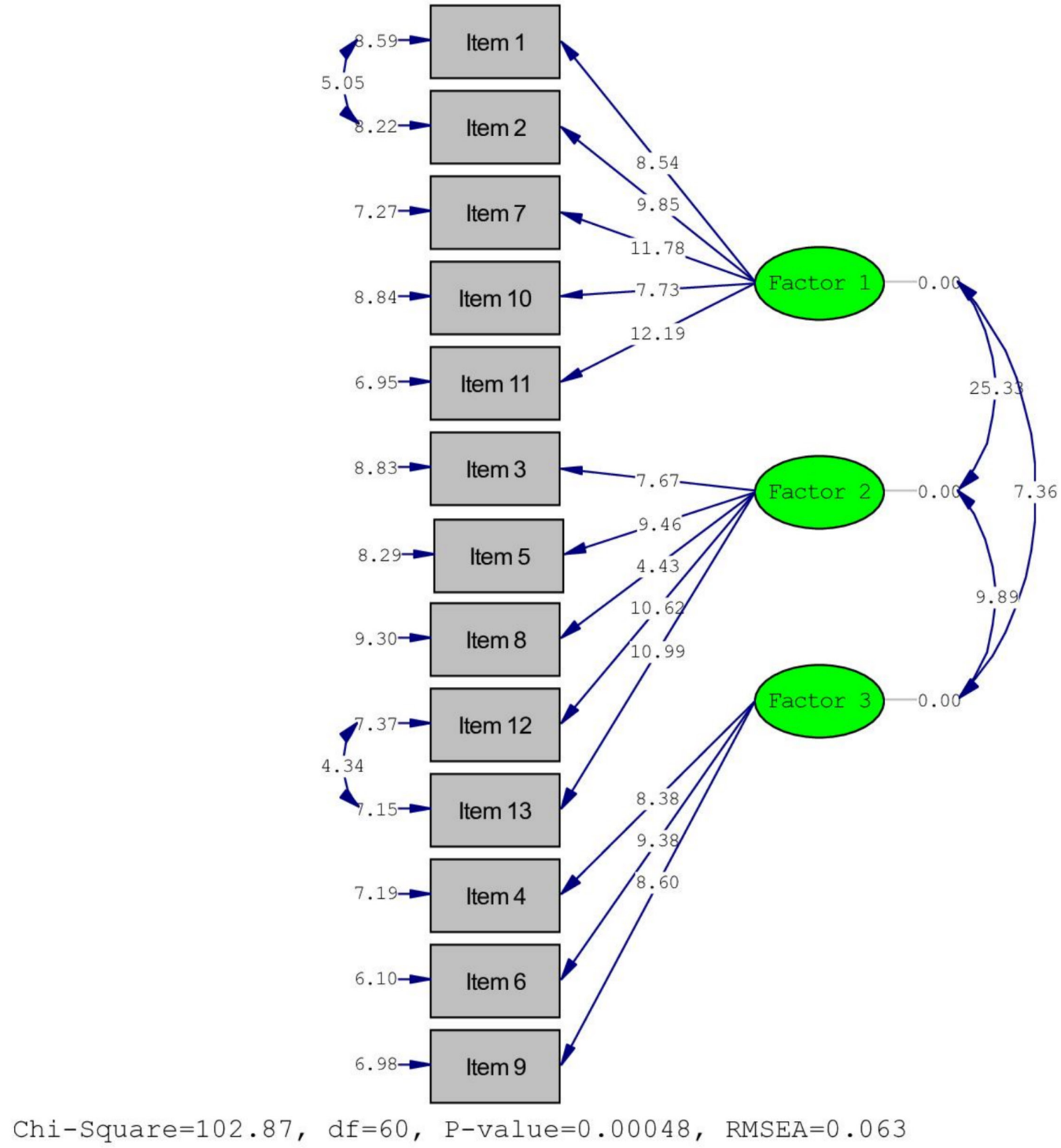

FIGURE 1 | Colonoscopy Satisfaction Questionnaire confirmatory factor analysis.

Dönmez 2014). Regarding the scores between the two tests, as the correlation approaches 1, it shows a high degree of relationship (Köneş et al. 2021). Accordingly, when the relationship between test and retest was examined, Pearson correlation coefficients were determined to vary between 0.82 and 0.97. Based on this finding, the scale was determined to be reliable due to its property of time invariance.

Cronbach's alpha reliability analysis was performed in order to evaluate the scale's internal consistency. The Cronbach's alpha coefficient for the satisfaction questionnaire total scale was calculated as $\alpha = 0.86$. Similarly, the Cronbach's alpha coefficient of the original scale was found to be 0.86 (Brotons et al. 2019). Cronbach's alpha coefficient can be calculated for each subscale as well as for the total reliability mean score of the scale. When the Cronbach's alpha value is 0.70 and above, it is thought that the scale has internal consistency. Approximation of this value to 1 shows that the items on the scale have high internal consistency (Aksoy et al. 2019; Martino et al. 2019). With these findings, the satisfaction scale

TABLE 6 | Colonoscopy satisfaction questionnaire confirmatory factor analysis—factor loads.

Item no.	Items	Information (F1)	Care (F2)	Service environment and facilities (F3)
1	Comprehensibility and usefulness of the information received during preparation for colonoscopy	0.58		
2	Explanations regarding the risks of colonoscopy and why it has been recommended	0.79		
7	Information provided about what I should do on the day of colonoscopy and what I could feel during the procedure (feelings, potential discomfort, etc.)	0.82		
10	Information about the results received from the relevant physician immediately after the procedure is completed	0.67		
11	Receiving information about how I would feel when I get home after the colonoscopy and what I should do in case of an emergency (phone number to be called in emergency)	0.97		
3	Time spent in the endoscopy waiting room until being called for the procedure		0.78	
5	The attitudes of the endoscopy unit employees while replying to my concerns and questions before colonoscopy		0.63	
8	Effectiveness of the methods used during colonoscopy in order to alleviate the pain.		0.50	
12	Recommendations received from the healthcare professionals (nurses and assistants) on the day of the procedure about the treatment and behaviours		0.63	
13	Approach of the physician performing the procedure and the treatment applied		0.57	
4	Comfort of the waiting room in the endoscopy waiting room			0.61
6	Comfort and security of the dressing room, wardrobes and lockers			0.71
9	Comfort and privacy of the resting room where I stayed after the procedure			0.69
	KMO, mean ± SD	2.67 ± 0.86	3.33 ± 0.75	2.20 ± 0.79
	Predictive/empirical validity (waiting time)	$B = 0.57$ (0.41–0.73), $p < 0.001$*	$B = 0.64$ (0.46–0.83), $p < 0.001$*	$B = 0.38$ (0.19–0.57), $p < 0.001$*
	Predictive/empirical validity (overall satisfaction)	$B = 0.72$ (0.60–0.84), $p < 0.001$*	$B = 0.86$ (0.72–0.99), $p < 0.001$*	$B = 0.54$ (0.38–0.69), $p < 0.001$*

Abbreviation: KMO, Kaiser–Meyer–Olkin.

was found to have a high level of reliability. The item-total correlation value of the safety subscale of the scale was 0.30. For the item-total correlation to have high discrimination, this value should be higher than 0.30 (Martinez-Martin et al. 2013; Yilmaz and Altinkurt 2013).

In the evaluation of the validity of the Colonoscopy Satisfaction Questionnaire, after linguistic validity was performed, scale items were presented to experts for scope evaluation. If the number of the experts included in the panel is more than 5, item IVI value should not be lower than 0.78 (Lynn 1986). In the present study, the IVI value for one dimension was calculated as 0.95. Given that the number of experts was 10, the validity index was determined to be high.

CVR was interpreted by considering the critical values table developed by Wilson et al. (2012). According to the CVR calculated for between 5 and 40 experts, the CVR for the 10 experts participating in the study was 0.52. Accordingly, it was decided to keep the 18 items on the scale.

CFA is an analysis used in order to confirm the previously determined factor structure. It analyses to what degree the items on the scale measure accurately. In order to accept CFA results as valid, GFIs of the scale should be at a sufficient level (Telef 2013; Yalcin and Cicekler 2021). Among CFA GFIs, if the chi-square test is found to be significant and when the chi-square test is divided by the degree of freedom and gets a value between 0 and 3, it is considered that the model has a perfect GFI (Yalcin and Cicekler 2021). An RMSEA value lower than 0.05 is accepted as normal, and a value lower than 0.10 is considered acceptable (Satilmis et al. 2021; Telef 2013). Accordingly, it can be seen that the scale items are fit. Besides, when the *t* values of the model are examined, it is seen that all items are significantly predicted by their own subscales.

According to CFA results, factor load values of the satisfaction scale items varied between 0.50 and 0.97. Each factor load should be a minimum of 0.30. It was seen that factor loads of the items under the satisfaction subscale were sufficient. In order for a factor to be stable, it should consist of at least three items (Karaman et al. 2017; Satilmis et al. 2021). The safety subscale of the scale consisted of two items, and there was one predictive question. As the parameters aimed to be measured were different, it was not deemed appropriate to merge the items of the safety subscale under the satisfaction subscale. As the items on the safety subscale of the scale were not found to be reliable, these items were removed from the scale, and it was decided to use the scale as the 'colonoscopy satisfaction scale'.

4.1 | Limitations of the Study

The institution where the study was conducted was a hospital located in a big city admitting a great number of patients. In January 2022, when COVID-19 cases began to rise again, planned colonoscopy procedures were postponed, and only emergency procedures were performed. Therefore, though temporarily, the data collection process was paused for some time. Exploratory factor analysis was not carried out in order not to change the position of the items in the sub-dimensions of the scale (to maintain the originality of the scale). A limitation of this study is that exploratory factor analysis was not conducted.

5 | Conclusion

The findings obtained in the study showed that the final version of 'the Colonoscopy Satisfaction and Safety Questionnaire (CSSQP)' could be used as 'Colonoscopy Satisfaction Scale' in Turkey. The scale is a valid and reliable tool that can be used by nurses who provide care to patients undergoing colonoscopy.

In light of these findings, many components were shown to affect patient satisfaction. Hence, the Turkish-adapted Colonoscopy Satisfaction Questionnaire, which consists of a total of 15 items, including 13 satisfaction items and two predictive items, can be used to determine patient satisfaction levels. This scale can be used not only in clinical practice but also in education, for quality improvement programmes and research evaluating patient experience. In particular, the presence of a colonoscopy-specific satisfaction scale adapted to Turkish allows patients to evaluate their satisfaction with factors such as the colonoscopy waiting room, information about colonoscopy and post-colonoscopy complications. This is important as for service quality improvement there is a need for studies to determine the satisfaction levels of colonoscopy patients and the factors that increase satisfaction.

Author Contributions

Study design: H.M.A., İ.Ç., and M.K. Data collection: H.M.A. Data analysis: H.M.A. and İ.Ç. Study supervision: H.M.A. and İ.Ç. Manuscript writing: H.M.A. Critical revisions for important intellectual content: H.M.A., İ.Ç., and M.K.

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Disclosure

Our paper titled 'Validity and Reliability Study: [Adaptation of The Colonoscopy Satisfaction and Safety Questionnaire to Turkish Language and Determination of Its Psychometric Properties]' has been submitted. This study focuses on assessing the validity and reliability of scale items. Our research has been designed to examine the accuracy and repeatability of scales, without involving a specific intervention or procedure associated with clinical trials. Therefore, we believe that this is not a study that requires a clinical trial number. The primary goal of our study is to provide valuable insights into the usability and reliability of the scales. We would like to emphasize that the nature and purpose of our study do not necessitate obtaining a clinical trial number. While adapting the scale, we followed the steps suggested by WHO and explained this in the method section. We are committed to making any necessary revisions to our paper in accordance with your recommendations and guidelines.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

Aci, O. S., D. Gencbas, E. Ciydem, and O. Kackin. 2024. "Validity and Reliability Study of the Turkish Version of the Salutogenic Health Indicator Scale." *International Journal of Nursing Practice* 30, no. 2: e13231. https://doi.org/10.1111/ijn.13231.

Aksoy, S. D., K. Mert, and İ. Çetin. 2019. "Reliability and Validity of the Conscience Perception Scale in Turkish Nurses." *Celal Bayar University Journal of Institute of Health Sciences* 6, no. 3: 148–153. https://doi.org/10.34087/cbusbed.599744.

Aytepe, U. E., and E. Donmez. 2022. "The Colorectal Cancer Screening Behaviors, Affecting Factors and Nonadherence in Turkey: A Systematic Review." *Journal of Public Health Nursing* 4, no. 1: 56–76. https://doi.org/10.54061/jphn.980767.

Brotons, A., M. Guilabert, F. J. Lacueva, et al. 2019. "The Colonoscopy Satisfaction and Safety Questionnaire (CSSQP) for Colorectal Cancer Screening: A Development and Validation Study." *International Journal of Environmental Research and Public Health* 16, no. 3: 392. https://doi.org/10.3390/ijerph16030392.

Brotons, A., C. Mangas-Sanjuan, J. Cubiella, et al. 2024. "Colonoscopy Satisfaction and Safety Questionnaire Based on Patient Experience (CSSQP): A Valuable Quality Tool for All Colonoscopies." *Gastroenterología y Hepatología* 47, no. 1: 1–13. https://doi.org/10.1016/j.gastrohep.2023.02.003.

Buyukozturk, S. 2002. "Factor Analysis: Basic Concepts and Using to Development Scale." *Educational Administration in Theory & Practice* 32: 470–483.

Coskun, S. 2020. "Cancer Awareness Measure Mythical Causes Scale (Cam-Mycs): Validity and Reliability of the Turkish Version." *Eskisehir Turkish World Application and Research Center Public Health Journal* 5, no. 3: 430. https://doi.org/10.35232/estudamhsd.745643.

El Zoghbi, M., and L. C. Cummings. 2016. "New Era of Colorectal Cancer Screening." *World Journal of Gastrointestinal Endoscopy* 8, no. 5: 252–258. https://doi.org/10.4253/wjge.v8.i5.252.

Esin, N. M. 2014. "Data Collection Methods & The Reliability and Validity of Data Collection Tools." In *Nursing Research: Process, Application, and Critique*, edited by S. Erdogan, N. Nahcivan, and N. M. Esin, 2nd ed., 193–232. Nobel Medical Bookstores.

Fernandez-Landa, M., A. Aginagalde, E. Arana-Arri, et al. 2019. "Quality Indicators and Patient Satisfaction in Colonoscopy." *Gastroenterology Hepatology* 42, no. 2: 73–81. https://doi.org/10.1016/j.gastre.2019.02.012.

Gálvez, M., A. M. Zarate, H. Espino, F. Higuera-de la Tijera, R. A. Awad, and S. Camacho. 2017. "A Short Telephone-Call Reminder Improves Bowel Preparation, Quality Indicators and Patient Satisfaction With First Colonoscopy." *Endoscopy International Open* 5, no. 12: E1172–E1178. https://doi.org/10.1055/s-0043-117954.

Johanson, G. A., and G. P. Brooks. 2010. "Initial Scale Development: Sample Size for Pilot Studies." *Educational and Psychological Measurement* 70, no. 3: 394–400. https://doi.org/10.1177/0013164409355692.

Karakoc, F. Y., and L. Dönmez. 2014. "Basic Principles of Scale Development." *World of Medical Education* 13, no. 40: 39–49. https://doi.org/10.25282/ted.228738.

Karaman, H., B. Atar, and D. Ç. Aktan. 2017. "The Comparison of Factor Extraction Methods Used in Exploratory Factor Analysis." *Gazi University Faculty of Education Journal* 37, no. 3: 1173–1193. https://doi.org/10.17152/gefad.309356.

Kennedy, I. 2022. "Sample Size Determination in Test-Retest and Cronbach Alpha Reliability Estimates." *British Journal of Contemporary Education* 2, no. 1: 17–29. https://doi.org/10.52589/BJCE-FY266HK9.

Koc, Ş. 2017. "Colorectal Cancer Prevention: Colorectal Cancer Risk Counseling." *Florence Nightingale Journal of Nursing* 25, no. 1: 69–76. https://doi.org/10.17672/fnhd.95845.

Köneş, M. O., M. M. Kaydirak, S. Baytar, İ. Yetkin, F. Kizoglu, and U. Oskay. 2021. "Turkish Adaptation of the Perinatal Grief Intensity Scale: A Validity and Reliability Study." *Journal of Health Science* 30, no. 3: 289–294. https://doi.org/10.34108/eujhs.1040374.

Latos, W., D. Aebisher, M. Latos, et al. 2022. "Colonoscopy: Preparation and Potential Complications." *Diagnostics* 12, no. 3: 747. https://doi.org/10.3390/diagnostics12030747.

Lawshe, C. H. 1975. "A Quantitative Approach to Content Validity." *Personnel Psychology* 28, no. 4: 563–575.

Lee, Y. J., E. S. Kim, K. S. Park, et al. 2015. "Education for Ward Nurses Influences the Quality of Inpatient's Bowel Preparation for Colonoscopy." *Medicine* 94, no. 34: e1423. https://doi.org/10.1097/MD.0000000000001423.

Liu, S. C., and H. Zhang. 2024. "Early Diagnostic Strategies for Colorectal Cancer." *World Journal of Gastroenterology* 30, no. 33: 3818–3822. https://doi.org/10.3748/wjg.v30.i33.3818.

Loftus, R., Z. Nugent, L. A. Graff, F. Schumacher, C. N. Bernstein, and H. Singh. 2013. "Patient Satisfaction With the Endoscopy Experience and Willingness to Return in a Central Canadian Health Region." *Canadian Journal of Gastroenterology and Hepatology* 27, no. 5: 259–266. https://doi.org/10.1155/2013/615206.

Lynn, M. R. 1986. "Determination and Quantification of Content Validity." *Nursing Research* 35, no. 6: 382–385.

Marcuello, M., V. Vymetalkova, R. P. Neves, et al. 2019. "Circulating Biomarkers for Early Detection and Clinical Management of Colorectal Cancer." *Molecular Aspects of Medicine* 69: 107–122. https://doi.org/10.1016/j.mam.2019.06.002.

Martinez-Martin, P., C. Rodriguez-Blazquez, M. Alvarez-Sanchez, et al. 2013. "Expanded and Independent Validation of the Movement Disorder Society–Unified Parkinson's Disease Rating Scale (MDS-UPDRS)." *Journal of Neurology* 260: 228–236. https:doi.org/10.1007/s00415-012-6624-1.

Martino, F., G. Caselli, E. Fiabane, et al. 2019. "Desire Thinking as a Predictor of Drinking Status Following Treatment for Alcohol Use Disorder: A Prospective Study." *Addictive Behaviors* 95: 70–76. https://doi.org/10.1016/j.addbeh.2019.03.004.

Ng, S. C., and S. H. Wong. 2013. "Colorectal Cancer Screening in Asia." *British Medical Bulletin* 105, no. 1: 29–42. https://doi.org/10.1093/bmb/lds040.

Pirincci, S., C. Benli, and P. Okyay. 2015. "Patients Admitted to Tertiary Health Care Center Colorectal Cancer Screening Program Awareness Study." *TAF Preventive Medicine Bulletin* 14, no. 3: 209–214. https://doi.org/10.5455/pmb.1-1398327138.

Sahin, N. S., and B. A. Uner. 2015. "Knowledge of, Attitudes Toward, and Barriers to Participation of Colorectal Cancer Screening in Aydın Central Region." *Journal of the Turkish Association of Family Physicians* 19, no. 1: 37–48. https://doi.org/10.15511/tahd.15.01037.

Samur, M., S. Seren Intepeler, and S. C. Lam. 2020. "Adaptation and Validation of the Compliance With Standard Precautions Scale Amongst Nurses in Turkey." *International Journal of Nursing Practice* 26, no. 3: e12839. https://doi.org/10.1111/ijn.12839.

Satilmis, İ. G., M. M. Kaydirak, S. Akın, and D. C. Potur. 2021. "Turkish Adaptation of the Oncology Fertility Preservation Survey: A Validity

and Reliability Study." *Journal of Ankara Health Sciences* 10, no. 2: 1–12. https://doi.org/10.46971/ausbid.890220.

Telef, B. B. 2013. "The Adaptation of Psychological Well-Being Into Turkish: A Validity and Reliability Study." *Hacettepe University Journal of Education* 28, no. 28–3: 374–384.

Tuncez, İ. H., N. Aksoy, and M. Koc. 2021. "National Cancer Screening Program Results; A City Example." *Phoenix Medical Journal* 3, no. 2: 69–73. https://doi.org/10.38175/phnx.922780.

WHO. 2018. "Process of Translation and Adaptation of Instruments." https://www.coursehero.com/file/30372721/WHO-Process-of-translation-and-adaptation-of-instrumentspdf/.

Wilson, F. R., W. Pan, and D. A. Schumsky. 2012. "Recalculation of the Critical Values for Lawshe's Content Validity Ratio." *Measurement and Evaluation in Counseling and Development* 45, no. 3: 197–210. https://doi.org/10.1177/0748175612440286.

Yalcin, M. M., and C. Y. Cicekler. 2021. "Teaching for Creativity Scales: The Study of Validity and Reliability." *OPUS International Journal of Society Research* 18, no. special issue: 5033–5066. https://doi.org/10.26466/opus.954244.

Yilmaz, K., and Y. Altinkurt. 2013. "Adaptation of Organizational Climate Scale into Turkish: The Validity and Reliability Study." *Trakya University Journal of Education* 3, no. 1: 1–11.