



## RESEARCH ARTICLE

# Validity and reliability of the Turkish version of the Commitment to Quitting Smoking Scale

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### ABSTRACT

**Objective:** The primary aim of this study is to adapt the Commitment to Quitting Smoking Scale (CQSS) to Turkish and to conduct its reliability and validity studies in a Turkish sample.

**Method:** The study involved a total of 314 smokers, comprising 178 (56.7%) women and 136 (43.3%) men, aged between 18 and 65. Statistical analysis included item-total score correlation coefficients, internal consistency coefficient, test-retest reliability, confirmatory factor analysis, criterion-dependent validity, and discriminant validity methods.

**Results:** Confirmatory factor analysis showed that the Turkish version of the CQSS maintains the single-factor structure of the original form ( $\chi^2=35.042$ ,  $\chi^2/df=2.061$ , Root Mean Square Residual (RMR)=0.035, Comparative Fit Index (CFI)=0.989, Goodness of Fit Index (GFI)=0.974, Root Mean Square Error of Approximation (RMSEA)=0.058). In convergent validity, significant correlations were observed between the CQSS and other measures like the Fagerstrom Test for Nicotine Dependence (FTND) and the Questionnaire of Smoking Urges-Brief (QSU-Brief). For discriminant validity, the 27% lower and upper groups method was used, revealing significant differences in the CQSS scores between participants in these groups. In reliability analysis, the Cronbach's alpha coefficient for the CQSS was found to be 0.91. Test-retest reliability analysis showed a correlation coefficient of 0.71 between two measurements.

**Conclusion:** When considering all the findings, it is evident that the CQSS possesses adequate psychometric properties within the sample of the Turkish-speaking population.

**Keywords:** Addiction, smoking cessation, quitting smoking, commitment, validity

## INTRODUCTION

It is evident that smoking has become a global epidemic, spreading rapidly. The alarming statistic that every 6.5 seconds, a smoker dies from a smoking-related disease highlights the severity of this epidemic (1).

Although 70% of smokers express a desire to quit smoking, far fewer manage to stay away from cigarettes in the long run. Factors such as lack of

support for quitting smoking, negative feelings, and severe withdrawal symptoms are often described as problems by smokers (2). The fact that quitting smoking is seen as a process involving many changes and challenges, leading to low quitting rates, necessitates a closer understanding of this process. In this context, determining the processes that are effective in quitting will contribute to both the relevant literature and clinical practice.

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Commitment is described as a phenomenon that has an undeniable effect on the change of human behavior (3). It is highly related to quitting smoking and is defined as continuing not to smoke even in the presence of possible difficulties in the process (4). Although commitment has been found to have a stronger effect on smoking cessation than other related concepts (4), studies have tended to focus on the reasons for quitting or the benefits of quitting. There is a need to expand the literature on commitment to quit smoking (5).

As a result, the development of a tool to assess the level of commitment to quit smoking in Turkish individuals is predicted to shape the current understanding of smoking cessation. It will be useful in evaluating the intervention methods structured to develop commitment in individuals who want to quit smoking and to achieve successful long-term cessation results. Finally, the main aim of this study is to carry out the Turkish adaptation of the Commitment to Quitting Smoking Scale (CQSS), and its reliability and validity studies in the Turkish sample.

## METHOD

### Procedure

To conduct this research, approval was obtained from the Social Sciences Scientific Research Ethics Committee of Istanbul Medipol University (number: 70, date: 22.06.2021). Initially, permission to use the CQSS was acquired via email from its developers. During the translation phase, three mental health experts, who were considered to have a good command of both languages, translated the scale. The three texts were then compared in terms of language and meaning, and the most appropriate items were selected. The current version of the scale was then given to another expert, who was considered fluent in both languages, and translated from Turkish into English. After the back-translation, the original text and the final text were compared, resulting in the new Turkish form of the scale. The Turkish form was administered to 49 people in a preliminary study. As part of the preliminary study, the item-total score correlation and the Cronbach's alpha value of the scale were calculated. The Cronbach's alpha value of the scale was found to be  $\alpha=0.88$ . Within the framework of the item analysis, it was found that the correlation values varied between  $r=0.562$  (item 1) and  $r=0.833$  (item 5). As a result, it was concluded that there was no item that should be removed from the scale.

Additionally, feedback on the scale was obtained from participants in the preliminary study, and it was understood that there were no items with ambiguous meanings. Finally, the data for the large sample were collected online over a period of approximately two months (July 2021 - August 2021).

### Sample

Inclusion criteria for the research were defined as being able to read and write, being between the ages of 18 and 65, being a regular smoker, abstaining from smoking for about three hours, and volunteering to participate in the research. Participants were asked not to smoke for three hours for two reasons. The first reason was to ensure that participants completed the scales when they had the urge to smoke, and the second was to comply with the instructions in the adaptation study of the Questionnaire of Smoking Urges-Brief (QSU-Brief) used in the study. A snowball sampling method was used to form the sample of regular smokers in a university environment in Istanbul. Participants who volunteered were assigned to the study. Through an online survey website, data were collected from 330 participants. Those with significant missing data were excluded from the study, and statistical analyses were performed on the data of 314 participants. The mean age was 28.12 years ( $SD=8.602$ ), ranging from 18 to 65 years.

### Measures

#### *Sociodemographic Data Form*

This form, prepared by the researchers, includes the participant's gender, age, educational status, marital status, statements about quitting smoking, and the age at which they started smoking.

#### *Turkish Version of the Commitment to Quitting Smoking Scale (CQSS)*

The original version of the scale, developed by Kahler et al. (4), evaluates individuals' commitment to quit smoking in the presence of possible difficulties and consists of eight self-reported 5-point Likert-type items. High scores indicate a high commitment to quit smoking. The factor analysis results in the original study showed that the scale had a single-factor structure. The Cronbach's Alpha value of the scale was determined to be  $\alpha=0.91$ .

#### *Fagerstrom Test for Nicotine Dependence (FTND)*

This scale, developed by Heatherton et al. (6), aims to evaluate the severity of physical dependence on nicotine and consists of six items. High scores

indicate high nicotine addiction. The validity and reliability study of the Turkish version of the scale was conducted by Uysal et al. (7). It was determined that the Turkish version had a unidimensional structure, and the Cronbach's Alpha value calculated for internal consistency was  $\alpha=0.56$ .

#### *Questionnaire of Smoking Urges-Brief (QSU-Brief)*

This scale, containing ten items and developed by Cox et al. (8), evaluates the desires of cigarette addicts towards cigarettes. The Turkish validity and reliability study of the short form of the scale was conducted by Demirezen (9). High scores on the scale indicate a high desire to smoke. The Cronbach's Alpha value of the scale was determined to be  $\alpha=0.92$ .

#### *Acceptance and Action Questionnaire-II (AAQ-II)*

Developed by Bond et al. (10), this scale assesses the level of psychological inflexibility and experiential avoidance in individuals. It consists of seven items and is scored on a 7-point Likert scale. An increase in the score obtained from the scale indicates an increase in the level of psychological inflexibility and experiential avoidance. The Turkish validity and reliability study of the scale was carried out by Yavuz et al. (11). The Cronbach's Alpha value of the scale was determined to be  $\alpha=0.84$ .

#### *Valuing Questionnaire (VQ)*

The original version of this scale was developed by Smout et al. (12). It contains ten items and is scored on a 7-point Likert scale. A high score from the scale indicates that the individual behaves in line with his values in his life. The Turkish validity and reliability study was carried out by Y. Aydin and G. Aydin (13) and includes two subscales: "progress" and "obstruction". The "progress" subscale measures the individual's determination to put into action what is valuable to them; the "obstruction" subscale is defined as avoiding certain experiences and moving away from a value-oriented life. The internal consistency coefficient for the whole scale was found to be  $\alpha=0.78$ , for the progress sub-dimension  $\alpha=0.77$ , and for the obstruction sub-dimension  $\alpha=0.76$ .

#### **Statistical Analysis**

The data collected in the research were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) v.21 and SPSS AMOS v.21 statistical programs. Item-total score analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, confirmatory factor analysis, criterion-dependent validity analysis,

**Table 1: Average scores, standard deviations, and score ranges of the participants from the scales**

	N	Score range	Mean	SD
FTND	314	0-10	3.62	2.724
QSU-brief	314	10-70	31.63	15.891
AAQ-II	314	7-49	24.68	11.398
VQ	314	6-60	32.79	11.204
Progress	314	3-30	19.61	6.289
Obstruction	314	0-30	13.18	7.225
CQSS	314	8-40	22.29	7.683

AAQ-II: Acceptance and Action Questionnaire-II; CQSS: Turkish version of the Commitment to Quitting Smoking Scale; FTND: Fagerstrom Test for Nicotine Dependence; QSU-Brief: Questionnaire of Smoking Urges-Brief; VQ: Valuing Questionnaire.

discriminant validity analysis, test-retest reliability analysis were applied, and the Cronbach's alpha coefficient was calculated.

## **RESULTS**

### **Sociodemographic Characteristics**

56.7% (178) of the participants were female. The educational levels of the participants were distributed as follows: 1.3% had primary school education, 2.9% had secondary school education, 13.4% were high school graduates, 70.7% were undergraduates, and 11.8% were graduate degree holders. Regarding marital status, 74.8% were single, 21% were married, and 4.1% were divorced. It was found that 55.7% of the participants planned to quit smoking in the near future.

### **Scales Analyses**

Table 1 presents the average scores, standard deviations, and score ranges of the participants for each scale.

### **Reliability Analyses**

In the study, internal consistency analysis, item analysis, and test-retest analyses were performed as part of the reliability analysis.

When all eight items of the scale were included in the reliability analysis, the Cronbach's Alpha value was found to be  $\alpha=0.91$ . The item-total score correlation method was used as part of the item analysis. Upon examining the correlation coefficients between the total scores obtained from the Turkish version of the CQSS and the scale items, it was found that the correlation values varied between  $r=0.505$  (item 1) and  $r=0.855$  (item 5) (Table 2).

**Table 2: Item-total score correlation analysis findings**

	T	1	2	3	4	5	6	7	8
T	1								
1	0.505**	1							
2	0.800**	0.357**	1						
3	0.791**	0.344**	0.521**	1					
4	0.847**	0.290**	0.743**	0.572**	1				
5	0.855**	0.322**	0.701**	0.555**	0.853**	1			
6	0.810**	0.292**	0.559**	0.680**	0.579**	0.610**	1		
7	0.814**	0.341**	0.556**	0.638**	0.608**	0.627**	0.625**	1	
8	0.824**	0.276**	0.556**	0.629**	0.625**	0.652**	0.699**	0.699**	1

\*, p<0.05; \*\*, p<0.01.

For the test-retest reliability method, the scale was reapplied to 30 participants after an interval of two weeks. A significant positive correlation with a very high effect level was found between the two measurements ( $r=0.719$ ;  $p<0.001$ ).

**Findings Related to Validity Testing**

Confirmatory Factor Analysis (CFA), criterion-dependent validity, and discriminant validity methods were used in the study to test the validity of the CQSS.

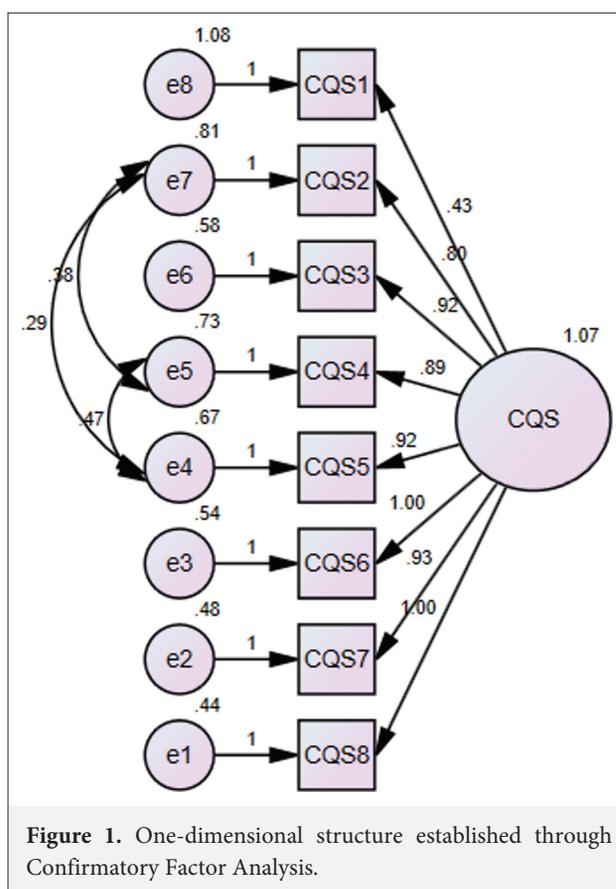
**Construct Validity**

The Kaiser-Mayer-Olkin (KMO) Test and Bartlett's Test were applied to determine the suitability of the present scale for factor analysis. The KMO value for the eight items of the scale was found to be 0.896. Bartlett's Test was found to be significant ( $\chi^2=1,662.551$ ;  $df=28$ ;  $p<0.001$ ).

As a result of the Confirmatory Factor Analysis (CFA), it was determined that the fit index values were not met. Items with high covariance between them, specifically items 2 and 4, 2 and 5, and 4 and 5, were identified according to the modification indices. According to the findings of the analysis, which was applied with the relevant error corrections, it was determined that the fit indices had sufficient values ( $\chi^2=35.042$ ,  $\chi^2/df=2.061$ , Root Mean Square Residual (RMR)=0.035, Comparative Fit Index (CFI)=0.989, Goodness of Fit Index (GFI)=0.974, Root Mean Square Error of Approximation (RMSEA)=0.058). Consequently, this final version is modeled as a one-dimensional structure (Fig. 1).

**Criterion-Related Validity**

Pearson correlation analysis findings were calculated between the scores obtained from the Turkish version of the CQSS and the scores obtained from



**Figure 1.** One-dimensional structure established through Confirmatory Factor Analysis.

the Fagerstrom Test for Nicotine Dependence (FTND), Questionnaire of Smoking Urges-Brief (QSU-Brief), Acceptance and Action Questionnaire-II (AAQ-II), and Valuing Questionnaire (VQ), including its subscales, Progress and Obstruction (Table 3).

**Discriminant Validity**

The mean scores of the 27% group with the lowest scores from the scale and the 27% group with the highest scores were compared using the independent

**Table 3: Pearson Correlation Analysis findings on criterion-related validity**

	CQSS	FTND	QSU-Brief	AAQ-II	VQ	Progress	Obstruction
CQSS	1						
FTND	-0.209**	1					
QSU-Brief	-0.166**	0.410**	1				
AAQ-II	-0.030	0.128*	0.302**	1			
VQ	0.105	-0.123*	-0.143*	-0.562**	1		
Progress	0.071	-0.076	-0.066	-0.366**	0.801**	1	
Obstruction	0.101	-0.124*	-0.164**	-0.553**	0.853**	0.372**	1

\*,  $p < 0.05$ ; \*\*,  $p < 0.01$ . AAQ-II: Acceptance and Action Questionnaire-II; CQSS: Turkish version of the Commitment to Quitting Smoking Scale; FTND: Fagerstrom Test for Nicotine Dependence; QSU-Brief: Questionnaire of Smoking Urges-Brief; VQ: Valuing Questionnaire.

**Table 4: Independent sample t-test results for lower and upper group means**

27% lower and upper group	N	Mean	SD	t	p
Lower group	84	12.56	3.198	-34.230	0.000*
Upper group	84	31.68	3.997		

\*,  $p < 0.05$ .

sample t-test to determine the item discrimination of CQSS (Table 4). A significant difference was found between the mean scores of the lower and upper groups from the scale ( $t = -34.230$ ;  $p < 0.001$ ). The mean of the upper group (mean=31.68), who scored high on the scale, was found to be significantly higher than the mean of the lower group (mean=12.56).

## DISCUSSION

According to the results of this study, correlation coefficients between the total scores from the Turkish version of the CQSS and its scale items ranged from 0.505 (item 1) to 0.855 (item 5). The literature suggests removing items from the scale if the correlation coefficient between the item and the total score is 0.20 (14) or less, or less than 0.30 (15). In this context, the item-total correlation coefficients for the scale items were found to be high. The Cronbach's alpha coefficient was found to be 0.91 for one dimension. For internal consistency to be deemed acceptable, the Cronbach's alpha coefficient should be at least 0.70 (16,17). Given the literature, the Turkish version of the CQSS demonstrates high internal consistency.

The test-retest analysis revealed a positive, significant relationship between the two tests ( $r = 0.719$ ). For the scale to be considered reliable, the correlation coefficient calculated using the test-retest method should be at least 0.70 (18). Therefore, considering all reliability analyses, there is evidence that the Turkish version of the CQSS is a reliable scale for our country's sample.

Regarding the fit indices, items with high covariance were identified as 2-4, 2-5, and 4-5. Items 2 ("No matter how difficult it may be, I won't let myself smoke once I quit.") and 4 ("Even if I really want one, I won't let myself pick up a cigarette once I quit.") exhibit structural and semantic similarities. Similarly, when we look at items 2 ("No matter how difficult it may be, I won't let myself smoke once I quit.") and 5 ("No matter how much I crave a cigarette when I quit, I'm going to resist the urge to smoke."), it is seen that the phrase "No matter how" and the verb "quit" are used in both of them. Finally, items 4 ("Even if I really want one, I won't let myself pick up a cigarette once I quit.") and 5 ("No matter how much I crave a cigarette when I quit, I'm going to resist the urge to smoke.") have elements of semantic and structural similarity in addition to being listed consecutively. It is assumed that all these elements can explain the measurement errors. As a result, it was determined that the fit indices obtained sufficient values according to the findings of the analysis applied after making the relevant error corrections.

Within the scope of determining the criterion-related validity, the correlation between the CQSS and FTND was negative and significant ( $p < 0.01$ ). Evidence in the literature points out that there is a positive and significant relationship between the level of nicotine dependence and some withdrawal symptoms caused by quitting smoking (19). In this context, it has been predicted that physiological dependence on nicotine may influence attitudes towards the difficulties of quitting smoking, and thus the commitment to quitting

smoking. In contrast to our study, the original CQSS study did not find a significant relationship between CQSS and FTND. This difference in findings may be due to the fact that the conditions of participation in the original study required participants to smoke at least ten cigarettes a day for at least one year. Given the sample size of the current study, the significant relationship between the level of addiction and commitment to quit smoking is a finding that should be considered in intervention studies.

It was found that the correlation between the CQSS and QSU-Brief was negative and significant ( $p < 0.01$ ). Considering that the CQSS contains several items aiming to measure the willingness to experience some negative internal experiences in the quitting process, this correlation may be conducive to further studies. Nosen and Woody (20,21) have shown that perceiving the urge to smoke as a negative experience and as something to be controlled by the individual predicts smoking relapse. In this context, the relationship between the commitment to quit smoking and the urge to smoke can be re-examined in future studies.

As psychological inflexibility is a phenomenon that has been found to be associated with many psychopathologies, such as the use of psychoactive substances (22), it was predicted that there would be a significant negative correlation between psychological inflexibility and commitment to quit smoking. However, it was found that there was no significant relationship between AAQ-II and CQSS scores. Similarly, in a study conducted by Singh (23) to determine the effectiveness of an Acceptance and Commitment Therapy (ACT)-based smartphone application and assess the effect of CQSS scores on participants' smoking cessation, it was found that there was no significant correlation between AAQ-II and CQSS scores. Although motivation and commitment to change appear to be processes within the framework of value orientation and psychological flexibility, they can also occur with rule governance, which may explain the lack of a significant relationship between psychological inflexibility and commitment (24). It may be recommended that the possible relationship between rule governance and commitment to quit smoking be investigated in further studies.

According to the prediction of our study, it was expected that there would be a significant relationship between the sub-dimensions of the value-oriented experience level and the commitment to quit smoking. However, according to the results obtained, it was found that there was no significant relationship

between the CQSS and VQ scores. To the best of our knowledge, there is no other study in the literature that examines the relationship between the CQSS and VQ. There is also a paucity of studies in the literature examining the role of value-oriented behavioral tendencies in smoking cessation. In the study by Bricker et al. (25), it was found that the VQ assesses the person's overall purpose in life and the extent to which behaviors associated with value domains are performed holistically, rather than value-oriented smoking cessation behaviors. It can be said that there is a need to expand the literature with further studies.

Within the scope of discriminant validity, the 27% lower and upper groups method was used. There was a significant difference between the lower and upper group t-values ( $p < 0.05$ ). This finding proves that scale items can distinguish participants with high and low scores on the CQSS (26). As a result, when all the validity analyses are examined, it is seen that there is evidence that the CQSS is a valid scale for the sample of our country.

In our study, the mean score obtained from the Turkish version of the CQSS was 22.29 (range=8-40). When considering each item of the scale separately, the average score was 2.8. In the study of the original form of the CQSS, while the total score of the scale was not provided, the average score of each item was, which was determined to be 3.9 (range=2-5). The difference in mean scores between the two studies can be attributed to the fact that the sample in the original study consisted of individuals seeking treatment, who therefore might have had higher motivation to quit smoking.

The Turkish adaptation study of the FTND was conducted with participants who had an average age of 38 years and were attending a smoking addiction clinic. The average addiction severity in this group was found to be 5 ( $\pm 2.5$  standard deviation (SD)). In contrast, in our study, the mean age was 28 years, and the mean severity of dependence was 3.62 ( $\pm 2.72$  SD). The lower mean age of our participants may explain the difference in addiction severity observed between the two studies.

This study has several limitations. Firstly, the data were obtained through self-reported scales. Secondly, the recruitment of participants through online social networks may have impacted the data quality. Third, our research sample predominantly comprises female participants. In contrast, recent studies on smoking in Turkey have shown that smoking is more common among men and less common among women (27). This discrepancy in our research sample may have

affected the generalizability of the results. Fourth, the study did not inquire about participants' use of psychoactive substances or alcohol, nor did it collect data on whether they had a history of psychiatric treatment for addiction or other issues. The absence of these data may have limited the assessment of the potential effects of the aforementioned variables, particularly on the total scores of the scales. Finally, the majority of participants being undergraduates may limit the generalizability of the results, as commitment to quit smoking can vary by age.

Given the undeniable effect of commitment on smoking cessation (28,29), the CQSS's role in both clinical practice and related academic studies is considered valuable, and this study may contribute to future research. In conclusion, the results of this study have demonstrated that the Turkish version of the CQSS is a valid and reliable instrument. Consequently, it can be suggested that the Turkish version of CQSS may be useful in related studies.

Contribution Categories		Author Initials
Category 1	Concept/Design	K.F.Y., S.K.K.
	Data acquisition	S.K.K.
	Data analysis/Interpretation	K.F.Y., S.K.K.
Category 2	Drafting manuscript	K.F.Y., S.K.K.
	Critical revision of manuscript	K.F.Y., S.K.K.
Category 3	Final approval and accountability	K.F.Y., S.K.K.
Other	Technical or material support	K.F.Y., S.K.K.
	Supervision	K.F.Y.

**Ethical Approval:** The Istanbul Medipol Social Sciences Scientific Research Ethics Committee granted approval for this study (date: 22.06.2021, number: 70).

**Informed Consent:** Informed consent was obtained from all participants.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Financial Disclosure:** The authors declare that they have no financial support.

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