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Age-friendly cities and communities questionnaire: A research on Turkish validity and reliability

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ABSTRACT

Purpose: This study has been conducted to test the Turkish Validity and Reliability of the Age-Friendly Cities and Communities Questionnaire.

Materials and Methods: This methodological research has been carried out in a health center in Istanbul between January and April 2021. Between the specified dates, 306 older adults who met the research criteria within the population of the research, who accepted to participate and returned the filled-out questionnaires have been included in the study. The items of the scale are scored between -2, 2 and the scale consists of 20 items and 8 sub-dimensions. After the scale was translated, the content and structure validity tests were carried out.

Results: As a result of the evaluations and analyses, the content validity index of the scale was found to be 0.96. In the explanatory factor analysis conducted in the adaptation of the scale to Turkish, the total variance rate explained was found to be 92.36%. The factor loads of all items ranged between 0.71 and 0.91. The Cronbach Alpha values of the sub-dimensions of the scale ranged from .899 to .969, and the total Cronbach Alpha value was determined as .954. EFA and CFA results showed that the scale consists of 8 sub-dimensions with 20 items and the factor structure is sufficient. Good coherence index values were obtained as a result of CFA.

Conclusion: The Turkish version of the Age-Friendly Cities and Communities Questionnaire is a valid and reliable measurement tool to evaluate age-friendly practices in an area where older adults live.

KEYWORDS

Age-friendly city; older adult; reliability; validity

Introduction

In the report published by the United Nations Population Fund in 2012, "Ageing in the 21st Century: A Celebration and A Challenge," it is stated that the older adults population in the world is steadily increasing.¹ However, with the increasing age, individuals go through some mental, physical, and psychological changes. In this process, although older adults can arrange their living space to a certain extent in line with their needs, they cannot make any changes in the public spaces outside their homes.²

The physical and social environments are the most determining factors for older adults' participation in society. For this reason, older adults need a comfortable, safe, clean, and livable urban environment to be able to live a life in touch with society and run their errands by themselves.³ Sustainable urban projects such as an age-friendly city are required to support an active and healthy life for older adults.⁴ Therefore,

WHO emphasizes the urgent need for restructuring in all sectors of society, especially in the areas of health, social care, transportation, housing, and urban planning. The global "Age-Friendly City" project has been initiated by WHO in order to make cities more accessible and livable.⁵

The age-friendly city is a project designed to provide a livable and accessible environment for older adults in which they can continue their lives actively while also being integrated with society like everyone else in the city, with an increased quality of life. There are eight criteria for an Age-Friendly City. These are outdoor spaces and buildings, transportation, housing, social participation, social inclusion and respect for older adults, information and communication, civic participation and employment, community support, and healthcare services.⁵ Making older adults more visible in the city, designing outdoor spaces to include everyone according to the principle of equality,

improving the conditions for older adults at national, local, and regional levels will also provide benecoherecences such as supporting people with lower income and preventing social isolation.⁶

Considering that two-thirds of the world population is in urban areas,⁷ the urban population will age and the cities need to be made suitable for the older adults.⁸ For this reason, projects and programs that will provide the functionality to older adults living in cities are even more important.⁹ In addition, there is a great need to monitor, measure, and evaluate the age-friendliness of cities and societies.¹⁰ "The Checklist of Key Features of Age-friendly Cities" published by WHO can be used as a map for the self-assessment of a city or community and to make a chart of progress.¹¹ The set of key indicators and the list of research methodologies published by WHO can also be used as additional input parameters for assessment.¹² It should also be considered whether the existing standards and classifications of age-friendly cities are outdated and in order to meet the expectations and challenges of the 21st century, standards should be renewed and implemented together with needs and thoughts of all partners and collaborators interested in the topic.¹³ AFCCQ covers the eight domains of WHO Age-friendly cities model and an additional financial situation domain. AFCCQ allows practitioners and researchers to define the age-friendly status of a city or a community. It also helps monitor the progress (or decrease) about being age-friendly and to monitor the potential effect of policies or social programs.¹⁴ As of 2019, there are four municipalities accepted in the "Age-friendly City" network in Turkey.¹⁵ These are Kadı köy (İstanbul), Beşiktaş (İstanbul), Muratpaşa (Antalya) and Mersin municipalities.¹⁵ In Turkey, there is no specific measurement tool to evaluate areas in which older adults live for age-friendliness. This study has been conducted in order to test the Validity and Reliability of the Turkish version of the Age-Friendly Cities and Communities Questionnaire.

Materials and methods

Type of Research: The research has been conducted methodologically.

The Universe and Sample of the Research: The research has been carried out in a health center in Küçükçekmece district in Istanbul between January and April 2021. The population of the study consisted of 700 older adults registered at the family health center (they are older adults living at home, registered at

a healthcentre). The sample consisted of 306 older adults from the population who met the research criteria, were accepted to participate in the study, and submitted the questionnaires between the specified dates. In the literature, it is stated that when adapting a scale to another culture, the number of participants in the sample should reach at least 5-10 times the number of items in the scale.¹⁶ Therefore, the study was carried out with 306 individuals who met the inclusion criteria. There were three inclusion criteria: only the older adults who were i) 65 years of age and older, ii) living in their own house (not in institutional care) and iii) able to communicate in Turkish were included. For the sample to be representative, the participants included had to reflect specific demographic characteristics of older population. Therefore, participants at all educational levels were included in the study.¹⁷

Data collection tools

The data were collected online by the researchers using the "Demographic Information Form" and "Age-Friendly Cities and Communities Questionnaire (AFCCQ)".

Personal Information Form: The form, created by the researchers, consists of 9 questions to determine the socio-demographic characteristics of the participants (such as age, gender, marital status, years of life in the region they live, education level, property status, people they live with, wheelchair use status, support for care, etc.).

Age Friendly Cities and Communities Questionnaire (AFCCQ): It has been developed by Dikken et al. (2020) to measure the status of age friendliness of cities and societies. The scale consists of 23 items and 9 sub-dimensions. The scale is a 5-point Likert-type scale and the items are scored as -2 (totally disagree); -1 (disagree); 0 (undecided); 1 (agree); 2 (totally agree). The sub-dimensions in the scale are, respectively: "Housing (1, 2)", "Social participation (3-6)", "Respect and social inclusion (7, 8)", "Civic participation and employment (9, 10)", "Communication and information (11, 12)", "Community support and health services (13-17)", "Outdoor spaces and buildings (18, 19)", "Transportation (20, 21)", and "Financial situation (22, 23)". A higher score from the scale indicates that cities and societies are age-friendly.¹⁰

Data collection

The study was conducted with individuals aged 65 or over who were registered at the health center between

January and April 2021. Individuals aged 65 and older were called on the phone and the forms were filled. The questionnaire form prepared with Google Docs program was sent to individuals aged 65 and older who were registered to the health center (through Whatsapp) and they were asked to fill in the form. Individuals who could not read the Questionnaire form and who could not fill in were called on the phone and their forms were filled in by the researcher. In addition, the questionnaire form was sent to individuals aged 65 or over online (Whatsapp, Facebook, Instagram for information and follow-up purposes) through snowball sampling and they were asked to fill out the forms and share them with individuals aged 65 or over. In snowball sampling, the sampling process starts by reaching one of the individuals to be included in the study. The researcher attempts to reach new participants by asking individuals who else would be willing to participate in the study. The data collection stage of the study that continues in this manner is finalized as soon as data saturation is reached.¹⁸ Therefore, the study was completed when 306 older adults have been reached between the specified dates. In addition, the questionnaire form was filled out by 50 people after 15 days for retesting.

Stages in the Adaptation of the Scale to Turkish: Firstly, the necessary permission was obtained from the author for the adaptation of AFCCQ to Turkish. Later, the study was carried out in four stages. In the first stage, language validity was carried out; the scale was translated into Turkish by 2 language experts. After the translation, a single form was created with the expressions in the scale items, and this form was reviewed by 2 Turkish language experts; the suitability of the scale items, Turkish language validity, and cultural suitability were checked and corrections were made. As a result of the corrections, the items of the scale were collected in a single form and translated back to the original language by a foreign language expert.¹⁶ The translated form was checked against the original scale, and it was determined that the Turkish form was similar to the English form. In the second stage, content validity was carried out in order to prove both the language and culture equivalence of the items and the content validity with numerical values.¹⁹ Content Validity Index-CVI is calculated as the percentage of agreement between the opinions of a minimum of 3 and a maximum of 20 experts. In the Content Validity Index, experts are expected to respond with "not suitable (1)", "the item needs to be adjusted (2)", "appropriate but requires small changes (3)", or "very appropriate (4)". In this technique, the

number of experts who marked (4) or (3) is divided by the total number of experts to obtain the "Content Validity Index (CVI)" for the relevant item. If the result of the analysis is greater than 0.80, it is stated that the item is sufficient in terms of content validity. It is stated that items with low CVI may be eliminated.¹⁹ The scale was sent to 5 experts for content validity. After the scoring by 5 field experts, CVI was found to be 96. In the third stage, Explanatory factor analysis and Confirmatory factor analysis were carried out for construct validity.^{16,20} In the fourth stage, in order to determine the reliability of the scale, test-retest reliability in the data collection stage, Cronbach's alpha reliability coefficient, Pearson correlation analysis, item-total score correlation, and composite reliability coefficient (CR) and average variance extracted (AVE) were used.²¹⁻²³

Analysis of Data: Statistical software package programs SPSS 22 and Mplus 7 package program were used in the analysis of the data. In the data analysis, the information from the Demographic Information Form regarding the participants of the study was analyzed through numbers and percentages. For validity study, expert opinions in determining the content and construct validity, Barlett Tests, Kaiser-Meyer-Olkin Index (KMO), Exploratory Factor Analysis, Confirmatory Factor Analysis, Principal Component Analysis) were used. For reliability study, Cronbach's Alpha Coefficient, Pearson Correlation analysis, item-total score correlation, composite reliability coefficient (CR), and average variance extracted (AVE) were used to identify internal consistency and homogeneity.

Research Ethics: Approval was obtained from the Ethics Committee of a Foundation University (2020/12 issue) for the research. Written permission was obtained from the owner of the scale for the adaptation of the AFCCQ, used in the study, to Turkish. The study was conducted in accordance with the principles of the Helsinki Declaration of Human Rights. The purpose of the study was explained to the individuals participating in the study and verbal consent was obtained from them.

Results

The average age of the individuals participating in the study was found to be 75.34 ± 8.43 and the average time period of living in the area of residence was found to be 25.82 ± 18.55 . It was found that 51.3% of the participants are female, 88.6% are married, 43.8% live with their spouse and children, 28.6% are illiterate, 55.6% of them own the house they live in. It was

Table 1. Sociodemographic characteristics of the individuals.

		Mean \pm SD	Min-Max
Age		75.34 \pm 8.43	65-99
Years lived in the current place of residence		25.82 \pm 18.55	1-99
		n	%
Gender	Female	157	51.3
	Male	149	48.7
Marital status	Married	271	88.6
	Single	35	11.4
Educational status	Illiterate	88	28.8
	Literate	63	20.6
	Primary education	37	12.1
	Secondary education	46	15
	High school and higher	47	15.4
The person living in the house with you	My spouse	25	8.2
	My spouse and children	133	43.5
	Alone	134	43.8
Type of residence	Own property	39	12.8
	Rent	170	55.6
	Belongs to a family member	39	12.7
		97	31.7
The state of needing support for daily life activities	Yes	70	22.9
	No	236	77.1
The state of using stick, walker, wheelchair	Yes	44	14.4
	No	262	85.6

found that 22.9% of the participants needed support for their daily life activities and 14.4% used stick, walker and wheelchair (Table 1).

Findings related to validity

Explanatory factor analysis (EFA)

Before construct validity analysis (exploratory and confirmatory factor analysis), factor analysis was performed after the sample size and data set were found to be suitable for analysis. In the first factor analysis, it was found that the item 9 was overlapping. In the literature, if one item has more than one dimension and has a load value of 0.32 and higher, and if the difference between factor load values in the related dimensions are less than 0.10, these items are considered to be overlapping and it is recommended to exclude them from the scale.¹⁶ For this reason, item 9 was excluded. In the second factor analysis performed with 22 items, it was found that item 10 was gathered under a single dimension. It is stated in literature that if an item is in a single dimension, it would be appropriate to exclude it.²³ For this reason, item 10 was excluded. In the third factor analysis performed with 21 items, it was found that item 3 was also gathered in a single dimension and item 3 was also excluded. Analyses were continued with 20 items. In the analysis performed with 20 items, KMO value was found to be 0.888 and Bartlett Sphericity Test was found to be

significant ($\chi^2=7192.721$; $p=0.000$).^{20,24} These findings revealed that the data are suitable for Explanatory Factor Analysis and that the analysis can be continued.¹⁶

In the literature, it is stated that the variance rate explained by a scale should be at least 52%.¹⁶ The explanatory factor analysis showed that the scale explained 92.36% of the total variance (Table 2). In addition, since EFA revealed that the scale has more than one factor, the Varimax factor rotation method was used, and it was checked whether there was any item that has cross load among the items of the scale. While determining the factors, factors with an eigenvalue above 1 were taken into consideration. As a result of the Varimax rotation method, it was found that the scale items are collected under 8 factors and the factor load values are above 0.32 (0.71-0.91), so no item should be removed from the scale¹⁶ (Table 2). As a result of the analyses, it was found that the scale consists of 8 sub-dimensions and 20 items.

When the analysis results were examined, it was found that the 1st factor consists of 2 items, items numbered 1 and 2, the factor loads of the items vary between .803 and .804, and it explains 8.555% of the total variance. This factor was named "Housing" as it included items related to "Housing" (Table 2). It was found that 2 factors consist of 3 items, items 4 through 6, the factor loads of the items vary between .826 and .859, and it explains 14.369% of the total variance. This factor was named "Social participation" as it contains items related to "Social participation" (Table 2). It was found that the 3rd factor consists of 2 items, items 7 and 8, the factor loads of the items vary between .908 and .915, and it explains 9.651% of the total variance. This factor was named "Respect and social inclusion" since it contains items related to "Respect and social inclusion" (Table 2). It was found that the 4th factor consists of 2 items, items 11 and 12, the factor loads of the items vary between .829 and .848, and it explains 9.540% of the total variance. This factor was named "Communication and information" since it includes items related to "Communication and information" (Table 2). It was found that the 5th factor consists of 5 items, items 13 through 17, the factor loads of the items vary between .717 and .877, and it explains 22.514% of the total variance. This factor was named "Community support and health services" since it includes items related to "Community support and health services" (Table 2). It was found that the 6th factor consists of 2 items, items 18 and 19, the factor loads of the items vary between .814 and .834, and it explains 9.651% of the total variance. This factor was

Table 2. AFCCQ's EFA results.

Scale Items	Communality	Corrected Item-total Correlations	Cronbach's Alpha if Item Deleted	Factor Load Values									
				F1	F2	F3	F4	F5	F6	F7	F8		
1	.923	.676	0.95	.804									
2	.924	.684	0.95	.803									
4	.876	.673	0.95		.826								
5	.933	.703	0.95		.859								
6	.892	.685	0.95		.835								
7*	.910	.425	0.95			.908							
8*	.914	.409	0.95			.915							
11	.957	.705	0.95				.829						
12	.964	.683	0.95				.848						
13	.804	.810	0.95					.717					
14	.930	.784	0.95					.877					
15	.908	.787	0.95					.843					
16	.909	.798	0.95					.836					
17	.881	.809	0.95					.778					
18	.972	.723	0.95						.834				
19	.966	.728	0.95						.814				
20	.962	.755	0.95							.765			
21	.974	.743	0.95							.799			
22	.934	.684	0.95										.835
23	.942	.629	0.95										.866
Eigenvalue	–	–	–	1.711	2.874	1.930	1.908	4.503	1.923	1.683	1.938		
Explained Variance	–	–	–	8.554	14.369	9.651	9.540	22.514	9.615	8.436	9.690		
% Total = 92.36%													

named “Outdoor spaces and buildings” since it includes items related to “Outdoor spaces and buildings” (Table 2). It was found that the 7th factor consists of 2 items, items 20 and 21, the factor loads of the items vary between .765 and .799, and it explains 8.436% of the total variance. This factor was named “Transportation” since it includes items related to “Transportation” (Table 2). It was found that the 8th factor consists of 2 items, items 22 and 23, the factor loads of the items vary between .835 and .866, and it explains 9.690% of the total variance. This factor was named as “Financial situation” since it includes items related to “Financial situation” (Table 2).

Confirmatory factor analysis

After the explanatory factor analysis was carried out and the 8-factor structure of the scale was revealed, the confirmatory factor analysis was carried out to verify this structure. The factor structure obtained as a result of the confirmatory factor analysis model of the scale shows that the 8-dimensional scale structure tested with EFA is confirmed. The coherence values were evaluated considering more than one reference value.^{16,25,26} CFA coherence values are given in Table 3. The items were found to be important for the factors in which they are included. The Path Diagram obtained as a result of the confirmatory factor analysis is given in Figure 1 and it was found that the values obtained are appropriate in terms of item-factor coherence (Figure 1).

As a result of the EFA and CFA, it was seen that the Turkish version of “AFCCQ” was verified with 20 items and 8 dimensions, differently from the original scale. All findings obtained show that the validity of the scale in Turkish culture is high.

Findings related to reliability

The Cronbach Alpha coefficient was calculated to identify the internal reliability of the 20 items of the scale obtained. The Cronbach Alpha values of the sub-dimensions of the scale ranged from .899 to .969, and the total Cronbach Alpha value was determined as .954. These values show that the scale is highly reliable (Table 4).^{22,27}

The reliability of a scale can be identified by different methods. One of these methods is convergent validity.²⁸ Convergent validity can be measured with the average variance extracted (AVE) and the construct reliability (CR).²⁹ An AVE value, one of the convergent validity measures of the model, higher than .50 and a CR value higher than .80 indicate that the scale is reliable.³⁰ In addition, to ensure convergent validity, it should be $CR > AVE$ and $AVE > 0.5$.²³ In this study, it was found that all CR values are greater than the AVE values and AVE values are greater than the critical value .50 (Table 4).

When the item-total correlation coefficients of the scale were examined, it was found that the total correlation coefficient of all items is over 0.30 (0.66-0.73) (Table 2). It has been stated in the literature that the

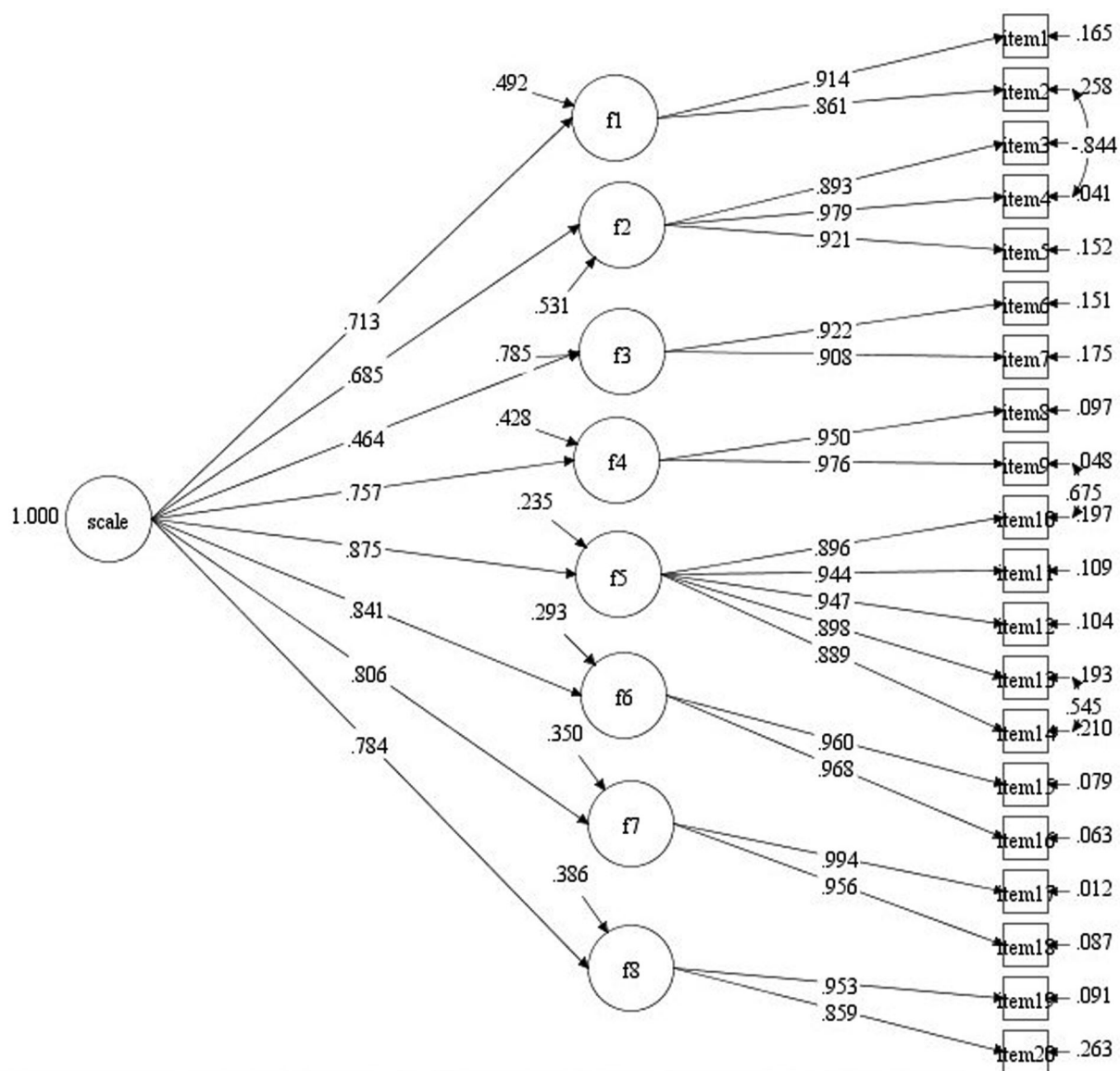


Figure 1. PATH diagram regarding the factor structure of the scale.

Table 3. Confirmatory factor analysis results.

coherence criteria	Found	Appropriate	Acceptable	Result
χ^2/df	4.39	<2	<5	Acceptable coherence
RMSEA	0.106	<0.05	<0.08	Low coherence
CFI	0.930	>0.95	>0.90	Acceptable coherence
TLI	0.916	>0.95	>0.90	Acceptable coherence
SRMR	0.063	<0.05	<0.08	Acceptable coherence

RMSEA: Root Mean Square Error of Approximation; CFI: Comparative coherence Index; SRMR: Standardized Root Mean Square Residual; TLI: Tucker-Lewis Index.

acceptable value in terms of item selection is ≥ 0.30 (Büyüköztürk, 2017; Özdamar, 2002). In addition, in order to identify whether the dimensions of the scale constitute a separate structure, the correlation coefficients between the dimensions were examined. This coefficient is checked for statistical significance, and a coefficient of .30 or higher is considered an indicator of the validity of the scale (Table 4).²⁰

A retest method was used to identify the invariance of the scale through time. The scale was applied to 50 people after 2 weeks. According to the results of the correlation analysis carried out to identify the relationship between the test and the retest, there is a significant positive high-level relationship between the two tests and a stable structure (Table 4).

Discussion

No scale was found to measure the age-friendliness of cities and communities in Turkey, the validity and reliability of which has been tested for its Turkish version. For this reason, this study has been conducted in order to adapt the Age-Friendly Cities and Communities Questionnaire (AFCCQ) developed by Dikken et al. in 2020 into Turkish and to test its

Table 4. Correlation between factors, score average, and reliability results.

Factors	1	2	3	4	5	6	7	8	AFCCQ Total	α	AVE	CR	X \pm SD	Test-retest (r ^{**})
1	r 1	.586**	.369**	.507**	.636**	.468**	.452**	.461**	.749**	.905	.79	.88	0.30 \pm 0.97	.895*
2		1	.469**	.563**	.511**	.506**	.515**	.417	.762**	.941	.86	.95	0.04 \pm 0.95	.944**
3			1	.241**	.259**	.286**	.266**	.291**	.494**	.899	.84	.91	-0.06 \pm 0.947	.934**
4				1	.614**	.489**	.534**	.513**	.745**	.956	.93	.96	0.22 \pm 1.00	.913**
5					1	.646**	.699**	.600**	.882**	.962	.83	.96	0.37 \pm 0.96	.980**
6						1	.680**	.534**	.770**	.969	.93	.96	0.21 \pm 1.03	.970**
7							1	.544**	.793**	.966	.95	.97	0.18 \pm 1.03	.973**
8								1	.719**	.929	.82	.90	0.31 \pm 0.98	.972**
AFCCQ Total									1	.954	-	-	0.21 \pm 0.74	.934**

^a: Cronbach Alpha Coefficient; AVE: Average Variance Extracted, CR:Construct Reliability.

validity and reliability in Turkish society. In this section, findings related to AFCCQ-TR, which consists of 20 items and eight sub-dimensions, are discussed.

Validity

In this study, EFA and CFA were used to test the construct validity of the Turkish version of AFCCQ-TR. A total of 415 participants are required in the study with at least 115 participants for EFA (5 times the number of items) and at least 300 participants for CFA.³¹ In the absence of sufficient sample size, it is argued that the data structure can be revealed empirically when EFA and CFA are performed on the same sample.^{31,32} In addition, since the number of sufficient sample for CFA varies according to parameters, number of factors and number of items, although there is no generally accepted value^{31,33} 300 and more is accepted in samples.^{31,34} However, due to COVID-19 pandemic restrictions, it was not possible to reach all of the older adults and exploratory and confirmatory factor analyses were performed on the same sample (n:306). Before the construct validity analysis, KMO value and Barlett's Sphericity Test values were calculated to identify the appropriate sample size. The KMO value was found to be 0.888 and Barlett's Test of Sphericity was found significant ($\chi^2 = 7192.721$; $p = 0.000$). In the literature, it is stated that a value less than 0.50 should not be accepted, a value of 0.80-0.90 is good, and a value greater than 0.90 is very good in relation to the KMO test.^{20,24} These results show that the data are sufficient for factor analysis.

In the explanatory factor analysis conducted in the adaptation of the scale to Turkish, the total variance explained was found to be 92.36%. In the original study of the scale conducted by Dikken et al. (2020), the total variance explained was found to be 61.7%.¹⁰ In this study, it was found that the factor loads of all the items ranged from 0.71 to 0.91. In the original study of the scale conducted by Dikken et al. (2020), it was found that the factor loads of all items ranged between 0.74 and 0.93.¹⁰ In line with these findings, it

was determined that the scale consists of 8 sub-dimensions with 20 items and the factor structure is sufficient.

Dikken et al. (2020) stated that the index values that examine the coherence of the scale model in the confirmatory factor analysis were $\chi^2 = 1.619$, RMSEA = 0.057, CFI = 0.937, SRMR = 0.0569, TLI = 0.923 and they were good coherence.¹⁰ In this study, coherence index values of the model were found to be $\chi^2/df = 4.39$, RMSEA = 0.106, CFI = 0.930, SRMR = 0.063, and TLI = 0.916. As a result of the relevant coherence index values, it was found that the values other than RMSEA are at an acceptable level. All values given in coherence index values are not statistically significant and model coherence may be sufficient.³⁵ For this reason, the values given when evaluating the model coherence are not considered one by one but taken as a whole. As a result, it was found that the 8-dimensional structure of the scale was confirmed with CFA, which was carried out to verify the explanatory factor analysis of the scale.

Reliability

The Cronbach Alpha value of the subdimensions of the scale was found to range from 0.899 to 0.969, and the total Cronbach Alpha value was found to be 0.954. In the original study of the scale conducted by Dikken et al. (2020), the Cronbach Alpha value of the subdimensions of the scale was found to range from 0.74 to 0.93.¹⁰ In the literature, it is stated that scale reliability with a Cronbach's α of 0.70 or above indicates that the reliability of the scale is sufficient to be used as a measurement tool in studies and that a value of 0.80 or above indicates that it is highly reliable. These findings show that AFCCQ-TR has a high level of internal consistency and a high level of reliability.

In the study, when the item-total correlation coefficients of the scale were examined, it was found that the total correlation coefficient of all items was over 0.30 (0.66-0.73). It has been stated in the literature

that the acceptable value in terms of item selection is ≥ 0.30 .^{20,22} The high correlation coefficient obtained for each item indicates that each item is effective and sufficient in measuring the intended behavior. In addition, in order to identify whether the dimensions of the scale constitute a separate structure, the correlation coefficients between the dimensions were examined. This coefficient is interpreted in terms of statistical significance and a coefficient of 0.30 or above is considered as an indicator of the validity of the scale.²⁰ The findings show that the reliability of the scale is high.

In the original scale, it is stated that all CR values were between 0.74-0.93 and these values are reasonable for reliability because they are >0.70 . It is stated in the literature that a CR value higher than 0.80 indicates that the reliability of the scale is good and it should be $CR > AVE$ and $AVE > 0.5$ in order to ensure convergent validity.^{23,30} In this study, it was found that all CR values were between 0.88-0.97, and AVE values were higher than 0.50, and it fulfilled $CR > AVE$ and $AVE > 0.5$.

AFCCQ, which was developed by Dikken et al. (2020), consists of 23 items and 9 factors.¹⁰ In factor 4 (Civic Participation and Employment), since “Q9 (I have enough opportunities to interact with younger generations) was overlapping and Q10 (I feel like a valued member of society) was in a single factor, these items were excluded from the scale. By referring to “The Checklist of Key Features of Age-friendly Cities” by Buffel et al. (2012), the question of whether using a universal checklist was a sufficient method to cope with the heterogeneity of populations and the heterogeneity of populations was brought to agenda.³⁶ It has been stated that to create age-friendly communities, methods and tools need to be adjusted to highly unequal local governments.¹⁰ This situation becomes much more important when the history of migration, existing ways of social inequality and poverty³⁷ and the number of increasing number of older adults are taken into consideration.¹⁰ Gender, age, socioeconomic status, health status, ethnic or cultural variety are factors affecting what individuals consider as important in their living environment’s being age-friendly.⁵ Zaman and Thornton (2018) generalized the age-friendly indicators of WHO, reported that they were inclusive and that changes should be made by considering local needs.³⁸ In addition, accessibility to physical infrastructure such as pavements, public areas, buildings and transportation facilities is becoming increasingly more standardized at national or international levels and adapted more by countries

and desirable characteristics related to the social environment can be less generalized.³⁹ The first reason why it was thought the fourth sub-dimension (Civic Participation and Employment) was not understood fully was due to the fact that the study was conducted in an area with ethnic/cultural and socioeconomic difference during the COVID-19 pandemic period. The second reason is discrimination for older adults in professional life. Discrimination for older adults in professional life includes thinking that older adults are slower and more inadequate than young adults, employees’ not wanting to employ older adults and preferring young adults who work for low pay when compared with older adults who have more experience and who get paid higher.^{40,41} While the concepts of “active aging” and “productive old age” come to the fore in today’s societies, it can be seen that these concepts are not reflected in the working life.⁴⁰ In terms of civic engagement and employment, it was reported that only %7 of individuals aged 65 and older worked in a paid job in Holland, Lahey.¹⁷ Turkey out-scores other countries about discrimination in the workforce. In job recruitment, there are individuals who are exposed to different behaviors due to their age among candidates who have the same characteristics.⁴² In Turkey, participation of older population to workforce had been reported as 12.0%.⁴³ In this case, it is thought that the items in “Social Participation, Respect and Social Inclusion, Community Support and Health Services” factors can meet the excluded questions.

One of the most meticulous ways to evaluate the intercultural validity of AFCCQ is measurement invariance.¹⁰ Measurement invariance is evaluating whether different groups respond similarly to a measurement tool and its elements.^{14,44} When measurement tools have a certain measurement invariance level, the mean scores of the factors in different countries/cultures can be compared and the results can be interpreted significantly.⁴⁴ AFCCQ-TR was applied to 50 individuals after 2 weeks for retest analysis. According to the results of the correlation analysis carried out to identify the relationship between the test and the retest, there is a significant positive high-level relationship between the two tests and a stable structure ($p < 0.001$). The findings obtained show that the consistency of the scale over time is high and reliable results can be obtained in more than one application. In the light of this information, it can be said that AFCCQ-TR is a valid and reliable tool for Turkish society. It is thought that it can be used in the evaluation of cities in countries where Turks live in terms of “age-friendly city and society”.

Conclusion

The findings were found to be consistent with the analysis results of the original scale. EFA and CFA results confirmed the 8-factor structure of the scale. Cronbach's α internal consistency coefficient of the scale, item-total correlation, and test-retest analyses were found to have high correlations. These results show that the AFCCQ-TR, validity and reliability study of which we have carried out for its Turkish version, is a valid and reliable tool for evaluating age-friendly cities and communities. It is thought that it can be used in the evaluation of cities in countries where Turks live in terms of "age-friendly city and society". For cross-cultural validity of AFCCQ, it is recommended to conduct validation studies by using the data from more than one country.

Limitations of the study

The present study has some limitations. First of all, the fact that EFA and CFA were performed on the same sample is the most important limitation of the study. Secondly, online data collection may have caused a bias and reliability of data is limited to the accuracy of responses given by all patients who participated in the study. Thirdly, the fact that the sample consisted of older adults who were 65 and older may have made it difficult to understand the questions. Fourthly, AFCCQ-TR Version 4 is a valid and reliable scale for Turkish society. It cannot be used in cultures other than Turkish culture.

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Author contributions

GBT, ZÖ, were involved in the initial conception of the study., GBT, ZÖ, NT conducted the interviews. GBT and ZÖ analyzed the data. All authors interpreted the data. All authors reviewed, revised and edited the paper. All authors read and approved the final manuscript submitted for publication

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