


The Development of the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale

COVID-19 Salgını Korku Ölçeği ve Salgın Hastalık Belirsizlik Ölçeği Geliştirme Çalışması

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ABSTRACT

Objective: This study aims to develop two separate measurement tools specific to Turkish culture to evaluate the fear of COVID-19 pandemic and the pandemic uncertainty.

Methods: It is a methodologically designed study. A draft form for both scales was prepared by the researchers in line with the relevant literature. The forms revised in line with the expert opinions were administered to 386 university students and their families between May and July 2020 during the COVID-19 pandemic. The data were analyzed using Statistical Package for the Social Sciences Version 22 and Amos 23 program. The Cronbach's alpha coefficient was calculated, and the exploratory and confirmatory factor analyses and the Pearson correlation analysis were conducted to test construct validity.

Results: The Fear of COVID-19 Pandemic Scale was found to be acceptable with 1 factor and 8 items, and the Pandemic Uncertainty Scale was found to be acceptable with 3 factors and 18 items. The Cronbach's alpha of the Fear of COVID-19 Pandemic Scale was found to be 0.92. The Cronbach's alpha of the Pandemic Uncertainty Scale was found to be 0.90 and that of the factors was between 0.86 and 0.89.

Conclusion: It was determined that both scales are reliable and can be used within the Turkish context.

Keywords: COVID-19, fear, pandemic, reliability, uncertainty, validity

ÖZ

Amaç: Bu çalışmanın amacı, COVID-19 Salgını Korku ve Salgın Hastalık Belirsizlik durumunu ölçmek için Türk kültürüne özgü iki ayrı ölçüm aracı geliştirmektir.

Yöntem: Metodolojik tasarımı bir çalışmadır. Araştırmacılar tarafından ilgili literatür doğrultusunda her iki ölçeğe ilişkin taslak form hazırlanmıştır. Uzman görüşleri doğrultusunda düzenlenen formlar COVID-19 pandemi sürecinde 26 Mayıs-10 Temmuz 2020 tarihleri arasında üniversite öğrencileri ve ailelerinden oluşan 386 kişiye uygulanmıştır. Veriler SPSS 22 ve Amos 23 programı kullanılarak, Cronbach alfa, yapı geçerliliğini test etmek için açıklayıcı faktör analizi, doğrulayıcı faktör analizi ve Pearson korelasyon analizi ile değerlendirilmiştir.

Bulgular: COVID-19 Salgını Korku Ölçeği sekiz madde tek boyut, Salgın Hastalık Belirsizlik Ölçeği 18 madde ve üç alt boyut olarak kabul edilebilir bulunmuştur. COVID-19 Salgını Korku Ölçeği Cronbach alfa değeri ,92; Salgın Hastalık Belirsizlik Ölçeği alt boyutları ,86 ile ,89 arasında olup, ölçek toplamının Cronbach alfa değeri ,90'dır.

Sonuç: COVID-19 Salgını Korku Ölçeği ve Salgın Hastalık Belirsizlik Ölçeğinin Türk toplumunda güvenilir bir şekilde kullanılacağı tespit edilmiştir.

Anahtar Kelimeler: COVID-19, korku, pandemi, güvenilirlik, belirsizlik, geçerlik

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INTRODUCTION

The most severe problem faced by the whole world in 2020 is the COVID-19 pandemic. The world has suffered the adverse individual, economic, social, and global consequences of this preventable disease. The disease, which was first detected in December 2019, spread to the whole world in a short time and became a global problem and was declared a pandemic by the World Health Organization.¹

In Turkey, the first COVID-19 case was announced on March 11, 2020, and some important measures have been taken as in all other countries.^{2,3} However, along with the global and managerial dimensions, the pandemic has an individual dimension including responsibilities that have an important impact on the control of the disease. Social isolation has been accepted as the most fundamental philosophy in preventing and controlling the spread of the pandemic, as well as reducing the pressure on health services. Unlike other pandemic diseases, this pandemic has reached a point where people are fearful about 'not going back to the good old days'.⁴

In order to determine the psychological and social consequences of the pandemic, it is important to consider feelings such as fear, anger, etc., experienced by individuals. Fear is a defense mechanism fundamental to survival and involves a variety of biological preparation processes to respond to potentially threatening events. Fear may lead to the development of various psychiatric disorders if it is chronic or disproportionate. Fear experienced during the pandemic may increase stress and anxiety levels in healthy individuals and may intensify the symptoms in people with any previous psychiatric problems.^{5,6}

In the early stages of the COVID-19 pandemic, scientists tried to raise the awareness of the public by informing them about the ways to protect physical health. As the disease spread, it became clear that it is important to protect mental health in this process. Various precautions have been taken to prevent the spread of the pandemic in different countries, resulting in increased panic and stress levels in individuals.⁷ COVID-19 causes individuals to experience stressful processes that include fear and anxiety about the disease.^{3,8,9} A recent study conducted in China with 1590 individuals revealed that traumatic stress experienced due to COVID-19 infection was reported as 73.4%, while the frequency of depression, anxiety, and insomnia was 50.7, 44.7, and 36.1%, respectively.¹⁰ Another study conducted with individuals who were infected with COVID-19 or were suspected of being infected with COVID-19 found that these individuals reported intense emotional and behavioral reactions such as fear, anxiety, insomnia, loneliness, and anger.⁵

The uncertainty about the pandemic and its uncontrolled development cause individuals to experience anxiety.¹⁰ Anxiety is defined as the state of apprehension the person is in, and it suppresses the individual, creating negative effects. Due to these negative effects, the individual may encounter unusual communication and interaction problems.¹¹ The concept of fear is generally defined as a reaction to a threatening situation. In this period of crisis, individuals face the fear of being infected by the COVID-19 virus, not being able to see their loved ones for a while and losing them.¹² This situation is often followed by uncertainty about what will happen. Uncertainty is sometimes perceived as an opportunity that leads to hope, and sometimes as a danger. People find it difficult to be uncertain about the future and not being able

to make future plans. Individuals feel even more uncomfortable, uneasy, and unhappy as uncertainty continues to grow.¹³

During the pandemic, various scales were developed simultaneously regarding the fear of COVID-19 by different researchers.^{7,14,15} Arpacı et al¹⁴ developed the COVID-19 Phobia Scale according to the DSM-V (The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) criteria to evaluate certain phobias in line with the recommendations of the American Psychiatric Association. Bakioglu et al⁷ evaluated uncertainty, depression, anxiety, and intolerance to stress in relation to the fear of COVID-19 and positivity, while Ladikli et al¹⁵ developed some measurement tools aimed at measuring individuals' level of fear of COVID-19. The tools they developed are not based on any conceptual basis.

The difference between the scale developed in this study to evaluate fear of COVID-19 pandemic from the other scales is that it is based on the Breast Cancer Fear Scale developed by Champion et al¹⁶. The scale includes emotional sensation statements about fear of COVID-19.

In order to evaluate the uncertainty experienced by individuals during the pandemic, Uncertainty in Illness Theory (UIT) was used. The theory was developed in 1988 by Nursing Theorist Merle Mishel and defined the uncertainty caused by the illness as a cognitive stressor. Mishel argues that managing uncertainty is important in terms of adaptation to illnesses and explains how people cognitively process illness-related situations. Uncertainty in Illness Theory explains the uncertainty experiences of people who are in the acute or worsening stage of the illness.¹⁷ Nurses can help individuals in managing uncertainty with nursing interventions such as establishing a connection between life expectations and experiences in the society, creating a therapeutic environment, and increasing knowledge and autonomy.¹⁸ For this reason, in this study, the 'Pandemic Uncertainty Scale' was developed based on the uncertainty theory of Mishel. The scales developed in the study address the level of uncertainty and fear regarding the COVID-19 pandemic, creating important data for the interventions to be employed to facilitate the management of the pandemic.

Aim of the Study

In this methodological study, Turkish psychometric properties of the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale were evaluated.

METHODS

Design

It is a methodologically designed study. The study was conducted with the students of a university in the Black Sea Region in Turkey and their families between May 26 and July 10, 2020.

Population and Sample

The research population consisted of the students of a university in the Black Sea Region in Turkey and their family members. The Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale were developed in line with the relevant literature and expert opinions. While the former includes 8 items, the latter includes 24 items. It was planned to reach 320 individuals, which is at least 10 times the total number of items in both scales. Announcements were made in student groups via social media regarding the research, and the data collection forms created were delivered to the participants. As a result of the announcements, a total of 386

individuals volunteered to participate in the research via Google forms and they constituted the sample of the study.

Data Collection Tools

Individual information form: This form consists of 10 questions regarding descriptive characteristics such as age, gender, education, marital status, income, employment status, and place of residence.

Fear of COVID-19 Pandemic Scale: The scale aims to evaluate the level of fear of individuals for the COVID-19 pandemic. The researchers created an 8-item questionnaire by examining the literature and theories on the subject and adapting the Breast Cancer Fear Scale developed by Champion et al¹⁶ to the COVID-19 pandemic. The opinions of 5 experts (an infectious diseases physician, a public health doctor, a psychiatrist, and experts in nursing and health psychology) were obtained regarding the draft form. Then, as a result of the revisions made by comparing the expert opinions, the Turkish pilot version of the scale was obtained. Each item in the scale is evaluated on a 5-point Likert scale: 'strongly disagree' (1), 'disagree' (2), 'undecided' (3), 'agree' (4), and 'strongly agree' (5). The scale consists of 8 items and is interpreted on the basis of the total score. An increase in the scale score indicates a high level of COVID-19 fear, while a decrease in the score indicates a low level of COVID-19 fear.

Pandemic Uncertainty Scale: The scale reveals the uncertainty experienced by individuals regarding the pandemic. Based on the UIT, which is concerned with the uncertainty experienced by the patients and caregivers during an illness, the draft scale items were developed by the researchers examining the literature on pandemic and illness process and Mishel's Uncertainty in Illness scales developed for the society, family, caregivers, and adults. The opinions of 7 experts in public health nursing, internal medicine nursing, infectious diseases as well as health psychology were received regarding the draft scale, and based on their recommendations, the final version of the Turkish pilot scale was prepared with 24 items. Based on the results of the validity and reliability analyses, items 6, 11, 13, 14, 16, and 22 were removed from the scale, and thus, the final version of the scale included 18 items. The scale is evaluated based on the sub-dimensions of self-efficacy and awareness of the pandemic (items 6, 8, 15, 16, 17, and 18), uncertainty about the current situation (items 1, 2, 3, 4, and 5), uncertainty about coping with the pandemic (items 7, 9, 10, 11, 12, 13, and 14), and the total score.

Each item in the scale is evaluated on a 5-point Likert scale: 'strongly disagree' (1), 'disagree' (2), 'undecided' (3), 'agree' (4), and 'strongly agree' (5). Items 6, 8, 15, 16, 17, and 18 are reverse coded. The minimum and maximum scores that can be received from the scale are 6-30 for the self-efficacy and awareness of the pandemic sub-dimension, 5-25 for the uncertainty about the current situation sub-dimension, 7-35 for the uncertainty about coping

with the pandemic sub-dimension, and 18-90 for the total score. The increase in the self-efficacy and awareness of the pandemic sub-dimension score indicates that the perceived uncertainty decreases, while the increase in the uncertainty about the current situation and uncertainty about coping with the pandemic sub-dimension scores and the increase in the total scale score indicate that uncertainty increases.

Beck Anxiety Scale: Beck Anxiety Scale, developed by Beck and Epstein, is a self-report scale.¹⁹ It is used to evaluate the frequency of anxiety symptoms experienced by a person. The Turkish adaptation study was conducted by Ulusoy and Sahin.²⁰ The scale is used for adolescents and adults (12 years and over) and includes items that individuals can answer on their own. It consists of 21 items and 2 sub-dimensions. Items 1, 4, 5, 7, 8, 9, 10, 11, 14, 15, 16, 17, and 19 are in the 'subjective anxiety' sub-dimension, while items 2, 3, 6, 12, 13, 18, 20, and 21 are in the 'somatic symptoms' sub-dimension. The score range of the scale is 0-63, and higher scores indicate higher anxiety levels. The rating of anxiety in the scale is as follows: 0-7 points (minimal anxiety), 8-15 points (mild anxiety), 16-25 points (moderate anxiety), and 26-63 points (severe anxiety). In the Turkish adaptation study of the scale, the Cronbach's alpha was found to be 0.93 and the test-retest reliability was $r=0.57$.²⁰ The Cronbach's alpha of the scale is 0.93 in this study.

Data Collection Method

After the item pools of the developed scales were created by the researchers in line with the literature and related theories, they were presented to expert opinion and pilot scale forms were obtained. The data collection form was created by combining the pilot scale forms, the individual information form, and the Beck Anxiety Scale used as the parallel form. The data were collected on a voluntary basis by sending this form to university students and their families online as Google form via social media. The validity and reliability stages of the study are given in Figure 1.

Validity Analysis

The SPSS 22 and Amos 23 programs were used to analyze the data. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to test the construct validity of the scales. Principal component analysis was used for EFA, and the data were analyzed with the varimax rotation method. To determine the appropriateness of EFA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used. Using the Bartlett sphericity test, the significance of the intervariable correlation coefficients was determined

For CFA, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), Standardized RMR, Normed Fit Index (NFI), χ^2 , and χ^2/SD goodness of fit indexes were used.

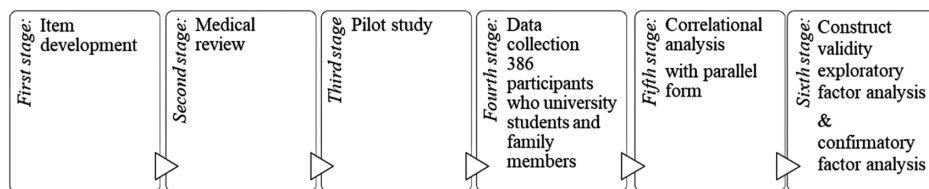


Figure 1. Flowchart of the Study.

Table 1. Descriptive Characteristics of the Participants

Descriptive Characteristics	$\bar{X} \pm SD$	
Age	52.1 ± 13.6 (min = 18, max = 62)	
	n	%
Participant characteristics		
University student	357	92.5
Family member	29	7.5
Gender		
Female	311	80.6
Male	75	19.4
Marital status		
Married	21	5.4
Single	365	94.6
Level of education		
Primary school	8	2.1
High school	27	7.0
University and higher levels of education	351	90.9
Working status		
Working	43	11.1
Not working	343	88.9
Level of income		
Income less than expenditures	130	33.7
Income equal to expenditures	223	57.8
Income higher than expenditures	33	8.5
Place of residence		
City	212	54.9
Town	124	32.1
Village	50	13.0

Reliability Analysis

The internal consistency of the instrument and each factor revealed by the factor analysis was tested using the Cronbach's alpha. The analysis included mean inter-item correlations and item-total item correlations. Tukey's test of additivity was performed for scale additivity. Spearman correlation analysis was made for parallel scale and item total score analysis.

Ethics

Prior to the study, the ethics committee approval (decision number: 3186GOA 2017/16-36, date: 29 April, 2020) and institutional permission from the Ankara Medipol University where the study was conducted were obtained. In addition, the approval was obtained from the Turkish Republic Ministry of Health, General

Directorate of Health Services, Scientific Research Platform. At the beginning of the survey form, which was shared with the participants via Google forms, the aim of the study and the research team were introduced, and participants' consent was obtained by explaining that participation was voluntary, they could withdraw from the study whenever they wanted, their information would be kept confidential, and the data obtained would only be used for scientific purposes. Ethical principles in the Helsinki Declaration (2008) were followed in all stages of the study.

RESULTS

Descriptive Characteristics

The average age of the participants is 52.1 ± 13.6 (min=18, max=62); 92.5% are university students, 80.6% are women, 94.6% are single, the majority (90.9%) have university or higher levels of education, 88.9% are not working, 57.8% of them reported that their income is equal to expenditures, and 54.9% live in the city center (Table 1).

Descriptive Statistics for the Scales

The mean score of the Fear of COVID-19 Pandemic Scale was found to be 23.7 ± 8.1 (min=8, max=40). The mean score of the Pandemic Uncertainty Scale was found as 53.4 ± 8.6 (min=26, max=83). The mean score for the self-efficacy and awareness sub-dimension of the scale was found to be 19.8 ± 5.0 (min=6, max=30), while it was 16.8 ± 4.6 (min=5, max=25) in the uncertainty about current situation sub-dimension and 20.7 ± 3.5 (min=7, max=31) in the uncertainty about coping with the pandemic sub-dimension. Beck Anxiety Scale mean score was 11.5 ± 10.8 (min=0, max=55), expressing mild anxiety (Table 2).

Results of Validity Analysis

According to the EFA results, the KMO coefficient of the Fear of COVID-19 Pandemic Scale is 0.917, and the Barlett test result is $\chi^2 = 2103.761$, $P = .000$. The factor loadings of the scale range between 0.431 and 0.761 and the total variance explained is 65.066 (Table 3). The KMO coefficient of the Pandemic Uncertainty Scale is 0.903 and the Barlett test result is $\chi^2 = 3634.634$, $P = .000$. The factor loadings of the scale items are between 0.431 and 0.761, and the total variance explained is 61.487 (Table 4).

Reliability Analysis

The Cronbach's alpha of the Fear of COVID-19 Pandemic Scale was found to be 0.92. Item-total score correlation coefficients of scale ranged between 0.58 and 0.82. The Cronbach's alpha of the Pandemic Uncertainty Scale was found to be 0.90. The internal consistency of the factors was as follows: self-efficacy and awareness of the pandemic $\alpha = 0.89$, uncertainty about the current situation $\alpha = 0.86$, and uncertainty about coping with the pandemic $\alpha = 0.84$. Item-total score correlation coefficients of scale ranged between 0.46 and 0.76. All the items in the scales had correlation coefficients greater than 0.30 (Table 3, Table 4).

Table 2. The Distribution of the Fear of COVID-19 Pandemic Scale, Pandemic Uncertainty Scale, and Beck Anxiety Scale Scores

Scale and sub-dimensions	$\bar{x} \pm SD$	Median	Min	Max
COVID-19 Pandemic Fear Scale	23.7 ± 8.1	24	8	40
Pandemic Uncertainty Scale	53.4 ± 8.6	54	26	83
Self-efficacy and awareness of the pandemic	19.8 ± 5.0	20	6	30
Uncertainty about the current situation	16.8 ± 4.6	17	5	25
Uncertainty about coping with the pandemic	20.7 ± 3.5	21	7	31
Beck Anxiety Scale	11.5 ± 10.8	8	0	55

Table 3. Validity and Reliability Results of the Fear of COVID-19 Pandemic Scale

Item	Scale Items	Factor Loading	$\bar{x} \pm SD$	Item-Total Correlation	Cronbach Alpha if Item Deleted
1	I am scared when the COVID-19 pandemic comes to my mind.	0.685	2.9 ± 1.3	0.765	0.910
2	I get angry when I think of the COVID-19 pandemic.	0.495	3.0 ± 1.3	0.625	0.922
3	I get upset when the COVID-19 pandemic comes to my mind.	0.642	3.4 ± 1.2	0.731	0.913
4	I get depressed when I think of the COVID-19 pandemic.	0.724	2.9 ± 1.3	0.796	0.908
5	I get nervous when I think of the COVID-19 pandemic.	0.742	3.1 ± 1.3	0.804	0.907
6	My heart beats rapidly when the COVID-19 pandemic comes to my mind.	0.431	2.2 ± 1.1	0.575	0.924
7	I feel restless when I think of the COVID-19 pandemic.	0.726	3.2 ± 1.3	0.796	0.908
8	I feel worried when I think of the COVID-19 pandemic.	0.761	3.1 ± 1.3	0.817	0.906

Total Cronbach's alpha = 0.92

Total explained variance (%) = 65.066

According to the CFA, the structural equation modeling results for the Fear of COVID-19 Pandemic Scale were significant in 8-item and a single-dimension scale structure at $P = .000$. Revisions were made to the model. During these revisions, variables that decreased the fit of the model were determined, and among residual values, new covariances were created for those with high covariance (e3-e6; e7-e8). The renewed fit index calculations

showed that accepted values were achieved for fit indices (Table 5). Normed Fit Index, CFI, IFI, GFI, TLI, and AGFI indices over 0.90 and RMSEA value below 0.08 correspond to acceptable fit²⁴⁻²⁶. According to the first level multifactor analysis results (RMSEA = 0.061; NFI = 0.907; CFI = 0.942; IFI = 0.943; GFI = 0.963; TLI = 0.910; AGFI = 0.927; and $\chi^2/SD = 2.423$), the GFIs of the Fear of COVID-19 Pandemic Scale are at an acceptable level ($P = .000$)

Table 4. Validity and Reliability Results of the Pandemic Uncertainty Scale

Item	Scale Items	Factor Loading	$\bar{x} \pm SD$	Item-Total Correlation	Cronbach Alpha if Item Deleted	Exp. Variance (%)
Factor 1: Self-efficacy and awareness of the pandemic ($\alpha = 0.89$)						23.546
6	To me, what to do to avoid the pandemic is clear.	0.568	3.7 ± 1.1	0.509	0.898	
8	I understand everything explained about the pandemic.	0.618	3.7 ± 1.0	0.540	0.897	
15	I am aware of all that needs to be done to cope with the pandemic.	0.764	3.9 ± 1.0	0.620	0.895	
16	I believe the measures I have taken against the pandemic will be effective.	0.681	3.6 ± 1.0	0.466	0.900	
17	What needs to be done to control the pandemic was determined.	0.680	3.6 ± 1.0	0.474	0.899	
18	I can understand what the authorities are saying because they use clear and understandable language in their statements about the pandemic.	0.562	3.7 ± 1.1	0.485	0.899	
Factor 2: Uncertainty about the current situation ($\alpha = 0.86$)						19.026
1	I do not know what will happen to me due to the pandemic.	0.535	3.2 ± 1.2	0.480	0.900	
2	I have many questions about the pandemic that have no answers.	0.603	3.0 ± 1.2	0.537	0.898	
3	I am not sure if the pandemic is getting better or worse.	0.699	3.3 ± 1.2	0.609	0.895	
4	It is unclear how bad the pandemic will turn out.	0.751	3.5 ± 1.1	0.715	0.892	
5	It is not clear how long the pandemic will last.	0.717	3.8 ± 1.0	0.750	0.891	
Factor 3: Uncertainty about coping with the pandemic ($\alpha = 0.84$)						18.915
7	The course of the pandemic continues to change in an unpredictable way.	0.531	3.2 ± 1.1	0.590	0.896	
9	Scientists say things with various meanings about the pandemic.	0.458	3.5 ± 1.0	0.586	0.896	
10	It is hard to know if the measures I have taken have worked.	0.493	3.1 ± 1.2	0.455	0.900	
11	Many different opinions were shared about what to do in dealing with the pandemic effectively.	0.542	3.4 ± 1.1	0.502	0.899	
12	The pandemic is sometimes getting better and sometimes getting worse. The course of the pandemic is inconsistent.	0.526	3.5 ± 1.1	0.637	0.895	
13	The effectiveness of the measures taken to stop the pandemic is uncertain.	0.624	3.0 ± 1.2	0.542	0.897	
14	What I can and cannot do during the pandemic continues to change.	0.715	2.9 ± 1.2	0.494	0.899	

Total Cronbach's alpha = 0.90

Total explained variance (%) = 61.487

Table 5. Pre-modification and Post-modification Multifactor Confirmatory Factor Fit Index Results for the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale

		RMSEA	NFI	CFI	IFI	GFI	TLI	AGFI	CMIN	CMIN/df
COVID-19 Pandemic Fear Scale	Pre-modification	0.098	0.801	0.834	0.837	0.921	0.768	0.858	93.440	4.672
	Post-modification	0.061	0.907	0.942	0.943	0.963	0.910	0.927	43.613	2.423
Pandemic Uncertainty Scale	Pre-modification	0.087	0.861	0.892	0.892	0.865	0.875	0.825	515.845	3.908
	Post-modification	0.079	0.882	0.913	0.914	0.883	0.897	0.845	437.163	3.389

RMSEA, Root Mean Square Error of Approximation; NFI, Normed Fit Index; CFI, Comparative Fit Index; IFI, Incremental Fit Index; GFI, Goodness of Fit Index; TLI, Tucker-Lewis index; AGFI, Adjusted Goodness of Fit Index; CMIN, Chi-square; CMIN/df, Chi-square value to degrees of freedom

(Table 5). The first level multifactorial CFA results for the scale are shown in Figure 2. The results revealed that the scale is accepted with a single factor and 8-item structure. The lowest and highest factor loadings of the scale were 0.63 and 0.90, respectively.

As the structural equation modeling results revealed, the Pandemic Uncertainty Scale was found to be significant at $P = .000$ level with 18 items and 3 sub-dimensions. Revisions were made in the model by determining the variables that reduced the fit of the model. Among the residual values, new covariances were created for those with high covariance (e1-e2; e7-e8; e17-1e18). Table 5 shows that the fit indices are acceptable as a result of the new fit index calculations. Comparative Fit Index, IFI, and TLI indices above 0.90 and RMSEA value below 0.08 correspond to acceptable fit²⁴⁻²⁶. According to the first level multifactor analysis results (RMSEA=0.079; CFI=0.913; IFI=0.914; TLI=0.97; and $\chi^2/df=3.389$), the GFIs of the Pandemic Uncertainty Scale are at an acceptable level with ($P=.000$) (Table 5). The first level multifactorial CFA results for the Pandemic Uncertainty Scale are shown in Figure 3. Based on these results, it can be said that the scale was accepted with its 18-item and 3-dimension structure. The lowest and highest factor loadings of the scale were 0.46 and 0.76, respectively.

Tukey additivity test was performed to obtain a scale total score by adding up the items of the Pandemic Uncertainty Scale. The test results revealed that the items of the scale are homogeneous and interrelated ($F=41.093$; $P < .05$). As far as the additivity line is concerned, it is seen the items in the scale can be added up to the Likert-type scale as $F=0.850$; $P > .05$. The Hotelling

T value is at a significant level ($F=22.944$; $P < .05$). According to this result, it has been revealed that the scale can measure the desired quality at a meaningful level. The intraclass correlation coefficient test revealed that the ordering of the questions and the structure characteristics of the scale items are valid and reliable in terms of both individual items ($r=0.339$) and mean measurements (0.902) ($P < .05$).

Parallel Form Test Reliability

The Beck Anxiety Scale was administered to 386 individuals in the study group to test parallel form reliability. A weak positive relationship was observed between the Beck Anxiety Scale mean score and the Fear of COVID-19 Scale mean score and the

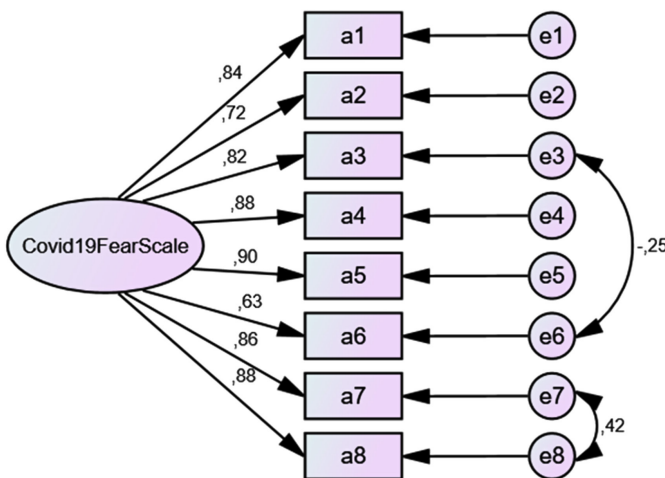


Figure 2. Examination of the Factor Structure of the Fear of COVID-19 Pandemic Scale with the PATH Diagram.

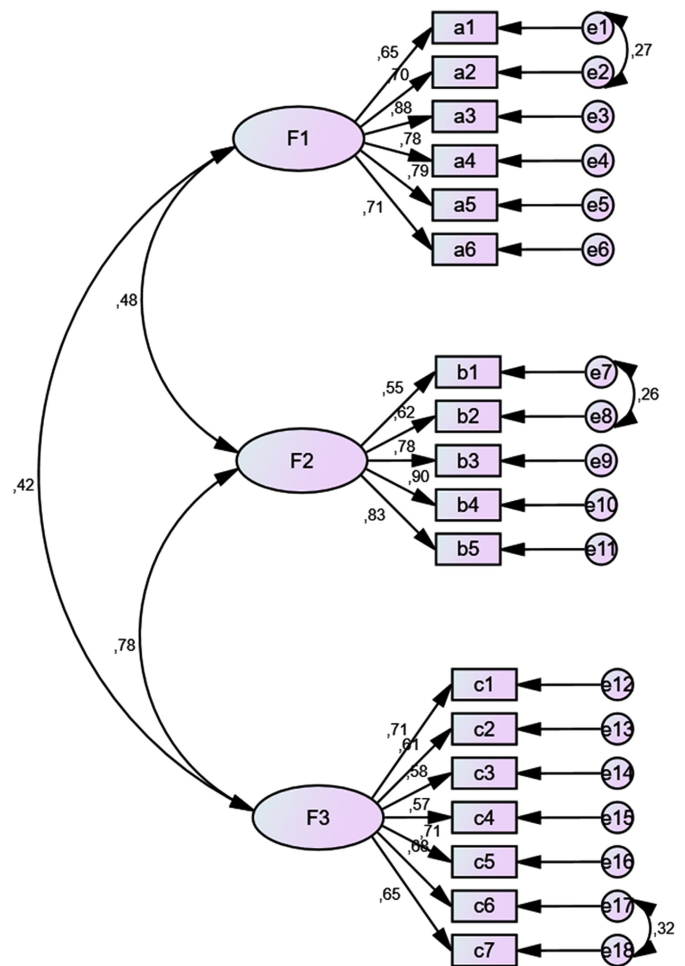


Figure 3. Examination of the Factor Structure of the Pandemic Uncertainty Scale with the PATH Diagram.

Table 6. The Comparison of the Correlation Coefficients of the Fear of COVID-19 Pandemic Scale, the Pandemic Uncertainty Scale, and the Beck Anxiety Scale

	COVID-19 Pandemic Fear Scale	Beck Anxiety Scale
COVID-19 Pandemic Fear Scale		$r=0.351$ $P=.000$
Pandemic Uncertainty Scale	$r=0.459$ $P=.000$	$r=0.237$ $P=.000$
Self-efficacy and awareness of the pandemic	$r=0.444$ $P=.000$	$r=0.166$ $P=.001$
Uncertainty about the current situation	$r=0.526$ $P=.000$	$r=0.147$ $P=.004$
Uncertainty about coping with the pandemic	$r=0.365$ $P=.000$	$r=0.175$ $P=.001$

Pandemic Uncertainty Scale total and sub-dimension mean scores. In addition, a moderate significant positive relationship was revealed between the fear and uncertainty scales developed in the study ($P < .01$) (Table 6).

DISCUSSION

As a result of expert opinions regarding the items of the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale, the content validity indices were found to be high. The items included in the scales are Likert type additives.²¹ In addition, the significant relationship between the scales indicates that the scales are compatible with each other. The moderate relationship between the scales developed in the study suggests that the perceived fear and uncertainty of COVID-19 are related to each other. In scale development studies, the significance revealed in parallel form validity is a data supporting the validity of the developed scales.²²

As a result of the EFA, the total variance KMO coefficient of the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale were 0.92 and 0.90, respectively. The Bartlett sphericity test results were found to be significant, which indicates that the sample size was perfectly adequate for factor analysis and the data were derived from multivariate normal distribution.²³ As a result of the analysis, the total variance explained was found to be 65.066 for the Fear of COVID-19 Pandemic Scale and 61.487 for the Pandemic Uncertainty Scale. Exploratory variance rate between 40 and 60% is considered sufficient in the literature.²⁴

Item analysis findings of both scales showed that the items are distinctive. According to the literature, the factor loading of an item is expected to be at least 0.30 or 0.40.²³ The factor loadings of the Fear of COVID-19 Pandemic Scale are between 0.43 and 0.76. According to the item analysis results, 6 items with a factor loading of less than 0.30 were removed from the Pandemic Uncertainty Scale and the total score correlation coefficients of the remaining items varied between 0.46 and 0.76. High correlation values between the whole scale and its factors reveal that the internal consistency of the scale is high.

As far as model fit is concerned, an χ^2/df value below 3 indicates perfect fit, while a value between 3 and 5 indicates a good fit. An RMSEA value below 0.08 points to good fit, and NFI, CFI, IFI, and GFI values of 0.90 and above indicate good fit. An AGFI value of 0.85 and above is accepted as an acceptable fit.²³⁻²⁷ As a result of the CFA, which tests construct validity, more than one fit index is obtained and the accuracy of the model is evaluated

not with a single fit index, but when all indices are together.²⁸ When the fit statistics of this study are examined, the RMSEA, NFI, CFI, IFI, GFI, TLI, AGFI, CMIN, and CMIN/DF values for the Fear of COVID-19 Pandemic Scale and the RMSEA, CFI, IFI, TLI, AGFI, CMIN, and CMIN/DF values for the Pandemic Uncertainty Scale indicate acceptable fit. When the model fit values and the factor loading values of the scale items are evaluated together, the single-dimension 8-item structure of the Fear of COVID-19 Pandemic Scale and the 3-dimension 18-item structure of the Pandemic Uncertainty Scale are confirmed, and it can be said that the models established for both scales have sufficient fit values.²³⁻²⁷

One of the methods for evaluating the internal consistency is the Cronbach's alpha reliability coefficient. If it is between 0.60 and 0.79, the measurement tool is considered relatively reliable, and if it is between 0.80 and 1, the tool is considered highly reliable.²⁹ In this study, the Cronbach's alpha coefficient of the Fear of COVID-19 Pandemic Scale was found to be 0.92. The Cronbach's alpha coefficient of the Pandemic Uncertainty Scale was found to be 0.90 for the whole scale, 0.89 for the self-efficacy and awareness of the pandemic dimension, 0.86 for the uncertainty about the current situation dimension, and 0.84 for the uncertainty about coping with the pandemic dimension.

This study investigated the psychometric properties of the Fear of COVID-19 Pandemic Scale and the Pandemic Uncertainty Scale, and a contribution was made to the literature. The results indicate that the scales are valid and reliable in revealing the fear of COVID-19 pandemic and pandemic uncertainty. It is recommended to increase the widespread effect of the scales by repeating the validity and reliability analyses on larger samples living in different cultures.

Limitations of Research

One limitation of this scale development study is that test-retest reliability could not be confirmed due to the study design. The results of this study can only be generalized to the individuals in the research group. Therefore, it may be beneficial to conduct methodological studies with different populations.

Ethics Committee Approval: Ethics committee approval for this study was received from Ankara Medipol University Non-Interventional Clinical Research Ethics Committee (Date: 29.04.2020, No: 0012).

Informed Consent: Participants' informed consent was obtained via Google Forms.

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REFERENCES

1. Remuzzi A, Remuzzi G. COVID-19 and Italy: What next? *Lancet*. 2020;395(10231):1225-1228. [CrossRef]
2. Aslan MM, Yuvacı HU, Kose O, Cevrilioglu AS, Ozden S. COVID-19 and pregnancy. *J Biotechnol Strateg Health Res*. 2020;4:10-13.
3. World Health Organization (WHO). Coronavirus disease (COVID-19) pandemic; 2020. Available at: <https://www.who.int/covid-19> (Access date: 27.04.2021).
4. European Centre for Disease Prevention and Control (ECDC). COVID-19 pandemic; 2020. Available at: <https://www.ecdc.europa.eu/en> (Access date: 27.04.2021).
5. Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry Clin Neurosci*. 2020;74(4):281-282. [CrossRef]
6. Shin LM, Liberzon I. The neurocircuitry of fear, stress, and anxiety disorders. *Neuropsychopharmacology*. 2010;35(1):169-191. [CrossRef]
7. Bakioğlu F, Korkmaz O, Ercan H. Fear of COVID-19 and positivity: Mediating role of intolerance of uncertainty, depression, anxiety, and stress. *Int J Ment Health Addict*. 2020;1:1-14.
8. Sherman AL. Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death Stud*. 2020;44(7):393-401.
9. Türkiye Psikiyatri Derneği. Mental health and coping with stress during the coronavirus disease outbreak; 2020. Available at: <https://www.psikiyatri.org.tr/2147/koronavirus-hastaligi-salgini-sirasinda-ruh-sagligi-ve-stresle-bas-etme>.
10. Li S, Wang Y, Xue J, Zhao N, Zhu T. The impact of COVID-19 epidemic declaration on psychological consequences: A study on active Weibo users. *Int J Environ Res Public Health*. 2020;17(6):2032. [CrossRef]
11. Aktan E. Social media and social anxiety: A research on social media users. *J Selcuk Commun*. 2018;11(2):35-53.
12. Din'er A. Fear: Its language, conceptualization, cultural aspect. *Int J Turk Lit Cult Educ*. 2017;6(2):769-798.
13. Yuksel B. *The Search for a Model That Integrates the Relationship between Attachment, Positive and Negative Emotion Regulation, and Intolerance to Uncertainty in Explaining the Symptoms of Anxiety*. Master Thesis, Ankara Hacettepe University; 2014.
14. Arpacı I, Karataş K, Baloğlu M. The development and initial tests for the psychometric properties of the COVID-19 Phobia Scale (C19P-S). *Pers Individ Dif*. 2020;164:(110108):1-6. [CrossRef]
15. Ladikli N, Bahadır E, Yumuşak FN, Akkuzu H, Karaman G, Türkkân Z. The reliability and validity of Turkish version of coronavirus anxiety scale. *Int J Soc Sci*. 2020;3(2):71-80.
16. Champion VL, Skinner CS, Menon U, et al. A breast cancer fear scale: Psychometric development. *J Health Psychol*. 2004;9(6):753-762. [CrossRef]
17. Mishel MH. Reconceptualization of the uncertainty in illness theory. *Image J Nurs Sch*. 1990;22(4):256-262. [CrossRef]
18. Zhang Y. Uncertainty in illness: Theory review, application, and extension. *Oncol Nurs Forum*. 2017;44(6):645-649. [CrossRef]
19. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol*. 1988;56(6):893-897. [CrossRef]
20. Ulusoy M, Sahin NH. Turkish version of the Beck Anxiety Inventory: Psychometric properties. *J Cogn Psychother*. 1998;12(2):163-172.
21. Ozdamar K. *Statistical Data Analysis with Package Programs-II, (Multivariate Methods)*. 9th ed. Nisan Bookstore; 2013.
22. Maughan S, Styles B, Lin Y, Kirkup C. *Partial Estimates of Reliability: Parallel Form Reliability in the Key Stage 2 Science Tests*. National Foundation for Educational Research UK; 2009.
23. Gürbüz S. *Structural Equation Modeling with AMOS*. 1st ed. Seçkin Publishing; 2019.
24. Gürbüz S, Şahin F. *Research Methods in Social Sciences*. 5th ed. Seçkin Publishing; 2018.
25. Byrne BM. *Structural Equation Modeling with AMOS*. 3rd ed. Routledge; 2016.
26. Hu L-T, Bentler PM. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychol Methods*. 1998;3(4):424-453. [CrossRef]
27. Kline RB. *Principles and Practice of Structural Equation Modeling*. 84th ed. The Guildford Press; 2016.
28. Capik C. Use of confirmatory factor analysis in validity and reliability studies. *J Anatolia Nurs Health Sci*. 2014;17(3):198-205.
29. Bujang MA, Omar ED, Baharum NA. A review on sample size determination for Cronbach's alpha test: A simple guide for researchers. *Malays J Med Sci*. 2018;25(6):85-99. [CrossRef]

SALGIN HASTALIK BELIRSIZLIK ÖLÇEĐİ

Aşağıdaki cümleler size; hiç uygun değilse “Kesinlikle Katılmıyorum”, uygun değilse “Katılmıyorum”, karar veremiyor iseniz “Kararsızım”, uygunsa “Katılıyorum”, tamamen uygunsa “Tamamen Katılıyorum” şeklinde aşağıda belirtilen yerlere çarpı (X) koyunuz.

Salgın Hastalık Belirsizlik Formu	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Salgın nedeniyle başıma neler geleceğini bilmiyorum.					
2. Salgınla ilgili cevapları olmayan pek çok sorum var.					
3. Salgının daha iyiye mi yoksa daha kötüye mi gittiğinden emin değilim.					
4. Salgının ne kadar kötü sonuçlanacağı belirsiz.					
5. Salgının ne kadar süreceği belirsiz.					
6. Bana göre salgından korunmak için yapılacaklar anlaşılır.					
7. Salgının seyri tahmin edilemez bir şekilde değişmeye devam ediyor.					
8. Salgın süreci ile ilgili açıklanan her şeyi anlıyorum.					
9. Bilim adamları, salgınla ilgili birçok anlama gelebilecek şeyler söylüyorlar.					
10. Aldığım önlemlerin işe yarayıp yaramadığını bilmek zor.					
11. Salgınla etkili baş etmede yapılacaklarla ilgili birbirinden farklı pek çok görüş verildi.					
12. Salgının bazı günler iyiye bazı günler kötüye gidiyor. Salgının gidişatı tutarsız.					
13. Salgını durdurmak için alınan önlemlerin etkinliği belirsiz.					
14. Salgın sürecinde neyi yapip ve neyi yapamayacağım değişmeye devam ediyor.					
15. Salgınla başetmede yapılması gerekenlerin hepsinin farkındayım.					
16. Salgınla ilgili aldığım önlemlerin etkili olacağına inanıyorum.					
17. Salgını kontrol altına almada yapılması gerekenler belirlendi.					
18. Yetkililer salgınla ilgili açıklamalarda sade bir dil kullandıklarından ne söylediklerini anlayabiliyorum.					

COVID-19 SALGINI KORKU ÖLÇEĐİ

Aşağıdaki cümleler size; hiç uygun değilse “Kesinlikle Katılmıyorum,” uygun değilse “Katılmıyorum,” karar veremiyor iseniz “Kararsızım,” uygunsa “Katılıyorum,” tamamen uygunsa “Tamamen Katılıyorum” şeklinde aşağıda belirtilen yerlere çarpı (X) koyunuz.

Salgın Hastalık Korku Formu	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. COVID-19 salgını aklıma geldiği zaman korkuyorum.					
2. COVID-19 salgınına düşündüğüm zaman sinirlenirim.					
3. COVID-19 salgını aklıma geldiği zaman üzülürüm.					
4. COVID-19 salgınına düşündüğüm zaman depresif olurum.					
5. COVID-19 salgınına düşündüğüm zaman tedirgin olurum.					
6. COVID-19 salgını aklıma geldiği zaman kalbim hızla çarpar.					
7. COVID-19 salgınına düşündüğüm zaman huzursuz olurum.					
8. COVID-19 salgınına düşündüğüm zaman endişelenirim.					