The Impact of COVID-19 Pandemic on Distress Intolerance: Among Panic Buyers in Turkey

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Abstract: In this study, the factors affecting levels of distress intolerance during the Covid-19 pandemic are statistically analyzed among panic buyers in Turkey. Distress intolerance also increased as health status deteriorates. Construct consistency was achieved in measuring distress intolerance during the Covid-19 period. Confirmatory factor analysis (CFA) was performed for participants who engage in panic buying behavior. CFA showed that the reliability and consisteny of this scale was ensured. It was seen that enduring uncomfortable emotions was the condition that affected distress intolerance the most. Doing everything to avoid feeling distressed or sad was found to be the least affecting distress intolerance in the Covid-19 period. When all of the fit criteria were considered, it was evident that the proposed model was valid for sample. Consequently, it is recommended that public health services develop health strategies with respect to the stated risk factors and to provide interventions that increase psychological flexibility to reduce Covid-19 related intolerance to distress.

Keywords: Covid-19, Confirmatory factor analysis, Distress intolerance, Panic buying.

1. INTRODUCTION

In efforts to make sense of human attitudes and behaviors, it is undeniably important to question the emotional states of individuals, their ways of dealing with the difficulties experienced, and their power for coping with traumatic periods or events. Distress intolerance is defined as a perceived inability to manage negative emotions and somatic states, and it is a behavioral response to such situations. The concept of distress intolerance is known to be an important transdiagnostic variable in the development or progression of psychological disorders. People may encounter various problems for which they have difficulty in producing solutions throughout their lives and may be unable to cope with those problems. Sadness, unhappiness, helplessness/hopelessness, anxiety, loss of interest, and depressive symptoms that a person finds psychologically difficult are defined as sources of distress. Tolerance, on the other hand, can be seen as taking action to reduce such negative emotions and move away from a difficult or challenging situation [1, 2]. Individuals with low tolerance for distress experience negative emotions as particularly threatening, and these individuals have trouble regulating their emotions. They tend to engage in maladaptive strategies such as overeating, drinking alcohol, or smoking excessively as a means to reduce or prevent distress [3]. There is increasing interest in the role of distress tolerance, or the inability to withstand negative emotions, in the initiation and maintenance of anxiety. However, studies of the role of

distress tolerance in anxiety disorders are less common. According to the available results, there is an association between difficulties in tolerating distress and anxiety in non-clinical populations. However, very few studies have investigated distress tolerance in participants diagnosed with an anxiety disorder [4]. As a result of measurements, it was found that "distress tolerance" was negatively related to "anxiety sensitivity" and "intolerance of uncertainty" in individuals with psychological problems due to anxiety [4].

The Covid-19 pandemic, which has affected the entire world, started in Wuhan, China, in December 2019 and officially reached Turkey on March 10, 2020. Medical, social, and political research to determine the impact of this pandemic on people in Turkey and throughout the world are all still ongoing. Understanding how people perceive the risks of a pandemic and how major crises shape individual behaviors is crucial in allowing decision-makers to shape their social and political strategies accordingly. The pandemic has had significant impacts on the physical and mental well-being of many people in Turkey. The social isolation implemented by the Ministry of Health to keep Covid-19 under control, for example, had significant effects on people's lives. Covid-19 has caused people under stress to more valuing health-related research. Therefore, the occurrence of distress intolerance among individuals experiencing increasing numbers of Covid-19 cases, new deaths, economic crises, and other stressors as a result of the pandemic is a phenomenon worth studying [5]. The global Covid-19 pandemic has affected people's ability to tolerate adversity. With each new wave of the pandemic, the troubles experienced by

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individuals increased. Akbari *et al.* [6] stated that more resilient people have greater chances of survival, and they examined the link between distress intolerance and psychological distress during the fourth wave of the pandemic in Iran. In the context of the Covid-19 pandemic, Losada-Baltar *et al.* [7] stated that being younger and being female were associated with higher levels of distress. Covid-19, which quickly spread around the globe, became a pandemic that has negatively affected the physical and mental health of people everywhere. The importance and necessity of social isolation during the pandemic and the state of being in quarantine caused emotions such as anger, helplessness, depression, anxiety, and fear of death [8].

Panic buying behavior occurs when consumers stockpile by buying unusually large quantities of goods in anticipation of a disaster, perceived disaster, expectation of a large price increase, or fear of shortages. It is a type of herd behavior and is seen in epidemics, lockdowns due to health policy, stock market fluctuations, cheap goods, fads, buying sprees, hoarding and investment panics. Panic buying can lead to real shortages, regardless of whether the risk of shortages is real or perceived. Panic buying, which occurs when various health crises such as pandemics occur, is strongly influenced by individuals' behaviors such as the threat of a health crisis, perceived product scarcity, or fear of the unknown and coping with problems caused by emotional pressure and uncertainty. This is because panic buying behavior is a form of behavior to alleviate anxiety, tolerate distress and regain control over the crisis and is an important factor explaining the social-psychological state of the individual. In the statistical models established in [9] study, anxiety level came to the fore as an important predictor of panic buying behavior.

During the Covid-19 period, the faster the virus spread, the faster the news received through all kinds of media spread. The information pollution and the fear felt affected people's panic and anxiety. Tolerance to distress increases with age. Panic buying behavior highlights the importance of psychological factors. Those who do not panic buy are more tolerant. While examining consumer behavior during pandemic periods such as Covid-19, it is considered important to take into account the anxiety and tolerance levels of individuals while conducting research on economic indicators. Therefore, decision makers are advised to develop interventions that will reduce perceived stress and

increase trust in information from reputable sources in the light of science [10].

In the following sections of this study, methods and result section including descriptive statistics, hypothesis testing, explanatory factor analysis, and confirmatory factor analysis are described. Followed by a section that draws conclusions based on the results of this study in comparison to those of other similar studies in the literature and offers recommendations for future studies.

2. STATISTICAL METHODS

The Distress Intolerance Scale (DIS), developed by [2], was created to measure individuals' resilience in coping with distressing internal situations triggered by various stressors. The items of the DIS are included in the Appendix. Çakır [3, 11] stated that distress intolerance is associated with many psychiatric disorders, including depression, anxiety disorders, substance and alcohol abuse, eating disorders, and personality disorders, and adapted the DIS developed by [2] to Turkish and performed consistency and reliability studies of the new version. The items of this single-factor scale are scored with a 5-point Likert-type system (1 = strongly agree, 5 = strongly disagree) and answers are based on self-report. High scores indicate high levels of intolerance of emotional strain. The Cronbach alpha internal consistency coefficient of the original scale was found to be 0.92 [2]. The aim of this study is to identify factors affecting the distress intolerance levels of people living in Turkey during the Covid-19 pandemic using the dataset of [12].

According to [13], explanatory factor analysis is a multivariate statistical method that utilizes the correlation between variables to create more effective and identifiable variables. In other words, it is a multivariate statistical method that reveals more effective and identifiable factors by bringing together those with high correlation among variables. It is investigated whether a large number of variables can be explained by a smaller number of factors. McHugh and Otto [2], Çakır [3], and Sari *et al.* [12] stated the DIS has a single-factor structure. Various parameter estimation methods are used in the exploratory factor analysis model, such as principal components (PC), least squares (LS), generalized least squares (GLS), maximum likelihood (MLE) methods. The researcher decides on the selection of these methods based on reasons such as the distribution type of the data and the structure of the variables. Within the context of

exploratory factor analysis (EFA), Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity Test are crucial tools for assessing the accuracy of the analysis and the suitability of the dataset.

The Kaiser-Meyer-Olkin (KMO) statistic is a measure used to assess the suitability of a dataset for factor analysis. The values typically range between 0 and 1, with higher values being desirable. A high KMO score indicates that there is sufficient common variance among the observed variables, suggesting appropriateness for factor analysis. Bartlett's Sphericity Test evaluates whether there is a significant correlation among the observed variables. The null hypothesis (H0) assumes no correlation between variables. If the test result indicates a significant correlation among variables, it suggests that the dataset is appropriate for factor analysis. These two tests serve as tools to assess whether factor analysis will yield reliable and valid results. A high KMO value and a significant Bartlett's Sphericity Test indicate that the dataset is suitable for conducting factor analysis.

Also, confirmatory factor analysis (CFA), which is one of the multivariate analysis methods, is a generally preferred statistical analysis method in applications involving measurement models. According to [14], a factor is an unobservable variable that is linked to more than one observed variable and helps to explain the correlation between these variables. According to [15], confirmatory factor analysis is a statistical method in which unobservable variables, called factors, are determined with the help of observed variables with a previously created measurement model. It is a method that tries to create an unobservable variable by using a previously known model

This method is used with the known and observable variables of an existing measurement model to detect unknown or unobservable variables. Thus, fewer and more interpretable variables are obtained. CFA is often used in the development of measurement models and in efforts to check the consistency of new structures to which scales are applied. CFA is particularly highly preferred in studies of moods that cannot be directly measured [16]. CFA reveals how well measured variables represent a set of theoretical latent structures. It offers the major advantage of analytically testing a precise, conceptually grounded theory to explain how different measured variables represent important psychological, sociological, or business constructs [13]. Confirmatory factor analysis is a method used to analyze whether the structure

determined by exploratory factor analysis is compatible with the data obtained and whether the model created by the researcher in the field he works in is compatible with the data. In addition, the usability and construct validity of scales with proven validity and reliability in a new field are tested with confirmatory factor analysis.

As a result of confirmatory factor analysis, fit evaluation is performed to determine how well the estimated model explains the data. This situation is also explained by the agreement ratio of the covariance matrix of the observed variables and the covariance matrix of the latent variables. The fit of the determined model with the data is evaluated using fit indices. According to the traditional approach to model determination, in testing confirmatory factor analysis, if the model is appropriate, it is acceptable, if not, the model is corrected and reanalyzed. According to [17], the chi-square test statistic is insufficient to evaluate data fit for the model. For this reason, different fit indices have been developed. When evaluating model fit, it is necessary to look at other fit indices.

There are various opinions about the sizes of samples to be used in CFA. For example, Bryman and Cramer [18] advised that the sample size should be at least 5 times the number of items included in the scale, while Nunnally [19] said that the sample size should be at least 10 times the number of items and Gorusch [20] said that the sample size should be at least 15 times the number of items [21].

In this study, the path analysis, CFA, and fit indices of the model as evaluated with the R program [22] are discussed based on the use of tolerance as the latent variable or factor and the items of the DIS (T1-T10) as the measurement variables to evaluate distress intolerance during the Covid-19 pandemic. Before proceeding to the CFA stage, a multivariate normality test was performed on the dataset. The method suggested by [23] was used to investigate the assumption of multivariate normal distribution. When the data was not a multivariate normal distribution then it is more appropriate to the robust technique was used for parameter estimates. The fit values of this model can be obtained using the Lavaan Package in R [24].

According to [25], RMSEA fit index is the fit index that shows the fit of the variables with the covariance matrix. As it approaches below 0.1, the interpretation that the model fit is good becomes stronger [26]. SRMR fit index is the fit index obtained by transforming the sample variance covariance matrix and model

variance covariance matrices into a correlation matrix. As the SRMR fit index approaches zero, the model fits the data well [16]. Model fit index RMSEA and/or SRMR values lower than 0.05 reflect a perfect model fit. RMSEA and/or SRMR values between 0.05 and 0.10 indicate an acceptable model fit. Other fit criteria fall within the range of 0 to 1, with closeness to 1 denoting a better fit of the model. When all of the fit criteria were considered, it was evident that the proposed model was valid for sample.

Reliability assesses how consistently a variable is measured. Internal consistency, a widely used measure, examines coherence among variables in a scale. Diagnostic measures are essential since no single item perfectly measures a concept, aiding in the evaluation of internal consistency. Cronbach's alpha is a measure of internal consistency used in exploratory factor analysis. This statistic is employed to assess how consistent items within a measurement instrument are with each other. Values typically range between 0 and 1, with higher values being desirable. A high Cronbach's alpha indicates strong correlations among the items in the measurement instrument, suggesting that they are measuring the same concept. Guttman's Lambda6 is a statistical measure used to evaluate the correlation between items in a measurement instrument. This coefficient assesses how much of the relationship between one item and the other items can be explained through linear regression. A high Lambda6 indicates strong relationships among items, enhancing the reliability of the measurement instrument.

These two measures are utilized to assess the reliability of measurement instruments in exploratory factor analysis. While Cronbach's alpha evaluates the internal consistency of the measurement instrument, Guttman's Lambda6 assesses the relationship between items. High values for both measures indicate a reliable and consistent measurement instrument.

Estimates of the composite reliability (CR) criterion of variance measures are also needed to analyze whether the variables considered in a model explain the latent variable. The criteria generally used for reliability and consistency analyses in CFA applications include CR≥0.70 with Cronbach alpha coefficients of ≥0.70 and AVE (average variance extracted) values of ≥0.50. Hair *et al.* [13] reported that the estimate for the described measurement of variance should be above 0.50 in order to prove the reliability of a scale. Values

of this level or higher indicate that the construct explains 50% or more of the variance of its indicators on average. However, Fornell and Larcker [27] stated that when CR values are higher than 0.6, AVE values lower than 0.5 are acceptable and the structural reliability is sufficient [28].

2.1. Research Group

In this study, data from the research conducted by [12] to evaluate the social and psychological effects of the Covid-19 pandemic in Turkey were used. Data records can be downloaded from the Mendeley Data platform in CSV format. Data sources can be accessed via the link https://doi.org/10.17632/sv95c7ydpy. Gias *et al.* [29] also used this dataset with the aim of building a prediction model to address anxiety classifications with the data mining techniques. In the dataset used in this study, 10 missing data points were identified for the T2, T3, and T4 items of the DIS belonging to the same male respondents. To improve the data quality, the missing data were replaced by the mode values of the corresponding variables. According to gender, the survey was completed by 1864 women, 936 men, and 3 participants who specified "other" as their gender. Those who specified "other" were excluded from the sample in all analyses as the number of such participants was small.
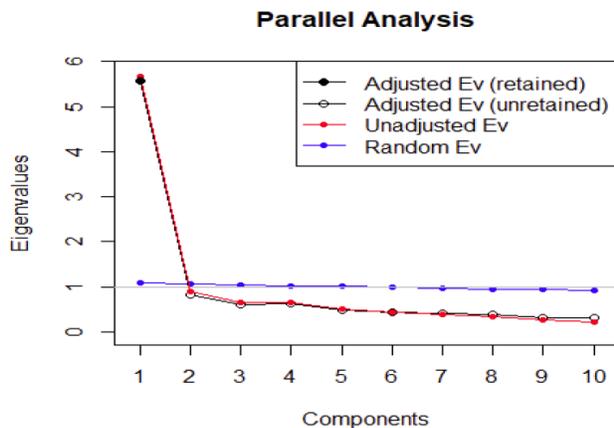
3. RESULTS

The sample for this study included 2850 participants. In Table **1**, frequencies some of the sociodemographic variables are presented. Mean and standard deviation (SD) values were calculated for the ages and DIS scores of the participants. While the mean age was 27.97 (SD = 9.4) years and the mean DIS score was 26.31 (SD=9.6). The mean DIS score of those who describe their health as very good is 23.98, and the mean DIS score of those who describe their health as very poor is 31.59.

3.1. Explanatory Factor Analysis

Primarily, EFA was performed on items of DIS scale. Çakır [3, 11] stated the number of factors of the DIS scale as 1. In Figure **1**, the vertical axis shows the eigenvalues and the horizontal axis shows the number of components (factors dimensions). The number of red dots above the intersection of the red and blue dots gives the factor number. By looking only at the number of colored (filled) dots, the number of factors is determined as 1 by parallel analysis technique.

Table 1:   Frequencies of Sociodemographic Variables

Variables	Sociodemographic Profile	n	%
Gender	Female	1864	65.4
	Male	986	34.6
Educational Status	Primary education	23	0.8
	High school	290	10.2
	Associate degree	550	19.3
	License	1504	52.8
	Graduate	483	16.9
Marital Status	Single	2034	71.4
	Married	719	25.2
	Divorced	86	3
	Other	11	0.4
Work-from-home status	Partially	609	21.4
	No	1187	41.6
	Yes	640	22.5
Panic buying	Yes	976	34.2
	No	1874	65.8
Chronic Disease status	Yes	1238	43.4
	No	1612	56.6

Figure 1: View of the number of the factor.

Moreover, it was observed that there was only 1 eigenvalue greater than 1. This supports that the number of factors is 1. As a result of the findings obtained, it was seen that the scale consisted of a single factor, as expected. Unweighted least squares method is chosen as the estimation method in EFA. It was observed that there was no difference between the results of the orthogonal rotation method Varimax and the oblique rotation method Direct Oblimin. This is because the number of factors is 1. The exploratory factor analysis revealed a 1-factor structure, with a variance of 52.09%. A total variance greater than 50%

is an indication that the construct is well measured. Internal consistency is obtained (Cronbach's alpha: 0.914; Guttman's lambda6: 0.918). The resulting value of the Kaiser-Meyer-Olkin test is greater than 0.70 and Bartlett's sphericity test is significant ($p<0.000$). The EFA results are given in Table **2**.

Table 2:   EFA Results

Kaiser-Meyer-Olkin Test	0.921
Bartlett Sphericality Test / p-value	16110.575 / 0.000
Cronbach's-α value	0.914
Guttman's Lambda (λ_6)	0.918

3.2. Confirmatory Factor Analysis

During pandemic periods such as Covid-19, it has been understood that it is important to take into account the anxiety and tolerance levels of people while examining consumer behavior and conducting research on economic indicators [9]. CFA was performed for participants who engage in panic buying behavior. The findings are presented in this section.

It can be concluded that the sample size of the present study was appropriate since the DIS included 10 items. The sample sizes of n=976 were considered

Table 3:   Goodness-of-Fit Values for the Modified CFA Models

Indexes	Values Obtained Model	Perfect Fit	Acceptable Fit
χ^2/df	116.179/35=3.32	$\chi^2/df \leq 3$	$3 < \chi^2/df \leq 5$
RMSEA	0.049	$0 \leq RMSEA \leq 0.05$	$0.05 < RMSEA \leq 0.10$
SRMR	0.049	$0 \leq SRMR \leq 0.05$	$0.05 < SRMR \leq 0.10$
GFI	0.995	$0.90 \leq GFI \leq 1$	$0.85 \leq GFI < 0.90$
AGFI	0.991	$0.90 \leq GFI < 1$	$0.85 \leq AGFI < 0.90$
CFI	0.993	$0.97 \leq CFI \leq 1$	$0.95 \leq CFI < 0.97$
NFI	0.990	$0.95 \leq NFI \leq 1$	$0.90 \leq NFI < 0.95$
NNFI	0.991	$0.95 \leq NNFI \leq 1$	$0.90 \leq NNFI < 0.95$
TLI	0.991	$0.95 \leq TLI \leq 1$	$0.90 \leq TLI < 0.95$
AVE=0.540 CR= 0.919 Cronbach's-alpha =0.9185 Omega=0.920			

sufficient for CFA with respect to [19]. The Mardia skewness value of the DIS was calculated as 696.557 (p<0.001) and the Mardia kurtosis value was 39.822 (p<0.001). According to these results, neither of the datasets had a multivariate normal distribution. For this reason, the WLSMV (maximum likelihood estimation with robust standard errors and a mean- and variance adjusted test statistic) technique was used for parameter estimates and model fit values using lavaan package in R. The WLSMV technique in CFA uses robust maximum likelihood estimation, incorporating weighted least squares, and adjustments for both mean and variance in the test statistic. It's especially effective for non-normal or categorical data.

In the model, a value of χ^2 =116.179 (df= 35, p<0.01) was computed. The χ^2/df ratio was 3.32, which indicated an acceptable model fit, as it fell between 0 and 5 [13, 26, 30]. The fit measures of the model were calculated as RMSEA=0.049 (root mean square error approximation), SRMR=0.049 (standardized root mean square residual), GFI=0.0.995 (goodness-of-fit index), AGFI=0.991 (adjusted GFI), CFI=0.993 (comparative fit index), NFI=0.990 (normed fit index), NNFI=0.991 (non-normed fit index), TLI=0.991 (Tucker–Lewis index).

When all of the fit criteria are considered, it is evident that our proposed models are valid, as Table **3** shows. Looking at the reliability coefficients in Table **3**, values of CR=0.919, AVE=0.540, Cronbach alpha=0.9185, and Omega=0.920 were obtained. Considering the fit index values given in Table **3**, it is seen that the model fits the data well.

The values in the "est" columns in Table **4** are non-standardized factor loadings that show the estimates of the path coefficients, and "std.err" is the standard error value of the non-standardized factor loading. "rhs" indicates the corresponding observed variable. The "z-value" and "p-value" values provide information about the levels of the predicted parameters. The "z-value" is calculated by dividing "est" by the "std.err" value. If z>1.96, path estimates at a significance level of 0.05 are significant. If p<0.05, it indicates that the latent factor has an important role in explaining this item. Thus, if p<0.05, the hypothesis that the model parameter is meaningless is rejected. The values in the "std.lv" column represent standardized factor loadings. That is, only latent variables are standardized in the "std.lv" column. In the "std.all" column, both the latent and observed variables are standardized. "std.all" is referred to as the fully standardized solution. In models with one latent factor, "std.all" can also be interpreted as a correlation coefficient. Taking the square of "std.all" gives the value of R^2, which indicates the extent to which each item can be explained by the latent structure. The greater the explained variance, the greater the effect of that item on the factor.

According to Table **4**, all items significantly affect the factor of tolerance (p<0.01). Item T4 ("Feelings of being distressed or sad scare me") is the variable that most affects the DIS score, and its variance explained by the latent factor is R^2=0.668 (p<0.01). This means that a 1-unit increase in the DIS score will increase T4 by 1.135 units.

Table 4: Factor Loadings of the CFA Model

| Items	est	std.err	z-value	pvalue	std.lv	std.all	R^2
T1	1.000	0.000	-	-	0.912	0.727	0.529
T2	0.806	0.041	19.546	0.000	0.735	0.611	0.373
T3	1.132	0.045	25.366	0.000	1.033	0.795	0.632
T4	**1.135**	0.042	27.090	0.000	1.036	0.817	**0.668**
T5	0.814	0.050	16.230	0.000	0.743	0.562	0.316
T6	1.126	0.044	25.343	0.000	1.028	0.765	0.586
T7	1.043	0.043	24.006	0.000	0.952	0.753	0.567
T8	**1.184**	0.043	27.736	0.000	1.081	0.837	**0.701**
T9	0.902	0.048	18.612	0.000	0.823	0.660	0.436
T10	1.091	0.045	24.458	0.000	0.995	0.758	0.575
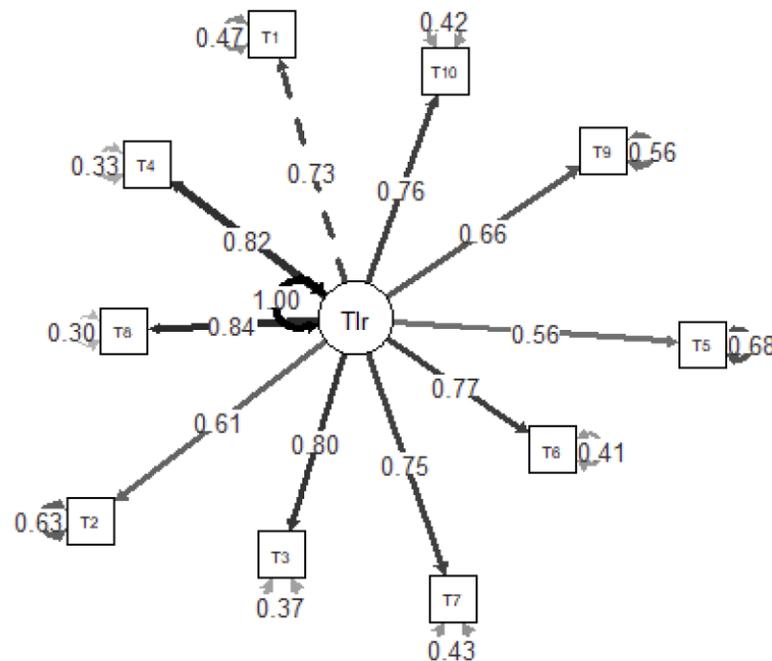
Figure 2: Confirmatory Factor Analysis Path.

Item T8 ("I can not stand uncomfortable feelings") is the variable that affects the DIS to the highest extent, and its variance explained by the latent factor is R^2=0.701 (p<0.01). This means that a 1-unit increase in the DIS score will increase T8 by 1.184 units. T5 ("I can do anything to not feel distressed or sad") was found to have the least effect on distress intolerance during the Covid-19 period, and its variance explained by the latent factor is R^2=0.316 (p<0.01). The results of the CFA model for DIS data obtained during the Covid-19 pandemic are given in Table **4**. In the path graph in Figure **2**, standardized factor loadings are shown on the lines and standard error values are shown on the rectangles.

4. DISCUSSION

Individuals with a low tolerance of distress experience negative emotions as particularly threatening, and these individuals have trouble regulating their emotions. They tend to engage in maladaptive strategies such as overeating, drinking alcohol, and smoking excessively in efforts to reduce or prevent distress. In the course of the Covid-19 pandemic, it was seen that tolerance to distress decreased among individuals as a result of their fear of the pandemic and health problems as well as the restrictions imposed on social life. In particular, it became obvious that parents who were overseeing

APPENDIX

Items of the Distress Intolerance Scale (DIS)

Tolerance-Item No.	The Distress Intolerance Scale (DIS)
T1	I can not cope with feeling distressed or sad.
T2	Other people can withstand feelings of distress and sadness better than I can.
T3	Being distressed or sad is always a great ordeal for me.
T4	Feelings of being distressed or sad scare me.
T5	I can do anything to not feel distressed or sad.
T6	When I'm feeling distressed or sad, I can't help but focus on how bad the distress really feels.
T7	I have to get rid of the uncomfortable emotions very quickly, otherwise I cannot bear them.
T8	I can not stand uncomfortable feelings.
T9	I can not stand the uncomfortable feelings.
T10	Being nervous scares me.

childcare and housework while maintaining their professional obligations online from home experienced various psychological problems. A high DIS score indicates an individual's high level of distress intolerance.

The relationships between T8 ("I cannot stand uncomfortable feelings"), T4 ("Feelings of being distressed or sad scare me") and DIS score were highest together with the related R^2 values.

Psychological flexibility is the ability of an individual to detect different changes in the outside world and adapt to these conditions while pursuing long-term goals. Flexibility is the most important element of psychological resilience [31]. Therefore, it is recommended that public health services develop various health strategies according to the risk factors mentioned in this study and offer interventions that increase psychological flexibility to reduce intolerance to stress caused by Covid-19.

RECOMMENDATIONS FOR FUTURE RESEARCH

One of the limitations of this study is that the data used in this study were collected online due to the Covid-19 pandemic. In addition, since the scale data were collected online, the sample was limited to literate and volunteer individuals with internet access. It was observed that women participated in the survey more than men. A different sample design is recommended for future studies to improve the performance and interpretability of the models. The findings are limited to the Turkish sample, but the study is replicable.

CONFLICT OF INTEREST

FINANCIAL SUPPORT

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