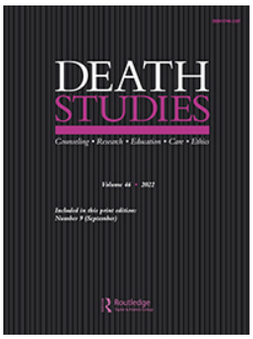

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The Turkish adaptation and psychometric characteristics of the COVID-19 Traumatic Stress Scale

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ABSTRACT

The study aimed to adapt and validate the COVID-19 Traumatic Stress Scale in Turkish. The scale consisted of three dimensions: "threat/fear of infection and death," "economic hardship," and "disturbed routines/isolation." The Turkish version (COVID-19 Traumatic Scale-TR) was tested on a convenience sample of 432 online participants. Confirmatory factor analysis confirmed the three dimensions of the COVID-19 Traumatic Stress Scale, but with item 9 removed, resulting in an 11-item scale. Cronbach's α score for the 11-item scale was 0.85. The scale may be important to test the impact of COVID-19 on different psychosocial domains, including economic impact and isolation, in Turkey.

The COVID-19 pandemic has dramatically changed routine life in many countries as a rapidly spreading deadly disease. The risk of transmission and mortality of the disease has caused people to live with constant stress. Both the presence of COVID-19 disease and the measures taken to prevent the spread of this disease (lockdown and similar measures) have caused adverse psychosocial effects on individuals (Dubey et al., 2020; Vindegaard & Benros, 2020). COVID-19 has become a severe psychosocial stressor for individuals due to many reasons such as decreased social contact during the pandemic process, change of routines, interrupted business life, and economic difficulties. In addition to being a psychosocial stressor, the COVID-19 pandemic is a severe traumatic event for both individuals and societies due to its low controllability and potential for death (Carvalho Aguiar Melo & de Sousa Soares, 2020; Kawohl & Nordt, 2020; Poudel & Subedi, 2020; Razai et al., 2020).

During the first days of the COVID-19 pandemic, Ahorsu et al. (2020) developed the 7-item Fear of COVID-19 Scale, which aimed to measure the fear related to the COVID-19 pandemic in individuals. Lee (2020) developed the 5-item Coronavirus Anxiety Scale to screen the anxiety symptoms associated with COVID-19. The 10-item COVID-19 Burnout scale was developed to measure COVID-19 associated burnout (Yildirim & Solmaz, 2020). The 5-item Coronavirus Stress Measure measures COVID-19 related distress (Arslan et al., 2020). The COVID-19 Stress Scale has five subscales: COVID danger and contamination fears, COVID fears about economic consequences, COVID xenophobia, COVID compulsive checking and reassurance-seeking, and COVID traumatic stress symptoms (Taylor et al., 2020).

These scales do not measure the psychological effects of isolation. despite social isolation during the COVID-19 pandemic being shown to have a substantial global impact with significant psychological consequences (Carvalho Aguiar Melo & de Sousa Soares, 2020; Razai et al., 2020). Kira et al. (2020) aimed to develop a complex traumatic stress measure for COVID-19. The resulting COVID-19 Traumatic Stress Scale has 12 items and three subscales: Threat/fear of future infection/death; Economic stressors/traumas; and Routine disturbance, isolation, and related secondary traumas.

Turkey ranks 9th in the world for COVID-19 cases and 18th for the total number of deaths (Public Health Professionals Association, 2021). In this context, we aim to adapt the COVID-19 Traumatic Stress Scale to Turkish and analyze its validity and reliability with a sample from Turkey. We further hypothesize that the subscales of the measure will be positively associated with generalized anxiety, depression, and

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posttraumatic stress disorder, but negatively associated with well-being.

Materials and methods

Procedure

After obtaining the necessary permissions from the developer of the COVID-19 Traumatic Stress Scale, the scale was translated into Turkish separately by three translators who are proficient in both Turkish and English, and a single Turkish form was created by working on three forms. We did not back-translate the scale after translating it into Turkish. Recent research on translation has questioned the functions of back-translations to improve the quality of questionnaires (Behr, 2017). Instead, we sought feedback on the wording and comprehensibility of the adapted scale from 20 experts. Small changes were made in line with the feedback, and the Turkish form of the COVID-19 Traumatic Stress scale was finalized. The project was approved by the Ethics Committee of the Eskişehir Osmangazi University. In addition, all procedures performed in the study were in accordance with the 1964 Helsinki declaration and its later amendments. Participants were recruited from many online platforms, including social media platforms, and snowball sampling. Data collection occurred via Qualtrics.

Participants

Participants were 432 adults (M_{age} = 29.83 years, SD = 10.31). A total of 275 were female, 148 were male (4 preferred not to say) and 261 were single, 162 were married, and 9 did not respond to the question about marital status. We also asked participants if they had a diagnosed psychiatric disorder, and 34 (8.00%) of them positively responded. Only 8 of the participants had been infected by coronavirus; however, 18 of them reported at least one member of their family had been infected. In addition, 192 reported at least one of their friends had been infected. Four participants had been bereaved of a family member due to COVID-19 and 52 had lost friends to COVID-19.

Measures

We asked participants some sociodemographic questions about their experiences related to COVID-19: if they were infected by coronavirus; if any of their family members were infected/died; and if any of their friends were infected/died. For the measures below, total scores for each scale (and subscale where relevant) were generated by averaging all items.

COVID-19 traumatic stress

The Turkish adaptation of the COVID-19 Traumatic Stress Scale (COVID-19 Traumatic Stress Scale-TR) was finalized by the researchers. As in the original, we used a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). All scale items were presented in random order.

Depression

The Patient Health Questionnaire-9 (PHQ-9) is a 9-item scale created to measure depression according to DSM-IV depression criteria (Kroenke et al., 2001). Participants responded to the statements on a 4-point scale (0 = *not at all* to 3 = *almost every day*), with higher scores indicating higher severity of depressive symptoms. It has been shown to be valid and reliable in the Turkish language and samples (Sari et al., 2016). The Cronbach's α was 0.89 in our sample.

Well-being

The World Health Organization-5 Well-Being Index (WHO-5) is a 5-item scale prepared by the World Health Organization (Topp et al., 2015). Participants answered the questions on a 6-point Likert style scale ranging from 1 (*never*) to 6 (*always*), with higher mean scores indicated higher well-being scores. The scale was found to be valid and reliable in the adult population in Turkey (Eser et al., 2019). The reliability of the scale was also sufficient in our sample (Cronbach's α = 0.83).

Generalized anxiety

We used the 7-item Generalized Anxiety Disorder-7 (GAD-7) (Spitzer et al., 2006). Items are scored from 0 (*never*) to 3 (*almost every day*). Its Turkish validity and reliability study was conducted by Konkan et al. (2013) and showed good reliability in our sample (Cronbach's α = 0.89).

Posttraumatic stress

The PostTraumatic Stress Disorder Checklist for DSM-5 (PCL-V) is a checklist created to measure posttraumatic stress symptoms according to DSM-5 diagnostic criteria (Blevins et al., 2015). PCL-V is a self-report scale with 20 items. Each item is scored on a 5-point scale, ranging from 1 (*not at all*) to 5 (*extremely*). The Turkish version of PCL-V was previously evaluated as valid and reliable (Boysan et al., 2017). The scale was also reliable in our sample (Cronbach's α = 0.95).

Table 1. Summary of CFA fit indices.

								95% CI (RMSEA)		
	χ^2	χ^2/df	CFI	NNFI	GFI	SRMR	RMSEA	L	U	$\Delta\chi^2$
Model 1	218.54*	4.29	0.92	0.89	0.98	0.07	0.09	0.08	0.10	
Model 2	186.75*	3.74	0.93	0.91	0.98	0.06	0.08	0.07	0.09	31.79*
Model 3	225.01*	4.41	0.91	0.89	0.98	0.07	0.09	0.08	0.10	38.27*
Model 4	119.53*	2.92	0.96	0.94	0.99	0.05	0.07	0.05	0.08	

Notes: CFI: Comparative Fit Index; NNFI: Bentler–Bonnett Non-normed Fit Index; GFI: Goodness of Fit Index; SRMR: Standardized Root Mean Square Residuals; RMSEA: Root Mean Square Error of the Approximation, $\Delta\chi^2$: χ^2 difference between nested models.
The fourth model was compared to third model, but we used AIC to compare models since they were not nested.
*$p < 0.001$.

Data screening and analysis

The data were screened by using IBM SPSS Data Editor v. 25. Since we aimed to validate the COVID-19 Traumatic Stress Scale, we included only the participants who responded to all statements of the scale and removed participants with missing responses on the scale ($n = 2$). Then, we investigated how much time the participant took to complete the survey. The mean duration was 15 minutes and 35 seconds and we, therefore, removed participants ($n = 5$) who completed the survey very fast ($z = -3.00$) or very slow ($z = +3.00$).

The construct validity of the COVID-19 Traumatic Stress Scale-TR was tested by confirmatory factor analyses (McArdle, 1996) using JASP v.0.13. We inspected Comparative Fit Index (CFI), Bentler-Bonett Non-normed Fit Index (NNFI), Root Mean Square Error of the Approximation (RMSEA) and its confidence interval, Standardized Root Mean Square Residuals (SRMR), Goodness of Fit Index (GFI), chi-square (Byrne, 2010a, 2010b), and the ratio of chi-square to its degrees of freedom (χ^2/df) (Kelloway, 1998) to evaluate the fitness of the model. We used chi-square difference ($\Delta\chi^2$) to compare different models to find the best-fitting model (Schermelleh-Engel et al., 2003). We also evaluated the criterion validity of the COVID-19 Traumatic Stress Scale-TR (Cronbach & Meehl, 1955). First, we estimated bivariate correlations between the subscales of the COVID-19 Traumatic Stress Scale-TR and depression, generalized anxiety, and posttraumatic stress scores. The higher positive associations are interpreted as higher validity. Second, we performed a linear multiple regression analysis using the COVID-19 Traumatic Stress Scale-TR subscales, depression, generalized anxiety, and posttraumatic stress as predictors and well-being as the dependent variable. Negative and unique associations between COVID-19 Traumatic Stress Scale-TR subfactors and well-being are considered as good validity.

Results

Construct validity

To test if the factor structure of the original COVID-19 Traumatic Stress Scale (Kira et al., 2020) fits our data, we performed a confirmatory factor analysis (CFA). In this model, items from 1 to 5 were loaded on the first factor (Fear from future infection), items 6–9 were loaded to the second model (Economic impact), and items 10–12 were loaded to the third factor (Isolation, routine disruption). We used a robust estimation, allowed the factors to correlate, and fixed the factor variances. All model estimates are summarized in Table 1. We added the plot for factor structure with standardized estimates for the *last* model (Figure 1). Furthermore, the item-factor associations were also summarized in Table 2 for the last model. The proposed model did not fit the data well, χ^2 (51) = 218.54, χ^2/df = 4.29, CFI = 0.92, GFI = 0.98, NNFI = 0.89, SRMR = 0.07, RMSEA = 0.09, 90% CI of RMSEA [0.08, 0.10]. However, all items were significantly associated with their predefined factors (*p*s < 0.001). Since the proposed model did not fit the data well, we investigated the modification indices. The modification indices indicated that item 9 (“*It has been difficult for me to get the things I need due to the Coronavirus (COVID-19)*”) should cross-load to the third factor. The authors of the original paper and their participants evaluated the item as part of the economic effects of COVID19; however, our participants (mostly students) appeared to interpret the item as a side effect of lockdown or closure of stores (i.e., limited reach to goods from markets or stores). Hence, we analyzed three alternative models: cross-loading item 9 to both the second and the third factors (model 2); loading item 9 only to the third factor (model 3); completely removing item 9 from the model (model 4). Then, we compared the models to select the best fitting factorial structure in the Turkish sample. We used $\Delta\chi^2$ to compare model fitness for the second and third models. For the last model, we

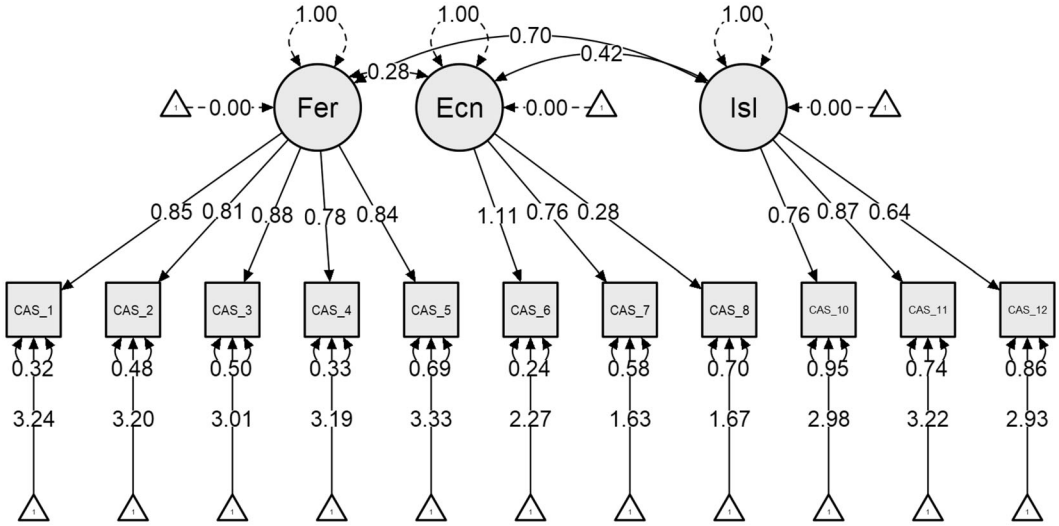

Figure 1. Factorial structure of the COVID-19 Traumatic Stress Scale-TR.

compared the Akaike information criterion (AIC) with the best of the first three models.

In the second model, we tested same three-factor structure, but allowed item 9 to cross-load to the second and the third factors, χ^2 (50) = 186.75, χ^2/df = 3.74, CFI = 0.93, NNFI = 0.91, GFI = 0.98, SRMR = 0.06, RMSEA = 0.08, 90% CI of RMSEA [0.07, 0.09]. This model with item 9 cross-loaded fit the data better compared to first model, $\Delta\chi^2$ (1) = 31.79, $p < 0.00001$[1]. In addition, all fit indices improved compared to the first model. Item 9 significantly loaded on both factors (*p*s < 0.001). The third model, where item 9 was loaded only to the third factor was tested, did not fit the data well, χ^2 (51) = 225.01, χ^2/df = 4.41, CFI = 0.91, NNFI = 0.89, GFI = 0.98, SRMR = 0.07, RMSEA = 0.09, 90% CI of RMSEA [0.08, 0.10]. Compared to the second model, the third model was a worse fit to the data, $\Delta\chi^2$ (1) = 38.27, $p < 0.00001$. The fourth model, with item 9 removed, fit data well, χ^2 (41) = 119.53, χ^2/df = 2.92, CFI = 0.96, NNFI = 0.94, GFI = 0.99, SRMR = 0.05, RMSEA = 0.07, 90% CI of RMSEA [0.05, 0.08]. Thus, we compared the AIC of model 2 (13646.25) with model 4 (12536.79). The smaller AIC for model 4 indicated that the model without item 9 fit data better. The standardized estimates for item-factor relationships were between 0.71 and 0.83 in the first factor; between 0.32 and 0.91 for the second factor; and between 0.57 and 0.71 for the third factor (see Table 2). Parallel to the original structure, the factors were named as "Fear from future infection," "Economic impact," and "Isolation, routine disturbance," respectively.

We conducted bivariate correlations between COVID-19 Traumatic Stress subscales and depression, generalized anxiety, posttraumatic stress, well-being scores, and age and gender of participants (see Table 3). Age was not associated with the COVID-19 Traumatic Stress subscales, but there was a gender difference in fear from future infection subscale, where females had higher scores. As such, we summarize means and standard deviations according to gender in Table 4.

The fear of future infection was significantly correlated with both economic impact and routine disturbance. As predicted, fear from future infection, economic impact, and routine disturbance were positively and significantly correlated with depression, generalized anxiety, and posttraumatic stress (*rs* changed between 0.25 and 0.46, *p*s < 0.001). In addition, fear from future infection, economic impact, and routine disturbance were negatively associated with well-being. These results indicate the validity of the COVID-19 Traumatic Stress Scale-TR in our Turkish sample.

Reliability

Cronbach's α score for the total 11-item scale was 0.85. For the subscales, Cronbach's α scores were 0.88 for fear from future infection, 0.67 for economic impact, and 0.66 for routine disturbance.

Discussion

We aimed to adapt the COVID-19 Traumatic Stress Scale to Turkish and test its validity and reliability. We also investigated the relationships between traumatic stress of COVID-19 and well-being, anxiety, posttraumatic stress, and depression symptoms. The confirmatory factor analysis confirmed the three

Table 2. COVID-19 Traumatic Stress Scale factors, factor loadings, and reliabilities.

Item	Unstandardized estimate	Standard error	95% CI		Standardized estimate	R^2
			Lower CI	Upper CI		
Fear of future infection						
Koronavirüsten (COVID-19) korkuyorum.	0.85	0.04	0.78	0.92	0.83	0.70
Başka insanların etrafındayken stresliyim çünkü koronavirüse (COVID-19) yakalanacağımdan endişeleniyorum.	0.81	0.04	0.73	0.89	0.76	0.58
Koronavirüs (COVID-19) hakkında düşünmek beni tehdit altı nda hissettiriyor.	0.88	0.04	0.80	0.96	0.78	0.61
Koronavirüse yakalanacağınız konusunda ne kadar endişelisiniz?	0.78	0.04	0.71	0.86	0.81	0.65
Son iki hafta içinde, koronavirüs nedeniyle gelecek hakkında endişeli ve korkmuş hissettim.	0.84	0.05	0.75	0.93	0.71	0.51
Economic impact						
Koronavirüs (COVID-19) beni maddi açıdan olumsuz etkiledi.	1.11	0.07	0.97	1.24	0.91	0.84
Koronavirus (COVID-19) nedeniyle işimi veya işten gelen gelirimi kaybettim.	0.77	0.08	0.62	0.91	0.71	0.50
Koronavirüs (COVID-19) nedeniyle ihtiyaç malzemelerine (gı daya) erişmekte zorlandığım zamanlar oldu.	0.28	0.06	0.17	0.40	0.32	0.10
Routine disturbance						
Son iki hafta içinde, koronavirüsten dolayı sosyal olarak izole olduğumu hissettim.	0.76	0.06	0.64	0.88	0.62	0.38
Son iki hafta içinde, günlük rutinlerim koronavirüsün yol açtı ğı durumdan etkilendi.	0.87	0.06	0.76	0.99	0.71	0.51
Yaşadığınız yerde kapalı kalmak başkalarıyla olan ilişkilerinizi ne ölçüde olumsuz etkiledi?	0.64	0.06	0.53	0.75	0.57	0.32

Note: CI: confidence interval.

Table 3. Bivariate correlations of the COVID-19 Traumatic Stress subscales with study variables.

Variable	1	2	3	4	5	6	7	8
1. Fear from future infection								
2. Economic impact	0.33*** <0.001							
3. Routine disturbance	0.56*** <0.001	0.40*** <0.001						
4. Generalized anxiety	0.46*** <0.001	0.29*** <0.001	0.39*** <0.001					
5. Depression	0.35*** <0.001	0.25*** <0.001	0.39*** <0.001	0.73*** <0.001				
6. Posttraumatic stress	0.42*** <0.001	0.31*** <0.001	0.38*** <0.001	0.74*** <0.001	0.79*** <0.001			
7. Well-being	−0.27*** <0.001	−0.16** 00.002	−0.26*** <0.001	−0.43*** <0.001	−0.52*** <0.001	−0.42*** <0.001		
8. Age	−0.02 0.674	0.02 0.708	−0.04 0.387	−0.22*** <0.001	−0.34*** <0.001	−0.25*** <0.001	0.11 0.030	
9. Gender (1 = Female; 2 = Male)	−0.18*** <0.001	−0.06 0.222	−0.08 0.098	−0.17*** <0.001	−0.17** 0.001	−0.17** 0.002	0.17*** <0.001	−0.04 0.434

Note. Rows below the correlation coefficients depict the *p*-values.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

dimensions of the COVID-19 Traumatic Stress Scale with a Turkish sample. However, different from the original version, the scale fit the data with 11 items in our sample.

The bivariate correlations revealed significant positive associations between the traumatic stress of COVID-19, anxiety, depression, and posttraumatic stress symptoms. The COVID-19 traumatic stress was found to be negatively correlated with well-being. Novel research conducted in the United Kingdom showed a modest increase in the prevalence of mental health problems such as higher levels of anxiety, depression, and traumatic stress in the early stages of the pandemic (Shevlin et al., 2020). A systematic review and meta-analysis reported that the prevalence of stress, anxiety, and depression due to the pandemic in the general population were 29.6, 31.9, and 33.7%, respectively (Salari et al., 2020). Consistent with our results, in a recent study, the adult population in the United Kingdom reported higher depression scores, higher anxiety scores, and lower mental well-being scores in the Mental health and well-being during the COVID-19 pandemic study (O'Connor et al., 2020).

Table 4. Means and standard deviations of study variables.

	Female		Male		All Sample		Cronbach's
Variables	M	SD	M	SD	M	SD	α
Fear of future infection	3.30	0.86	2.97	0.90	3.19	0.88	.88
Economic impact	1.98	0.78	1.88	0.80	1.95	0.79	.67
Routine disturbance	3.09	0.92	2.93	0.92	3.03	0.92	.66
GAD	2.26	0.63	2.02	0.66	2.18	0.65	.89
Depression	2.20	0.63	1.97	0.68	2.12	0.66	.89
Posttraumatic stress	2.80	0.86	2.49	0.92	2.70	0.89	.95
WB	2.82	0.90	3.17	1.05	2.94	0.96	.83
Age	30.22	10.29	29.38	10.36	29.83	10.31	

Note. GAD: Generalized Anxiety Disorder; WB: well-being.

The reliability of the COVID-19 Traumatic Stress Scale-TR was good and very similar to the original study (α = 0.88) (Kira et al., 2020). We can conclude that the 11-item COVID-19 Traumatic Stress Scale-TR is a reliable measurement tool. Although there were 12 items on the original scale, item 9 ("*It has been difficult for me to get the things I need due to the Coronavirus (COVID-19)*") was removed in the Turkish scale. The likely explanation may be the different types of restrictions in each country during the COVID-19 outbreak. Unlike most countries, sustained nationwide lockdowns were not held in Turkey. To reduce the potential negative economic consequences of the outbreak, Turkey's government declared national lockdowns just for weekends. That may explain why having difficulty for the individuals to get things they need were not encountered.

Our study is limited via the use of self-report questionnaires and convenience sampling. Our sample was dominated by young adult university students, which may have affected scores on the economic impact subscale. However, we think that the COVID-19 Traumatic Stress Scale-TR is an important scale to test COVID-19 related stress on different psychosocial domains including economic impact and isolation in Turkey. The scale is superior to similar scales in terms of measuring psychosocial effects, not only fear or anxiety, and measure psychological effects associated with economic and isolation. It is also short, valid, and reliable. Thus, its adaptation added an important measure into Turkish. Also, testing the validity and reliability of the scale in a new sample within a different language and cultural setting contributed to the robustness of the measure.

Note

1. The *p*-value for chi-square is estimated by https://www.socscistatistics.com.

Disclosure statement

The authors have no conflict of interest to disclose. This article has not been published elsewhere and it has not been submitted simultaneously for publication elsewhere.

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