COVID STRESS SCALES: THE PSYCHOSOCIAL IMPACT OF COVID-19 IN LATINOS/AS

LAS ESCALAS DE ESTRÉS DE COVID: EL IMPACTO PSICOSOCIAL DEL COVID-19 EN LATINOS/AS

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ABSTRACT

The COVID-19 pandemic is linked to a rise in mental health problems and the consequent devastating impact on social, political and health pillars. Puerto Rico has been no exception, including an aggressive and restrictive quarantine period, and several thousands of deaths attributed to the virus. The aim of this investigation is to examine the reliability and convergent validity of the Spanish version of the COVID Stress Scale (CSS). The CSS is a robust instrument to measure stress related to fears of being exposed to the virus and to the deleterious consequences in the lifestyle of the individual. Participants were 416 persons who completed an online survey that included the CSS and the assessment of depressive and anxiety symptoms. We examined item-level characteristics, factor structure and the convergent validity of the scales. The results support the five-factor structure of the CSS, excellent internal reliability, and convergent validity with scales of anxiety and depression. Overall, the Spanish version of the CSS provide a reliable and valid assessment of the new proposed COVID stress syndrome.

KEYWORDS: COVID-19, COVID Stress Scale, Spanish, mental health, Latinos/as.

RESUMEN

La pandemia del COVID-19 ha estado asociada a un incremento en problemas de salud mental y al devastador impacto en pilares sociales, politicos y de salud pública. Puerto Rico no ha sido la excepción, incluyendo un periodo riguroso restrictivo de salidas fuera del hogar y varias miles de muertes atribuidas al virus. El propósito de esta investigación es examinar la confiabilidad y validez convergente de la versión en español de la Escala de Estrés de COVID (EEC). Participaron 416 personas que completaron una encuesta en línea que incluía la EEC y la evaluación de síntomas de depresión y ansiedad. Examinamos características a nivel de ítemes, la estructura factorial y la validez convergente de las diversas escalas. Los resultados apoyan una estructura de cinco factores en la EEC, confiabilidad interna excelente, y validez convergente con las escalas de depresión y ansiedad. En general, la versión en español de la EEC provee una evaluación confiable y válida del nuevo síndrome de estrés de COVID.

PALABRAS CLAVE: COVID-19, español, Escala de Estrés de COVID, salud mental, Latinos/as.

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The World Health Organization (WHO) declared the COVID-19 a global pandemic on March 11, 2020, which in a matter of months was transmitted to 224 countries in the world. Rapidly, the presence of this virus reshaped societies, caused immense grief, wrecked economies, and generated a sense of doom and emotional anguish in many individuals (Christakis, 2020).

Numerous international studies have documented that during the pandemic, the incidence of some psychiatric disorders began to increase in the general population. Specifically, symptoms of insomnia, depression, substance abuse, anxiety and post-traumatic stress augmented considerably in China, Spain, United States of America (USA), Canada, Iran, Italy, and other countries (Xiong et al., 2020). For example, Evans et al. (2021) in a longitudinal study with young adults at a United Kingdom (UK) university and with the same participants, assessed depression symptoms prior to the lockdowns (autumn 2019) and during the pandemic (April/May 2020). Results showed that prior to the pandemic, 13.8% of the participants meet the criterion of a depressive disorder. However, during the pandemic the number of people with major depression increased considerably (34.3%).

Another similar study compared the proportion of a sample of the general population pre and post the COVID pandemic. Ettman et al. (2020) found that compared to adults interviewed in 2017-2018 that reported 8.5% of clinical depression, from March to April of 2020 that number rose to almost 28%. More worrisome is that prior to the pandemic only 0.7% of the population reported severe depression, but from March to April 2020 that number rose to 5.1%. In a recent cross-national study, Al Omari et al. (2020) explored the prevalence of stress, depression and anxiety in young people aged 15-24, in six different countries (i.e. Oman, Saudi Arabia, Jordan, Egypt, Irak and United Arab Emirates). The total prevalence of stress, depression, and anxiety, was 38%, 57%, 40.5%, respectively, with no significant differences between the six countries. The results of this study point to the fact that marked psychological distress is widespread in different countries. The roots of this psychological and social pandemonium can be attributed to the social disconnection of the lockdowns, the pervasive loss of jobs, personal concern of becoming infected, and the intense pressure felt by many parents of studying with their children in virtual classes, even when there was no preparation for the complications of what was coming (Pai & Vella, 2021; Rossi et al., 2020).

Women in particular, has been found to be more vulnerable for psychiatric symptoms than men, in almost all of the international studies conducted during the pandemic (Roesch et al., 2020). Specifically, an increase in symptoms of depression, post-traumatic stress disorder, anxiety and stress (Lindau et al., 2021). The reasons for this situation are multifactorial. For example, while 1.8 million men left the job market in the USA since the pandemic, 2.5 million women left their jobs, usually because they take on more responsibilities of parenting and homeschooling. (U.S. Bureau of Labor Statistics, March 5, 2021). Additionally, there is mounting evidence that compared to the year 2019, in 2020 cases of domestic violence has more than doubled in such different countries as China, Singapore, USA, Brazil and the UK (Boserup et al., 2020). Also, women tend to raise and educate children without institutional support, report a heightened care of older parents and many have to spend time with their male aggressors, with a decrease in social support (Li & Wang, 2020).

In the midst of all this unusual situation, Taylor and his colleagues created a new instrument that assessed the impact of the COVID-19 on various psychological and social variables (Asmundson & Taylor, 2020; Taylor et al., 2020). The COVID Stress Scales (CSS) are based on the premise that the distress-related responses to the virus are essentially a conglomerate of interconnected

symptoms that are linked to five distinct factors; 1) danger and contamination fears, 2) fears about economic consequences, 3) xenophobia, 4) compulsive checking and, 5) traumatic stress symptoms.

According to Taylor et al. (2020) scores on the CSS make it feasible to identify a COVID stress disorder. In their initial study, conducted with thousands of participants in Canada and the USA, 13% of the sample presented high scores on the CSS plus severe impairment. Those persons with high scores were significantly more anxious, depressed, performed more hygienic behaviors and avoided public spaces. Also, Asmundsen and Taylor (2021) presented longitudinal data about the scores on the CSS and noted that the total score reflected fluctuations according to the months that the instrument was administered. For example, comparing the score obtained from March 21 to April 1 to those obtained from July 20 to August 7, they identified a decline in the scores. Those data reflect that the scores on the CSS are reactive to how the virus is being treated and medically evaluated.

As far as we know, there has been three independent international investigations with the CSS. The first was reported by Abbadi et al. (2021) with Egyptian and Saudi university students. The results revealed that the CSS had a five-factor structure, and excellent internal reliability (α = .94). The authors concluded that the instrument is useful to identify individuals who are demonstrating stress related to the COVID-19. For their part, Khosravani et al. (2021) utilized the CSS with Persian patients with anxiety and obsessive-compulsive disorders. Results demonstrated that the CSS had a five-factor structure and was found to have reliability and validity in a Persian setting. Similarly, Mahamid et al. (2021) examined the psychometric properties of the CSS with Palestinian adults. The results were similar to the other studies in that the CSS demonstrated a high level of reliability and validity, with a Cronbach Alpha of. 94 and concurrent validity with depression and anxiety scales.

The purpose of the current study was to evaluate the psychometric properties of the CSS with a sample of Latino/a participants. Specifically, we wanted to document if the scores for Latino/a participants will be consistent with the five-factor structure of the original instrument. To our knowledge, no studies has reported the results of a Spanish translation of the CSS and compare the results with the one obtained in Canada and the USA. Additionally, we investigated if the instrument was positively associated with other scales that measure depression and anxiety, supporting convergent validity. Finally, we wanted to know if Latino women also report more psychological symptoms than their male counterpart.

METHOD

Participants

The sample consisted of 416 participants with ages ranging from 21 to 79 years (*M* = 46.03, *SD* = 11.96). Most of the participants were women (87.3%), heterosexual (93.0%), married (44.7%), with annual income between $ 0.00 to $ 20,000 (27.6%), with an academic preparation of baccalaureate or bachelor's (33.2%), and affiliated with the Catholic religion (49.0%). There were no incentives, monetary or otherwise, to encourage participation in this investigation. Table 1 presents the sociodemographic data of the sample.

TABLE 1.
Sociodemographic data of the sample.

	f	%
Sex		
Female	363	87.3
Male	53	12.7
Sexual Orientation		
Heterosexual	387	93.0
Gay	8	1.9
Lesbian	5	1.2
Bisexual	7	1.7
Pansexual	3	0.7
Asexual	2	0.5
Other (unspecified)	4	1.0
Marital status		
Married	186	44.7
With partner living together	76	18.3
Single	71	17.1

	f	%
Divorced	37	8.9
Widower	13	3.1
With partner (not living together)	33	7.9
Annual Income		
$0 - $20,000	115	27.6
$21,000 - $30,000	61	14.7
$31,000 - $40,000	62	14.9
$41,000 - $50,000	47	11.3
$51,000 - $60,000	42	10.1
$61,000 - $70,000	25	6.0
$71,000 or more	64	15.4
Academic Preparation		
High school or less	19	4.6
Associate degree/technical	60	14.4
Bachelor's degree	138	33.2
Master's degree	111	26.7
Doctoral degree	88	21.2

Measurement

COVID-19 Stress Scales (CSS). The CSS (Spanish version) is a 36-item self-report measure distributed over five stable factor dimensions, corresponding to scales assessing COVID-related stress and anxiety symptoms: 1) danger and contamination fears, 2) fears about economic consequences, 3) xenophobia, 4) compulsive checking and reassurance seeking, and 5) traumatic stress symptoms about COVID-19. Items are rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). In the original investigation by Taylor et al. (2020) the CSS obtained an internal reliability > .90 and demonstrated convergent and discriminant validity. This instrument was originally developed in English by Taylor et al. (2020). The Spanish version of the scale was translated by the authors of the current study using the cross-translation method. First, an independent bilingual person translated the items from the original instrument. Then a new bilingual translator performed the re-translation (Maneersriwongul & Dixon, 2004). Finally, another bilingual psychologist reviewed the instrument to ensure equivalence of content, semantics, and conceptual and theoretical consonance with the original (Flaherty et al., 1988).

Generalized Anxiety Disorder-7 (GAD-7). The GAD-7 questionnaire (Spanish version) is a one-dimensional self-administered scale designed to assess the presence of anxiety symptoms (Spitzer et al., 2006). The total score is calculated by the simple addition of the answers to each item. Each item is rated in frequency on a 4-point (0 = *not at all*, 3 = *nearly every day*) scale and total scores may range from 0 to 21. The total score may be categorized into four severity groups: minimal (0-4), mild (5-9), moderate (10-14), and severe (14-20). Previous studies have found that this measure have a test-retest correlation of .83 and an internal reliability of .92. The Spanish version was translated and adapted by García-Campayo et al. (2010). A study conducted in Puerto Rico demonstrated an excellent internal consistency of .91 (Pagán-Torres et al., 2020a).

Eight-Item Patient Health Questionnaire (PHQ-8). The PHQ- 8 (Spanish version) is an eight-item self-report measure that is used to assess depression severity and criteria for a major depressive episode (Kroenke et al., (2009). Each item is rated in frequency on a 4-point (0 = *not at all*, 3 = *nearly every day*) scale and total scores may range from 0 to 27. The total score may be categorized into five levels of severity: minimal (total score, 0–4); mild (total score, 5–9); moderate (total score, 10–14); moderately severe (total score, 15–19); and severe (total score, 20–27). A score of 10 or above is frequently used as a cut point to identify patients with major depression. A study conducted recently in Puerto Rico with the PHQ-8 demonstrated an excellent internal reliability of .92 and concurrent validity with other measures of psychopathology (Pagán-Torres et al, 2020b).

Coronavirus Anxiety Scale (CAS). Lee (2020) developed this instrument in English based on specialized literature on fear and anxiety. The scale assesses the following symptoms as a result of thinking or being exposed to information about the coronavirus (COVID-19): dizziness (*item 1*), sleep disturbances (*item 2*), tonic immobility (*item 3*), loss of appetite (*item 4*) and nausea or stomach problems (*item 5*). Each item is scored on a 5-point scale to reflect the symptom frequency, which ranges from 0 (not

at all) to 4 (almost every day) during the past two weeks. The lowest score obtained is 0, and the highest is 20, where the higher the score, the greater the anxiety associated with COVID-19. In the current study, we used the Spanish version of CAS that was adapted and validated for Puerto Ricans (González-Rivera et al., 2020). The study conducted in Puerto Rico found that the CAS demonstrated excellent internal consistency of .93.

Data Analysis

To carry out the statistical analysis, the SPSS program (version 27) was used for the Confirmatory Factor Analysis model, and the STATA program (version 16) was used for the calculation of the mean-variance extracted. The composite reliability was calculated from Microsoft Excel, where a data sheet was created with the formula for each measure. The corresponding values were entered to obtain the result for each factor of the CSS. Descriptive analyzes were carried out for the sample and the measurements of the instruments used. A multivariate normality analysis was performed using the measures of Mardia, Henze-Zirkler, and Doornik-Hansen (Doornik & Hansen, 2008) for the CSS. Since no evidence of multivariate normality was found for the scale, we proceeded to estimate the Satorra-Bentler corrections (Satorra & Bentler, 2001) in the goodness of fit of the confirmatory factor analysis model. In the confirmatory factor analysis for the CSS, a maximum likelihood estimation was used, and for the goodness of fit, the measures of Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI). In this analysis, two models were tested, a base model in which all the items on the scale were presented towards a single general factor and the theoretical model of five factors obtained by Taylor et al. (2020).

Once the model was estimated in the confirmatory factor analysis, the internal consistency was estimated using Cronbach's alpha coefficients and Composite Reliability for the factors of the coronavirus stress scale and the other instruments used in this research. In addition, the discrimination of the items was calculated, as well as the mean-variance extracted to examine the convergent-divergent validity of the factors of the coronavirus stress scale. Then Pearson Product Moment correlation analysis and multiple regression analysis were performed using successive steps (stepwise). Similarly, group comparison analyzes were carried out between the measures of the scales by sex using the Mann-Whitney U statistic since the data did not follow a normal distribution. Finally, the corrections for the depression and anxiety scales were obtained to know at what level the participants were for both measures. This is important because it provides a general idea about the mental health status of the sample under study. The results obtained are presented below.

Research Design and Procedures

This study has an instrumental and *ex post facto design* (Montero & León, 2007). This research was approved by the Institutional Review Board (IRB) of Ponce Health Science University (Protocol # 2011048762). The data compilation was carried out by using online questionnaires through the PsychData platform and posting a paid ad in the main social networks as a recruitment method: FB, Twitter, and WhatsApp, among others. The authors received no financial support for the research. The aims and procedures of the study were explained online. The study ad redirected the participants to the online survey, where they had access to the consent form with the following information: (a) the purpose of the study, (b) inclusion criteria, (c) the voluntary nature of the study, (d) possible risks and benefits, and (e) their right to withdraw from the study at any time. To guarantee the privacy and confidentiality of the participants, the questionnaires were completed anonymously, and they were able to print a copy of the informed consent.

RESULTS

Before testing the factorial structure of the CSS, we examined if items had multivariate normality. The results show that for our sample, the multivariate normality is not met, Mardia's M_{skew} = 229.92, $\chi^2(8,436)$ = 16,062.38, p < .001, Mardia's $M_{kurtosis}$ = 1,637.21, $\chi^2(1)$ = 2,754.78, p < .001, Henze-Zirkler = 1.01, $\chi^2(1)$ = 9.56e+06, p < .001, Doornik-Hansen χ^2 (72) = 700.56, p < .001. Once we determined the distribution of the scale, we proceed to test the confirmatory factor analysis (CFA) models. As well, due to the lack of normality (Doornik & Hansen, 2008), we used the Satorra-Bentler adjustments for the models (Satorra & Bentler, 2001).

The first proposed model was a Base Model (BM) with 36 items of the scale under one factor. This model is used to assure that the scale does not fit under a single factor. The goodness of fit for this model shows that the scale does not fit under a single factor (see Table 2). The second model (M1) that we tested was the theoretical model of the CSS. This model includes five factors (danger and contamination, socioeconomic consequences, xenophobia, traumatic stress symptoms, and compulsive checking). This is the model corresponding to the results of Taylor et al. (2020) in their research. Our results show that the goodness of fit of the model has an adjustment below expected. We checked the factor loadings of the items as recommended by Schumacker and Lomax (2010) to found items with loadings below .65. These authors recommend to delete items with factor loadings below .65 from the model to improve it. We found two items with these characteristics (items 5 and 17). First, we removed item 5 from the model and run the analysis. The model improve a littler but the scores of the model fit still below the acceptable and the item 17 loading keep below .65 so we removed that item from the model. After this, the model improved and the model fit was adequate so we stayed with this new model (M2). In Table 2 and Figure 1 the corresponding data are presented.

TABLE 2.
Goodness of Fit for the CFA Models.

Model	χ^2_{adj}	*df*	$RMSEA_{adj}$	CFI_{adj}	TLI_{adj}	*AIC*	*ΔAIC*	$\Delta RMSEA_{adj}$
BM	5,557.69	594	0.14	0.61	0.59	41,127.69	5,031.51	0.08
M1	1,914.11	584	0.07	0.89	0.88	36,799.26	2,364.14	0.00
M2	1,491.31	517	0.07	0.92	0.91	34,435.12		

Note. BM = Single factor base model; M1 = Theoretical model with five factors; M2 = Theoretical model with five factors and covariances between errors to control the shared variance based on the modification indexes; χ^2_{adj} = chi-squared with Satorra-Bentler adjustments; *df* = degree of freedom; $RMSEA_{adj}$ = Root Mean Square Error Approximation with Satorra-Bentler adjustments; CFI_{adj} = Comparative Fit Index with Satorra-Bentler adjustments; TLI_{adj} = Tucker-Lewis Index with Satorra-Bentler adjustments; *AIC* = Akaike Information Criterion; *ΔAIC* = Change in AIC; *ΔRMSEA* = Change in RMSEA; All statistics of χ^2_{adj} and RMSEA where statistically significants p < .001.

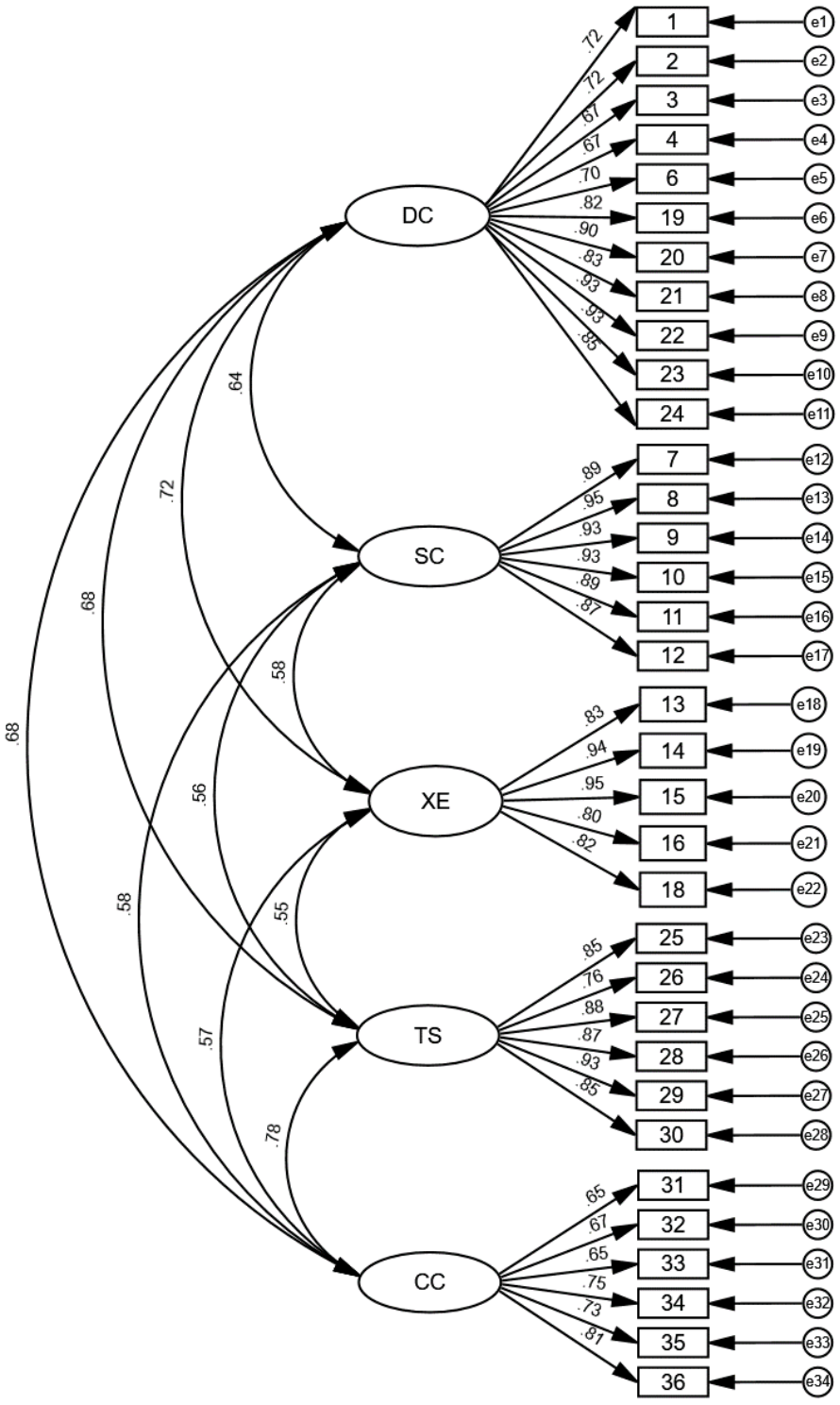

FIGURE 1.
Model 2 of the Confirmatory Factor Analysis.

Reliability, Discrimination, and Validity

To examine the reliability of the factors for the CSS and the other scales used in this study we used Cronbach's alpha coefficient and Compound Reliability. All the measures of internal consistency were adequate achieving scores of more than .70 for all the factors of the CSS (see Table 3), as well for the PHQ-8 (.95), and the CAS (.94) (Kline, 2005). Compound reliability for the CSS was identical to Cronbach's alpha scores.

The items discrimination for the CSS were adequate for all factors: Danger and contamination (.69 - .87), Socioeconomic consequences (.86 - .93), Xenophobia (.80 - .90), Traumatic stress (.73 - .90), Compulsive checking (.58 - .73). As well, the discrimination index fit as expected for the PHQ-8 (.74 - .88), GAD-7 (.72 - .88) and for the coronavirus anxiety scale (.81 - .86) being all more than .30 (Kline, 2005).

To estimate the convergent validity for the factors of the CSS we uses the Average Variance Extracted (AVE) (Fornell & Lacker, 1981) and for the divergent validity we uses the Maximum Shared Variance (MSV) and Average Shared Variance (ASV) (Hair et al., 2010). Scores more than .50 are indicatives of convergent validity. The five factors of the CSS presents AVE scores between .51 to .83, MSV scores between .41 to .61 and ASV score between .35 to .46. Divergent validity was stablished because the MSV and ASV scores were both lower than AVE for all factors, except for the compulsive checking factor that the MSV score was more than the AVE score. In general, this shows evidence that the scale has convergent and divergent validity. Table 3 shows descriptive measures of the CSS, the internal consistency coefficients, the average variance extracted, and the correlations between factors.

TABLE 3.
Mean, Standard Deviation, Cronbach's Alpha, Compound Reliability, Average Variance Extracted, and Correlations (*n* = 416).

		M	*SD*	α	*CR*	*AVE*	*MSV*	*ASV*	*1*	*2*	*3*	*4*	*5*
1.	DC	27.07	11.14	.95	.95	.64	.51	.46	-	.64	.72	.68	.68
2.	SC	9.33	8.00	.97	.97	.83	.41	.35	.65	-	.58	.56	.57
3.	XE	12.14	6.09	.94	.94	.76	.51	.37	.72	.59	-	.55	.57
4.	TS	7.28	6.89	.94	.94	.73	.61	.42	.67	.54	.54	-	.78
5.	CC	10.00	5.85	.86	.86	.51	.61	.44	.65	.54	.53	.71	-

Note. DC = Danger and Contamination; SC = Socioeconomic Consequences; XE = Xenophobia; TS = Traumatic Stress; CC = Compulsive Checking; *M* = mean; *SD* = standard deviation; α = Cronbach's alpha; *CR* = compound reliability; *AVE* = average variance extracted; *MSV* = maximum shared variance; *ASV* = average shared variance. All the correlations were statistically significant $p < .001$. Cronbach's alpha for the entire scale was .97. Scores over the diagonal represents correlation between latent factors, while scores below diagonal represents direct correlations between factors. The global score for Coronavirus Stress Scale has the following measures: Mean = 65.82, Median = 66.00, Standard Deviation = 31.56, Minimum = 0, Maximum = 136.

Correlation and Regression

To understand better the way the variables interact, we proceeded to run a Pearson correlation between factors of the CSS, PHQ-8, GAD-7, and CAS. Results show evidence of statistically significant correlations that fluctuate between .39 to .92. The correlation for the global score of the CSS with the measure of depression (PHQ-8) was highly moderate (Champion, 1981) and significant ($r = .59$, $p < .001$), for the GAD-7 was highly moderate and significant as well ($r = .71$, $p < .001$), and for the measure of CAS were highly moderate and significant ($r = .68$, $p < .001$). Table 4 shows Pearson's correlations.

As we obtained correlations of more than .50 between the principal measures, we proceeded to conduct an analysis of multiple regression to examine if one of the measures can predict well the stress for COVID. The proposed model was examined under the stepwise method. The results show a well model fit, $F(2, 401) = 240.90$, $p < .001$, explaining 54% of the variance of stress for COVID, with an adequate Durbin-Watson test (1.91) as well as VIF (2.29). In this model, the variables

that predict stress for COVID were general anxiety (β = .45, *t* = 8.91, *p* < .001) and Anxiety for Coronavirus (β = .34, *t* = 6.59, *p* < .001). Depression was excluded from the model in the stepwise process (β = -.05, *t* = -.72, *p* = .47).

TABLE 4.
Pearson Correlations.

		1	2	3	4	5	6	7	8	9
1.	CS-GS	(.97)								
2.	DC	.92**	(.95)							
3.	SC	.80**	.65**	(.97)						
4.	XE	.81**	.72**	.59**	(.94)					
5.	TS	.82**	.67**	.53**	.54**	(.94)				
6.	CC	.80**	.65**	.54**	.53**	.71**	(.86)			
7.	PHQ-8	.59**	.49**	.40**	.39**	.68**	.52**	(.95)		
8.	GAD-7	.71***	.59**	.47**	.46**	.80**	.64**	.83**	(.95)	
9.	CA	.68**	.54**	.45**	.45**	.79**	.62**	.68**	.75**	(.94)

Note. *** *p* < .001. CS-GS = COVID Stress Global Score; DC = Danger and Contamination; SC = Socioeconomic Consequences; XE = Xenophobia; TS = Traumatic Stress; CC = Compulsive Checking; PHQ-8 = depression measure; GAD-7 = general anxiety measure; CA = Coronavirus Anxiety. Scores inside parenthesis represents Cronbach's alpha coefficients.

Group Comparisons

We realize group comparisons to examine if there are significant differences in the scores of the scales (COVID stress global score, danger and contamination, socioeconomic consequences, xenophobia, traumatic stress, compulsive checking, depression, general anxiety, and coronavirus anxiety) by sex. We run a Mann-Whitney U test due to the lack of normal distribution. Significant differences were found for all the measures except for depression. These findings suggest statistically significance for CSS, danger and contamination, socioeconomic consequences, traumatic stress, compulsive checking, general anxiety and COVID anxiety by sex. Nevertheless, we cannot detect evidence of significant differences for xenophobia and depression by sex. Our findinds show that women have significantly higher scores in the measures than men, but the effect size detected was low (Kerby, 2014). Table 5 shows the results for the Mann-Whitney U test with their standard error, Z score, significance, effect size, and mean rank for the groups.

TABLE 5.
Mann-Whitney U Test.

	U	*SE*	*Z*	*p*	*r*	*Mdn*	
						Women	Men
CS-GS by Sex	11,922.50	817.59	2.82	.005**	.24	67.00	54.00
DC by Sex	11,749.00	817.23	2.61	.009**	.22	29.00	25.00
SC by Sex	11,808.00	815.55	2.68	.007**	.23	9.00	5.00
XE by Sex	10,904.50	815.38	1.58	.115	.13	14.00	12.00
TS by Sex	12,172.50	813.57	3.14	.002**	.27	6.00	1.00
CC by Sex	11,415.50	816.50	2.20	.028**	.19	10.00	8.00
PHQ-8 by Sex	10,173.50	790.43	1.10	.270	.09	7.00	6.00
GAD-7 by Sex	11,670.00	808.46	2.64	.008**	.22	7.00	4.00
CA by Sex	11,694.00	772.09	2.96	.003**	.24	6.00	5.00

Note. ** = *p* < .01. CS-GS = COVID stress global score; DC = Danger and Contamination; SC = Socioeconomic Consequences; XE = Xenophobia; TS = Traumatic Stress; CC = Compulsive Checking; PHQ-8 = depression measure; GAD-7 = general anxiety measure; CA = Coronavirus Anxiety. *U* = Mann-Whitney score, *SE* = Standard Error; Z = standarized Z score; *p* = significance; *r* = rank-biserial correlation effect size for Mann-Whitney's U Test; *Mdn* = Median.

Depression and anxiety status

To know better the status of mental health of our sample we proceeded to evaluate the measures of depression (PHQ-8) and general anxiety (GAD-7). The cut points for PHQ-8 were: 5 (minimal), 10 (mild), 15 (moderately severe), and 20 (severe). For GAD-7 the cut points were: 5 (minimal), 10 (mild), and 15 (severe). To examine the scores obtained by the sample we can observe that 38.7% do not have depressive symptomatology, nevertheless, 22.6% show minimal depression symptoms, 13.0% showed mild depression, 10.3% show moderately severe depression, and 12.5% showed severe depression, and 2.9% were not estimated because they did not complete the measure. For the symptomatology of anxiety, we found that 35.1% do not show symptoms of anxiety. On the other hand, 25.0% show minimal anxiety, 15.4% showed mild anxiety, and 23.8% show severe anxiety.

DISCUSSION

The present study investigated the psychometric characteristics of the CSS in a sample of Latinos/as. Overall, the results indicate that the psychometric properties of the Spanish version are similar to the ones obtained in Canada, USA, Egypt, and Persia (Abbady et al., 2021; Khosravani et al., 2021). Particularly, the Cronbach alpha coefficients of the five scales that comprise the CSS showed good to excellent internal reliability. That replicates the studies conducted in various parts of the world. Also, the item discrimination of the CSS were adequate for all five factors. The discriminate index for the PHQ-8, GAD-7 and CAS fitted as expected.

The results of the present study provide evidence of the validity of the CSS in relation to external variables, such as measures related to symptoms of depression, general anxiety and anxiety related to the coronavirus. All those instruments demonstrated moderate to high correlations ($r > .60$) between the score of the CSS and the symptomatology of anxiety and depression. Those initial data provide initial evidence for the potential validity of the CSS as a measure of a syndrome of stress in adults. Also, the five CSS correlated significantly with one another, with correlations ranging from .51 to .83, which advance the idea that they form a stress syndrome.

Our data suggest that the participants were reporting a high degree of stress to the pandemic. Although, Taylor (2021) has indicated that the CSS has not a specific cut-off score to distinguish those that are demonstrating a high level of distress, our results strongly suggest that our participants were reporting a high degree of stress symptoms. Our statement is based on information provided in two figures in an article published by Asmundson and Taylor (2020). They inform that those participants that meet criteria for a COVID stress disorder, reported a mean between 42-50 in the total score. Conversely, individuals with no disorder in the CSS reported a mean between 37 and 28 total score. In our sample our participants reported a much higher mean score (70.23).

Consistent with results from many other investigations, in our study women reported significantly higher scores on all the five factors of the CSS, with a total score much higher in women (72 versus 58). As previously indicated, the combined burden of job loss, the exacerbation of gender based violence and familial responsibility has increased stress for women. Consequently, gender disparities has increased, as women are disproportionately responsible for childcare, eldercare and domestic tasks (Lindau et al., 2021). Nevertheless, our gender analysis is limited by the fact that male participants were underrepresented in our sample. Thus, some degree of caution must be exercised in the interpretation of this finding.

Our results as compared with the original report of Taylor et al. (2020) shows many striking similarities when considering the level of individuals with depression and anxiety. For example, in the Taylor et al. study, they documented that 22% of the participants showed moderate/severe depression scores. In the present study we obtained 23%. As for

anxiety, Taylor et al. presented data that showed that 28% of their participants had a moderate/severe range of anxiety symptoms. In current study we obtained a slightly more elevated number (39%). The data from the Taylor et al. study and the current studies reveal that a considerable number of participants were showing distressing symptoms of anxiety or depression.

In the most recent epidemiological study conducted in Puerto Rico, Canino et al. (2019), found a 12-month prevalence of any mood disorder of 9.9%, and any anxiety disorder of 12.5%. Those numbers are significant below those obtained in our study where individuals with moderate/severe symptoms of mood and anxiety were 39% and 23% respectively. This finding is not surprising as its well-known that self-report scales without including measures of psychosocial impairment usually report elevated rates of psychiatric disorders. Epidemiological research usually includes an in-depth clinician-administered interview which might provide more conservative and valid data on symptom burden (Jeong, et al., 2018).

The present findings must be considered in light of strengths and certain limitations. The strengths include that we utilized a carefully translated version of the CSS. Nevertheless we did not adapt the instrument to our Latino population. In addition, we obtained the participation of more than 400 persons, which is an acceptable number in quantitative research. One strength is that we utilized three additional clinical instruments (PHQ-8, GAD-7, CAS) in addition to the CSS, finding moderate to large correlations among the variables. Therefore the convergent validity strengthen the findings of the current study.

The results of the current study extend the understanding of the deleterious role of the COVID-19 on the mental health of Latinos/as. These findings underscore that, in addition to government support to alleviate the physical malaise of the virus, there is a need for mental health support and professional assistance to cope with the psychosocial distresses due to the pandemic. Overall, our findings are in agreement with a wealth of published international studies where it is documented the negative impact of the COVID-19 in the mental health of the population.

The main limitation is that the sample that participated was circumscribed to individuals that routinely use the internet. We do not know if similar results could be obtained among those individuals who do not routinely use the internet. It should be mentioned that collecting data via internet has some disadvantages that may limit the generalizability of our results. Thus, these participants may not be representative of community samples. Second, our data was obtained through self-reports on depression, stress and anxiety. As we do not use a structured clinical interview, we do not know who actually had a psychiatric diagnosis (e.g., major depressive disorder) or an adjustment disorder. Thirdly, the CSS was carefully translated to Spanish but we did not adapt the content of the instrument to a Latino population.

In conclusion, the present findings support the idea that the Spanish version of the CSS is a reliable and valid self-report instrument that can be used to evaluate the degree of stress that the coronavirus pandemic is causing in the general population. Definitively, the CSS can be used as a screening tool to identify those individuals that are presenting emotional and social difficulties and that are at risk of suffering from psychiatric disorders. The current findings must be used to inform clinical practice aimed at identifying individuals at risk of developing serious mental disorders. Further studies examining the clinical usefulness of the CSS would strengthen its routine use in general and specialized clinics of mental health.

Research Ethical Standards

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