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Psychometric properties of the Chinese version of the COVID-19 Phobia Scale among Chinese undergraduates

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We examined the validity and reliability of the COVID-19 Phobia Scale (C19P-S) in the Chinese cultural context. We translated the original version of the C19P-S into Chinese and assessed its structure through exploratory factor analysis, confirmatory factor analysis, internal consistency reliability tests, and test–retest reliability tests. The Chinese version of the C19P-S comprises 20 items classified into four dimensions: psychological, psychosomatic, economic, and social. According to the statistical results, the scale has adequate psychometric properties in the Chinese cultural context and, therefore, can be used to assess the COVID-19 phobia of Chinese undergraduates.

Keywords
coronavirus; COVID-19 Phobia Scale; mental health; fear response; phobia; anxiety; depression; pandemic

Article Highlights

- The Chinese version of the COVID-19 Phobia Scale was found to have adequate psychometric properties for use with Chinese undergraduates.
- There was a significant positive correlation between COVID-19 phobia and anxiety among Chinese undergraduates.
- There was a significant positive correlation between COVID-19 phobia and depression among Chinese undergraduates.

A new coronavirus (COVID-19) was identified in late 2019. Infections and deaths are increasing worldwide, and the spread of COVID-19 has not been fully controlled (Wu & McGoogan, 2020). Previous studies have shown that the spread of influenza (e.g., H1N1), respiratory syndromes (SARS, MERS), viral fevers (Ebola), and other similar epidemics have caused severe negative emotions and induced fear and anxiety disorders in populations around the world (Ibrahim, 2016; Nwaoga et al., 2014; Tausczik et al., 2012). For example, a large epidemic of neocrown pneumonia was reported to increase the risk of mental disorders, such as schizophrenia, anxiety, depression, phobias, and acute stress disorder, in the Chinese public (Hu et al., 2020; Huang et al., 2020; Sun et al., 2020). Likewise, researchers have found that the negative impact of the spread of COVID-19 has caused increases in fear and anger, alcohol and tobacco abuse, and extreme behaviors such as divorce and suicide (Dai et al., 2020).

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Phobia is a long-term fear of objects or the environment that can be clinically divided into three categories: social phobia, agoraphobia, and specific phobia (American Psychiatric Association, 2013). Phobias are further divided into five specific categories: fear of the natural environment; fear of animals; fear of injury, blood, or injections; fear of situations; and fear of other things. People's physical and mental functioning may deteriorate significantly because of excessive cognitive, emotional, or behavioral responses to objects and events related to the COVID-19 epidemic. Therefore, researchers have defined COVID-19 phobia as a specific subtype of phobia (N. Liu et al., 2020).

According to several experts, the COVID-19 pandemic has caused personal fear, grief, and physical and mental illness (Aardema, 2020; Bitan et al., 2020; Mertens et al., 2020; Sloan et al., 2020). Therefore, it is necessary to measure the early signs of COVID-19 phobia in order to provide timely psychological treatment to people who exhibit high levels of this form of anxiety (L. Duan & Zhu, 2020; Qiu et al., 2020). However, since COVID-19 phobia is a relatively new disorder, there are few scales to assess its severity. The Coronavirus Fear-19 Scale (Ahorsu et al., 2020) was developed to assess personal fear of COVID-19 physiological conditions and emotional experience, but it does not measure cognition, social interaction, or behavior. Therefore, the completeness of the scale has been questioned (Ahorsu et al., 2020).

The COVID-19 Phobia Scale was developed by Arpaci et al. (2020). It includes 20 items corresponding to the specific phobia diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., American Psychiatric Association, 2013) that are divided across four subscales: psychological, psychosomatic, economic, and social. The purpose of the present study was to translate the COVID-19 Phobia Scale into Chinese and examine its psychometric properties in the context of Chinese culture to provide a suitable measurement tool for COVID-19 phobia assessment in this setting.

Method

Participants and Procedure

Participants comprised undergraduate students at universities in China. We used cluster sampling and conducted an online survey. The study was approved by each university's management department and surveys were issued under teachers' supervision. Before they began completing the survey, participants were told that their answers would be kept confidential and that there were no consequences for nonparticipation. The students provided informed consent prior to participating in the study. No incentives were provided for participation. As all participants had paid close attention to the work related to the new crown pneumonia epidemic, they filled out the survey items carefully, so that the recovery rate was 100%.

Prediction Sample

We selected 912 undergraduates in Guangxi and Jiangsu Provinces using cluster convenience sampling as Sample 1. There were 492 women and 420 men, and the average age was 19.53 years (SD = 2.94, range = 17–25).

Formal Test Sample

We used cluster convenience sampling to select 1,140 undergraduates in Guangxi, Shaanxi, Shandong, and Jiangsu Provinces as Sample 2. There were 654 women and 486 men, and the average age was 19.20 years (SD = 2.85, range = 16–24). After 2 weeks, 150 of them completed the scale again to examine the test–retest reliability.

Measures

The COVID-19 Phobia Scale

Upon receiving consent from Arpaci et al. (2020), the original English version of the COVID-19 Phobia Scale was first translated by a linguist fluent in both English and Chinese to form a preliminary Chinese version,

then this was translated back into English by another bilingual translator. The three versions were compared, and some content revisions were made. The expression "neocrown virus pandemic" in Items 7, 15, 16, and 17 was revised to read "new coronavirus pneumonia epidemic spread." In terms of predictive feedback, responses to the latter phrase showed it was more appropriate and easier to understand. Finally, the COVID-19 Phobia Scale–Chinese version (C19P-S-C) was formed, consisting of 20 items divided across four subscales: psychological (six items, e.g., "The fear of coming down with coronavirus makes me very anxious"), psychosomatic (five items, e.g., "I experience severe stomachaches because of worry about coronavirus"), economic (four items, e.g., "Food supply shortages due to the coronavirus pandemic make me anxious"), and social (five items, e.g., "The coronavirus pandemic makes me feel extremely anxious when I see people coughing"). Items are rated on a 5-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *indifferent*, 4 = *agree*, 5 = *strongly agree*).

Anxiety

We used the Chinese version of the Anxiety Self-Rating Scale (Q. Duan & Sheng, 2012) to measure anxiety. The scale consists of 20 items (e.g., "I get upset or panic easily") rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Cronbach's alpha in this study was .86.

Depression

We used the Chinese version of the depression scale developed by Lu et al. (2020) to measure depression. The scale consists of seven items (e.g., "I feel sullen and depressed") rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Cronbach's alpha in this study was .87.

Data Analysis

SPSS 23.0 was used for exploratory factor analysis, assessing internal consistency reliability and test–retest reliability, and correlation analysis. Amos 22.0 was used for confirmatory factor analysis.

Results

Item Analysis

We used the critical ratio technique to compare scores on the C19P-S-C. The total scores of the 912 participants in Sample 1 were divided into high and low categories, with the top 27% of scores allocated to the high group, and the bottom 27% of scores to the low group. Then we used an independent samples *t* test to examine the average of the scores on each item between high and low groups. The survey results show that the scores on the 20 items in the high and low groups showed significant differences at $p < .05$, so all items could be retained.

Exploratory Factor Analysis

Data from Sample 2 were subjected to an exploratory factor analysis using principal components analysis and promax oblique rotation. Results show that the Kaiser–Meyer–Olkin value was .91, with a Bartlett's test of sphericity value of $\chi^2 = 4048.82$, $p < .01$. Four factors were acquired and all items had factor loadings greater than .70 (see Table 1), which suggests that all items could be retained.

Table 1. *Rotated Factor Loadings for the COVID-19 Phobia Scale – Chinese Version*

Psychological		Psychosomatic		Economic		Social	
Item	Factor loading	Item	Factor loading	Item	Factor loading	Item	Factor loading
Psy1	.84	Som1	.90	Eco1	.78	Soc1	.85
Psy2	.85	Som2	.91	Eco2	.84	Soc2	.75
Psy3	.85	Som3	.91	Eco3	.79	Soc3	.76
Psy4	.83	Som4	.83	Eco4	.68	Soc4	.74
Psy5	.82	Som5	.81			Soc5	.83
Psy6	.78						

Note. $N = 912$.

Confirmatory Factor Analysis

We used Amos 22.0 for confirmatory factor analysis of the measured variables. The results show that the model provided a good fit to the data, chi square = 496.20, degrees of freedom = 164, root mean square error of approximation = .06, normed fit index = .90, comparative fit index = .92, goodness-of-fit index = .90, parsimonious goodness-of-fit index = .63. The model had high structural validity (see Figure 1).

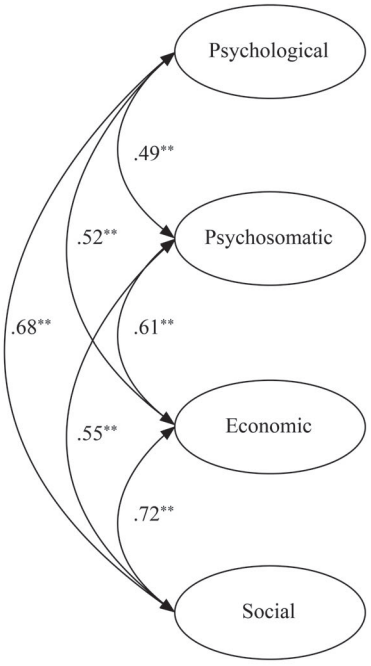

Figure 1. *Confirmatory Factor Analysis of Model Fit*

Validity Assessment

We used Pearson correlation analysis to investigate the relationships among scores on the C19P-S-C and the measures of anxiety and depression. The results show there were significant positive correlations among the scale scores ($p < .01$; see Table 2).

Table 2. *Correlation Analysis of the COVID-19 Phobia Scale – Chinese Version With Measures of Anxiety and Depression*

	Total score	Psychological	Psychosomatic	Economic	Social
Anxiety	.53**	.49**	.58**	.46**	.44**
Depression	.57**	.61**	.55**	.49**	.51**

Note. ** $p < .01$.

Test–Retest Reliability

The retest data collected after a 2-week interval show that the correlation coefficients for the C19P-S-C scores at each time point ranged between .82 and .91, with the test–retest reliability for the total scale being .87, and the test–retest reliability for the four subscales being .86, .82, .91, and .85 for psychological, psychosomatic, economic, and social subscales, respectively.

Discussion

We assessed the psychometric properties of the C19P-S-C in a Chinese cultural context. The study used exploratory factor analysis, confirmatory factor analysis, reliability analysis, and validity analysis to test the applicability of the C19P-S-C for use with Chinese undergraduates. The statistical results show that the psychometric properties of the C19P-S-C were satisfactory. In addition, the test–retest reliability of the C19P-S-C was good, indicating that the scale remained stable in this study. Thus, it can be used as a reliable measurement tool to assess the symptoms of COVID-19 phobia in Chinese undergraduates.

The exploratory factor analysis and item analysis results demonstrate that the 20 items of the scale were statistically significant and all should be retained. We found a significant positive correlation between COVID-19 phobia and the anxiety of Chinese undergraduates. This is consistent with previous research results in other cultural contexts (Ardestani et al., 2021; Arpaci et al., 2020; Bilgiç et al., 2022). We also found a significant positive correlation between the COVID-19 phobia and depression of Chinese undergraduates. People often feel fear and anxiety during a pandemic (Ibrahim, 2016; Nwaoga et al., 2014; Tausczik et al., 2012); thus, the results of this study are consistent with previous studies on fear and anxiety in regard to infectious viruses. For example, Z. G. Liu et al. (2005) showed that the transmission of infectious viruses can lead to depression in individuals.

This study has one main limitation. For easy access to research samples, we recruited only Chinese undergraduates as participants. Undergraduates spend much of their time in the relatively closed environment of the university, which is different from that of other populations, where people may experience frequent contact with strangers. In the future, the applicability of this scale to groups outside the university context should be evaluated.

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