DEVELOPMENT AND VALIDATION OF PSYCHOLOGICAL DISTRESS FOR CHINA UNIVERSITY STUDENTS USING EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS

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ABSTRACT

College is a time to prepare for the shift from school to work and youth to adulthood. Nonetheless, psychological anguish is common among Chinese college students, particularly in the wake of COVID-19. Thus, the number of researchers studying psychological distress is increasing. Through the development and validation of an instrument, this study seeks to examine the effectiveness of psychological distress. To have a deeper knowledge of this issue, this instrument was designed and validated using the Psychological Distress Scale framework, which was created by Kessler et al. (2003). 406 valid responses from a China university were obtained from this cross-sectional study for the pilot program. Exploratory factor analysis (EFA) was performed on 204 participants using SPSS, while confirmatory factor analysis (CFA) was performed on 202 data using AMOS. According to the findings of experts, certain expressions need to be clarified. The results of the EFA later showed that each item only belonged to one concept with greater loading factors; nevertheless, four items were removed before the study to satisfy the discriminant validity, construct validity, and convergent validity of the CFA. A thorough assessment is required since, despite the acknowledged significance of psychological discomfort in academic contexts, there is insufficient research on its validity and reliability in the Chinese population.

Keywords: psychological distress, confirmatory factor analysis, exploratory factor analysis.

INTRODUCTION

According to the findings on the mental health of the general population from 190 Chinese cities, 28.8 percent of them have symptoms of anxiety and 16.5 percent of depression (Wang et al., 2020). In New Zealand among young adults, psychological distress is increasing (Twenge et al., 2019). Twenty to forty-five percent of students experience clinical-level distress, and over sixty percent experience sub-clinical distress, university students may be especially vulnerable (Auerbach et al., 2016; Auerbach et al., 2019; Leppink et al., 2016; Stallman, 2010). Similarly, in another study from ten universities of traditional Chinese medicine, 9185 students have a detection rate of 31.5% for depression (Lu et al., 2021). Only a small percentage of students who are clinically distressed seek therapy, despite the high incidence of distress (Blanco et al., 2008; Stallman, 2010). Additionally, according to other studies, students are much less likely than non-students to ask for assistance (Blanco et al., 2008), and the most problematic students are likewise the least likely to do so (Ryan et al., 2010). The fact that just 1 in 6 adolescents who seek treatment receive "minimally adequate" care raises additional concerns (Stein et al., 2013).

In addition, college students' everyday lives were severely disrupted by sudden public health events, especially the COVID-19 epidemic, since all classes were converted to virtual ones and social isolation was enforced for several months. Without a doubt, throughout the epidemic, pupils' mental health deteriorated (Chaturvedi et al., 2021). Reports of students' mental health concerns both before and after the epidemic have significantly increased due to the ongoing uncertainty and often shifting standards on college campuses since 2020. In Bangladesh, research looking into the psychological effects of the pandemic discovered that 3.8% of pupils had light anxiety, 48.4% had moderate anxiety, and 44.6% had severe anxiety. These anxiety levels were positively connected with worrying about how the pandemic would affect the economy and day-to-day living (Dhar et al., 2020). Cheng et al. (2020) also state that the main factors contributing to suicide among Chinese graduates are stress related to graduation academic stress and depression. Similarly, the primary factors influencing college students' mental health are stress and anxiety (Beiter et al., 2015).

LITERATURE REVIEW

Psychological distress is a general term for psychological functioning that is disrupted in the face of stressful life circumstances. However, psychological distress is rarely characterized as a distinct category. However, recognizing this distressing emotional experience is essential for learners to seek help in the future (Rentala et al., 2019). They claim that this awareness is necessary to prevent psychiatric diseases like poor diet, attempted suicide, symptoms of stress, anxiety, and sadness. Consequently, it is imperative to identify the characters of psychological distress. The simplest definition comes from Kessler et al. (2003) and Turner et al. (2019), psychological distress is explained as the emotional suffering brought on by the interaction of depressive and anxious symptoms. Depression and anxiety were defined as psychological distress in this research context.

According to the American Psychiatric Association (2013), depression is characterized by a core collection of symptoms that last for at least two weeks and are present for most of the day, such as sadness, hopelessness, depression, despair, and worthlessness. Anxiety is a prevalent psychological disturbance among students in circumstances related to higher education. Anxiety symptoms include trepidation, uneasiness, a feeling of sweating, shaking, trouble concentrating, excessive worry, restlessness, fatigue, insomnia, and a sense of impending disaster or danger (Tripathi & Chhibber, 2021).

Therefore, the Psychological Distress Scale (PDS), consisting of 10 items, has been posited as a reliable instrument in this study for evaluating symptoms of psychological distress, such as anxiety, hopelessness, and worthlessness (Kessler et al., 2003). The K10 consists of two sections: anxiety symptoms: four items; for example, "Did you feel exhausted for no apparent reason?" and depression symptoms: six items; for example, "Did you feel hopeless?". Participants were requested to evaluate their experiences throughout the previous four weeks using a 6-point Likert scale, with 1 denoting "None of the time" and 6 denoting "All of the time".

The PDS is well suited to be widely used as a widespread instrument for mental health assessment because of its validity and briefness. Merson et al. (2021) and Pereira et al. (2019)

claim that the PDS has strong internal consistency (*r*=.91), a significant inter-item correlation (ranges from .350 to .659), and good test-retest reliability in both the non-treatment-seeking sample (ICC =.86; *r* =.76) and the treatment-seeking sample (ICC =.89; *r* =.80), suggesting a valid instrument with a factor-based framework for evaluating psychological distress. The PDS Chinese version has good psychometric qualities and retains the original English version's single dimension (Ye et al., 2017). This implies that the test's Chinese translation is a viable and dependable way to gauge psychological traits, and it measures the same construct as the English version. Therefore, it is very feasible to think about employing the PDS as a screening tool for college students in mainland China, where school-based mental health interventions are not always easily accessible. However, it is very essential to do the EFA and CFA to evaluate the instrument carefully in the pilot study.

RESEARCH METHODOLOGY

This study employed a cross-sectional research technique, which collects data at a particular point in time throughout a period (Sekaran & Bougie, 2016). Both the pilot and the actual study used data collected from a Chinese public university's college. Simple random sampling was utilized to select responses from among the second-year SJZIEI students in nine departments. The resources for depression and anxiety were extracted from Kessler et al. (2003)'s literature.

The pilot project's first step is to ensure that psychological discomfort is legitimate for actual fieldwork. Peer help's content validity was assessed by five issue specialists with doctorates who have worked in academic settings for more than five years. A statistician assessed the validity of psychological distress to make sure the scale was suitable. Before coming to the ultimate agreement, the differences were examined, debated, and changed. The findings showed that the language needed to be made clearer: Over the last 30 days, it has altered. The psychological distress scale was then sent to a qualified translator for back-to-back translation from English into basic and general Chinese, and back-to-back translation by two bilingual specialists to reduce ambiguity or misunderstanding, to guarantee face validity.

Five randomly selected respondents were given the PDS for a pre-test once the validation procedure was finished. This was done to evaluate the consistency of their responses and get feedback on any ambiguous terminology, the clarity of the questions, and the questionnaire's layout. These issues were identified and fixed before the pilot project and actual fieldwork (Zikmund & Babin, 2010). An adequate sample size should be established once the instrument has been revised in response to expert panel and pre-test input. A representative sample of participants should then be chosen based on the full-scale study eligibility requirements. The research met the minimal sample size criteria by collecting 406 valid responses for the pilot project, of which 204 were valid for the EFA (Awang, 2015; Bahkia, Awang, Afthanorhan, Ghazali, & Foziah, 2019). Furthermore, the minimum sample size requirement of 200 was met by gathering 202 valid replies for the CFA analysis. The data from the pilot study were the subject of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) prior to the survey.

RESULTS & DISCUSSION

Exploratory Factor Analysis on Psychological Distress Construct

Kaiser Normalization and the Varimax rotation approach were used in an exploratory factor analysis of the Psychological Distress questionnaire's ten items. The criteria for item loadings of .4 or higher and eigenvalues larger than or equal to one were taken into consideration. One factor emerged because of the exploratory factor analysis, as indicated in Table 1. The study's single identified factor had eigenvalues of 8.0, which was statistically significant.

Table 1 The Results of Exploratory Factor Analysis Loading for PD

Item	Description	1
Factor 1: Comorbid		
23	How many times in the past 30 days did you feel so depressed that nothing could lift your spirits?	.945
19	How often did you feel fidgety or restless over the past 30 days?	.934
20	How many times in the past 30 days have you been unable to sit still due to restlessness?	.926
22	How many times did you feel like everything was an effort over the past 30 days?	.926
21	How often did you feel down in the past 30 days?	.914
18	How many times did you feel hopeless in the past 30 days?	.893
16	How often did you feel anxious in the past 30 days?	.886
17	How many times in the past 30 days have you been so anxious that nothing has been able to soothe you?	.859
24	How many times did you feel unworthy in the past 30 days?	.845
15	How many times did you feel exhausted for no apparent cause in the past 30 days?	.825
Eigenvalues		8.031
In Explained Variance Percentage		80.314
Kaiser-Meyer-Olkin = .943		
Bartlett's Test of Sphericity Approx. Chi-Square = 2583.297, df = 45, Sig. = .000		
Percentage of Total Variance = 80.314%		
Cronbach's Alpha		.973
The Cronbach's Alpha value for the 10 items is .973.		

Table 1's findings show that a single component has emerged, accounting for 80.3% of the variance. The results show that the inter-item correlations (all items r>.05), the test for Kaiser-Meyer-Olkin (KMO) test (.943), the Bartlett's Sphericity Test (X2=2583.297, df=45, p<.05), and the matrix correlation indicators are significant. Consequently, it is confirmed that there are no consequences of singularity or multicollinearity. These findings further support the sample's applicability for conducting factor analysis.

It is shown from Table 1, that psychological distress has only one factor after all rotation. Factor loadings of psychological distress for the ten items, they are .945, .934, .926,.914, .893, .886, .859, .845, and.825, in that order. Given the change of the component, the researcher renamed

the new factor. Factor 1 includes all 10 items with a new variable named Comorbid. Certainly, the term "comorbid" is often used to describe the coexistence of anxiety and depression. It indicates that both conditions are present simultaneously in an individual. "Psychological Comorbidity" refers to the presence of two or more psychological disorders or conditions in an individual at the same time. It implies that the person is dealing with multiple mental health issues concurrently. In addition, "Comorbid," the single component, has a dependability value of Cronbach's Alpha of .973.

Confirmatory Factor Analysis on Psychological Distress Construct

The data obtained were analyzed using the AMOS 24 application to conduct Confirmatory Factor Analysis (CFA) to verify the latent construct measurement models for three key aspects: (1) unidimensionality, (2) validity, and (3) reliability (Aimran et al., 2017). CFA tests were employed for each factor to assess their compatibility. The primary criterion for assessing compatibility was the loading factor value, which should ideally be ≥.50, and <1.00. Additionally, three validity criteria were proposed for fit assessment: Fitness Index, Convergent Validity, and Construct Validity.

Fitness Index

Despite all factorloadings being above, the fitness index falls short of the necessary threshold. The study then looked at the Modification Index (MI) to find the redundant items. After deleting item PD1, PD2, PD4, PD9, six items remained. The findings show that the CFA analysis did meet the criteria of RMSEA = .071(<.08), Chi-Square=2.004(<3), while CFI (.990) and TLI (.983) values did, as shown in Figure 1, approach >.90.

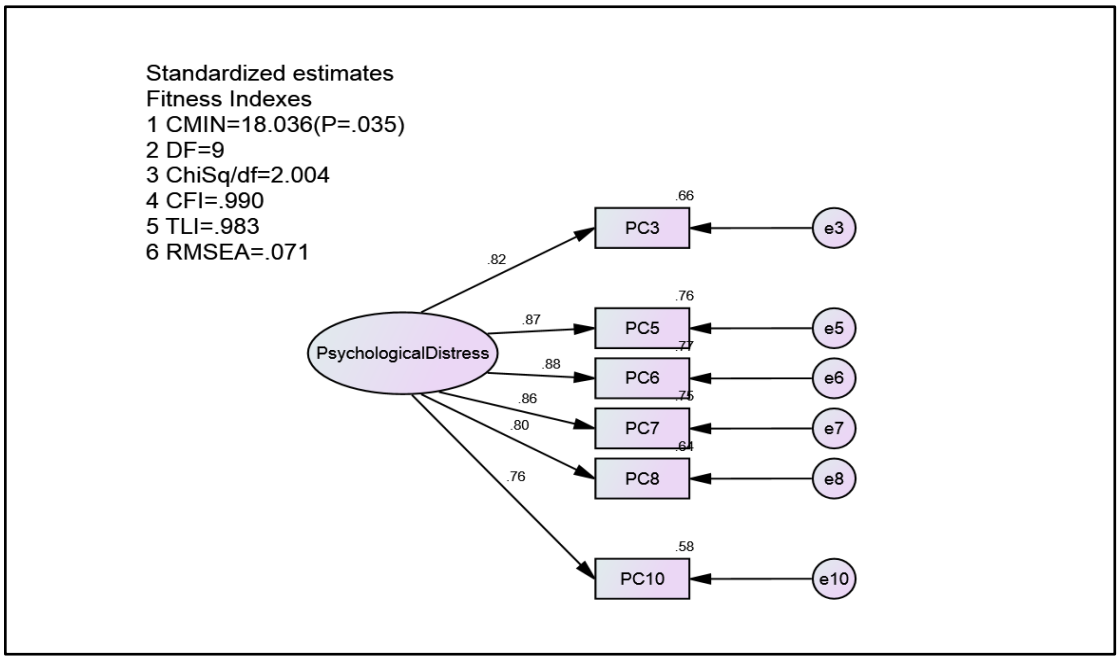

Figure 1 CFA Result of Psychological Distress

Convergent Validity

For validity assessment, the results indicate that the CFA evaluation of Psychological distress did meet the criteria of AVE ≥ .50(.73), as indicated in Table 2.

Table 2 The CFA Summary for Psychological Distress

Item		Dimension	Standardized regression weights Estimate	AVE	CR
PC3	<---	Psychological distress	.815		
PC5	<---	Psychological distress	.873		
PC6	<---	Psychological distress	.877		
PC7	<---	Psychological distress	.863	.69	.93
PC8	<---	Psychological distress	.803		
PC10	<---	Psychological distress	.760		

Construct Validity

Construct validity refers to the degree to which a test accurately measures the intended concept. It is pivotal to establish the overall validity of a method. With only one construct at hand, all fitness indexes, including absolute fit (RMSEA), incremental fit (CFI and TLI), and parsimonious fit (Chisq/df), are essential to evaluate whether the model meets the criteria (see Figure 1). Thus, achieving construct validity is imperative. As suggested by Awang et al. (2018), commonly used indicators contain the normed Chi-Square (X^2)/df, the comparative fit index (CFI), and the root mean of approximation (RMSEA). Table 3 shows that the PDS satisfies the requirements for each of the three fitness index categories: (1) the absolute fit index is established when the RMSEA value is less than .08 (.071); (2) the incremental fit index is met when the PDS achieves a CFI value of.990, exceeding the suggested threshold of.90; and (3) the parsimonious fitness, as determined by Chisq/df, results in a value of 2.004, below the 3.0 threshold proposed by Bentler (1990). Consequently, this research substantiates the PDS's construct validity.

Table 3 Fitness indices

Name of category	Name of index	Level of acceptance	Result	Status
Absolute Fit Index	RMSEA	RMSEA <.08	.071	Fulfilled
Incremental Fit Index	CFI	CFI >.90	.990	Fulfilled
Parsimonious Fit Index	Chisq/Fit	Chisq/df <3.0	2.004	Fulfilled

Discriminant Validity

The discriminant validity index summary was created to evaluate the discriminant validity (Table 4). According to Awang et al. (2015), the diagonal values (bold) displayed are greater than those in the row and column.

Table 4 The Square Root of AVE for Psychological Distress

	Psychological Distress
Psychological Distress	.83
AVE	.69

Composite Reliability

When the academic adjustment construct's composite reliability (CR=.93) is higher than the required minimum score of .6, composite reliability is obtained (Table 2).

The assessment of normality for Psychological distress

Each item's normality rating is reflected in the skewness and kurtosis measures. The skewness and kurtosis values must be within the typical distribution as indicated by the range of -1.5 to 1.5, kurtosis values falling between -3.0 and 3.0 are considered acceptable. The value of these two types of figures is in this range as shown in Table 5.

Table 5 Assessment of Normality of Psychological Distress

Variable	Min	Max	Skewness	Critical Ratio	Kurtosis	Critical Ratio.
PC10	1.000	6.000	-.588	-3.414	-.356	-1.031
PC8	1.000	6.000	-.075	-.434	-.765	-2.219
PC7	1.000	6.000	-.137	-.797	-.369	-1.069
PC6	1.000	6.000	-.208	-1.206	-.726	-2.106
PC5	1.000	6.000	.157	.909	-.655	-1.899
PC3	1.000	6.000	.072	.419	-.563	-1.633
Multivariate					10.119	7.339

CONCLUSIONS

This study set out to develop and validate a survey instrument for measuring psychological discomfort in a classroom context. Based on the results of the EFA and CFA, the psychological distress scale (PDS) was successfully developed to investigate the efficacy of students' psychological distress in a university setting. The specialists' analysis led to the clarification of certain terms. According to the EFA's findings, just one of the ten components experienced psychological distress following rotation. The CFA confirmed that the PDS meets construct validity, convergent validity, and discriminant validity requirements after removing four questions (items PD1, PD2, PD4, and PD9). The PDS's validity is further supported by the findings of normalcy and unidimensionality investigations. The validity of the PDS instrument in measuring psychological distress among students has therefore been established by the EFA and CFA results. This study suggests using PDS in several research settings, such as China University. Future research could look at both external and internal factors that influence students' psychological suffering, such as peer support and emotional intelligence.

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