

# *Exploring the Relationship between Depression, Anxiety and Stress by Depression, Anxiety and Stress Scale-21*

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**Abstract:** This article recruited 125 young people (51 males and 74 females), of whom 42 were from Hong Kong and 83 from Chinese mainland. Participants filled out the scale online with Chinese version of DASS-21 and Kessler depression scale. The results showed that: (1) the internal consistency reliability of DASS-21 was 0.93, and it also had high reliability in three dimensions, and the whole scale had good structural validity. (2) Anxiety, depression and stress were significantly correlated with depression. Anxiety and stress had a regression relationship with depression respectively. (3) There was no significant difference in sex and region between depression, anxiety and stress.

## 1. Introduction

Depression is a mood disorder with main symptoms of depression, loss of interest and cognitive impairment, including focus, thinking and making decisions <sup>[1]</sup>. Pharmacological therapy with serotonin as the main ingredient, behavioral therapy (such as BA and CBT) and neuroscience therapy are three main therapy ways to cure depression <sup>[2]</sup>. Measurement of depression is essential for choosing different treatment. Although many scales were developed to measure depression, the result cannot accurately show the level of a single depression dimension <sup>[3] [4] [5]</sup>, because it was found that the symptoms of depression and anxiety often overlapped and it had difficulties to distinguish them with highly correlated <sup>[6]</sup>. In order to distinguish the two clinical symptoms, Lovibond and Lovibond established a three-element model which includes depression, anxiety and stress dimensions by exploratory factor analysis, and then it was woven into Depression, Anxiety and Stress Scale-21(DASS-21) <sup>[7]</sup>.

However, the three-element model is controversial. Oei reported different structure, he recruited 263 employees from different companies in Indonesia, Singapore, and Thailand and tested them with DASS-18 <sup>[8]</sup>. The results showed that correlation of dimensions was higher than the original DASS-21 and it is the best structure which is suitable for Asian participants <sup>[10]</sup>. Interestingly, Alfonsson supported that the two-factor structure provides the best fitting indices for DASS-21 <sup>[11]</sup>. In addition, someone supposed that the DASS loses the validity of the measurement with of the change of the language, because the difference culture can lead to the change of emotion meanings in translation. As a result, studies explored DASS with multiple languages to analyze the stability and applicability. Daza stated the DASS-21 had a good structural validity with Spanish version <sup>[9]</sup>. Chinese version of the scale also reported that the scale had good reliability <sup>[7]</sup>.

To explore the structure and the influence of different versions, this study use different language

versions of DASS-21 to measure different language preference groups in the same country and analyze differences and correlations. Besides, the study also analyze reliability and validity of DASS-21 and verify the stability of the three-element structure. Last, in this study, DASS measured anxiety and stress to distinguish anxiety and depression symptoms and explore gender and region differences.

## 2. Method

### 2.1. Participants

The study recruited 125 participants, all of these participants are under the age of 30, from a range of 22 to 26. In the sample, 42 participants are from Hong Kong and the 83 are from Chinese mainland. In these participants, 74 were female with an average age of 18 to 22 (SD=0.68) and 51 male with an average age of 22 to 26 (SD=0.61).

### 2.2. Measure and Procedure

The research adopted Chinese version and English version of DASS-21 and Kessler depression scale. First, participants were asked to complete a short scale of 10 items of Kessler-10 scale which reflect non-specific psychological problems, then accomplished DASS-21 independently and made the choices of 21 items (1=It doesn't apply to me at all, 4= It always apply to me) after understanding the instruction of the scale. Finally, the researcher collected the questionnaire and analyzed data.

## 3. Results

### 3.1. Reliability

The results of the test of the reliability of the questionnaire by the Cronbach's alpha show that the total coefficient of the total table is 0.93, the Cronbach's alpha of the depression dimension is 0.88, the Cronbach's alpha of the anxiety dimension is 0.80, and that of the stress dimension is 0.82. The results showed that the total scale and each dimension have good internal consistency reliability. The results are shown as table 1.

Table 1: Mean, standard deviation and internal consistency reliability of DASS

	Cronbach's alpha	Depression	Anxiety	Stress
Mean		12.18	11.52	13.02
SD		4.44	3.50	3.93
Total	0.93			
Depression	0.88			
Anxiety	0.80			
Stress	0.82			

### 3.2. Exploratory Factor Analysis and Validity

Exploratory Factor Analysis establish that the partial correlation between variables is very strong and is very suitable for principal component analysis (Table 2). Bartlett spherical test shows that  $P=0.000<0.05$ , which proves that the variables are not independent. Principal component analysis (PCA) was used to analyze 21 variables. The results showed that the eigenvalues of the first factor were 9.284, which explained 44.21% of the total variance of the original variables. The eigenvalues

of the five factors are greater than 1, and the three factors are significantly higher than the latter two. The contribution rate of cumulative variance of the first three factors is 55.67%, which explains 55.67% of the total variance (Table 3). It is confirmed that we can extract DASS-21 into three factors. According to the cumulative variance contribution rate of factor analysis, the eigenvalues and rotating load matrix of each factor show that the scale has good structural validity. The results of Pearson correlation analysis showed that there was a significant correlation among the factors, and the correlation coefficient was 0.76 — 0.93, which was highly correlated. There was also a significant correlation between each factor and the total scale, and its value was above 0.90. And the value of the coefficient is greater than the correlation coefficient between the factors. This indicates that the structure validity is good.

Table 2: KMO and Bartlett Test

Kaiser-meyer-olkin measurement of adequacy sampling		0.92
Global test of Bartlett's	Approximate Chi-square	1392.37
	df	210
	Sig.	.000**

Table 3: Eigenvalues and Total Variance of DASS

Component	Initial eigenvalue			Extract square sum loading			Rotational square sum loading		
	Eigenvalue	Variance contribution rate%	Cumulative variance Contribution Rate%	Eigenvalue	Variance contribution rate%	Cumulative variance Contribution Rate%	Eigenvalue	Variance contribution rate%	Cumulative variance Contribution Rate%
1	9.28	44.21	44.21	9.28	44.21	44.21	3.29	15.67	15.67
2	1.22	5.83	50.04	1.22	5.83	50.04	3.24	15.40	31.07
3	1.18	5.63	55.67	1.18	5.64	55.67	2.86	13.61	44.68

### 3.3. The Relationship between Depression, Anxiety and Stress

As shown in table 4, the depression dimension of DASS was significantly correlated with depression level of Kessler depression scale, which illustrates the consistency. And depression, anxiety and stress dimensions were significantly correlated. The regression analysis between anxiety, stress and depression showed that when depression was used as dependent variable, anxiety and stress were introduced as independent variables respectively, anxiety and stress both entered the model, which proved that there was a regression relationship between anxiety and stress to depression (table 5).

Table 4: The correlation Between the Various Factors

		Depression in DASS	Stress	Anxiety	Depression	DASS
Depression	r					
In DASS	r					
Stress	r	0.88**				
Anxiety	r	0.76**	0.79**			
Depression	r	0.54**	0.57**	0.60**		
DASS	r	0.93**	0.93**	0.90**	0.61**	

Table 5: Regression of Anxiety and Stress to depression

Dependent variable	Predictor variable	R2	AdjustR2	F	B	Sig	t
Depression	Anxiety	0.36	0.35	67.70	1.16	0.000**	8.09
	Stress	0.33	0.33	60.37	0.99	0.000**	7.77

### 3.4. Gender and regional differences

The results showed no significant difference in depression, anxiety and stress in gender between Hong Kong and mainland participants.

## 4. Conclusion

First of all, good reliability and validity of the scale in this sample prove that the scale is effective. However, in exploratory factor analysis, it is found that five factors can also be extracted, and the load of each factor is not very high. One of the reasons may be: the sample size is too small, what's more, because of too many items of scale, the participants may not focus on latter part of the questionnaire, resulting in some option scores deviated. This may also be a factor in which there is no significant difference in depression, anxiety and stress between gender and region, but it is also worth exploring that it does not exist in itself. Another important reason is that three-element structure is unsuitable in English-speaking community in China, which, of course, requires further confirmatory factor analysis and more English-speaking participants.

Secondly, depression and anxiety have a significant correlation, and anxiety has a regression relationship with depression, that is, anxiety is an important factor affecting depression. Generally speaking, depression and anxiety are always accompanied by depression, depression patients usually have the characteristics of anxiety disorder, and anxiety disorder patients usually have depression. The two diseases may occur at the same time, and it may be difficult to distinguish them. In the John 's study, about 85 percent of patients with depression also had significant anxiety symptoms, while up to 90 percent of patients with anxiety disorder had combined depression <sup>[12]</sup>. This makes it easy to explain the significant relationship between depression and anxiety we analysis above. From the perspective of development, John said anxiety disorder plays a major role in the development of children, usually in children or youth. Anxiety occurs when you are a teenager or a child. Therefore, if you are in anxiety for a long time, it will cause a lot of problems to your own psychology and life, and the impact of psychological traits and external environment will probably lead to depression.

Thirdly, stress and depression also have a significant correlation, and the pressure has a regression relationship with depression, that is, pressure is also an important factor that affects depression. John also illustrates the most likely cause of depression in a person's life is probably a source of psychological and social stress, which make it easy to explain the result we made above. Under the condition of excessive stress, many emotions are suppressed and evaded. In this state of high pressure, long-term depression may cause depression, want to avoid stress, avoid reality, but this avoidance may lead to changes in interpersonal relationships and social status, making the situation worse. Robert confirmed the point in his report and he also supposed that gender and stress have always been thought to be closely related to the diagnosis of depression <sup>[13]</sup>.

## References

- [1] E. Lenze1. *The symptom of depression that nobody understands*. *European Neuropsychopharmacology*, (2012), 22, 441.
- [2] Y. Barak. *Outstanding needs in depression and how multimodal antidepressants may solve them*. *European*

*Neuropsychopharmacology*, (2012), 22, 441.

[3] Zoltan Kozinszky, Robert B. Dudas. Validation studies of the Edinburgh Postnatal Depression Scale for the antenatal period. *Journal of Affective Disorders*, (2012), 176(1),95-105.

[4] Lee, Chin-Pang, Chu, Chun-Lin. The Chinese Version of the Gotland Male Depression Scale (GMDS): Mokken scaling. *Journal of Affective Disorders*, (2015), 186(1),48-52

[5] Breeman, Suzanne, Cotton, Seonaidh. Normative data for the Hospital Anxiety and Depression Scale. *Quality of Life Research*, (2015), 24(2), 391-398.

[6] Kui Wang, Hai Song Shi. Cross-Cultural Validation of the Depression Anxiety Stress Scale–21 in China. *Psychological Assessment*, (2016), 28(5), 88–100.

[7] Shaw, T., Campbell. Properties of the DASS-21 in an Australian Community Adolescent Population. *Journal of Clinical Psychology*, (2017), 73(7), 879-892.

[8] Daza, P., Novy, D., Stanley, M., & Averill, P. The Depression Anxiety Stress Scale-21: Spanish translation and validation with a Hispanic sample. *Journal of Psychopathology and Behavioral Assessment*, (2002), 24, 195–205.

[9] Oei, Tian P. S., Sawang, Sukanlaya. Using the Depression Anxiety Stress Scale 21 (DASS-21) across cultures. *International Journal of Psychology*, (2013), 48(6)

[10] Alfnsson, S., Wallin, E., Maathz, P. Factor structure and validity of the Depression, Anxiety and Stress Scale-21 in Swedish translation. *Journal of Psychiatric and Mental Health Nursing*, (2017), 24(2-3), 154-162.

[11] Clara, I. P., Cox, B. J., & Enns, M. W. Confirmatory factor analysis of the Depression–Anxiety–Stress Scales in depressed and anxious patients. *Journal of Psychopathology and Behavioral Assessment*, (2001), 23, 61–67.

[12] John W G Tiller MD. Depression and anxiety. *The medical journal of Austria*, (2013), 199, 28-31.

[13] Robert C. The state of knowledge about the relationship between 5-HTTLPR, stress, and depression. *Journal of Affective Disorders*, (2017), 228, 205-206.