



Gender Difference in the Relationship between Post-graduate Students' Stress and their Mental Health

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Abstract

Objective: In the present study, the objective was to examine the gender difference in the relationship between post-graduate students' stress and their mental health.

Methods: There were 336 post-graduate students (201 females) from 54 Chinese universities participated in this study. We measured their stress and mental health in a cross-sectional design.

Results: The results indicated that Chinese post-graduate students' stress positively predicted their mental health. Furthermore, male students had higher levels of stress than girls in financial stress, stress from lover, interpersonal stress, and other stressors. In addition, the strength of the positive prediction of post-graduate students' academic stress on mental health was significantly weaker for female students than for male students, while the strength of the positive prediction of other stressors on mental health was significantly stronger for female students than for male ones.

Conclusion: Our findings confirm that there are gender differences in the relationship between post-graduate students' stress and their mental health.

Keywords: Stress; Mental health; Post-Graduate Students; Chinese

Introduction

In previous research, stress has been widely linked to mental health. A number of studies indicated that students' stress was moderately related to their mental health [1-3]. For example, data from the Department of Health and Human Services showed that nearly 25% of American adolescents' mental illness was influenced by stress. Individuals exposed to more stressors tend to report worse mental health compared to those who have experienced very few of these stressors in their daily lives. Furthermore, Liu and Lu's [4] study indicated that academic stress increased the risk of depression for Chinese high school students. Every day, post-graduate students experience several kinds of stressors such as academic stress, financial stress, and stress from interpersonal relationship. Compared with undergraduate students, post-graduate students experience some different kinds of stressors such as stress from publication. However, few studies have examined the relationship between post-graduate students' stress and their mental health. Therefore, the first objective of the present study is to examine the relationship between Chinese post-graduate students' stress and their mental health. It is expected that post-graduate students' stress positively predicts their mental health.

Moreover, some studies have indicated that there is gender difference in the relationship between stress and mental health. In the existing literature, the diathesis-stress model has been used to explain why some students are more likely to suffer from mental disorders than other ones [5]. This model has suggested that biological or genetic traits (diatheses) interact with stress to produce mental disorders such as anxiety, depression, and schizophrenia [5]. Based on this model, some researchers have suggested that gender may contribute to the relationship between stress and mental health [6]. In empirical research, some studies found that females reported more stressors overall than males [4, 7, 8]. Hence, female students are more likely to experience more mental disorders. However, some other studies showed that girls reported more interpersonal-related stressors from their peers and family members than boys who were more likely to report achievement-related stressors [4, 9, 10]. Additionally, some studies showed that girls responded with more mental disorders such as depression than boys [8]. In this study, the second objective is to examine the gender difference in the relationship between Chinese post-graduate students' stress and mental

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health. It is expected that gender moderates the relationship between stress and mental health.

Method

Participants and procedure

Participants came from 28 provinces (54 universities) in People's Republic of China. There were 336 post-graduate students (201 females) agreed to participate in our study. Among them, 282 were master degree candidates (106 were in grade 1, 116 in grade 2, and 60 in grade 3) and the others were PhD candidates (14 in grade 1, 20 in grade 2, 11 in grade3, and 9 in grade 4). The mean age of these post-graduate students was 24.67 years ($SD=2.62$). Participants were invited to complete a questionnaire online. Ethical approval was granted from institutional review of our institution.

Measures

Stress: Stress was assessed with a 32-item measure [11]. The scale was developed in Chinese. The scale has seven dimensions which measure stress from job hunting (e.g., it is difficult to find a job); academic stress(e.g., it is difficult to publish a paper); financial stress (e.g., the subsidy from my school is not enough); stress from family (e.g., my parents do not understand me); stress from lover (e.g., I am disappointed in a love affair); interpersonal stress (e.g., I do not have friends); other stressors (e.g., I am not satisfied with my live). Students were asked to respond on a four-point scale, ranging from 1 (strongly disagree) to 4 (strongly agree). An average scale score of each dimension was computed. The reliability and validity of this scale were well established in previous research [11]. The internal consistency reliability of this scale was 0.85 in the present study.

SCL-90: The Symptoms Check List 90 (SCL-90) [12] was used to assess Chinese post-graduate students' mental health. The SCL-90 assesses 9 primary symptom dimensions (somaticism, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) and a Global Severity Index (GSI) which shows the general severity of all symptoms. This scale has been widely used in China. The validity and reliability were both well-established among Chinese. The internal consistency reliability of this global scale was 0.98 in the present study.

Results

Mean and Standard Deviation (SD) of each variable is presented in Table 1. Correlations for the variables are listed in Table 2. The results showed that Chinese post-graduate students' stress was moderately correlated with their symptoms. ANOVAs revealed that male students had a higher level of stress than girls in financial stress, $F(1, 334) = 8.40, p < 0.01$; stress from lover, $F(1, 334) = 12.63, p < 0.01$; interpersonal stress, $F(1, 334) = 8.09, p < 0.01$; and other stressors, $F(1, 334) = 8.38, p < 0.01$.

The relationship between Chinese post-graduate students' stress and mental health was tested by structural equation model. The analysis was conducted in AMOS 7.0. The results indicated that the factor loadings of all indicators were significant and the goodness of fit indices of the model were acceptable; $\chi^2=382.63, df= 118, \chi^2/df= 3.24$, Comparative Fit Index (CFI) = 0.95; root mean square error of approximation (RMSEA) = 0.08. As shown in Figure 1, the results revealed that Chinese post-graduate students' stress significantly and positively predicted their mental health (coefficient =1.44, $SE = 0.11, p < 0.01$).

Table 1: Descriptive statistics.

	Mean	SD
Stress from job hunting	2.66	0.76
Academic stress	2.66	0.60
Financial stress	2.24	0.57
Stress from family	2.08	0.51
Stress from lover	1.19	0.51
Interpersonal stress	1.61	0.60
Other stress	2.11	0.76
Somaticism	16.66	6.01
Obsessive-compulsive	19.54	6.52
Interpersonal sensitivity	15.25	5.42
Depression	22.92	8.45
Anxiety	16.60	6.14
Hostility	9.38	3.25
Phobic anxiety	9.70	3.60
Paranoid ideation	9.37	3.28
Psychoticism	15.37	5.45
Others	10.95	3.91

Next, a linear mixed model was used to examine the gender difference in the relationship between Chinese post-graduate students' stress and their mental health. The analysis was carried out by using SPSS 16.0 [13]. We first examined the relationship between each kind of stressor and Global Severity Index (GSI). The model was as follows: $GSI = \mu + r_1 (\text{Stress from job hunting}) + r_2 (\text{Academic stress}) + r_3 (\text{Financial stress}) + r_4 (\text{Stress from family}) + r_5 (\text{Stress from lover}) + r_6 (\text{Interpersonal stress}) + r_7 (\text{Other stressors}) + e$. Next, gender was added into the model as a factor to test the gender difference in this relationship. The model used in this step was as follows: $GSI = \mu + r_1 (\text{Stress from job hunting}) + r_2 (\text{Academic stress}) + r_3 (\text{Financial stress}) + r_4 (\text{Stress from family}) + r_5 (\text{Stress from lover}) + r_6 (\text{Interpersonal stress}) + r_7 (\text{Other stressors}) + r_8 (\text{Gender}) + r_9 (\text{Stress from job hunting})'(\text{gender}) + r_{10} (\text{Academic stress})'(\text{gender}) + r_{11} (\text{Financial stress})'(\text{gender}) + r_{12} (\text{Stress from family})'(\text{gender}) + r_{13} (\text{Stress from lover})'(\text{gender}) + r_{14} (\text{Interpersonal stress})'(\text{gender}) + r_{15} (\text{Other stressors})'(\text{gender}) + e$. The results indicated that stress from job hunting (value = 10.27, Standard Error [SE] = 4.03, $p < 0.01$), academic stress (value = 9.91, $SE = 4.80, p < 0.05$), interpersonal stress (value = 15.55, $SE = 5.55, p < 0.01$), and other stressors (value = 16.37, $SE = 6.85, p < 0.01$) positively predicted GSI for male students. The linear mixed model also outputted values which showed whether the effects of independent variables on dependent variables for male students were significantly different from female students. The results indicated that the strength of the positive prediction of post-graduate students' academic stress on GSI was significantly weaker for female students than for male students (value = -22.39, $SE = 7.58, p < 0.01$), however, the strength of the positive prediction of other stressors on GSI was significantly stronger for female students than for male ones (value = 18.99, $SE = 7.55, p < 0.01$).

Discussion

The present study contributes to theory and practices in some important ways. First, the present study investigated the relationship between Chinese post-graduate students' stress and their mental

Table 2: Intercorrelations among stress and mental health.

	Variable	Stress from job hunting	Academic stress	Financial stress	Stress from family	Stress from lover	Interpersonal stress	Other stress	Somaticism	Obsessive-compulsive	Interpersonal sensitivity	Depression	Anxiety	Hostility	Phobic anxiety	Paranoid ideation	Psychoticism	Others
1	Stress from job hunting	1																
2	Academic stress	0.36**	1															
3	Financial stress	0.32**	0.40**	1														
4	Stress from family	0.32**	0.25**	0.34**	1													
5	Stress from lover	0.29**	0.21**	0.25**	0.21**	1												
6	Interpersonal stress	0.35**	0.40**	0.34**	0.34**	0.34**	1											
7	Other stress	0.53**	0.44**	0.49**	0.43**	0.12*	0.45**	1										
8	Somaticism	0.35**	0.22**	0.28**	0.28**	0.19**	0.48**	0.56**	1									
9	Obsessive-compulsive	0.41**	0.41**	0.29**	0.30**	0.28**	0.54**	0.61**	0.75**	1								
10	Interpersonal sensitivity	0.48**	0.35**	0.33**	0.34**	0.28**	0.57**	0.65**	0.77**	0.87**	1							
11	Depression	0.50**	0.39**	0.35**	0.37**	0.20**	0.49**	0.60**	0.83**	0.84**	0.83**	1						
12	Anxiety	0.41**	0.32**	0.32**	0.27**	0.20**	0.44**	0.55**	0.73**	0.75**	0.77**	0.77**	1					
13	Hostility	0.36**	0.25**	0.27**	0.28**	0.14*	0.48**	0.50**	0.79**	0.77**	0.80**	0.80**	0.82**	1				
14	Phobic anxiety	0.41**	0.25**	0.26**	0.26**	0.22**	0.48**	0.56**	0.79**	0.76**	0.83**	0.79**	0.81**	0.76**	1			
15	Paranoid ideation	0.44**	0.26**	0.30**	0.30**	0.26**	0.50**	0.56**	0.80**	0.80**	0.86**	0.85**	0.84**	0.74**	0.79**	1		
16	Psychoticism	0.45**	0.32**	0.30**	0.29**	0.21**	0.46**	0.51**	0.83**	0.80**	0.80**	0.81**	0.83**	0.74**	0.77**	0.82**	1	
17	Others	0.37**	0.27**	0.29**	0.24**	0.26**	0.48**	0.56**	0.79**	0.76**	0.83**	0.79**	0.81**	0.74**	0.77**	0.82**	0.84**	1

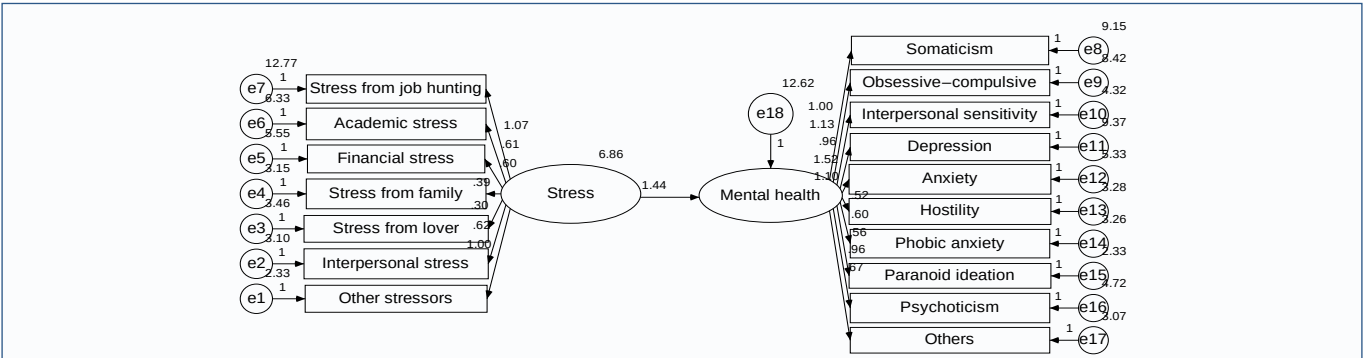


Figure 1: The relationship between Chinese post-graduate students' stress and mental health.

health. In line with our first expectation and the previous empirical findings [1-3], the present study showed that Chinese post-graduate students' stress positively predicted their mental health. In previous empirical research, several studies revealed that students' stress was a predictor of their mental health [4]. By using a sample from Chinese post-graduate students, our findings confirm that this link is also true among post-graduate students whose stressors are different from high school students and undergraduates. In addition, our findings imply that reducing post-graduate students' stress is an effective way to reduce the occurrence of their mental illness.

Second, our data did not provide supportive evidence to the previous findings that females reported more stressors overall than males [4, 7, 8] and girls reported more interpersonal-related stressors from their peers and family members than boys [4, 9, 10]. Our descriptive data showed that male post-graduate students experienced more stress than female ones. Moreover, in previous research, researchers suggest that gender can moderate the effects of stress on mental health [6]. In the present study, the linear mixed model provided us an opportunity to directly compare the relationship between each kind of stressor and mental health across

male post-graduate students and female ones. In line with our second expectation, our findings confirm that gender moderates the relationship between stress and mental health, which supports the previous theory [6]. However, the results revealed that the strength of the positive prediction of other stressors on mental health was significantly stronger for female students than for male students, but academic stress on mental health was significantly weaker for female students than for male students which is not in line with the previous findings that girls responded with higher levels of mental disorders than boys [8]. Our findings suggest that the relationship between some specific stressors and mental health is stronger for males, while the relationship between some other stressors and mental health is stronger for females.

Limitations and Future Directions

Although the present study contributes to the literature in some important ways, we should recognize its limitations. First, in this study, Chinese post-graduate students' stress and mental health were both measured by using a self-report questionnaire. More information sources such as teacher rating could be used in further research. Second, we used a cross-sectional design to investigate the

relationship between Chinese post-graduate students' stress and mental health, hence, we cannot examine the causal relationship between post-graduate students' stress and mental health. A longitudinal design could be used in further research. Third, the present findings were only tested among Chinese post-graduate students. Further research may use students from other countries to investigate whether the present findings could be generalized to Western post-graduate students.

Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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