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Research Article

The Mediating Role of Mental Vulnerability between Negative Life Events and Interaction Anxiousness

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ABSTRACT

Purpose: The study aims to analyze the relationships between mental vulnerability, negative life events and interaction anxiousness among undergraduate students in China and examine the mediating role of mental vulnerability on undergraduate students.

Methods: A cross-sectional survey target for undergraduate students in Liaoning province. Pearson correlation coefficient, multiple linear regression and structural equation modeling method were applied to analyze the data.

Results: The results suggest that mental vulnerability played a partial mediating role between negative life events and interaction anxiousness among undergraduate students. Negative life events had a significant indirect effect on the interaction anxiousness through mental vulnerability.

Conclusion: The study result will contribute to improve the physical and mental health development of undergraduate students.

Keywords: Interaction anxiousness; Mental vulnerability; Mediating effect; Negative life events; Undergraduate students

INTRODUCTION

College life is an important development and transitional period for college students entry into the society in their growth. Under the influence of university environment, college student is undergoing great changes in physical and psychological and they are prone to various psychological troubles in study, scientific research, social relationships and other aspects [1]. Social anxiety disorder is a mental disorder characterized by significant fear of negative evaluation and avoidance of interpersonal situations [2]. Individuals with social anxiety disorder often experience intense fear, avoidance and distress in unfamiliar social situations [3]. According to the survey, social anxiety in college students is usually manifested to worry and fear about interpersonal communication, which could easily lead to a high risk for depression, substance use disorder and suicide among undergraduate student [4]. Social and environmental factors lead to social anxiety, which includes family, negative life events and others comments [5]. Social anxiety, as a common self-development problem of college students, has become one of the major issues in college mental health work [6].

Psychological vulnerability can be defined as trait-anxiety, the stable tendency to experience anxiety and negative affect when exposed to stress [7]. Mental vulnerability is an important aspect of mental health among undergraduate students. Under the influence of family, school and social environment, undergraduate students' physical and mental development is unbalanced, resulting in mental vulnerability [8]. Vulnerability has a negative impact on sensitivity undermining the individual's ability to adapt to adverse conditions and suffer from psychopathological disorders more likely [9]. Undergraduate medical students represent a particularly vulnerable population because they need to cope with many stressors [10,11]. Such as complex learning courses, internship with patients, parents' expectations and longer learning cycles.

Negative life events refer to the stimulation that causes stress on the individual's body and mind, which requires the individual to

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make certain efforts to deal with. They are common among college students, research shows that negative life events are significantly correlated with social anxiety and it can affect the degree of state anxiety of individuals [12]. According to the survey, although there are many studies on the influencing factors of interaction anxiousness in China, previous studies have found that medical students have slightly higher interaction anxiousness than other undergraduate students, interaction anxiousness is affected by negative life events and psychological factors, but there is no research on mental vulnerability as a relevant factor [13]. This study explores the relationship between mental vulnerability, life events and interaction anxiousness in order to provide reference for promoting the physical and mental health of college students.

MATERIALS AND METHODS

Design

Three representative cities are selected in Liaoning province, respectively were Dalian, Shenyang and Jinzhou. The sample size was determined based on the criterion proposed by Kendall in 1975 (*i.e.*, 10-fold the number of items). There are 76 items in the three scales and socio-demographic information in this survey. Given the greater sampling error of convenience sampling, the sample size was increased by 50%. A total of 1,238 medicine college students took part in the survey. All participants completed the tests on line voluntarily.

Measures

Mental vulnerability: The Mental Vulnerability Questionnaire (MVQ) has been demonstrated to be a significant predictor of physical health [14]. This scale is composed of 22 items and 3 subcategories: Mental symptoms, psychosomatic symptoms and interpersonal problems. Each dimension of the MVQ scale is scored between 1 and 5, from "never" to "always" and the total score range from 22 to 110. The higher the total score, the greater the degree of mental vulnerability. The Cronbach's a coefficient was 0.925.

Life events: Adolescent Self-Rating Life Events Checklist (ASLEC). It can be used to measure the frequency and quantify the impact of life events [15]. This scale is composed of 27 items and 6 subcategories: Interpersonal relationship factor, learning pressure factor, punishment factor, loss factor, health adaptation factor and other factors. Each item is divided into 6 grades (0-5) according to the occurrence and influence of the event in the past 12 months and the total score range from 26 to 130. The higher the score, the greater the distress caused by life events. The Cronbach's a coefficient was 0.904.

Interaction anxiousness: Interaction Anxiousness Scale (IAS) can be used as an effective tool to study social anxiety of Chinese college students [16]. This scale is composed of 15 items IAS scale is scored between 1 and 5, from "not at all" to "very much", questions 3, 6, 10 and 15 are scored in reverse, that is, 5=1, 1=5 and the total score range from 15 to 75. The higher the total score, the greater the degree of interaction anxiousness. The Cronbach's a coefficient was 0.883.

Data analysis

Data analysis use SPSS 20.0 and AMOS 22.0. Assess the relationships between the life events, mental vulnerability and interaction anxiousness by the Pearson's correlation coefficients. Multiple linear regression was performed using the interaction anxiousness as the outcome variable and life events and mental vulnerability as continuous independent variables, at the same time, controlling for demographic information. Last, structural equation modeling was used to verify the hypothetical relationships between three latent variables.

RESULTS

Descriptive statistic

A total of 1300 questionnaires were issued in this study, among which 18 were invalid questionnaires 1238 questionnaires were distributed and the recovery rate of 95.23%. The subjects ranged in age from 18 to 25 and the mean age was 21.00 ± 1.65 years. Other socio-demographic information is shown in Table 1.

Table 1: Frequency distribution of demographic characteristics (n=1238).

Factors	Group	n	%
City	Jinzhou	421	34
	Shenyang	419	33.8
	Dalian	398	32.1
Gender	Male	345	27.9
	Female	893	72.1
Grade	Freshman	441	36.2
	Sophomore	348	28.6

	Junior	320	25.8
	Senior	129	10.4
Number of children	1	623	50.3
	>1	615	49.7
Student cadre	Yes	826	67.5
	No	412	33.3
Family atmosphere	Harmony	946	76.4
	Inharmony	292	23.6
Family nature	Single parent family	134	10.8
	Non-single parent family	1104	89.2
Schlorship	Yes	627	50.6
	No	611	49.4
Father's education	Primary school and below	213	17.2
	Junior high school	565	45.6
	Senior high school	231	18.7
	Junior college	98	7.9
	University degree or above	131	10.6
Mother's education	Primary school and below	207	16.7
	Junior high school	601	48.5
	Senior high school	235	19
	Junior college	117	9.5
	University degree or above	78	6.3
General health problems	No	815	65.8
	Migraine	138	11.1
	Allergic rhinitis	102	8.2
	Asthma	8	0.6
	Hypertension	6	0.5
	Diabetes	3	0.2
	Others	166	13.4
Medical history	No	255	20.6
	Anti-anxiety medications	596	48.1

	Depressant	327	26.4
	Hypnotic	45	3.6
	Analgesic	15	1.2

Correlation analyses

Table 2 shows the correlations and descriptive statistics for the entire sample of the medicine colleges students. The results show that the score of ASLEC was positively correlated with MVQ and IAS (r=0.411, 0.424, p<0.01). There was a significant correlation between MVQ and IAS scores in all dimensions. The correlation coefficient between interaction anxiousness and health adaptation factor was the highest (r=0.426, p<0.01) and the correlation coefficient between interaction anxiousness and loss factor was the least (r=0.211, p<0.01). Among the two dimensions of MVQ, IAS score showed a higher correction with interpersonal problems (r=0.567, p<0.01) than with mental symptoms (r=0.467, p<0.01).

Table 2: Means, standard deviation and correlation main variables (n=1238).

	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1	ASLEC	—											
2	Interpersonal relationship factor	0.48**	—										
3	Learning pressure factor	0.61**	0.25**	—									
4	Punishment factor	0.86**	0.31**	0.49**	—								
5	Loss factor	0.74**	0.27**	0.36**	0.63**	—							
6	Health adaptation factor	0.81**	0.29**	0.45**	0.68**	0.54**	—						
7	Other factors	0.65**	0.26**	0.35**	0.60**	0.44**	0.51**	—					
8	MVQ	0.41**	0.18**	0.29**	0.28**	0.22**	0.41**	0.26**	—				
9	Mental symptoms	0.34**	0.15**	0.22**	0.24**	0.17**	0.36**	0.22**	0.93**	—			
10	Psychosomatic symptoms	0.36**	0.15**	0.34**	0.23**	0.18**	0.35**	0.17**	0.77**	0.60**	—		
11	Interpersonal	0.38**	0.14**	0.30**	0.23**	0.20**	0.37**	0.19**	0.83**	0.65**	0.89**	—	

	problems											
12	IAS	0.42**	0.18**	0.30**	0.28**	0.21**	0.43**	0.21**	0.55**	0.47**	0.51**	0.58	—
	Means	63.94	14.7	13.61	14.69	7.17	7.75	7.61	46.58	17.72	12.62	12.31	34.95
	Standard deviation	19.06	4.53	3.9	6.85	3.76	3.02	2.49	13.13	5.54	3.42	3.46	9.59

Note: MVQ: Mental Vulnerability Questionnaire; ASLEC: Adolescent Self-Rating Life Events Check List; IAS: Interaction Anxiousness Scale; *P<0.05; **P<0.01

Multiple regression analyses

As shown in Table 3, Model I (F=39.179, p<0.001, R^2=0.217) accounted for a significant portion of the variance in interaction anxiousness. This indicated that these sociodemographic variables could explain 21.7% of the variation in interaction anxiousness. Without controlling for the influence of the mediators, only gender and number of children had significant effect on interaction anxiousness. When life events dimensions as independent variable were added in Model II (F=57.917, p<0.001, R^2=0.315) on the basis of Model I. Newly added independent variables explained 9.8% of interaction anxiousness. Model III (F=86.635, p<0.001, R^2=0.432) with mental vulnerability dimensions added in the multiple linear regression accounted for 43.2% variance of interaction anxiousness, a total of 11.7% of which was explained by these additional variables.

Table 3: Results of the multiple regression analysis by building progressive models with the interaction anxiousness as the dependent variable.

	Variables	B (SE)	Beta	t	P	F value	Adjusted R^2
Model I	Gender	3.103 (0.558)	0.145	5.556	0	39.179**	0.217
	Grade	-2.733 (0.252)	-0.288	-10.833	0		
	Number of children	2.629 (0.496)	0.137	5.306	0		
	Student cadre	0.644 (0.519)	0.032	1.241	0.215		
	Family atmosphere	2.995 (1.067)	0.075	2.808	0.005		
	Family nature	0.423 (0.820)	0.014	0.516	0.606		
	Scholarship	-1.030 (0.495)	-0.054	-2.081	0.036		
	General health problems	0.291 (0.119)	0.062	2.450	0.014		
	Medical history	2.257 (0.153)	0.381	14.768	0		

Model II	Gender	4.370 (0.531)	0.205	8.228	0	57.917**	0.315
	Grade	-1.850 (0.245)	-0.195	-7.543	0		
	Number of children	1.840 (0.467)	0.096	3.938	0		
	Student cadre	0.329 (0.486)	0.016	0.677	0.499		
	Family atmosphere	1.695 (1.003)	0.042	1.690	0.091		
	Family nature	0.628 (0.768)	0.020	0.818	0.413		
	Scholarship	-0.740 (0.464)	-0.039	-1.596	0.111		
	General health problems	0.198 (0.111)	0.042	1.776	0.076		
	Medical history	1.854 (0.146)	0.313	12.684	0		
	ASLEC	0.173 (0.013)	0.344	13.276	0		
Model III	Gender	2.983 (0.491)	0.140	6.073	0	86.635**	0.432
	Grade	-1.500 (0.224)	-0.158	-6.688	0		
	Number of children	1.031 (0.429)	0.054	2.406	0.016		
	Student cadre	0.652 (0.443)	0.032	1.473	0.141		
	Family atmosphere	-0.247 (0.921)	-0.006	-0.269	0.788		
	Family nature	-0.906 (0.705)	-0.029	-1.284	0.199		
	Scholarship	-0.348 (0.423)	-0.018	-0.824	0.41		
	General health problems	-0.130 (0.103)	-0.028	-1.253	0.21		
	Medical history	1.554 (0.134)	0.263	11.566	0		
	ASLEC	0.100 (0.013)	0.198	7.837	0		
	MVQ	0.296 (0.019)	0.405	15.946	0		

Note: Sociodemographic variables were entered as categorical variables, which was entered as a continuous variable; Gender (1: Male, 2: Female); Grade (1: Freshman, 2: Sophomore, 3: Junior, 4: Senior); Number of children (1: 1, 2: >1); Student cadre (1: Yes, 2: No); Family atmosphere (1: Harmony, 2: Inharmony); Family nature (1: Single parent family, 2: Non-single parent family); Scholarship (1: Yes, 2: No); General health problems (1: No, 2: Migraine, 3: Allergic rhinitis, 4: Asthma, 5: Hypertension, 6: Diabetes, 7: Others); Medical history (1: No, 2: Anti-anxiety medications, 3: Depressant, 4: Hypnotic, 5: Analgesic); **P<0.01

Structural equation modeling

As seen in Figure 1, all factor-loading parameters reached significance in the negative life events (0.41~0.87) and the mental vulnerability (0.66~0.98), the goodness of fit index indicates that the fitting effect between the model and the data is good: χ^2/df=8.103, CFI=0.962, GFI=0.958, NFI=0.957, IFI=0.962, RMSEA=0.076. The structural equation modeling explained 13% of the variance in mental vulnerability and 38% of the variance in interaction anxiousness according to the estimated squared multiple correlations. As seen in Table 4, negative life events had a significant direct effect on interaction anxiousness and mental vulnerability. Meanwhile, mental vulnerability had a significant direct effect on interaction anxiousness. The lower and upper values of the 95% confidence interval for the indirect effects did not include zero, demonstrating that these indirect effects were significant. The effect of mental vulnerability in the relationship between life events and the interaction anxiousness were partially supported. This indicated that 45.4% (0.177/0.390) of the variance in interaction anxiousness was produced by mental vulnerability as a mediator.

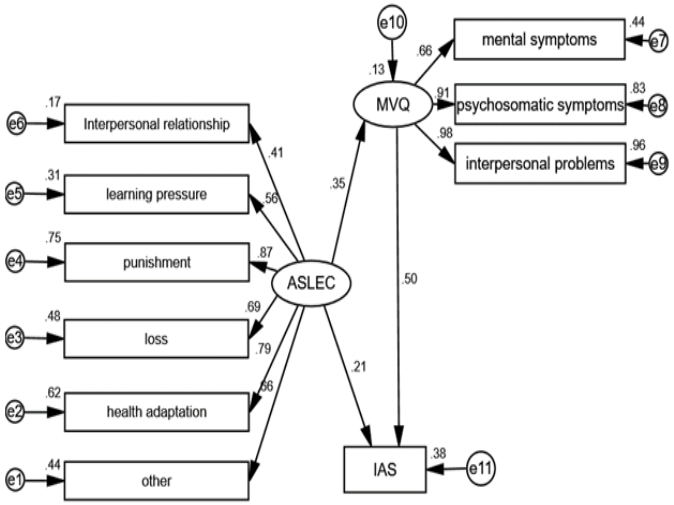

Figure 1: The mediating effect model of psychological vulnerability. **Note:** The data in the figure are standardized path coefficients and e1-e11 are resists.

Table 4: Results for the total, indirect and direct effects of mental vulnerability on interaction anxiousness severity with life events as mediator.

Model pathways			Point estimate	SE	95% CI
Total effect					
Life events	Interaction anxiousness		0.39	0.027	(0.335, 0.439)
Direct effect					
Life events	Mental vulnerability		0.351	0.031	(0.290, 0.411)
Mental vulnerability	Interaction anxiousness		0.504	0.028	(0.446, 0.557)
Life events	Interaction anxiousness		0.213	0.028	(0.156, 0.266)
Indirect effect					
Life events	Mental vulnerability	Interaction anxiousness	0.177	0.02	(0.140, 0.219)

Note: ASLEC: Adolescent Self-Rating Life Events Check List; IAS: Interaction Anxiousness Scale; MVQ: Mental Vulnerability Questionnaire; CI: Confidence Interval

DISCUSSION

There is an increasing prevalence of mental health problems among university student populations, medical students experience higher levels of emotional and psychiatric disorders [17]. Through this study, we have a new understanding of the influencing factors of social anxiety among medical students.

The results show that social anxiety scores of college students in Liaoning province are generally high, this indicates the

importance of early intervention to most medical students with interaction anxiety.

Looking back at some of the studies that have been done, there is a high correlation between negative life events and interaction anxiousness, the positive predictive effect of negative life events on interaction anxiousness has been supported by numerous studies. Meanwhile, it is worth noting that in correlation analysis, two dimensions of negative life events were significant positive associated with interaction anxiousness (*i.e.*, health adaptation factor, learning pressure factor). We cannot help but speculate that controlling the influence of negative life events in two dimensions can alleviate the negative impact of interaction anxiousness on medical college students.

Results of model II showed that three dimensions of mental vulnerability all had a significant impact on interaction anxiousness under the control of sociodemographic variables. After the mental vulnerability variables were included in model III, only psychosomatic symptoms and interpersonal problems among them were significant predictors of interaction anxiousness. This is partially consistent with Xie, et al. and Fan, et al. who demonstrated that college students are troubled by interaction anxiousness in their interpersonal relationship, interpersonal problems is still one of the important causes of psychological problems among college students, which more likely to happen when people are afraid of being excluded or isolated [18,19].

According to the goodness-of-fit indexes, the structural equation modeling analysis of the effect of negative life events on interaction anxiousness with mental vulnerability as a mediator indicated that is consistent with the hypothesis model. This indicates the higher level of negative life events you perceive, the worse the mental vulnerability you report, the more serious the interaction anxiety. The results of this study will help to test the validity of the process model that links negative life events with interaction anxiety through mental vulnerability may play an intermediary role between negative life events and interaction anxiousness. This study did not discuss the influence of other factors and the follow-up study can further improve the research method and discuss the influencing factors in-depth way. Its cross-sectional and correlational design limits the ability to draw any causal inferences [20].

CONCLUSION

In conclusion, mental vulnerability play a partial mediating role in negative life events and interaction anxiousness. However, longitudinal research is needed to confirm these findings. It is particularly important to expand the construction of mental health team in colleges and change the previous education mode of remedial mental health. The mental health of undergraduate students should attract more attention of education workers and medical workers. For mental health professionals, when making decisions to reduce undergraduate students' interaction anxiousness, more attention should be paid to students who are mentally vulnerable or have experienced negative life events.

LIMITATIONS

The selected samples have a few limitations, only three schools in one province were selected for the survey, in future studies, the sample coverage should be expanded to take into account the adaptability of different target groups.

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DISCLOSURE

The authors report no conflicts of interest in this work.

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