

The Effect of Trait Anxiety on Medical Freshmen's Post-Traumatic Growth: The Mediating Role of Resilience

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Abstract

Trait anxiety is a risk factor for post-traumatic growth when medical freshmen are experiencing stressful events. However, little is known about whether resilience has the mediating role between trait anxiety and post-traumatic growth. The current study surveyed the Post Traumatic Growth Inventory (PTGI), Self-rating Depression Scale (SDS), the State-Trait Anxiety Inventory (STAI) and the Connor-Davidson Resilience Scale (CD-RISC) in a sample of 295 medical freshmen. The results founded that post-traumatic growth was negatively correlated with trait anxiety, with correlation coefficients of -0.609 ($p < 0.01$), and positively correlated with resilience, with correlation coefficient of 0.635 ($p < 0.01$). Moreover, resilience could mediate the relationship between trait anxiety and post-traumatic growth. These findings provide theoretical implications to promote medical freshmen's resilience to adapt to their life of college.

1. Introduction

It is widely known that trait anxiety is a risk factor for the development of anxiety-related psychopathology [1, 2]. Individuals with high trait anxiety are more susceptible to heightened subjective estimates or feelings towards uncertainty about a potential threat. Previous studies reported that medical students are faced with multiple challenges such as academic pressure and interpersonal distress [3, 4]. These challenges bring about much higher prevalence of emotional problems and somatic symptoms compared to their peers [5]. Especially for the first-year medical students with trait anxiety are quite vulnerable to stress-related mental problems, because the maladjusted environment and overburdened study-related tasks make them at greater risk of experiencing anxiety [6].

Although, the negative effect of trait anxiety on medical freshmen warrants greater attention to its significant implications, the students' potentials to deal with difficulties should also be taken into account. Actually, most people that face stressful events do not present any mental disorder but show much growth [7], who may find many benefits and experience growth from these stressful events. Post-traumatic growth (PTG) is known as an important concept in positive psychology. It is theorized to be facilitated by engagement in cognitive processing, emotional coping and disclosure, resulting in beneficial changes in self-perception, external relationships, and philosophy on life [8]. The positive changes after experiencing stress events, including increasing personal strength, identifying new possibilities, increasing enjoyment of life, improving interpersonal relationships and positive mental changes, and these changes could be consistently found across different types of trauma [9, 10]. It should be noted that PTG is not a return to baseline following trauma exposure, but rather it could create an increased appreciation for life in general, more meaningful interpersonal relationships, an increased sense of personal strength, changed priorities, and a richer existential and spiritual life [11].

When in a new circumstance, medical freshmen may experience anxiety because of uncertainty, but it is also worth noted that Kalin pointed out the positive accent of anxiety, in which its higher level may bring about a higher possibility of revealing a person's potential goal [12]. Substantial evidence suggests that resilience has protective effects on mental health. Resilience is confirmed as a crucial mediator of the

relationship of clinical practice-related stress with depression and anxiety in nurse students [13, 14]. Resilient students with greater positivity could view situations in a better light to struggle with adversity successfully, and finally get the growth after stress [15]. However, it is still unclear how resilience plays a role in trait anxiety and PTG of medical freshmen.

Based on the literature discussed above, the present study aimed to assess the relationships of trait anxiety, resilience and PTG of the medical freshmen, and examine the mediating role of resilience between trait anxiety and PTG. A more thorough understanding of the mechanism of PTG in medical students has important implications for intervention to improve mental health.

2. Methods

2.1 Participants and procedures

295 freshmen were randomly recruited from a military medical university in Chongqing China. They were introduced the purpose the survey with unified instructions by two psychological professionals, and were required to complete the test independently. This survey packet comprised Post Traumatic Growth Inventory, State-Trait Anxiety Inventory and Connor-Davidson Resilience Scale, and sociodemographic information including name, gender and age. Data were collected in August 2019 online. 295 questionnaires were distributed and 295 valid questionnaires were collected. The effective response rate was 100%, including 133 males (45.1%) and 162 females (54.9%). The ratio of male to female was about 0.82:1, with an average age of 19.12 (SD=0.68). This cross-sectional study was approved by the Ethical Committee of Army Military Medical University.

2.2 Measures

2.2.1 Post-traumatic growth

Post Traumatic Growth Inventory (PTGI) is a 21-item measure assessing individuals' post-traumatic growth. The original PTGI was developed by Tedeschi and Calhoun including five subscales of relating to others, new possibilities, personal strength, appreciation of life, and spiritual change [16]. As none of the students in this sample is religious, the two items of spiritual change subscale were omitted in the Chinese version of PTGI. The final version of the PTGI consisted of 19 items with 4 subscales. Each item is rated from 0 (*I did not experience this change as a result of my crisis*) to 5 (*I experienced this change to a very great degree as a result of my crisis*), with high total score indicating high level of growth after stress. This inventory has been proved to possess good psychometric properties in populations in many countries [17, 18]. In this study, the internal consistency of the scale was 0.907.

2.2.2 State-Trait Anxiety

The State-Trait Anxiety Inventory (STAI) is conducted to assess individuals' state and trait anxiety [19]. The scale consists of 40 items, divided into 20 items that refer to state anxiety (STAI-S) and 20 items that refer to trait anxiety (STAI-T). In this study, we only focus on the STAI-T. The STAI-T is administered to

evaluate stable and longstanding anxiety, and each item is scored on a 4-point Likert ranging from 1 (*almost never*) to 4 (*almost always*). The higher the score indicates greater trait anxiety. The internal consistency coefficient of STAI-T was 0.798 in this study.

2.2.3 Resilience

The Connor-Davidson Resilience Scale (CD-RISC) is used to evaluate individuals' ability to successfully cope with adversity or difficulties [20]. The scale includes 25 items, and respondents endorsed each item on a 5-point Likert from 0 (*not true at all*) to 4 (*true nearly all of the time*). The total score of the scale range from 0 to 100, with higher score reflecting better resilience. Due to the translation and revision of Yu and Zhang [21], the Chinese version of the scale is well documented and demonstrated good reliability and validity. In this study, the internal consistency coefficient of the scale was 0.904.

2.3 Data analyses

SPSS 22.0 and PROCESS 3.3 were carried out to perform statistical analysis on the data. Pearson correlation analysis and multiple regression analysis were applied to examine the effects of each variable on PTG. The PROCESS version 3.3 (Model 4) developed by Hayes [22] was used for to examine the mediating role of resilience between anxiety and PTG. 5000 bootstrap samples with retraction were drawn to obtain a 95% confidence interval of the mediating effect value. If the upper and lower limits of the interval do not include 0, the mediating effect reaches statistical significance [23].

3. Results

3.1 Descriptive statistics and inter-correlations among main variables

The means and standard deviations ($M \pm SD$) of trait anxiety, resilience and PTG were 41.79 ± 7.24 , 69.83 ± 12.37 , 69.26 ± 17.31 . The mean score of males' PTG was $71.62 (SD=17.28)$ and that of females' was $67.33 (SD=17.14)$. Comparing to the female medical fresh students, the males' PTG is significantly higher than females' ($t= 2.13, p<0.05$). Additionally, PTG was found to be significantly and negatively correlated with trait anxiety ($r=-0.462, p<0.01$), but positively correlated with resilience ($r=0.635, p<0.01$). See Table 1 for details.

Table 1
Descriptive statistics and inter-correlations between variables
(N=295)

Variables	Mean	SD	1	2	3
1. trait anxiety	41.79	7.24	-		
2. resilience	69.83	12.37	-0.609**	-	
3. PTG	69.26	17.31	-0.462**	0.635**	-
<i>Note.</i> ** $p < 0.01$					

3. 2 Mediating effect of resilience in the relationship of trait anxiety and PTG

The mediating analysis of resilience on the association between trait anxiety and PTG is illustrated in Fig. 1. Trait anxiety was negatively associated with resilience ($a = -0.609$, $p < 0.01$) (a path). Resilience was positively associated with PTG ($b = 0.562$, $p < 0.01$). The result indicated that with the mediator (c path), trait anxiety was negatively associated with PTG ($c' = -0.120$, $p < 0.01$). Because the a and b paths were significant, the mediation analysis was performed using bootstrapping methods with bias-corrected confidence estimates. In the present study, the 95% CI of the indirect effect was obtained through 5000 bootstrap resampling to refine the mediating effects and provides higher accuracy power [24, 25]. The indirect effect was $ab = -0.343$; 95% CI = [-0.434, -0.261]. Empirical 95% CI didn't consist of zero, indicating that resilience was the path through which trait anxiety could influence PTG when controlling for age (see Table 2). The direct effect size was -0.120, and the mediation effect was -0.343, accounting for 25.92% and 74.08% of the total effect, respectively. Altogether, the model accounted for 74.24% of the total variance of PTG.

Table 2
Indirect effect of resilience between trait anxiety and PTG

Variables			Mediation testing		
Independent(X)	Mediating(M)	Dependent(Y)	Indirect effect	95%CI ^a	
				Lower	Upper
Trait anxiety	Resilience	PTG	-0.343	-0.434	-0.261
<i>Note.</i> ^a CI, confidence interval.					

4. Discussion

The current study examined whether resilience acted as a mediator in the association between trait anxiety and PTG of medical freshmen. The results demonstrated that resilience had mediating effects between trait anxiety and PTG.

Medical education is considered to be one of the most stressful training programs out of any profession, especially in the first year [26]. Stressful events such as interpersonal relationship and overloaded academics could cause negative effects on the students' psychological well-being [27]. Individuals with high trait anxiety are more susceptible to stress [28]. However, in our study we found medical students with trait anxiety had different degree of PTG. Most of the freshmen began to show resilience, which is the adaptive ability to maintain mental health despite adversity and stressful events. More importantly, they believed that the academy life had made them obtain comprehensive growth how they are affected by moderate anxiety. Moreover, in this study gender differences were observed in PTG. Compared to the female medical fresh students, the males' PTG is significantly higher than females'. The results are consistent with previous studies that females were experiencing more severe stress and anxiety symptoms, while males showed better resilience to stress [29, 30].

Our study also found PTG was negatively related with trait anxiety and positively with resilience, and the association between anxiety and PTG was mediated by resilience. That is, PTG was not directly influenced by trait anxiety, but indirectly through resilience. This was in line with the mixed model of PTG proposed by Tedeschi and Calhoun [31], indicating that an individual's temperamental vulnerability such as trait anxiety combined with pretrauma characteristics, the nature of the traumatic event (e.g., prolonged exposure to the trauma), and coping processes influence the development of PTG. Although trait anxiety was a risk factor for PTG [32], but according to Connor and Davidson, resilience is defined as a constellation of personal characteristics (i.e., optimism, hardiness, strong self-esteem, and positive affects) and cognitive characteristics to reframe the stressor to emphasize positives of the situation as a coping strategy being positively associated with PTG [33, 34]. The current result suggested that resilience had a mediating role between trait anxiety and PTG. The possible explanation is that anxious medical freshmen with high resilience can reconstruct the meaning of adversity and give it a new and positive value. As an individual's ability to deal with frustration and stress and recover mental health, the higher the level of resilience, the better it is to adjust negative emotions, and could adopt cognitive reappraisal strategy to make them get more growth after encountering stressful events [35].

Several limitations of the present study need to be mentioned. First, the pertinent variables (trait anxiety, resilience, and PTG) were measured with self-report questionnaires. The relations among the three constructs might have been impacted by common method variance [36]. Second, other unmeasured variables (e.g., social support, coping style) that likely affect PTG were not included in the current study. Therefore, future studies should consider these variables to verify whether these dimensions influence on trait anxiety and PTG. Finally, the study relied on cross-sectional self-report data with Chinese medical freshmen, which limited our capacity to make causal statements and the generalizability of the results.

Notwithstanding these limitations, the current study contribute to our knowledge concerning the linkages among trait anxiety, resilience and PTG. Specifically, the finding of the mediating role of resilience between trait anxiety and PTG suggests that resilience may be considered as a useful intervening target for psychological service providers to enhance medical freshmen's PTG in a stressful context. Further studies are required to determine the efficacy of resilience-building interventions in medical freshmen.

Declarations

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References

1. Heeren A, Bernstein EE, McNally RJ. Deconstructing trait anxiety: a network perspective. *Anxiety Stress Coping*. 2018; 31(3):262–76.
2. Reiss S. Trait anxiety: it's not what you think it is. *J Anxiety Disord*. 1997; 11(2):201–14.
3. Quek TT, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS, Ho RC. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health*. 2019; 16(15):2735.
4. Hope V, Henderson M. Medical student depression, anxiety and distress outside North America: a systematic review. *Med Educ*. 2014; 48(10):963–79.
5. Saadi TA, Addeen SZ, Turk T, Abbas F, Alkhatib M. Psychological distress among medical students in conflicts: a cross-sectional study from Syria. *BMC Med Educ*. 2017; 17(1):173.
6. Iorga M, Dondas C, Zugun-Eloae C. Depressed as Freshmen, Stressed as Seniors: The Relationship between Depression, Perceived Stress and Academic Results among Medical Students. *Behav Sci (Basel)*. 2018; 8(8):70.
7. Kaye-Kauderer HP, Levine J, Takeguchi Y, Machida M, Sekine H, Taku K, et al. Post-Traumatic Growth and Resilience Among Medical Students After the March 2011 Disaster in Fukushima, Japan. *Psychiatr Q*. 2019; 90(3):507–18.
8. Magne H, Jaafari N, Voyer M. La croissance post-traumatique: un concept méconnu de la psychiatrie française [Post-traumatic growth: Some conceptual considerations]. *Encephale*. 2021; 47(2):143–50.
9. Habib A, Stevelink SAM, Greenberg N, Williamson V. Post-traumatic growth in (ex-) military personnel: review and qualitative synthesis. *Occup Med (Lond)*. 2018; 68(9):617–25.
10. Jayawickreme E, Infurna FJ, Alajak K, Blackie LER, Chopik WJ, Chung JM, et al. Post-traumatic growth as positive personality change: Challenges, opportunities, and recommendations. *J Pers*. 2021; 89(1):145–65.
11. Tang W, Wang Y, Lu L, Lu Y, Xu J. Post-traumatic growth among 5195 adolescents at 8.5 years after exposure to the Wenchuan earthquake: Roles of post-traumatic stress disorder and self-esteem. *J Health Psychol*. 2021; 26(13):2450–59.
12. Kalin NH. Novel Insights Into Pathological Anxiety and Anxiety-Related Disorders. *Am J Psychiatry*. 2020; 177(3):187–89.

13. Bacchi S, Licinio J. Resilience and Psychological Distress in Psychology and Medical Students. *Acad Psychiatry*. 2017; 41(2):185–88.
14. Devi HM, Purborini N, Chang HJ. Mediating effect of resilience on association among stress, depression, and anxiety in Indonesian nursing students. *J Prof Nurs*. 2021; 37(4):706–13.
15. Peng L, Cao HW, Yu Y, Li M. Resilience and Cognitive Bias in Chinese Male Medical Freshmen. *Front Psychiatry*. 2017; 8:158.
16. Tedeschi RG, Calhoun LG. The post-traumatic growth inventory: measuring the positive legacy of trauma. *J Trauma Stress*, 1996; 9(3): 455–71.
17. Tedeschi RG, Cann A, Taku K, Senol-Durak E, Calhoun LG. The Posttraumatic Growth Inventory: A Revision Integrating Existential and Spiritual Change. *J Trauma Stress*. 2017; 30(1):11–18.
18. Taku K, Calhoun LG, Tedeschi RG, Gil-Rivas V, Kilmer RP, Cann A. Examining posttraumatic growth among Japanese university students. *Anxiety Stress Coping*. 2007; 20(4):353–67.
19. Knowles KA, Olatunji BO. Specificity of trait anxiety in anxiety and depression: Meta-analysis of the State-Trait Anxiety Inventory. *Clin Psychol Rev*. 2020; 82:101928.
20. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depress Anxiety*. 2003; 18(2):76–82.
21. Yu XN, Zhang JX. Factor analysis and psychometric evaluation of the Connor-Davidson resilience scale (CD-RISC) with Chinese people. *Soc Behav Personal*, 2007; 35(1):19–30.
22. Hayes, AF. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications. 2017.
23. Preacher KJ, Hayes AF. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behav Res Methods Instrum Comput*, 2004; 36(4): 717–31.
24. Levy JA, Landerman LR, Davis LL. Advances in mediation analysis can facilitate nursing research. *Nurs Res*, 2011; 60(5): 333.
25. Rucker DD, Preacher KJ, Tormala ZL, Petty RE. Mediation analysis in social psychology: Current practices and new recommendations. *Soc Pers Psychol Compass*, 2011; 5(6), 359–71.
26. Xu YY, Wu T, Yu YJ, Li M. A randomized controlled trial of well-being therapy to promote adaptation and alleviate emotional distress among medical freshmen. *BMC Med Educ*. 2019; 19(1):182.
27. Farrell SM, Kadhum M, Lewis T, Singh G, Penzenstadler L, Molodynski A. Wellbeing and burnout amongst medical students in England. *Int Rev Psychiatry*. 2019; 31(7-8):579–83.
28. Quek TT, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS, Ho RC. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health*. 2019; 16(15):2735.
29. Hou F, Bi F, Jiao R, Luo D, Song K. Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China: a cross-sectional study. *BMC Public Health*. 2020; 20(1):1648.
30. Barnett MD, Maciel IV, Johnson DM, Ciepluch I. Social Anxiety and Perceived Social Support: Gender Differences and the Mediating Role of Communication Styles. *Psychol Rep*. 2021; 124(1):70–87.

31. Tedeschi RG, Calhoun LG. Post-traumatic growth: Conceptual foundations and empirical evidence. *Psychol Inq.* 2004; 15:1–18.
32. Kazak AE, Barakat LP, Meeske K, Christakis D, Meadows AT, Casey R, Stuber ML. Posttraumatic stress, family functioning, and social support in survivors of childhood leukemia and their mothers and fathers. *J Consult Clin Psych.* 1997; 65:120–29.
33. Garnefski N, Kraaij V, Schroevers MJ, Somsen GA. Post-traumatic growth after a myocardial infarction: a matter of personality, psychological health, or cognitive coping? *J Clin Psychol Med Settings.* 2008; 15(4):270–7.
34. Habib A, Stevelink SAM, Greenberg N, Williamson V. Post-traumatic growth in (ex-) military personnel: review and qualitative synthesis. *Occup Med (Lond).* 2018; 68(9):617–25.
35. Bacchi S, Licinio J. Resilience and Psychological Distress in Psychology and Medical Students. *Acad Psychiatry.* 2017; 41(2):185–88.
36. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol.* 2003; 88(5):879–903.

Figures

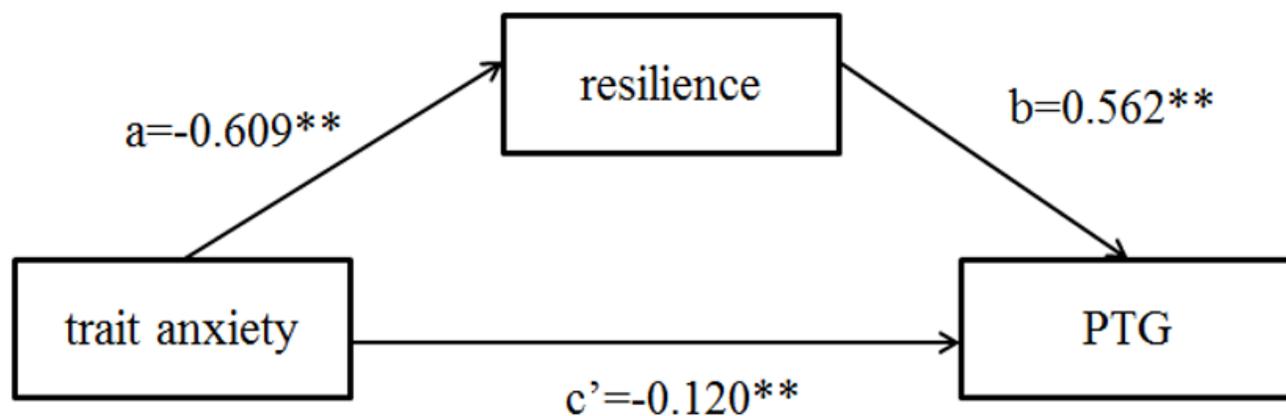


Figure 1

Mediation model examining the indirect relationship between trait anxiety and PTG through resilience. $^{**}p < 0.01$.