

Posttraumatic Growth in Fresh Medical Cadets after Military Training and its Influencing Factors

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Abstract

This study explored the relationships among resilience, emotion regulation, positive and negative emotion, cognitive reappraisal, and posttraumatic growth in the military training situation. The role of resilience as a potential mediator was also assessed. Three hundred and seventy eight students from one military medical university who just finished one-month military training completed Connor-Davidson resilience questionnaire (CD-RISC), posttraumatic growth inventory (PTGI), emotion regulation scale (ERS), positive and negative affect scale (PANAS), and emotion regulation questionnaire (ERQ). It was found that posttraumatic growth had significant positive correlations with resilience, inhibition adjustment, abreaction adjustment, positive emotion, and cognitive reappraisal, and had negative correlation with negative emotion. Resilience, inhibition adjustment, positive emotion, and cognitive reappraisal could significantly predict the level of posttraumatic growth (explaining 53% of the total variance). Resilience partially mediated the associations of positive emotion; inhibit adjustment, cognitive reappraisal, and posttraumatic growth. In conclusion, it could increase the level of cadets' PTG by resilience, positive and negative emotion, emotion regulation and cognitive reappraisal, and it would be proved that the resilience control the effective of positive and negative emotion, emotion regulation and cognitive reappraisal to PTG.

Keywords: Posttraumatic growth; Emotion; Resilience; Fresh medical cadets

Introduction

Military training is a physical and psychological ordeal for army recruits, which aims to consolidate and reinforce the physical abilities and military skills in one quarter. As one of the most important parts of cultivation of military strategic forces, Chinese Recruits Training (CRT) is a process which can transform civilians into soldiers through a series of physical exercise and military skills, and it's generally finished in one month for medical cadets. The course of CRT is strict and diversified for medical cadets who just graduated from high school. During the period of CRT, medical cadets learn about the physically related skills, mental stress training and military skills, such as developing new interpersonal relationships, adapting to strict military regiments, and strenuous training, as well as the rapid role transition in just one month. Above all, some cadets always respond stress and maladjustment during CRT [1,2]. A majority of these cadets are maladjusted about the military management, such as completing personal hygiene, the team cooperation consciousness, a wide variety of courses, the difficult living environment, and finishing the task in time. Mild maladjustment will lead to depression, anxiety, and other psychological problems, while severe maladjustment makes non-combat depletion of numbers in the armed forces [3]. Depression and anxiety always make recruits have more difficulties in completing the tasks, and those recruits who feel anxious and depressed are more likely to report negative emotions, which led to recruits develop more post-traumatic stress disorder (PTSD) and less post-traumatic growth (PTG) [4]. In contrast, recruits who have more positive emotions developed more PTG [5]. Meanwhile, according to this phenomenon, the psychologists can establish a more suitable health guideline for cadets and build a comfortable mental environment basic on the decreasing the cadets' psychological problems.

PTG is the positive psychological change experienced as a result of the struggle with trauma [6,7] and it is also defined as a transformative quality of which emphasizes responding to highly stressful or traumatic

events. It is widely recognized that most individuals reported the positive change following a traumatic event. Recently, some researchers have support that the PTG is developed after the majority of trauma, instead of the PTSD [8,9]. More-often, the individuals exposed to repeated or extreme indirect trauma also can experience PTG in some circumstances, for example, when their family members of soldiers were on service [10] or with serious illness [11,12] counselors and therapists or even people who watched the traumatic event on TV [13]. The recruits are allowed active in barracks for little private time. The real influences of the trauma for recruits are reflected in many aspects. The most common stress events, for recruits, are unharmonious interpersonal relations, the contradiction between the work and study, the ability to finish the task in time in CRT. Those high stress events for a majority of recruits finally led to experience the PTG [14].

Resilience is the absence of psychopathology in the aftermath of exposure to potentially traumatic events [15,16]. In recently years, previous studies have shown that resilience has a moderating effect on the association between negative life events and mental health problems [17-19]. Recruits with high resilience can generally maintain mental health when they encounter negative events [20]. It is generally believed that high-resilience individuals are good at dealing with the traumatic events [21]. Resilience is therefore associated with fewer PTSD symptoms [22,23] and most individuals reported personal growths

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after traumatic exposure [24,25]. Some researchers have shown that the Penn Resilience Program (PRP) can increase the leave resilience of participants [21], and the Military Resilience Trainer (MRT) is applied to American army in order to increase the level of soldiers' resilience [18]. It is shown that the high-resilience recruits wouldn't feel nervous or anxious when they experienced traumatic events regularly. Nowadays, resilience is regarded as a good tool for measurement of recruits' mental health, and high-resilience individuals are recruited to join in the army.

Emotion regulation, defined as how individuals influence the onset, course, and experience of their emotions, has been proven to be effective against emotional disorders following traumatic events [26]. With the emotional disorders, the individuals often respond the negative emotions [27,28]. Previous research has indicated that the individuals who have emotional disorders usually showed the negative emotions such as depression and anxiety [27,29,30]. Clark and Watson emphasized the meaning of positive emotions could mitigate negative effects of depression or anxiety, and some researchers also prove positive emotions have important influence in the individuals' behavior and mind [31,32]. This positive emotion has benefit effect on emotion health [33,34] and functional for individual [35]. In recent research, high-resilience individuals often respond positive emotion after traumatic events and it is also proved that, in the camp environment, high-resilience individuals are adapt well [2,21].

Previous studies found that high-resilience students usually adapt well through abreaction adjustment after traumatic events and it was also proved that positive emotions could predict resilience and life satisfaction. Similarly, another study indicated that high-resilience students always experienced PTG after stressful events and resilience could reduce the effect of stress [2]. However, to the best of our knowledge, management of emotional distress allows for more constructive cognitive processing of the complicated consequences of trauma experience, and it would be conducive to individual positive emotion and cognition [7]. It is a pity that no reports exist regarding the recruits' relationships between PTG and emotion in previous studies, let alone the relationship between PTG and negative emotion in the field of military training.

To sum up, the aims of our study are threefold. First, this study will describe the some protective factors for increase the recruits' post-traumatic growth after CRT. Second, we will expound the relationships among PTG, resilience, negative emotion, positive emotion, inhibit adjustment and abreaction adjustment. Third, the study intends to identify the possible mediating role of positive coping in the effects of resilience, positive emotion, inhibit adjustment, and cognitive reappraisal on PTG. Based on empirical and theoretical evidence, we hypothesized that (1) The posttraumatic growth of the recruits should have positive correlations with resilience, inhibition adjustment, abreaction adjustment, positive emotion and cognitive reappraisal, and have negative correlations with negative emotion. (2) The resilience, inhibition adjustment, positive emotion and cognitive reappraisal of the students can predict with the level of posttraumatic growth. (3) Resilience will mediate the impacts of positive emotion, inhibit adjustment, and cognitive reappraisal on PTG.

Methods

Participants

A cross-sectional investigation was conducted in a cluster sample of 400 participants who came from a military medical university, and the total of 378 cadets (75 females and 303 males) completed the whole

questionnaire after one-month military training in 2013, a response rate of 93.75%. The participants were high school graduates with an average age of 18 years (SD=0.8).

Measures

Self-report instruments were used in this study, including the Posttraumatic Growth Inventory (PTGI), the Connor-Davidson Resilience Scale (CD-RISC), the Emotion Regulation Scale (ERS), the Positive and Negative Affect Schedule (PANAS), the Cognitive Reappraisal Subscale of Emotion Regulation Questionnaire (ERQ), and a background survey such as age, gender, nationality, place of birth abroad.

Resilience: The 25-item Connor-Davidson Resilience Scale (CD-RISC) measures resilience [22]. Item responses are rated on a five-point scale (from 1=not true at all, to 5=true nearly all the time). It has a good reliability and validity in chinese medical students, with an internal consistency coefficient of .90 [36].

Posttraumatic growth: The Posttraumatic Growth Inventory [37] which is translated into Chinese version [38] reflects growth-related change after the traumatic event. Item responses are rated on a six-point Likert scale from 0=I never experience this change as a result of the traumatic event, to 5=I experienced this change to a very great degree as a result of the traumatic event [39]. The 21-item scale divided into 5 factors, including relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. For the scale in the study, the internal consistency coefficient was .89.

Emotion regulation scale: The Emotion Regulation Scale [40] is made up of 24 items, and responses are rated on four-point scale to assess the decrease and increase of six basic emotions (anger, disgust, interest, happiness, sadness, fear), inside, ignore and suppress reflect antecedent-focused emotion regulation, attention and catharsis reflect response-focused emotion regulation. The internal consistency coefficient of this scale is .85.

Positive and negative affect scale: The Chinese version of the Positive and Negative Affect Scale [41] is composed of 20 adjectives that indicate positive and negative emotions. This scale aims to assess emotions that the subjects experience every day. Responses are given on a scale from 1 (do not feel at all) to 5 (feel strongly). The internal consistency coefficient of the scale is 0.73.

Cognitive reappraisal: The Cognitive Reappraisal Subscale of Emotion Regulation Questionnaire [40] consist of 5 items, and item responses are rated on a seven-point scale from 1= definitely don't agree, to 7=definitely agree. The internal consistency coefficient of the scale is .75.

Procedure

The participants provided verbal and written informed consent to participate in the present study, and this study was approved by the Ethics Committee of the Third Military Medical University. The subjects completed a separate response booklet with structured, anonymous, and self-reported questionnaires after finished one month military training. These questionnaires included Connor-Davidson resilience questionnaire, posttraumatic growth inventory, emotion regulation scale, positive and negative affect scale and emotion regulation questionnaire.

Statistical analysis

All data were analyzed using SPSS 18.0 software and path analyses were estimated in AMOS 17.0. It was conducted to describe the

associations of the study variables by Pearson correlation analysis, the evaluate differences of the main results presented in this study and previously reported results through T-test. Regression analysis was performed to examine the contributions of resilience, positive and negative emotion, inhibition and abreaction adjustment, and cognitive reappraisal to PTG. Effects with $p < .05$ were considered statistically significant.

Results

Correlations among the PTG, resilience, positive and negative emotion, inhibit and vent adjustment, and cognitive reappraisal

The change was calculated by Pearson's correlation, which is the medical recruits' PTG in relationships between the level of PTG after training and other factors, such as resilience, positive and negative emotion, inhibit and vent adjustment and cognitive reappraisal. There were five factors positively associated with PTG, and one factor negatively associated with PTG. They were resilience ($r=0.611, P<0.01$), positive emotion ($r=0.588, P<0.01$), inhibition adjustment ($r=0.309, P<0.01$), abreaction adjustment ($r=0.333, P<0.01$), cognitive reappraisal ($r=0.372, P<0.01$), and negative emotion ($r=-0.204, P<0.05$).

The regression analysis of resilience, positive and negative emotion, inhibition and abreaction adjustment, and cognitive reappraisal to PTG after training

As a number of variables were associated with PTG, a regression analysis was conducted to determine the best predictors. In the regression analysis for PTG, positive and negative emotion, inhibition and abreaction adjustment, and cognitive reappraisal were entered. For PTG, the significant predictors were resilience, positive and negative emotion, inhibition and abreaction adjustment, and cognitive reappraisal to PTG, it's same to correlation analysis, as shown in Table 1.

We examine the research model, position of PTG between resilience, positive emotion, inhibition adjustment, and cognitive reappraisal. The exogenous variables were positive emotion, inhibition adjustment and cognitive reappraisal. The mediating variable was resilience. In the path of PTG had 4 direct paths (positive emotion-PTG, inhibition adjustment-PTG, resilience-PTG, cognitive reappraisal-PTG), as shown in Figure 1. This analysis yielded good adjusted goodness of fit: $\chi^2/df=4.2$. When it isn't more than 5, the model is accepted. And other fit indices are greater than 0.90 by comprehensive examination, the index data domain model is fit well ($p < 0.01$), as shown in Table 2.

Discussion

This study clearly explains the influences of PTG for medical cadets after CRT, and provides several effective scientific evidences in order to improve the level of PTG. And it covers the shortage of the past research which regarding the recruits' relationships between PTG and emotion in previous studies, let alone the relationship between PTG and negative emotion in the field of military training.

The correlations of the PTG and its influencing factors were explored. PTG of the recruits had significant positive correlations with resilience, inhibition adjustment, abreaction adjustment, positive emotion, and cognitive reappraisal, and had negative correlation with negative emotion. And the recruits with high PTGI scores scored significantly higher in resilience, abreaction/inhibition adjustment, positive emotion and cognitive reappraisal than the recruits with lower PTGI scores. The relationships between the PTG, resilience, positive/

	PTGI Total Score (PTG)				
	B	SE(B)	β	T	P
Constant	-46.569	11.230		-4.147	0.000
Resilience	0.596	0.125	0.349	4.755	0.000
Abreaction Adjustment	0.055	0.295	0.013	0.188	0.851
Inhibition Adjustment	1.030	0.286	0.277	3.604	0.000
Positive Emotion	0.789	0.191	0.307	4.130	0.000
Negative Emotion	-0.220	0.238	-0.060	-0.925	0.357
Cognitive Reappraisal	0.525	0.220	0.149	2.389	0.018

Table 1: Regression Analysis in PTG (n=378) 3.3 Path analysis: Examining the role of PTG between resilience, positive emotion, inhibition adjustment, and cognitive reappraisal.

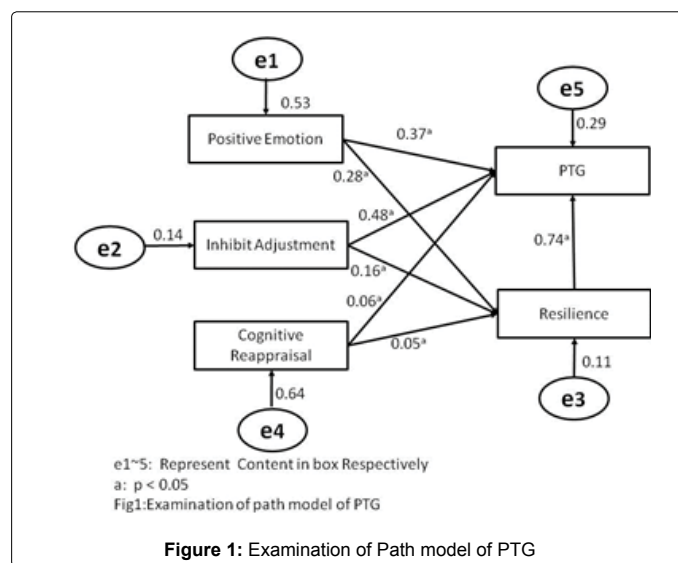


Figure 1: Examination of Path model of PTG

negative emotion and cognitive reappraisal were also proposed by previous researches. But all of researches were take the different crowds as the investigation object, and they just had study on the relationships between two or three factors among above factors-resilience and PTG in Kanako's, positive/negative emotion, and cognitive reappraisal in Jenna's, PTG and positive/negative emotion in Alexandra's. In this study, we have proved the relationships among those factors for recruits are believable, and they would be useful to increase the level of PTG through these factors.

These results suggest that the higher PTGI scores recruits have the higher resilience, and they are better at regulating mood, thinking and behavior, which is consistent with the findings by Hooper, Marotta and Lanthier [42]. The high-resilience recruits have enough endurance to get the positive aspect regularly during experience the traumatic events, and they transform the negative emotion to positive emotion easily. Similarly, the positive emotion led to the recruits chooses the best aspects all the times, and increase the recruits' psychological endurance (resilience) in the end. Finally, it might create a virtuous circle, the high-resilience recruits always feel positive emotion, and positive emotion led to more PTG. Of course, it was also proved by the previous research [43] that PTG is influenced by positive emotion, and it would be an important role in the increasement of PTG.

Resilience, inhibition adjustment, positive emotion and cognitive reappraisal of the recruits could predict their posttraumatic growth (explaining rate 53%). Resilience, inhibition adjustment, positive emotion and cognitive reappraisal could also indirectly affect the

Model	Residual Root Mean Square	Goodness of Fit Index	Adjusted Goodness of Fit Index	Goodness of Fit Index of Simple Effect	Standard Fit Index	Incremental Fit Index	Comparative Fit Index
Default Model	0.055	0.964	0.818	0.193	0.926	0.942	0.940
Saturated Model	0.000	1.000			1.000	1.000	1.000
Independent Model	0.136	0.637	0.456	0.425	0.000	0.000	0.000

Table 2: Fit Indices of PTG Structural Equation Model

posttraumatic growth through resilience. The previous study has similarly indicated that resilience is the predictive variable of PTG [42]. And the positive cognitive reappraisal has effectively predicted on PTG in 12 months [44]. The emotional expression, emotional processing, and positive coping style have also indirectly forecast the PTG [45,46].

Path analysis of this study indicated that resilience, inhibition adjustment, positive emotion, and cognitive reappraisal have direct effects on PTG, meanwhile, the inhibition adjustment, positive emotion, and cognitive reappraisal also have impact on PTG by resilience. The idea that individuals with high-resilience usually use vent adjustment to abreact the emotion rather than inhibition adjustment [47] was not proved in current study. The possible explanation may be the respondents' living environment. In this study, the recruits are recruited from high school graduates, and the unfamiliar military environment usually led them introverted or afraid to communicate with people, and compared with the normal person. The medical military recruits are better at emotion management and coping strategies of cognitive reappraisal [47], therefore, the recruits probably appeared the positive emotion and PTG while facing the traumatic events. In addition, collective administration of military university helps to form a forthright character. This forthright character may be helpful for recruits to vent negative emotion, and the collective consciousness often create a interpersonal circle, the recruits will get some useful advises to overcome the difficulties when they experience the traumatic events.

However, some limitations of this study should be taken into account. First, the current research sample was relatively small. Second, all of participants were come from the same university, and the gender proportion was asymmetry. Third, the current study was based on one month, but the attainment of the PTG needs a long time. By the way, a longitudinal study would be examined the function of PTG and the relationships between the resilience, positive and negative emotion, emotion regulation, cognitive reappraisal, and PTG in the medical military recruits in the future study.

Conclusion

This study explored some influence factors for increase the PTG level, including resilience, inhibit and vent adjustment, emotion regulation and cognitive reappraisal. In addition, the resilience has played a mediating role of positive emotion, inhibit adjustment and cognitive reappraisal on PTG. These findings fills part of percent knowledge gap, and indicate the way to enhance the PTG levels, likes management of emotional distress, Penn Resilience Program (PRP), the Military Resilience Trainer (MRT), and so on. It also provides several effective scientific evidences in order to improve the level of PTG. Meanwhile, the psychologists can establish a more suitable health guideline for cadets and build a comfortable mental environment basic on the decreasing the cadets' psychological problems. The future studies should focus on the way and method to enhance the PTG levels or resilience levels in recruits wildly, like the change of PTG during CRT, or the relationships between PTG and military training intensity, or the effective of the high-level PTG for medical cadets' life.

Competing Interests

None declared.

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