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Application of the Pennsylvania resilience training program on medical students



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ABSTRACT

This study explored the effects of the Penn Resilience Program (PRP) on the positive and negative emotions, emotion regulation style, and resilience among Chinese medical students. Resilience, positive and negative emotions, and emotional regulation styles scores were compared before and after training through a questionnaire survey. (1) The resilience, positive emotion, and cognitive appraisal scores of the low-resilience experimental group increased significantly after training ($P < .05$), whereas their negative emotion and expression suppression scores were significantly decreased ($P < .05$). The positive emotion scores of the high-resilience experimental group increased significantly after training ($P < .05$), whereas its total scores for negative emotion and expression suppression decreased significantly ($P < .05$). (2) No significant changes were found in the resilience, positive emotion, negative emotion, cognitive appraisal, and expression suppression scores of the control group ($P > .05$). PRP could improve the level of resilience and positive emotion for medical students and help them adopt a positive emotion regulation style when facing difficult situations. Our findings laid the groundwork for resilience interventions in the future.

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1. Introduction

Resilience has been a significant research topic since the 1970s, particularly in the field of psychology. It is defined as the capacity to cope effectively with a difficult situation and maintain a healthy disposition in the face of disaster, pain or adversity (Rutter, 1990).

In recent decades, researchers have paid attention not only to the definition and structure of resilience, but to its protective factors as well (Liu, Wang, & Lü, 2013). Some researchers have proposed that resilience consists of internal and external systems. Internal factors refer to psychological factors as well as biological factors that include physical health, genetic predisposition, temperament and gender. External factors refer mainly to the family environment, parenting style, peer relationships and other factors. Internal and external factors interact and influence each other (Ollson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003).

Previous studies had shown that resilience had a moderating effect on the associations between negative life events and mental health problems (Armstrong, Galligan, & Critchley, 2011; Peng et al., 2012; Pinquart, 2009). Students with high resilience could generally maintain mental health when they encounter negative events (Rew, Taylor-Seehafer, Thomas, & Yockey, 2001; Roy, Carli,

& Sarchiapone, 2011). It is therefore necessary for individuals to improve their resilience for the sake of their mental health. This topic has attracted wide interest among researchers. However, there was no universally accepted resilience training program, so researchers continued to work on resilience training programs for intervention. Waite and Richardson (2004) conducted resilience training (Personal Resilience and Resilient Relationships, PRRR) sessions with 232 workers, covering topics such as self-esteem, controlling forces, life goals, interpersonal relationships and job satisfaction. It was found that the self-esteem, controlling force, life goal and interpersonal relationships of the experimental group were significantly higher than those of the control group after training. Steensma, Den, and Stallen (2007) conducted a 6-month resilience training program on Dutch workers suffering from stress and burnout. Their results showed that the employees exhibited a higher level of effective coping and a lower level of depression under pressure after training, indicating that resilience could be increased through group psychological training.

Several researchers have also begun to focus on student resilience, and have created meaningful training plans. Henderson and Milstein (1996) proposed a “six strategy training program” that entails: (1) providing students with opportunities to participate in activities, such as developing their courage to ask questions and creating activity programs; (2) establishing and maintaining high expectations from students, such as requiring students to

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accomplish their jobs; (3) creating a caring and supportive climate and establishing trust with them; (4) enhancing pro-social tendencies of students to help them establish healthy relationships with teachers and other students; (5) clarifying behavioral norms and rules for students; (6) teaching students life skills and social skills, including communication skills and problem-solving ability. In addition, Sternberg (2003) proposed the “Another 3R” training program. This model focuses on personal interaction with the environment and how to solve individual problems effectively, and requires students to learn reasoning, build up their resilience, and become more responsible. The International Resilience Research Project (IRRP) proposed the “I am, I have, I can” resilience training strategy based on the psychological characteristics of college students. This program aims to improve the resilience of college students by letting them: (1) find their personal power (personal feeling, attitudes, and beliefs (I am)); (2) find and make full use of their external resources (development of security and feeling of protection (I have)); (3) master their interpersonal skills and problem-solving ability (such as creativity, persistence, humor, and communication (I can)).

Currently, the Penn Resilience Program (PRP) has been put into practice worldwide, which was designed by Seligman and colleagues in Pennsylvania University in 1999. This training plan is based on the cognitive behavioral theory, which focuses on improving students’ cognitive behavior and skills (Kumpfer, 1999). By now, about 19 controlled studies have been conducted to assess the effectiveness of the PRP. These studies have found that the PRP program could relieve anxiety, depression, adjustment disorders and behavioral problems (Giovanni & Elena, 2009). Through Meta analysis, these studies also found that young adults who participated in the PRP showed fewer depressive symptoms and behavior problems, suggesting that they have gained PRP skills through the training. In addition, this training has been applied among officers and soldiers of U.S. Army. The U.S. Army Master Resilience Trainer (MRT) course provides basic resilience skills training as well as instruction in teaching these skills to subordinate soldiers (Reivich & Seligman, 2011).

Nowadays, the Pennsylvania Resilience Program has been used worldwide, but it has not yet been used among Chinese medical students till now. Therefore, the current study applies the PRP training course to Chinese medical students and examines its effects on the resilience, positive and negative emotions, and emotion regulation of medical students.

2. Materials and methods

2.1. Participants

A total of 312 students were recruited from the Third Military Medical University in China by means of a public announcement. Every subject completed a separate response booklet with structured and self-reported questionnaires. These questionnaires assessed resilience, positive and negative emotions and emotion regulation styles. According to a plus or minus standard deviation of the average score of the Connor–Davidson Resilience Scale (CD-RISC), the students were divided into high-resilience and low-resilience groups, with each group consisting of 30 students. Half of the students from each group were then divided into the experimental group and received PRP training. The remaining students were divided into the control group and were told to wait for resilience training. The age of the participants ranged from 18 to 22 years old ($M = 19.78$, $SD = .77$). The experimental group was composed of 22 males and 8 females aged $20.04 \pm .72$. The control group was composed of 20 males and 10 females aged $20.18 \pm .66$. The participants provided verbal and written informed consent to participate

in the study, and this study was approved by the Ethics Committee of the Third Military Medical University.

2.2. Measures

2.2.1. Resilience

The Connor–Davidson Resilience Scale (Connor & Davidson, 2003) includes 25 questions and covers 3 factors (toughness, strength, and optimism). The three factors consist of toughness (e.g. I am able to stay focused and think clearly under pressure.); strength (e.g. the past successful experience makes me more confident to face new challenges.); optimism (e.g. I can perceive the optimistic side of a thing.). Each question measured responses on a five point scale from 0 (*not true at all*) to 4 (*true nearly all the time*). The scale has high reliability and validity in the Chinese population, with an internal consistency coefficient of .91 (Yu & Zhang, 2007).

2.2.2. Positive and negative emotions

The Chinese version of the Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988) is composed of 20 adjectives that indicate positive (e.g. cheerful; enthusiastic) and negative emotions (e.g. fearful; nervous) (Huang, Yang, & Ji, 2003). This scale aims to assess emotions that the subjects experience every day. Responses are given on a scale of one (*do not feel at all*) to five (*feel strongly*). The internal consistency coefficient of the scale is .73.

2.2.3. Emotion regulation styles

The Emotion Regulation Scale (Gross & John, 2003) consists of 10 questions that measure expression inhibition (e.g. I will hide my mood to myself) and cognitive reappraisal (e.g. When I want a more positive emotional experience, I will change my thought). Each question is rated from one (*strongly disagree*) to seven (*agree*). A higher score indicates more frequent usage of this regulation style. The internal consistency coefficient of this scale is .88.

2.3. Procedures

Ten training sessions, facilitated by group leaders, were conducted every week. Each training session lasted for 90–120 min. The training emphasized discussion and experiences sharing among the participants.

2.3.1. Resilience training program

Based on the PRP course contents and the characteristics of the medical students, this training consists of the following steps: connecting thoughts and emotions, challenging irrational thinking and beliefs, cognitive training, a review of lessons 1–3, self-confidence and interpersonal contact, coping strategies, behavior modification exercises, a review of lessons 5–7, problem-solving exercises, and a review of the entire PRP curriculum. Theme games, role-playing, case analysis, brainstorming, and other activities enabled students to increase their participation in the training. The brief contents are as follows (see Table 1).

The evaluation standard of the training effect was set according to the following process: (1) determining the psychological scale scores before and after training, (2) determining the feelings and changes of the group members before and after training, (3) interviewing the members and comprehending their suggestions and comments after the training. This interview included questions on which course the members found most impressive, and the changes they experienced after training, as well as suggestions for a PRP training plan in the future.

Table 1
Brief contents of PRP training among Chinese medical students.

Lessons	Contents
Thoughts and emotion connection	The group leaders and members get to know each other. The course contents all around Ellis's ABC theory are also introduced. The students need to recount recent difficult experiences in a sequential manner, and to recall their thoughts and their feelings
Challenging irrational thoughts and beliefs	Identify involuntary negative thoughts, and recognize these ideas often appear correct. Learn to analyze cases from a positive view
Cognitive training	Learn how to deal with negative events and think flexibly to prevent catastrophizing. The members ascertain the worst-case scenario, the best-case scenario, the probable scenarios, respectively by analyzing the events. The members describe accidents and frustrations that occur in their daily life, and discuss feasible solutions to these events
Review lessons 1–3	Review the knowledge and cognition skills in lessons 1–3. The trainer provided additional cases to the members to complete the exercises
Interpersonal communication	The members present three common types of social communication patterns (impulsive, passive and confident) through role-play. The members develop interpersonal communication skills by improving confidence
Coping strategy	Learn stress-coping methods (e.g. deep breathing and muscle relaxation), practice positive meditation through organizing positive and optimistic images
Behavior modification exercises	Adjust their maladaptive behavior and recognize all-or-nothing thinking. Learn to divide complex tasks into several more controllable sections and finish the entire mission step by step
Review lessons 5–7	Review the relaxation and social skills to solve problems in daily life
Problem-solving exercises	Discuss and analyze events in their daily lives. Problem-solving exercises are repeatedly made to consolidate skills and knowledge
Review entire course	Summarize PRP training course. End the course by a party

2.4. Statistical analysis

All data were analyzed using SPSS15.0 software. Independent-samples *T* test and Paired-samples *T* test were conducted to make comparisons between the training and the control groups before and after training.

3. Results

3.1. Comparison of the resilience, emotion, and emotion regulation style scores of the college students prior to resilience training

The high-resilience students had more positive emotions and tended to use more emotion regulation style of cognitive appraisal, whereas the low-resilience students had more negative emotions and used more expression inhibition frequently. No significant differences in resilience, positive emotion, negative emotion, cognitive appraisal, and expression inhibition scores were found between the control and experimental groups ($P > .05$) (see Table 2).

3.2. Comparison of the resilience, emotion, and emotion regulation style scores of the low-resilience group before and after resilience training

The resilience, positive emotion, and cognitive appraisal scores of the low-resilience experimental group increased significantly after training ($P < .05$), whereas their negative emotion and expression suppression scores decreased significantly ($P < .05$). Compared with the former results, no significant differences were found in the resilience, positive emotion, negative emotion, cognitive appraisal, and expression suppression scores of the low-resilience control group ($P > .05$) (see Table 3).

3.3. Comparison of the resilience, emotion, and emotion regulation style scores of the high-resilience group before and after resilience training

The positive emotion scores of the high-resilience experimental group significantly increased after training ($P < .05$), whereas their total negative emotion and expression suppression scores decreased significantly ($P < .05$). Compared with the former results, no significant differences were found in the resilience, positive emotion, negative emotion, cognitive appraisal, and expression suppression scores of the high-resilience control group ($P > .05$) (see Table 4).

Through interviews, students in the experimental group reported that they had undergone significant changes after training. About 90% of the training students reported reduced negative emotions and increased experience of positive emotions. About 87% of the training students showed that they had learned different coping strategies for various complicated situations. What's more, nearly all the students reported cognitive style as the most significant factor in resilience training.

4. Discussion

This study explored the effects of the PRP on the positive and negative emotions, emotion regulation styles, and resilience among Chinese medical students. Compared with the results prior to the training, the resilience, positive emotion, and cognitive appraisal scores of the low-resilience experimental students were significantly increased after training, whereas their negative emotion and expression inhibition scores were significantly reduced. The positive emotion scores of the high-resilience experimental group were increased significantly, whereas its negative emotion and expression inhibition scores were significantly reduced. No significant changes were found in the scores of the control group.

Table 2
Comparison of the resilience, emotion, and emotion regulation style scores of the experimental and control groups prior to resilience training ($\bar{x} \pm s$).

	Experimental group with high resilience ($n = 15$)	Control group with high resilience ($n = 15$)	t_1	P_1	Experimental group with low resilience ($n = 15$)	Control group with low resilience ($n = 15$)	t_2	P_2
Resilience	86.96 ± 3.15	86.48 ± 4.23	1.10	.28	58.47 ± 6.15	59.02 ± 6.75	-.46	.65
Positive emotion	36.42 ± 6.25	36.77 ± 5.28	-.89	.38	25.77 ± 3.48	26.31 ± 3.52	.73	.44
Negative emotion	13.86 ± 4.38	13.91 ± 4.20	-1.07	.29	17.88 ± 3.91	18.24 ± 3.26	-.88	.40
Cognitive appraisal	35.11 ± 4.38	35.69 ± 4.91	-.75	.33	28.76 ± 4.38	29.11 ± 4.69	-1.24	.30
Expression inhibition	10.26 ± 4.12	10.33 ± 5.07	-.25	.80	14.30 ± 4.57	14.16 ± 5.04	.14	.53

Table 3Comparison of the resilience, emotion, and emotion regulation style scores of the low-resilience group before and after resilience training ($\bar{x} \pm s$).

	Experimental group with low resilience				Control group with low resilience			
	Pre-training	Post-training	t_1	P_1	Pre-training	Post-training	t_2	P_2
Resilience	58.47 ± 6.15	69.38 ± 8.25	-2.70	.01	59.02 ± 6.75	58.34 ± 5.92	-.21	.64
Positive emotion	25.77 ± 3.48	30.42 ± 4.90	-3.07	.00	26.31 ± 3.52	25.77 ± 2.89	.49	.52
Negative emotion	17.88 ± 3.91	15.09 ± 3.57	-2.70	.01	18.24 ± 3.26	18.38 ± 4.42	-1.01	.32
Cognitive appraisal	23.76 ± 4.38	28.05 ± 4.69	3.26	.01	23.11 ± 4.83	25.73 ± 3.67	.88	.41
Expression inhibition	14.30 ± 4.57	9.25 ± 4.22	-2.75	.01	14.16 ± 5.04	15.21 ± 5.84	.15	.79

Table 4Comparison of the resilience, emotion, and emotion regulation style scores of the high-resilience group before and after resilience training ($\bar{x} \pm s$).

	Experimental group with high resilience				Control group with high resilience			
	Pre-training	Post-training	t_1	P_1	Pre-training	Post-training	t_2	P_2
Resilience	86.96 ± 3.15	87.13 ± 2.57	.58	.57	86.48 ± 4.23	85.91 ± 4.43	.06	.95
Positive emotion	36.42 ± 6.25	40.62 ± 3.77	4.39	.00	36.77 ± 5.28	35.58 ± 3.24	1.18	.24
Negative emotion	13.86 ± 4.38	11.23 ± 3.87	2.17	.03	13.91 ± 4.20	13.23 ± 3.11	-.33	.74
Cognitive appraisal	35.11 ± 4.38	36.77 ± 5.45	1.64	.10	35.69 ± 4.91	33.27 ± 4.30	1.77	.08
Expression inhibition	10.26 ± 4.12	8.63 ± 3.11	2.04	.04	10.33 ± 5.07	10.63 ± 3.11	-.78	.44

These results suggested that PRP training could improve the resilience and positive emotions of college students, as well as reduce their negative emotions, and helped them use more emotion regulation of cognitive appraisal. This study indicated that this training program was suitable for Chinese medical students, particularly for the lower resilient students.

The results of this study showed that the PRP could improve the positive emotions of medical students, particularly for the low-resilience students. The PRP could also help them use a positive emotion regulation style. This conclusion supported the previous study of Cutuli, Chaplin, Gillham, Reivich, and Seligman (2006), which found that PRP could provide long-term prevention of individual depression and anxiety symptoms. The participating students continuously showed a high level of resilience and retained their mastery of the problem-solving, interpersonal communication, and relaxation skills learned in the PRP course 2 years or even longer after their participation in the program (Brunwasser, Gillham, & Kim, 2009). These skills could help members reduce their negative emotions, enhance their positive emotions, and gradually acquire a positive emotion regulation style. This result was consistent with the report that resilience had a positive relationship with positive emotions and an emotion regulation style of cognitive appraisal, and that positive emotions had a buffer effect on the recovery of an individual from daily stresses (Ong, Bergeman, Bisconti, & Wallace, 2006).

Previous studies showed that high resilient individuals had more positive emotions, and positive emotions were quite relevant to active cognition (Fredrickson, 2004; Southwick, Vythilingam, & Charney, 2005). Therefore, PRP training could be used to change the cognition style and cognitive flexibility of individuals, thereby promoting positive emotions and enhancing resilience.

However, some limitations of the study should be noted. First, this training was carried out only at one university, so a much more complex and larger sampling is needed across sites in China to examine the training effects in future studies. Second, the use of measures based on self-reporting and judgments by the participants might lead to under-reporting and, consequently, the occurrence of type II errors. Furthermore, the present study failed to follow up the long-term effects of this training for the medical students. In addition, cultural background, modes of teaching, family structure, and other factors should be considered in subsequent studies. Therefore, the PRP should be modified to better adapt to Chinese medical students and help them improve their resilience.

5. Conclusion

This study applied the resilience program of Pennsylvania University to Chinese medical students. The PRP training demonstrated that resilience could be learned and trained. Improving emotional management, communication skills, interpersonal relationships, optimistic thinking, and self-efficacy of students is crucial to the enhancement of their resilience. Emotion regulation style also plays an important role in the resilience of medical students. However, future studies should focus on the cognitive style changes of students to improve their resilience in the future, because students participating in the current study reported that cognition is the key to resilience training. Lastly, the PRP should be widely applied to different sample groups and to susceptible individuals in particular.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.paid.2014.01.006>.

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