The mediating role of self-esteem in the relationship between big five personality traits and depressive symptoms among Chinese undergraduate medical students

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ABSTRACT

The objectives of this study were to examine the correlations between big five personality traits and depressive symptoms among Chinese undergraduate medical students, and to explore the mediating role of self-esteem on the correlations. Self-reported questionnaires, including Big Five Inventory, the Center for Epidemiologic Studies Depression Scale, Rosenberg's Self-Esteem scale, and socio-demographic section were distributed to 2000 undergraduate medical students at four medical colleges and universities in Liaoning province, China, in June 2014. 1738 students became the final subjects. After adjustment for age and gender, agreeableness ($\beta = -0.329$) and openness ($\beta = -0.096$) were negatively related to depressive symptoms, while neuroticism ($\beta = 0.245$) was positively related to the symptoms. Self-esteem functioned as a mediator in the relationship between agreeableness ($a * b = -0.154$, 95% CI: -0.182, -0.127)/openness ($a * b = -0.097$, 95% CI: -0.124, -0.069)/neuroticism ($a * b = 0.031$, 95% CI: 0.007, 0.058) and depressive symptoms. Therefore, identifying at-risk students and undertaking appropriate intervention strategies that focus on both personality traits and self-esteem may be effective in preventing and reducing depressive symptoms among Chinese medical students.

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1. Introduction

Medical education can bring about various and significant psychological distress for physicians-in-training (Dyrbye, Thomas, & Shanafelt, 2006). Previous studies have shown that medical students experience higher levels of depression (Givens & Tjia, 2002; Sobowale, Zhou, Fan, Liu, & Sherer, 2014). It has also been revealed that the high prevalence of depression among physicians can partly be traced back to the medical education they receive (Tjia, Givens, & Shea, 2005). Thus, the mental and psychological well-being of medical students is significant not only for the medical students, but also for the quality of health care service they will provide in the future (Fahrenkopf et al., 2008).

Prior research has demonstrated that personality traits are associated with depressive symptoms and disorders (Bienvenu et al., 2001; Kotov, Gamez, Schmidt, & Watson, 2010; Wang et al., 2014). The most established personality traits model, the Five-Factor Model, recognizes that personality traits are organized from many specific characteristics into five broad domains, which consist of extraversion, neuroticism, conscientiousness, agreeableness, and openness (Markon, Krueger, & Watson, 2005). The model is determined by biological factors and transcends languages and cultures (McCrae & Costa, 1999), and its universality has been validated in 50 cultures (McCrae, Terracciano, Personality Profiles of Cultures Project, 2005). Among the big five personality traits, neuroticism has consistently been proved to be related to or predict depression (e.g., Bunevicius, Kakkute, & Bunevicius, 2008; Kotov et al., 2010). In a sample of 338 medical students, emotional stability was found to be negatively correlated with depression (Bunevicius et al., 2008), a finding that is consistent with the result in a meta-analysis, in which high neuroticism and low conscientiousness are found to be linked to depression (Kotov et al., 2010). In another study conducted among the Chinese unemployed population, the four personality traits with the exception of openness significantly predicted depressive symptoms after adjustment for demographic characteristics (Wang et al., 2014). Research on the relationship between extraversion and depression is mixed. Even though extraversion was found to protect against symptoms of depression in Norwegian medical students when they started to work as junior physicians (Gramstad, Gjestad, & Haver, 2013), the

protective effect was not found in other studies (Bienvenu et al., 2001; Kotov et al., 2010). In the meta-analysis, the traits of agreeableness and openness were largely unrelated to depression, although some studies did reveal opposite results (Kotov et al., 2010). As yet, the studies examining the correlations between big five personality traits and depression in medical students are very limited and no such studies have been conducted among Chinese medical students.

Self-esteem refers to a person's positive or negative attitude toward himself or herself (Rosenberg, 1965), and is closely associated with personality traits (McCrae & Costa, 1999). In a previous study, big five personality traits accounted for 34% of the variance in self-esteem, and the traits that were most strongly related to self-esteem were: emotional stability, extraversion, and conscientiousness (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). Extraversion and openness can predict increases in self-esteem when people adjust to a significant life transition (Kling, Ryff, Love, & Essex, 2003). Previous studies carried out among Chinese people also showed that self-esteem was positively correlated with extraversion and negatively correlated with neuroticism (Cai, Wu, & Brown, 2009; Galchenko & Van de Vijver, 2007). A moderate or weak correlation was also revealed between conscientiousness/openness and self-esteem (Luk & Yuen, 1997; Zhang, Zou, & Xiang, 2006). However, studies examining the relationship between big five personality traits and self-esteem among medical students are extremely underrepresented. Meanwhile, self-esteem is found to be related to or predict depression (e.g., Grotmol et al., 2010; Sowislo, Orth, & Meier, 2014). Self-esteem functioned as a predictor of severe depressive symptoms among Norwegian physicians in both sexes in a 10-year follow-up study (Grotmol et al., 2010). In another longitudinal study, self-esteem level predicted subsequent depressive symptoms, and the effect of self-esteem level held when big five personality traits were controlled (Sowislo et al., 2014). The results agree with that of a meta-analysis covering 77 longitudinal studies, which reveals that the effect of self-esteem on depression is significant, regardless of gender, age, measurement tools, or time lag between assessments (Sowislo & Orth, 2013).

Although the respective associations of self-esteem with personality traits and depression have been confirmed by previous studies, the possible mediating role of self-esteem in the relationship between big five personality traits and depression has not yet been explored. Based on five factor theory, the big five personality traits influence people's self-conceptions, including self-esteem (McCrae & Costa, 1999). According to the cognitive theory of depression, low self-esteem is a diathesis that exerts causal influence on the onset and maintenance of depression (Beck, 1967). Thus, we hypothesized that self-esteem might function as a mediator in the relationship between big five personality traits and depression. As China has witnessed huge social transformation, in the process certain negative effects, such as increased physician-patient conflicts, are likely to affect the mental health of medical students. Considering the population in China and its increasingly high proportion of the elderly, we should give priority to the mental well-being of future health care providers. The objectives of the present study were to examine the correlations between big five personality traits and depressive symptoms among Chinese undergraduate medical students, and to explore the possible mediating role of self-esteem on the correlations.

2. Methods

2.1. Subjects

This cross-sectional study was conducted in Liaoning province (with a population of 44 million), China, in June 2014. All of the four medical tertiary institutions in the province were included

in the investigation. Undergraduate medical education in China lasts for 5 years. 4 whole classes of medical students were randomly chosen from each institution based on academic year. Self-reported questionnaires were either distributed to the students in class time or sent to students in later stages of their studies. A total number of 2000 questionnaires were distributed and 1785 (89.25%) students returned the questionnaires. 47 invalid questionnaires were excluded and a pool of 1738 students (effective response rate: 86.90%) became the final subjects.

This study was approved by the Committee on Human Experimentation of each involved institution. Written informed consent was obtained according to the Declaration of Helsinki (59th WMA General Assembly, 2008).

2.2. Measures

2.2.1. Measurement of big five personality traits
Big five personality traits were measured with Big Five Inventory (BFI) (John & Srivastava, 1999). BFI consists of 44 items and each item is scored on a 5-point Likert scale ranging from 1 to 5. The Chinese version of BFI demonstrates adequate reliability and validity (Wang et al., 2014). In the present study, the Cronbach's alpha coefficients for extraversion, agreeableness, conscientiousness, neuroticism and openness were 0.681, 0.715, 0.652, 0.660 and 0.728 respectively.

2.2.2. Measurement of depressive symptoms
Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). It consists of 20 items and each item is scored on a 4-point Likert scale, ranging from 0 to 3. The score from each item is calculated to obtain an overall score, with higher score indicating higher level of depressive symptoms. Subjects scoring 16 and above were defined as depressed (Radloff, 1977). The Chinese version of CES-D demonstrates good reliability and validity (Wu, Ge, Sun, Wang, & Wang, 2011). The Cronbach's alpha for the scale in the present study was 0.892.

2.2.3. Measurement of self-esteem
Rosenberg's Self Esteem Scale (RSES) was used to assess global self-esteem of the students (Rosenberg, 1965). The scale is a ten-item measure and each item is scored on a 4-point Likert scale from 0 to 3. Higher total score indicates a higher level of global self-esteem. In the current study, the Cronbach's alpha for the scale was 0.833.

2.2.4. Demographic characteristics
Demographic information regarding age, gender, hometowns, academic year, and educational levels of both parents were obtained in the study. Hometowns were dichotomized into rural and urban areas. Educational levels of parents were categorized into three groups of primary school, secondary school, college and above.

2.3. Statistical analysis

All analyses were performed using SPSS 13.0. All statistical tests were two-sided and the significance level was set at $p < 0.05$. Pearson's correlation was used to examine correlations among depressive symptoms, big five personality traits and self-esteem. Hierarchical regression analysis was used to explore the effects of groups of independent variables on depressive symptoms. In step 1, the control variables of age and gender were entered; in step 2, big five personality traits were entered; in step 3, self-esteem was added. Standardized estimate (β), F, R^2 and R^2-changes (ΔR^2) for each step were provided. Asymptotic and resampling