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The Mediating Role of Neuroticism in the Association Between Psychological Distress and Professional Identity Among First-Year Medical Students

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Abstract: Objective This study examined the association between psychological distress and professional identity among first-year medical students and investigated whether neuroticism mediated this association. **Methods** Using the cluster-sampling method, 898 first-year medical students from a university in Guangdong Province were randomly selected as research subjects. Questionnaires were administered using the NEO Five-Factor Inventory (NEO-FFI), Kessler Psychological Distress Scale(K10), and College Students' Professional Identity Scale as research instruments. **Results** Psychological distress was positively correlated with neuroticism (r =0.660, P<0.01), whereas psychological distress was negatively correlated with professional identity ($r = -0.308$, $P < 0.01$). Neuroticism was also negatively correlated with professional identity ($r = -0.323$, $P < 0.01$). Psychological distress was significantly negatively associated with professional identity (total effect: B = −0.527, $t = -9.648$, $P < 0.001$). When neuroticism was included in the model, the association between psychological distress and professional identity remained significant (B = −0.287, $t = -3.996$, $P < 0.001$). Psychological distress was positively associated with neuroticism (B = 0.749, $t = 26.217$, $P < 0.001$), while neuroticism was negatively associated with professional identity (B = −0.322, $t = -5.082$, $P < 0.001$). The indirect effect was significant (B = −0.241, 95% CI [−0.341, −0.145]), accounting for 45.6% of the total effect, indicating a partial mediating role of neuroticism. **Conclusion** Psychological distress was negatively associated with professional identity among first-year medical students, and this association was partly mediated by neuroticism. These findings suggest that interventions aimed at strengthening professional identity should address not only psychological distress but also individual differences in emotional stability and stress-related coping. Integrating psychological support with professional identity education may help first-year medical students adapt to the academic and psychological demands of medical education.

Keywords: First-year Medical Students; Psychological Distress; Neuroticism; Big Five Personality; Professional Identity; Mediation Analysis.

1. Introduction

Medical education is characterized by a prolonged training period, intensive academic demands, and substantial professional and emotional challenges. Upon entering university, first-year medical students must simultaneously adapt to a new learning environment, transition from secondary-school learning to self-directed medical education, and develop a realistic understanding of the medical profession. These demands may increase vulnerability to psychological distress, including anxiety, depressive symptoms, and other forms of negative emotional experience. At the same time, the early stage of medical education represents an important developmental period for establishing professional identity.

Professional identity reflects students' acceptance, recognition and engagement with medicine at the cognitive, affective and behavioral levels. It is directly associated with medical students' learning motivation, academic persistence and future career loyalty, serving as an important psychological foundation for medical talent training [1]. The freshman period constitutes a critical window for the formation of medical professional identity. Exploring the intrinsic psychological mechanisms influencing professional identity among medical freshmen bears practical significance.

Emotional distress is a non-specific psychological syndrome centered on negative emotions such as anxiety and depression[2]. Existing studies have shown that high-level emotional distress depletes individuals' psychological resources, induces negative cognitive bias, and reduces their acceptance of their own field. When medical freshmen are exposed to persistent emotional distress, they tend to magnify the academic pressure of medical curricula, form negative evaluations of the value of medicine and career prospects, and consequently impair professional identity[3]. Nevertheless, how emotional distress exactly acts on the professional identity of medical freshmen, as well as the mediating personality-related psychological mechanisms, remains to be further verified.

Neuroticism is a core dimension of the Big-Five personality model, reflecting individual dispositional tendency toward emotional stability[4]. Individuals with high neuroticism experience intense emotional fluctuations, are more prone to negative emotions such as anxiety, frustration and worry, and tend to interpret stressors in a negative manner[5]. The diathesis-stress theory posits that negative emotional stress activates vulnerable personality traits, which in turn exacerbate individuals' psychological maladjustment[6].

For first-year medical students, persistent psychological distress may be accompanied by greater emotional instability and heightened sensitivity to academic and environmental stressors. In turn, these characteristics may be associated with more negative evaluations of medical education and reduced identification with the medical profession. Neuroticism may therefore represent an important psychological pathway

linking psychological distress to professional identity.

Based on this theoretical framework, we hypothesized that neuroticism would mediate the association between psychological distress and professional identity. Specifically, we hypothesized that psychological distress would be positively associated with neuroticism, neuroticism would be negatively associated with professional identity, and psychological distress would retain a direct negative association with professional identity after neuroticism was taken into account. The proposed mediation model is presented in Figure 1.

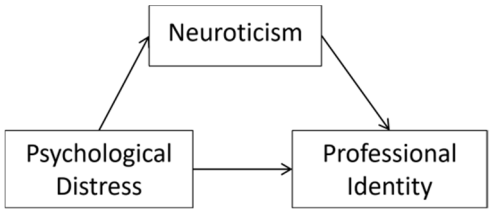

Figure 1. Hypothesized mediation model of neuroticism between psychological distress and professional identity.

2. Materials and Methods

2.1. Participants

A cluster sampling method was used to recruit first-year medical students from a medical university. A total of 898 valid questionnaires were obtained.

The inclusion criteria were as follows: (1) enrollment as a first-year student in a medical-related program; (2) voluntary participation in the study; and (3) provision of informed consent. Questionnaires were excluded when the response time was excessively short or when response patterns indicated obvious invalid responding.

Ethics approval for this study was obtained from the relevant institutional ethics committee (reference code: NFYKDX002). All participants were informed of the study procedures before participation and participated voluntarily.

2.2. Measures

2.2.1. Psychological Distress

Psychological distress was assessed using the Kessler Psychological Distress Scale (K10) [7]. The K10 is a widely used measure of nonspecific psychological distress, particularly symptoms associated with anxiety and depressive affect. Higher scores indicate greater psychological distress. The scale demonstrated satisfactory reliability in the present sample.

2.2.2. Neuroticism

Neuroticism was assessed using the neuroticism subscale of the NEO Five-Factor Inventory (NEO-FFI) [8]. Neuroticism represents individual differences in emotional stability and susceptibility to negative affect. Higher scores indicate greater neuroticism and a greater tendency toward emotional instability and negative emotional experiences. The neuroticism subscale of this scale demonstrated satisfactory reliability and validity in the present sample.

2.2.3. Professional Identity

College Students' Professional Identity Scale[9]: It consists of dimensions including professional cognition, professional affection, and professional behavioral engagement. A higher total score indicates a higher level of professional identity among medical students. The scale demonstrated satisfactory reliability and validity in the present sample.

2.3. Statistical Analysis

SPSS 26.0 software together with the PROCESS macro was used for data processing and analysis. Descriptive statistics were performed on the dataset. Pearson correlation analysis was adopted to examine the correlations among variables, and the PROCESS macro was applied to test the mediating effect of neuroticism. A P-value of less than 0.05 was set as the criterion for statistical significance.

3. Results

3.1. Descriptive Statistics and Correlations

The means, standard deviations, and Pearson correlation coefficients for the study variables are presented in Table 1.

The mean score for psychological distress was 9.98 (SD = 7.31), the mean score for neuroticism was 33.66 (SD = 8.30), and the mean score for professional identity was 86.01 (SD = 12.54).

Psychological distress was significantly positively correlated with neuroticism (r = 0.660, p < 0.01). Psychological distress was significantly negatively correlated with professional identity (r = −0.308, p < 0.01), and neuroticism was significantly negatively correlated with professional identity (r = −0.323, p < 0.01).

Table 1. Descriptive Statistics and Correlations Among Study Variables (N = 898)

Variable	M	SD	1	2	3
1. Psychological distress	9.98	7.31	1		
2. Neuroticism	33.66	8.30	0.660**	1	
3. Professional identity	86.01	12.54	−0.308**	−0.323**	1

Note. M = mean; SD = standard deviation. ** p < 0.01.

3.2. Mediation Analysis

With emotional distress as the independent variable X, professional identity as the dependent variable Y, and neuroticism as the mediating variable M, Model 4 of the PROCESS macro was applied to test the mediating effect. The results are shown in Table 2 and Table 3. Emotional distress exerted a significant negative predictive effect on professional identity (B=−0.527, t=−9.648, P<0.001). After incorporating the mediating variable neuroticism, the negative predictive effect of emotional distress on professional identity remained significant(B=−0.287,t=-3.996,P<0.001), Emotional distress significantly positively predicted neuroticism (B=0.749,t=26.217,P<0.001), and neuroticism significantly negatively predicted professional identity(B=-0.322,t=-5.082,P<0.001), The 95% Bootstrap confidence intervals for the mediating effect, direct effect and total effect all excluded zero. Neuroticism played a partial mediating role in the association between emotional distress and professional identity, with the mediating effect accounting for 45.6 % of the total effect.

Table 2. Regression Models Examining the Mediating Role of Neuroticism

Predictor	Professional identity			Neuroticism			Professional identity		
	B	SE	t	B	SE	t	B	SE	t
Neuroticism	−0.322	0.063	−5.082***						
Psychological distress	−0.287	0.072	−3.996***	0.749	0.029	26.217***	−0.527	0.055	−9.648***
R^2	0.120			0.435			0.095		
F	60.753			687.355			93.085		

Note. B = unstandardized regression coefficient; SE = standard error. *** $p < 0.001$.

Table 3. Bootstrap Mediation Effects of Neuroticism

Effect	Effect	BootSE	BootLLCI	BootULCI	Proportion of total effect
Total effect	−0.527	0.065	−0.653	−0.402	—
Indirect effect	−0.241	0.051	−0.341	−0.145	45.6%
Direct effect	−0.287	0.079	−0.444	−0.129	54.4%

Note. BootSE = bootstrap standard error; BootLLCI = lower limit of the 95% bootstrap confidence interval; BootULCI = upper limit of the 95% bootstrap confidence interval

4. Discussion

This study recruited medical freshmen as participants to explore the relationships among emotional distress, neuroticism of the personality model, and professional identity. It confirmed that neuroticism exerts a partial mediating effect between emotional distress and professional identity. The results indicated that emotional distress in medical freshmen can directly reduce the level of professional identity, and can also indirectly impair professional identity by elevating neuroticism (emotional instability).

4.1. Emotional Distress Exerts a Significant Effect on Professional Identity Among Medical Freshmen

Correlation results revealed a significant negative association between emotional distress and professional identity, which validated the study hypothesis that emotional distress exerts a direct negative predictive effect on professional identity. Upon entering a completely new and unfamiliar academic environment, medical freshmen have to adapt to brand-new learning approaches. Furthermore, medical knowledge is comparatively more abstruse than that of other disciplines, posing greater challenges for these students. Confronted with multiple stressors stemming from the abrupt shift in learning patterns, increased difficulty of medical coursework, and the gap between idealized expectations and real-world perceptions of the medical profession, individuals suffering from emotional distress such as anxiety and depression may experience substantial depletion of psychological resources. This predisposes them to negative cognitive bias, amplifies perceived academic pressure related to medical training[6], diminishes their appreciation of professional value and occupational meaning, and consequently reduces their acceptance and identification with medicine[10]. These findings suggest that medical colleges should attach importance to emotional screening for first-year students, identify those with high levels of emotional distress in a timely manner, and deliver psychological counseling, so as to prevent negative emotions from directly undermining students' professional identity.

4.2. Neuroticism Plays a Mediating Role Between Emotional Distress and Professional Identity.

The present study revealed that neuroticism exerted a partial mediating effect between emotional distress and professional identity among medical freshmen, which verified one of the research hypotheses. On the one hand, emotional distress significantly positively predicted neuroticism: higher levels of emotional distress increased the likelihood of developing neurotic dispositional tendencies following prolonged exposure. On the other hand, emotional distress could influence medical students' degree of professional identity by reinforcing neurotic personality tendencies. As a key trait of the personality model, neuroticism represents the dispositional tendency toward emotional instability[11]. Individuals with high neuroticism are more susceptible to stress amid environmental changes[12] and tend to interpret events in a negative manner. According to the diathesis-stress theory[6], emotional distress acts as a negative stressor that activates this vulnerable personality trait of neuroticism. When medical freshmen experience persistent emotional distress, the negative cognitive bias stemming from neuroticism is amplified. Consequently, they are more likely to focus on difficulties and setbacks in medical study, which weakens their emotional belonging to the medical profession.

The mediating effect accounted for 45.6 % of the total effect in the present study, suggesting that this indirect path of personality traits possesses relatively strong explanatory power. Although personality traits are relatively stable, individual emotional response patterns can still be improved through cognitive regulation and emotion-management training. Several approaches may be adopted to reduce neurotic dispositional tendencies. First, provide emotional counseling for medical freshmen, closely monitor their emotional changes, and relieve emotional distress resulting from poor adaptation to the new environment. Second, implement group-based interventions focusing on emotion management and cognitive restructuring, such as cognitive therapy. Third, assist students in recognizing and observing

the emergence of negative emotions, and understanding the sources of such emotions correctly. For students with high neurotic tendencies, support them to develop more rational stress-coping strategies so as to buffer the adverse impacts brought by personality traits.

5. Conclusion

Neuroticism plays a partial mediating role between emotional distress and professional identity among medical freshmen, and emotional distress significantly negatively predicts professional identity. Therefore, the cultivation of professional identity for medical freshmen cannot rely merely on courses such as professional introductions and career lectures. Psychological interventions should be integrated with professional ideological education, and mental-health education should be embedded into medical professional education. This approach helps freshmen objectively recognize both the pressures and values of the medical discipline, so that they can develop stable professional identity on the basis of emotional adaptation.

6. Limitations

The sample of this study was recruited from only a small number of medical institutions. Future research could expand the sample by including medical schools from diverse regions to improve the generalizability of the conclusions. In addition, this study mainly adopted self-report questionnaires for data collection, which may lead to common-method bias and reporting bias. Further studies may incorporate longitudinal assessments, behavioral indicators or multi-source evaluation data to enhance the robustness of the research findings.

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