Medical University Students' Personality and Learning Performance:

Learning Burnout as a Mediator

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Abstract Objective To explore the relationship between the personality and learning performance of medical university students, and check the mediator role of learning burnout. **Methods** A survey with the scales such as NEO-FFI, learning burnout and learning performance was made on 699 medical university students in grade one and grade two from 4 universities, and 636 subjects were valid. **Results** Correlation analysis results indicated that both extraversion and conscientiousness were positively correlated to the learning performance, and that both neuroticism and agreeableness were negatively correlated to learning performance. Openness to experience had no significant correlation with the learning performance. But learning burnout was significantly related to learning performance and the Big Five personality. Hierarchical regression analysis results indicated that, neuroticism, openness to experience and conscientiousness were powerful predictors of learning burnout beyond the demographic variables, and 18% variance of learning burnout was explained by Big Five personality. Hierarchical regression also indicated that conscientiousness, agreeableness and openness to experience were powerful predictors of learning performance beyond the demographic variables, and 17% variance of learning performance was explained by Big Five personality. Learning burnout partially mediated the relation between conscientiousness and learning performance. **Conclusion** Higher conscientiousness predicted higher learning performance of medical university students, but higher agreeableness predicted lower learning performance. Higher learning burnout predicted lower learning performance, and it partially mediated conscientiousness' effect on learning performance. There are two ways to improve learning performance of medical university students from this research, one is to cultivate and improve their conscientiousness, and the other is to lower their learning burnout. It is best to cultivate their conscientiousness and in the meanwhile lower learning burnout.

1. INTRODUCTION

The dominant classification system in current personality research incorporates a set of broad or 2nd-order factors called the Big Five. These factors are labeled as Neuroticism (or its polar opposite, Emotional Stability), Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. This system originated with the factor analysis of trait adjectives. Adjectives are still in use today as well as more recently constructed questionnaires which are designed to assess the Big Five.

Evidence is accumulating which suggests that virtually all personality measures can be reduced or categorized under the umbrella of a five-factor model of personality, which has subsequently been labeled as the "Big Five" [1]. The five factor structure has been recaptured through analysis of trait adjectives in various languages, factor analytic studies of existing personality inventories, and decisions regarding to the dimensionality of existing measures made by expert judges[2]. The dimensionality of the Big Five has been found to generalize across virtually all cultures [3-5] and remains fairly stable over time[4-5]. In addition, research suggests that the Big Five traits have a genetic basis[6], and the heritability of its dimensions appears to be quite substantial[7].

What's the relation between the Big Five personality (the dimensions constituting the five-factor model are neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) and medical university students' learning performance based in China's current socio-economic and cultural background? This study will explore the effects of the Big

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Five personality and learning burnout on medical university students' learning performance, and check the mediator role of learning burnout between personality and learning performance.

2. METHODS

2.1 Subjects

In this study, 699 medical university students from 4 universities had taken part in the surveys, and 636 valid subjects were recovered. The response rate was 91.0%. The samples included 235 men and 398 women, and 3 subjects missing gender information; 275 in Grade one and 361 in grade two; 301 only-child and 322 with siblings, and 13 subjects missing the information of only-child or not; 306 from rural and 317 from city, and 13 subjects missing such information.

2.2 Measures

The Big Five personality. The Big Five was assessed with the NEO Five Factor Inventory [8]. The scale consists of 60 items that constitute five scales: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness, and each domain has 12 items. All items are scored on a 5-point frequency rating scale ranging from 1 (never) to 5 (always). The alpha reliability coefficient of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness in the current sample was 0.76, 0.79, 0.81, 0.77 and 0.85 respectively.

Learning performance. The scale of learning performance consists of 4 items. A sample item was: "My performance is better than other students." All items are scored on a 5-point frequency rating scale ranging from 1 (never) to 5 (always). High scores on learning performance are indicative of good performance. After reverse-scoring six of its twelve items, it was found that higher scores indicate better learning performance. The alpha reliability coefficient of this scale in the current sample was 0.74, which was consistent with psychometric standards.

Learning burnout. Burnout was assessed with the MBI-GS for students (Schaufeli et al., 2000). The scale consists of 15 items that constitute three scales: Exhaustion (5 items), Cynicism (4 items), and Efficacy (6 items). All items are scored on a 5-point frequency rating scale ranging from 1 (never) to 5 (always). High scores on exhaustion and cynicism and low sores on efficacy are indicative of burnout (i.e., all efficacy items are reverse scored, which is denoted by r-efficacy). The alpha reliability coefficient of exhaustion, cynicism and efficacy in the current sample was 0.89, 0.83, 0.92.

Control variables. To exclude alternative explanations, we controlled the variables that might be related to medical university students' learning performance and the Big Five. Firstly, we excluded the intervention of variables like gender, grade and home address of students, because these variables might influence their learning performance. Secondly, since the university students with good performance are often chosen as the class leader, we avoid the influence of being class leader in this study. Thirdly, as the only-child may effect on the personality of students, we also controlled the variable of being only-child.

3. RESULTS

3.1 Results of correlation analyses on the variables

SPSS 22.0 was used to data analysis in this research. Table 1 contained the means, standard deviations, and inter-correlations among the study variables.

Table 1 Means, standard deviations, and correlations among the study variables（N=636）

	M	SD	1	2	3	4	**5**	6	7
1 neuroticism	2.81	0.55	—						
2 extraversion	3.31	0.37	-0.30**	—					
3 openness to experience	3.19	0.34	-0.22**	0.23**	—				
4 agreeableness	3.22	0.34	-0.42**	0.22**	0.23**	—			
5 conscientiousness	3.30	0.38	-0.45**	0.44**	0.22**	0.15**	—		
6 learning performance	2.96	0.68	-0.11**	0.16**	-0.06	-0.17**	0.32**	—	
7 learning burnout	2.72	0.52	0.34**	-0.22**	-0.21**	-0.25**	-0.32**	-0.17**	—

Note: ** $P < 0.01$, * $P < 0.05$.

Seen from table 1, the mean of learning performance was 2.96 on 5-point scale. This point was lower than the median 3. The mean of learning burnout was 2.72 on 5-point scale, also lower than the median 3. The lowest mean in the big five dimension was neuroticism, as it got 2.81 on 5-point scale, which was also lower than the median 3. And the highest mean in the big

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five dimension was conscientiousness, as it got 3.30 on 5-point scale, which was higher than the median 3.

Neuroticism, extraversion, agreeableness, and conscientiousness were significantly related to learning performance, and the correlation coefficients were r =-0.11(p < 0.01); 0.16(p <0.01); -0.17(p < 0.01); and 0.32(p <0.01), respectively. Each dimension of the Big Five personality was significantly related to the other dimensions as well.

The Big five dimensions, such as neuroticism, extraversion, openness to experience, agreeableness and conscientiousness, were significantly related to learning burnout, and the correlation coefficients were r =0.34(p <0.01), -0.22(p < 0.01), -0.21(p <0.01), -0.25(p < 0.01) and -0.32(p <0.01) respectively. Learning burnout was significantly related to learning performance, and the correlation coefficient was r =-0.17(p < 0.01).

3.2 Results of mediated-regression analysis

Regarding to the learning performance as the dependent variable, the research investigated the effect of Big Five personality on learning performance by hierarchical regression analysis. The variables which got into the regression model program included demographic variables, which were treated as control variables and into the first layer, and the five dimensions of big five personality, which got into the second layer. The ΔR^2 changes between the layers were calculated to test whether there is a reliable increment at the same time. The results were as in Table 2.

Table 2 Results of the mediated-regression analyses（N=636）

	learning burnout β		learning performance β		
	Model 1	Model 2	Model 3	Model 4	Model 5
Step 1					
gender	-0.03	-0.03	0.04	0.07	0.07
grade	0.03	-0.03	-0.01	-0.01	-0.02
only -child	0.07	0.02	-0.04	-0.01	-0.01
class leader	0.03	0.00	0.14**	0.11**	0.11**
home address	0.10*	0.15***	-0.10*	-0.10*	-0.08
Step 2					
neuroticism		-0.19***		-0.08	-0.06
extraversion		-0.04		0.06	0.06
openness to experience		-0.14**		-0.11**	-0.10**
agreeableness		-0.08		-0.21***	-0.22***
conscientiousness		-0.18***		0.34***	0.30***
Step 3					
Learning burnout					-0.11*
F	1.05	21.01***	2.82*	20.10***	6.15*
R^2	0.01	0.19	0.03	0.20	0.21
Adjusted R^2	0.00	0.17	0.02	0.18	0.19
ΔR^2	0.01	0.18***	0.03*	0.17***	0.01*

Note: *** P <0.001, ** P <0.01, * P <0.05

The results of table 2 showed that the standardized regression coefficients of home address in the controlled variables was significant, and the standardized coefficient (β) was 0.10 (p < 0.05) (model 1). They explained the 1% variance of learning burnout. Neuroticism, openness to experience and conscientiousness had a significant negative influence on learning burnout. The standardized coefficients (β) of Neuroticism, openness to experience and conscientiousness were -0.19 (p < 0.001), -0.14 (p < 0.01) and -0.18(p <0.001)

respectively. They explained the variance of 18% jointly after controlling the effect of demographic variables (model 2). Extraversion and agreeableness had no significant influence on learning burnout.

The results of table 2 also showed that the standardized regression coefficients of the class leader and home address in the controlled variables were significant, and the standardized coefficients (β) were 0.14 (p < 0.01) and -0.10 (p <0.05) respectively (model 3). They explained the 3% variance of learning performance.

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Agreeableness, openness to experience and conscientiousness had a significant influence on learning performance, in which the impact of agreeableness and openness to experience were negative, but that of conscientiousness was positive. The standardized coefficients (β) of agreeableness, openness to experience and conscientiousness were -0.21 ($p<0.001$), -0.11 ($p< 0.01$) and 0.34 ($p<0.001$) respectively. They explained the variance of 17% jointly after controlling the effect of demographic variables. Neuroticism and extraversion had no significant influence on learning performance (model 4). Learning burnout had a significant negative influence on learning performance. The standardized coefficient (β) was -0.11 ($p < 0.05$). Learning burnout explained 18% variance of learning performance (model 5). According to these outcomes, it was clear that learning burnout partially mediated the relation between conscientiousness and learning performance.

4 DISCUSSION

The results of this study showed that conscientiousness and agreeableness of big five personality had significant effects on the learning performance of medical university students. In particular, agreeableness had negative effects, but conscientiousness played a positive role.

Agreeableness had a negative effect on learning performance. Its possible explanation was that the greater the number of learning tasks of medical university students engaged in, then the greater the learning stress they faced[8-9]. High learning stress may break their normal life, so their body and mentality may be in a high stress state. If they are in such a state for too long, their learning performance would be influenced.

Conscientiousness has a positive effect on learning performance. In the work world, conscientiousness is linked to performance most strongly through the achievement orientation of conscientious persons [10-11]. A number of studies have linked conscientiousness to salary and earnings. For example, Orpen (1983) found that conscientiousness (characterized as need for achievement) predicted five-year salary growth in a sample of South African managers. Furthermore, Barrick and Mount (1991) noted a positive correlation ($\rho=.17$) between conscientiousness and salary in five studies they were able to locate examining this relationship. Conscientiousness also seems to enable persons to obtain promotions into more complex and prestigious jobs. A consistent finding from the assessment center literature is that ratings of achievement orientation effectively predict. For a medical university student, conscientiousness is positively and strongly linked to performance.

5. CONCLUSIONS

①All dimensions of big five were significantly correlated to learning performance except openness to experience. ② Conscientiousness had a positive effect on learning performance, but agreeableness had a negative effect on learning performance, neuroticism and extraversion had no significant effect.

③Learning burnout had a negative effect on learning performance, and it partially mediated conscientiousness' effect on learning performance.

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