

The Influence of Big Five Personality Conscientiousness and Learning Motivation on Senior High School Students' Academic Achievement

Meng Wang*, Xiangyu Wu

Logistics University of People's Armed Police Force, Tianjin 300309, China

*1329586517@qq.com

Abstract

Objective To study the influence and mechanism of high school students' conscientiousness and learning motivation on their academic achievement. **Methods** four classes were randomly selected from a key high school in Hebei Province to investigate the big five personality (NEO) questionnaire and Learning Motivation Scale (MTMS). SPSS software was used for correlation and hierarchical regression analysis. **Results** the C (conscientiousness) of the big five personality was 0.481 ($P < 0.01$), which was most significantly correlated with academic achievement. Compared with the correlation between learning motivation and academic achievement of 0.322 ($P < 0.01$), conscientiousness had a stronger ability to predict academic achievement. **Conclusion** the prediction ability of big five personality conscientiousness for senior high school students' academic achievement is stronger than learning motivation.

Keywords

High School Students' Academic Achievement; Conscientious Learning Motivation.

1. Research Background

Academic achievement is the embodiment of the results of students' learning tasks in the school, a kind of feedback of students' own learning activities, and the most important and key proof of ability in this period. Foreign studies also pay attention to the relationship between students' cognitive ability, executive function, learning style, personal personality and self-esteem and college students' mental health and academic achievement. Research shows that big five personality can well predict academic performance, and personality and learning motivation can significantly predict students' academic performance and mental health [7]. There is a high correlation between the two personality traits, so which personality trait has a stronger prediction of high school students' academic performance? This study takes the big five personality and learning motivation as independent variables and demographic factors as control variables to explore the impact of independent variables on academic achievement. The study selected a key middle school in a city of Hebei Province. A total of 267 people in four classes were investigated with the big five personality (NEO) questionnaire and Learning Motivation Scale (MTMS), and 222 valid questionnaires were collected. Among them, C (conscientiousness) $r = 0.481$ ($P < 0.01$) was the most significantly correlated with academic achievement; N (neuroticism) was negatively correlated with academic achievement, $r = 0.404$ ($P < 0.01$); A (agreeableness) $r = 0.255$ ($P < 0.01$); E (extroversion) $r = 0.182$ ($P < 0.01$); O (openness) $r = 0.158$ ($P < 0.05$); there was also a significant correlation between learning motivation and academic achievement, $r = 0.322$ ($P < 0.01$).

2. Research Methods

2.1. Research Object

This study takes senior two students of Dingzhou No. 2 middle school as the research object. Four classes are randomly selected. 267 questionnaires are tested and 222 valid questionnaires are recovered. The effective rate is 83%, including 136 boys, accounting for 61% and 86 girls, accounting for 38.6%.

2.2. Research Tools

1. Simplified version of Neo questionnaire

Zhang Xiaonan revised the Big Five Personality Scale (ipip-neo-pi-r). The A-coefficient square of the whole scale is 0.846, and the A-coefficient of each subscale is 0.760-0.881. The test-retest reliability after 2 weeks is 0.785, and the test-retest reliability of each subscale is 0.691-0.836 [4,5] The questionnaire contains 60 items and is divided into five dimensions: openness, conscientiousness, extraversion, agreeableness and neuroticism. The scale is scored with 5 points, from "completely inconsistent" to "very consistent" This paper analyzes the five dimensions, but we focus on the relationship between conscientiousness and academic achievement.

2. Learning motivation (MTMS) scale

The scale consists of 20 items. Each item is evaluated as "consistent" and "inconsistent". It includes four subscales:

① weak learning motivation: used to test whether the learning motivation is too weak; ② strong learning motivation: used to test whether the learning motivation is too strong; ③ learning interest distress: used to test whether the learning interest is troubled; ④ Learning goal obsession: test whether there is obsession with learning goals. This paper does not analyze the correlation of subscales, and mainly studies the impact of learning motivation on learning achievement.

3. academic record

The research object selected in this paper is the second grade students in senior high school. We collect a monthly test score and a mid-term score, and make a weighted average of the two scores as the average score level of students. Of course, the weighted average of the two scores can not fully represent the true level of a student, and there may also be the interference of external factors such as physical factors, environmental factors and abnormal performance.

3. Result Analysis

3.1. Correlation between Each Dimension of Big Five Personality and Academic Achievement

Table 1 describes the correlation. Table 1 shows that the correlation between core variables is in line with expectations. There is a strong correlation between conscientiousness and learning motivation ($r = 0.45, P < 0.01$). There is a significant correlation between conscientiousness and learning achievement, $r = 0.48 (P < 0.01)$; followed by a (agreeableness) and learning achievement, $r = 0.25 (P < 0.01)$; e (extroversion) was positively correlated with academic achievement, $r = 0.18 (P < 0.01)$; O (openness) was positively correlated with academic achievement, $r = 0.15 (P < 0.05)$; n (neuroticism) was negatively correlated with academic achievement, $r = 0.40 (P < 0.01)$;

3.2. Correlation between Learning Motivation and Academic Achievement

Table 1. Mean, standard deviation and correlation coefficient of each variable

	variable	M	SD	1	2	3	4	5	6	7	8	9	10
1	achievement	475.47	52.50										
2	Conscientiousness	40.93	6.07	0.48**									
3	nervous	31.95	7.89	-0.4**	-0.56**								
4	Extraversion	40.65	6.19	0.18**	0.31**	-0.4**							
5	Openness	40.85	6.42	0.15*	0.31**	-0.24**	0.32**						
6	agreeableness	42.32	5.88	0.25**	0.4**	-0.48**	0.25**	0.10					
7	Lower learning motivation	8.36	1.62	0.28**	0.41**	-0.31**	0.04	0.30**	0.31**				
8	Strong learning motivation	8.13	1.35	0.15*	0.2**	-0.34**	0.02	0.04	0.17**	0.3**			
9	Learning interest puzzle	8.81	1.00	0.16*	0.22**	-0.16*	-0.07	0.00	0.25**	0.35**	0.26**		
10	learning motivation	33.73	3.89	0.32**	0.45**	-0.46**	0.10	0.22**	0.37**	0.78**	0.66**	0.59**	
11	Learning goal puzzle	8.42	1.49	0.27**	0.39**	-0.44**	0.24**	0.22**	0.30**	0.44**	0.33**	0.24**	0.74**

Note: n = 222, * P < 0.05, ** P < 0.01, *** P < 0.001

Table 1 shows that there is a significant correlation between learning motivation and learning achievement, $r = 0.32$ ($P < 0.01$); too weak learning motivation is positively correlated with learning achievement, $r = 0.28$ ($P < 0.01$); learning goal distress is positively correlated with learning achievement, $r = 0.27$ ($P < 0.01$); learning interest distress is positively correlated with learning achievement, $r = 0.16$ ($P < 0.01$); too strong learning motivation is correlated with learning achievement, but there is no significant correlation in other dimensions, $r = 0.15$ ($P < 0.01$) It can be seen that too strong learning motivation will not improve performance. We should maintain appropriate learning objectives.

3.3. A Comparison between Conscientiousness and Learning Motivation in Predicting Academic Achievement

Table 2. Hierarchical regression analysis of conscientiousness and learning motivation predicting academic performance

variable	Model 1		Model 2		Model 3	
	b	β	b	β	b	β
1. Gender	-13.28	-0.12	-14.84*	-0.13*	-10.32	-0.09
2. Learning motivation			4.43***	0.32***	1.90*	0.14*
3. Due diligence					3.53***	0.40***
R ²	0.01		0.12		0.25	
F	3.40		15.34***		24.78***	
ΔR^2	0.01		0.10		0.13	
ΔF	3.40		26.88***		38.40***	

Note: n = 222, * P < 0.05, ** P < 0.01, *** P < 0.001

Through the method of hierarchical regression, this paper analyzes the two related variables of big five personality conscientiousness and learning motivation. Which variable has more significant correlation and stronger prediction ability for learning achievement. Firstly, control the variable of gender, and add the variable of learning motivation in the second layer, R^2 Value increases by 0.12, $\Delta F = 26.88$ ($P < 0.001$), which shows that learning motivation is a significant factor predicting learning achievement ($\beta=0.32$, $P < 0.001$). In the third layer, big five personality conscientiousness, R^2 Value increased by 0.13, $\Delta F = 38.40$ ($P < 0.001$) ($\beta= 0.40$, $P < 0.001$) has a stronger ability to predict academic achievement, at this time, gender and learning motivation become no longer significant. The model designed after hierarchical regression of three variables has statistical significance $R^2= 0.25$, $f = 24.78$ ($P < 0.001$). It is concluded that the prediction ability of big five personality responsibility on learning achievement is stronger than that of learning motivation, which is in line with the expected design.

4. Discuss

This paper mainly analyzes the influence mechanism of conscientiousness and learning motivation on senior high school students' academic achievement in the big five personality traits. The results show that both conscientiousness and learning motivation can significantly predict academic achievement. Through the hierarchical regression analysis of conscientiousness and learning motivation on achievement prediction, it can be concluded that conscientiousness has a stronger ability to predict academic achievement than learning motivation.

4.1. Conscientiousness Can Predict Academic Achievement better than Learning Motivation

The predictive reliability of personality test for academic achievement has been widely recognized by scholars at home and abroad [3]. Foreign scholars use the reliability estimation of predictor to eliminate the artificial variability of standard deviation and operational validity, so as to obtain the theoretical value of the validity of big five personality dimensions, and estimate the reliability distribution for each personality dimension. The average reliability of emotional stability, extroversion, openness, affinity and responsibility were 0.73, 0.75, 0.81 and 0.74 respectively. And foreign researchers also developed an empirical distribution of the five test retest coefficients, using the coefficients of the research report in the evaluation database. The average test-retest reliability of emotional stability, extroversion, openness, affinity and preciseness were 0.76, 0.75, 0.75, 0.71 and 0.77 respectively [6]. Table 2 shows that the five dimensions of the big five personality, except neuroticism, are negatively correlated with academic performance, the other four dimensions are positively correlated, especially the conscientiousness is significantly correlated. This is because students with high conscientiousness are more self disciplined and achieve better results by making learning plans and setting learning goals. The students with low Conscientiousness are relatively free and loose, lack of organization and systematicness, and are difficult to complete complex and long-term plans, so their grades are relatively poor. Learning motivation is often an instrumental identification motivation [1], which is not a pleasure from the heart, but more as an external goal and task. In this case, even if students are not interested in the learning content itself, they can regard learning as a task to be completed at present, and achieve academic success by virtue of perseverance, hard work, self-control and self-planning. Therefore, from this perspective, the relationship between conscientiousness and academic achievement will be closer than perseverance. Interestingly, the interpersonal relationship of students with high responsibility is relatively poor. Excessive concentration and rigorous attitude will make others feel tired and unhappy. Foreign studies have also demonstrated this point. In work learning that requires

more flexibility, initiative, creativity and cognitive complexity, responsibility may not be a good performance predictor (Da Costa et al., 2015; H ü lsheger et al., 2009; Hough, 1997; Robertson & Callinan, 1998; Robertson et al., 2000) [11].

4.2. Learning Motivation should be Moderate

Previous research results have proved that there is a significant positive correlation between learning motivation and academic achievement. The higher the individual learning motivation, the better the corresponding academic achievement, and the lower the learning motivation, the lower the corresponding academic achievement [8] Wang Qing, a domestic scholar, believes that the correlation between learning motivation and English achievement is the highest, the correlation between learning motivation and Chinese achievement is the second, and the correlation between learning motivation and mathematics achievement is the smallest, with the correlation coefficients of ($r = 0.665$), ($r = 0.758$), ($r = 0.812$) [2]. Among domestic scholars Xin Tao and Shen Jiliang [9] It is concluded that there is a significant positive correlation between academic achievement and learning motivation, and the higher the level of deeper motivation in learning motivation, the higher the individual academic achievement can be highly predicted; the explanation of learning motivation for academic achievement is 8%. This paper explores the correlation between each sub factor of learning motivation and academic achievement: the correlation coefficient between weak learning motivation and academic achievement is 0.288 ($P < 0.01$) The correlation coefficient between strong learning motivation and learning achievement was 0.159 ($P < 0.05$); the correlation coefficient between learning interest obsession and learning achievement was 0.167 ($P < 0.05$); the correlation coefficient between learning goal obsession and learning achievement was 0.270 ($P < 0.01$). The correlation coefficient between learning motivation (total) and learning achievement was $r = 0.32$ ($P < 0.01$). Strong learning motivation was related to learning achievement, but there was no significant difference in other dimensions, $r = 0.15$ ($P < 0.01$) It can be seen that students with too strong learning motivation will not improve their performance, and students with too weak learning motivation will do better than those with too strong motivation. Therefore, when setting learning goals, we should not aim too high, but set practical learning goals in combination with our own situation.

5. Research Significance and Shortcomings

First, this paper aims to analyze which factors can better predict academic performance through the investigation and Research on the personality traits and learning motivation of high school students. Second, students can better understand their personality traits and learning motivation, so as to make appropriate adjustments, better complete learning tasks and improve academic performance. Third, School Teachers can better predict academic performance according to students' personality traits Teaching students in accordance with their aptitude and giving more guidance and supervision to students with poor self-discipline. For the objects of this survey and research, there may be inaccurate data, great subjectivity of personality test itself, and it does not rule out that individual students perfunctory questionnaire in order to complete the task. Secondly, the collection of sample size is not large enough, which will lead to incomplete data and have a certain impact on the results.

References

- [1] Fang Luyao. The influence of perseverance and conscientiousness on College Students' academic performance: the intermediary role of deliberate practice -- Taking Zhejiang University as an example [J]. Higher education forum, 2019 (05): 103-109.
- [2] Wang Jinyang, Wang Mengcheng, Dai Xiaoyang. Prediction of academic achievement of senior high school students by intelligence and personality: the perspective of senior five [J]. Chinese Journal of clinical psychology, 2011,19 (6): 824-6.
- [3] Ge Panpan. Revision of the Big Five Personality Scale (ipip-neo-120) [D]. Yangzhou University, 2016.
- [4] Dai Xiaoyang, Yao Shuqiao, Cai Taisheng, et al. Application of Revised NEO Personality Questionnaire in China [J]. Chinese Journal of mental health. 2004,18 (18): 171-174.
- [5] Dai Xiaoyang, Wu Yiquan. Application of NEO-PI-R in people aged 16-20 [J]. Chinese Journal of clinical psychology. 2005,13 (1): 14-18.
- [6] Novikova, I. A., & Vorobyeva, A. A. (2017). Big Five Factors and academic achievement in Russian students. *Psychology in Russia. State of the Art*, 10(4), 93–106. doi: 10.11621/ pir. 2017. 0409.
- [7] Jesús F. Salgado and Gabriel Táuriz. The Five-Factor Model, forced-choice personality inventories and performance: A comprehensive meta-analysis of academic and occupational validity studies[J]. *European Journal of Work and Organizational Psychology*, 2014, 23(1) : 3-30.
- [8] Tao Yutong. Research on the influence of big five personality on employment performance of college graduates [D]. Hunan Normal University, 2020.
- [9] Xin Tao, Shen Jiliang, Lin Chongde. The reform of normal education from the perspective of teachers' knowledge structure [J]. *Research on higher normal education*, 1999 (06): 12-17.
- [10] Yang Xiaojiang. Research on the relationship between positive psychological capital, emotional intelligence and learning motivation of senior high school students [D]. Hebei University, 2017.
- [11] Jesús F. Salgado. Moderator effects of job complexity on the validity of forced-choice personality inventories for predicting job performance[J]. *Revista de Psicología del Trabajo y de las Organizaciones*, 2017.