The Effect of Big Five Personality on College Students' Learning Initiative: Self-Regulated Learning as a Mediator

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Abstract: In today's society education is getting more and more attention, and students' learning initiative is one of the research hotspots. Some researchers have found that students' learning initiative (LI) is one of the key factors of educational effectiveness, and personality traits are considered to be important determinants of individual behavior and decision-making. Self-regulated learning (SRL) acting as a mediator has not been fully investigated. Therefore, based on questionnaire survey data from Chinese college students, this paper uses correlation analysis, regression analysis, and mediation analysis to investigate the impact Five Factor Model of Personality (FFM) on college students' LI and the self- regulated learning. It is found that FFM significantly and positively influences college students' LI; SRL play a partial mediating role. The enhancement of self-regulated learning ability can promote students' LI.

1 INTRODUCTION

The rapid development of information technology makes it necessary for college students to have good LI, which can be used to adapt to the ever-changing demand for knowledge and skills. In Chinese universities, studies have shown that students do not spend much time on learning, whether in or out of class (Lin, 2019), with a low level of commitment to learning and a poor state of learning. In recent years, personality types have become more and more popular, and many people make clearer plans for their future by measuring personality types. Therefore, by studying the relationship between Five Factor Model of Personality (FFM) and learning initiative (LI), it helps students to improve their LI and teachers to improve their educational interventions.

This study analyzes the relationship between FFM and LI and the mediating role of self- regulated learning (SRL) via a questionnaire. On the basis of regression analysis, process model four plug-ins in SPSS were chosen to verify the mediation effect, in order to verify whether the mediating variable self-regulation sense plays a mediating effect in it.

2 LITERATURE REVIEW

LI refers to the emotional attitude of autonomy, motivation and active exploration that learners show in learning. The self-regulation model proposed by Zimmerman provides theoretical support for the understanding of LI (Zimmerman, 2002), which has multi-dimensional characteristics, including self-regulation (SR), motivation, goal setting and so on. In the current educational environment, LI is recognized as an important factor in influencing learning outcomes, improving learning outcomes and promoting lifelong learning. LI and learning outcomes (academic performance, knowledge mastery, and learning satisfaction) are proven to be positively correlated (Lei et al., 2024), and the self-determination theory proposed also emphasizes intrinsic motivation's importance on learning outcomes, which supports the importance of LI (Deci & Ryan, 2000). LI plays a role in students' academic life that should not be underestimated, and early on, researchers have already explored various factors affecting LI, such as personal traits (self-efficacy, intrinsic motivation), the social environment (teacher feedback, peer influence), and the learning environment (the difference between online and offline). While the FFM is one of the factors affecting LI among personality traits, everyone can basically be categorized into the FFM.

There is scarce literature on the FFM and LI. One study accumulated a sample of more than 70, 000 people and reported that academic performance (AP) was significantly associated with pleasantness, responsibility and openness personality (Poropat, 2009). Proactive personality and academic motivation in students' online learning are positively associated (Fu et al., 2024). Personality traits have also been investigated in academic achievement. It was found that neuroticism was negatively correlated and the other four dimensions is positively associated (Chen et al., 2021). Neuroticism is negatively correlated with all four LS (Komarraju et al., 2011). Wang obtained the effect of proactive personality on AP by collecting data from 388 college students and concluded proactive personality and AP are correlated (Wei et al., 2016). In previous studies, it has been found that different personality types do have different effects on learning (whether it is AP, academic engagement, academic achievement, or learning style).

An important component of learning is self-regulation (Neuman et al., 1999). Zimmerman and Bandura studied the sense of SR by emphasizing the individual's ability to control his or her own behavior during the learning process (Bidjerano, 2007; Anglim et al., 2020).

The relationship between FFM traits and SRL has been a topic of interest in various studies. One study studied team effectiveness at work and traits from the FFM factors (Onah et al., 2020). The article specifically examined the relationship between the FFM model and SRL strategies (Huang & Yu, 2019). There have also been studies that delved further into how learner differences in FFM traits affect the use of SRL strategies, suggesting that effortful regulation mediates the effects of responsibility and pleasantness (Whiteside et al., 2016).

SR involves the ability to control behaviors and emotions and plays an important role in fostering LI. Cognitive optimism can promote independent learning and SR among college students, emphasizing the relationship between LI and SR (Zimmerman, 2000). One study emphasizes the importance of SR in the learning process (Bandura, 1977). In addition, one prior study particularly based on high school students found a positive correlation between motivational regulation and SR, suggesting that students who demonstrate LI engage more in SRL behaviors (Thompson, 2005). In conclusion, the literature suggests a strong relationship between academic initiative and SR, but the extent to which SR is engaged across personality and academic initiative has not been fully explored.

However, relation between personality on LI has not been systematically investigated, and much of today's research on personality focuses on performance, work outcomes, career development, and leadership (Sirinarin, 1991). Although focusing primarily on those variables, these studies also provide a basis for understanding the relationship between FFM and learning and achievement (Wang et al., 2011). As well as whether the impact of research related to the relationship between FFM and academic initiative will undergo change if there is a sense of SR mediator intervention.

3 METHOD

3.1 Subjects

300 Chinese university undergraduates were selected through a stratified sampling method, in which they were divided into four grades, and the proportion of men and women was approximately half. 252 valid questionnaires were recovered and collated, and the average age is 18 to 24 years old.

3.2 Measurement

3.2.1 Chinese Big Five Personality Inventory (NEO-FFI)

The Chinese FFM Short Form Inventory (Costa & McCrae, 1992), first proposed by Costa and McCrae (Pintrich, 1991), was used in this paper, with a total of 40 questions, and the scale was based on a Likert 6-point scale(1=strongly disagree;6=strongly agree). The internal consistency coefficients for each subscale were good.

3.2.2 SR Learning Scale

This scale is derived from Zimmerman and Schunk's theory of SRL and is largely based on the SRL Questionnaire developed by Pintrich (Huang & Xie, 2013). The scale, which has been revised several times, aims to assess students' ability to regulate the learning process, including goal setting, use of learning strategies, time management, and self-reflection. The questionnaire contains 20 questions divided into four dimensions, including 5 questions on goal setting; 5 questions on learning strategies; 5 questions on time Management 5 questions; and Self-Reflection 5 questions. The scale was scored on a 5-point Likert scale (1=strongly disagree;5=strongly agree), with higher scores representing greater SR. The overall

reliability of the scale was 0. 89, goal setting 0. 85, learning strategies 0. 87, time management 0. 82, and self-reflection 0. 84.

3.2.3 LI Scale

The Questionnaire on College Students' LI was compiled by Huang Youquan et al. (2002), which was divided into four dimensions, including learning affectivity, learning self-control, learning interaction and learning conscientiousness, with a total of 17 questions. The answers to the questionnaires were set at four levels, namely, not very much, not much, basically, and very much, with scores of 1, 2, 3, and

4 respectively, and the lower the score, the lower the initiative in learning. The questionnaire has high content validity and reliability

4 RESULTS

4.1 Descriptive and Correlational Analysis

In this paper, the correlation coefficients and mean squares between the variables were calculated separately (See Table 1).

Table 1: Correlation between LI and FFM.

	LI	Neuroticism	Conscientiousness	Openness	Extraversion	Agreeableness
LI	1					
Neuroticism	0. 646**	1				
Conscientiousness	0. 610**	0. 509**	1			
Openness	0. 631**	0. 543**	0. 583**	1		
Extraversion	0. 700**	0. 459**	0. 602**	0. 543**	1	
Agreeableness	0. 608**	0. 590**	0. 450**	0. 448**	0. 565**	1

**. $P < 0.01$

4.2 Results of the SR Mediation Model Analysis

The model's coefficient of determination, R^2, was 0. 6550, indicating that FFM explained about 65. 50% of the variance in self-regulated sense, showing high model explanatory power. The mean square error (MSE) was 0. 1232, reflecting a small average error between the model predictions and the actual observations. The F-value of the overall regression model was 474. 6709 with degrees of freedom of 1 and 250 and the model was highly significant ($p < 0.001$). This indicates a significant effect of FFM type on SR, support the important role of FFM traits in explaining the variance in SRL, and provide a solid foundation for further mediation effect analyses (See Table 2).

Table 2: Summary of the SRL model.

R	0. 8093
R²	0. 6550
Mean Squared Error (MSE)	0. 1232
F	474. 6709
df1	1. 0000
df2	250. 0000
p	0. 0000

The constant term was not statistically significant. The results further confirm the significant positive effect of FFM type on SRL. This result suggests that for every unit increase in the independent variable FFM type, SRL increased by an average of 1. 0401 units and that this effect is highly statistically reliable (See Table 3).

Table 3: Regression coefficients of the mediating variable (SRL).

Variable	Coeff	SE	t	p	95% LLCI	95% ULCI
(Constant)	-0. 2485	0. 1899	-1. 3083	0. 1920	-0. 6225	0. 1256
FFM	1. 0401	0. 0477	21. 7869	0. 0000	0. 9461	1. 1341

In summary, FFM type is a significant and positive predictor of SR sense of self. The constant term was not significant, but the strong influence of the independent variable provided a solid foundation for the subsequent analysis of the mediating effect.

The model is able to explain about 75. 76% of the variance in LI, showing high explanatory power. The mean square error (MSE) was 0. 0333, reflecting a small average error between the predicted and actual observed values of the model, indicating a good model fit. The F-value of the overall regression model was 389. 1530 with degrees of freedom of 2 and 249

and p-value <0. 001 respectively, indicating that the model was highly statistically significant. These results indicate that the selected independent variables are significant joint predictors of LI and the overall model fit is excellent and can effectively explain the variance in LI. This provides a solid statistical foundation for further exploring the specific mechanism of the independent variables' influence on LI (See Table 4).

Table 4: Summary of LI model.

R	0. 8704
R²	0. 7576
Mean Squared Error (MSE)	0. 0333
F	389. 1530
df1	2. 0000
df2	249. 0000
p	0. 0000

The predictive value of the outcome variable LI is 0. 6154 when all the independent variables (FFM Type and SR) take the value of zero and this predictive value is significantly different from zero.

The results confirm the significant positive effect of FFM types on LI. This suggests that for every unit increase in FFM type, there is an average increase of 0. 2559 units in LI and that this effect is highly statistically reliable (See Table 5).

Table 5: Regression coefficient of LI.

Variable	Coeff	SE	t	p	95% LLCI	95% ULCI
Constant	0. 6154	0. 0990	6. 2162	0. 0000	0. 4204	0. 8103
FFM	0. 2559	0. 0422	6. 0609	0. 0000	0. 1727	0. 3391
Self-Regulated	0. 3643	0. 0329	11. 0894	0. 0000	0. 2996	0. 4290

FFM type has a significant positive direct effect on academic initiative. The statistical significance of the indirect effect was confirmed. These results suggest that FFM type not only directly affects LI, but also indirectly affects LI through sense of SR. Thus, sense of self- regulation plays a partially mediating role between FFM type and LI. In summary, the results support the hypothesis that FFM type indirectly affects LI through SR, reveal the complex mechanism of action between the variables, and provide empirical evidence for further understanding of their intrinsic relationship (See Table 6).

Table 6: Direct and indirect effects of FFM Traits on LI.

	Effect	SE	t	p	95% LLCI	95% ULCI
Direct Effect	0. 2559	0. 0422	6. 0609	0. 0000	0. 1727	0. 3391
Indirect Effect	0. 3789	0. 0479	-	-	0. 2810	0. 4634

The stratified 1 model included only the control variables with a coefficient of determination R2 of 0. 013 and an adjusted R2 of 0. 008, indicating that the explanatory power of the control variables on the dependent variable was low, but the model was significant overall (F (5, 894) =2. 436, p=0. 033) (See Table 7).

Table 7: Overall model comparison (incremental R² and F-Value).

	R²	AdjustedR²	ΔR²	F	df	p
Layer 1	0. 013	0. 008	0. 013	F(5, 894)=2. 436	(5, 894)	0. 033
Layer 2	0. 024	0. 018	0. 011	F(1, 893)=10. 067	(1, 893)	0. 002

$\triangle R^2$ denotes the increment in explained variance between model strata.
F-values and their corresponding p-values were used to test the overall significance of the model.
All confidence intervals are 95% and were estimated using 5000 self- sampling.

The Stratification 2 model introduced the independent variable on top of Stratification 1, and the coefficient of determination R2R was raised to 0. 024, and the adjusted R2R was raised to 0. 018, showing an increase in the explanatory power of the model. The incremental R2R of 0. 011, corresponding to a significant incremental F-value (F (1, 893) =10. 067, p=0. 002), indicates that the introduction of the independent variable contributes to the model with statistical significance.

5 DISCUSSION

The results suggest that FFM types not only directly affect LI, but also indirectly through the mediating variable SR. Individuals with higher SRL are better able to plan learning tasks,
monitor learning progress and adopt effective strategies when encountering difficulties. A positive correlation is observed between SRL and LI (Pintrich, 2002), which implies that increased SRL ability contributes to increased LI is also confirmed in this paper.

The study provides some suggestions for educational practice activities, where educators can design more personalized learning programs based on students' different personality traits and SRL theories, so that students can better improve their AP and learning efficiency, and increase their LI. Focusing on the development of students' SRL skills, research has found that SRL strategies and learning outcomes are positively correlated (Zimmerman, 2002), and that improved SRL skills can help improve AP (Hattie et al., 1997). Therefore, it is essential for educators to pay attention to learners' different personality types as well as SRL abilities.

There are still some limitations. This study used a questionnaire method, and subjects may have problems with subjective bias in filling out the questionnaire, and there is a need to try to expand the data sources and the sample size in future studies. Future research can explore the dynamic relationship between these variables through a longitudinal research design, and can also consider adding other factors that may affect LI, such as family background educational environment to the study.

6 CONCLUSION

In this study, the relationship between the FFM traits and LI, as well as whether SRL acts as a mediator are examined. The study adopted a cross-sectional design, data was collected via questionnaire.

The results of the study showed that FFM traits were significantly and positively related to LI. In addition, SRL played a significant mediating role. Improvement in SRL contributes to enhanced LI, and the FFM traits can indirectly affect LI by influencing SRL.

The present study provides a new perspective. The findings help educators to better develop effective teaching strategies, understand students' personality differences, and have important practical value for improving students' learning initiative and self-regulated learning.

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