

Research Article

The Influence of Transformational Tutor Style on Postgraduate Students' Innovative Behavior: The Mediating Role of Creative Self-Efficacy

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Postgraduates being as the backbone of the innovative talent team, the enhancement of postgraduates' innovative behavior has become the focus of higher education reform in the new era. Postgraduate students' innovative behaviors are influenced by multiple factors, and mentorship plays a crucial role in the cultivation of postgraduate students' innovative behaviors. This study is based on social cognitive theory and empirical analysis from the perspective of individual postgraduate students and mentorship cultivation. Multisource data were obtained from a research team attending a teacher training college in southwest China, and a questionnaire survey was conducted on 362 postgraduate students based on an online approach. The empirical study was conducted using SPSS software and AMOS software combined with hierarchical regression analysis and structural analysis of covariance to examine the mechanism of the effect of transformational tutoring style on postgraduate students' innovative behavior, using creative self-efficacy as a mediating variable. The results showed that the transformational tutoring style had a significant positive effect on the innovation behavior of postgraduate students, and the creative self-efficacy partially mediated the effect of the transformational tutoring style on the innovation behavior. According to the findings of the study, the creative self-efficacy of postgraduate students is enhanced through the collaboration of "multiple" subjects; the "integrated" cultivation model is built to create a transformative tutor team; a mentoring community is established. The study is aimed at providing a reference for the cultivation of innovation ability of master students.

1. Introduction

Postgraduates are an important reserve force for building an innovative country, and it is an important mission of postgraduate education to cultivate and improve the innovation ability of postgraduates [1]. In the increasingly competitive society, stimulating the innovative behavior of postgraduate students and enhancing their innovative ability is the focus of postgraduate education in universities. However, with the expansion of postgraduate student enrollment, there are many problems in the cultivation of postgraduate students, which can hardly meet the urgent needs of social development [2]. Therefore, further improving the quality

of postgraduate education and enhancing the innovation ability of postgraduate students is an urgent problem to be solved.

Past research has found that transformational leadership can change an individual's attitude toward work, enhance self-efficacy, improve the relationship between the leader and the individual, encourage intrinsic motivation to do innovative work, and promote the development of individual expertise skills as well as innovative cognition, thereby promoting innovative behavior [3, 4]. The development of students based on certain organizational situations is the basis of the tutoring style in the field of education. At present, postgraduate training adopts the tutor responsibility

system, and the tutor is the first responsible person for postgraduate training. The literature analysis reveals that tutor style is an important factor influencing the innovative behavior of postgraduate students [5]. At present, the research on tutor style and postgraduate students' innovative behavior mainly focuses on tutor styles such as authoritarian-benevolent [6], inclusive [7], supportive, and controlling [8], the impact is rarely studied. Meanwhile, most of the studies on transformational tutors' influence on research innovation behaviors focus on their main effects, and the specific paths of influence need to be further explored. In contrast to traditional tutorials, transformational tutors will influence students through their own behaviors, stimulate students' intrinsic motivation and recognition of academic goals, and increase students' creative self-efficacy; creative self-efficacy is a psychological perception generated by postgraduate students after self-judgment, which have an impact on the generation of behaviors and their outcomes. This study attempts to extend leadership theory to higher education by using Social Cognition Theory (SCT) as a theoretical basis. Based on leadership theory, this study explored the relationship between transformational tutoring style and postgraduate students' innovative behavior. Based on Social Cognition Theory, the mechanism of the influence of transformational tutoring style on postgraduate students' innovative behaviors was explored based on the mediating role of creative self-efficacy. Within the discussion, this research offers corresponding countermeasures and suggestions to promote the development of postgraduate education in colleges and universities.

2. Definition of Core Concepts

2.1. Transformational Tutor Style. The tutor style originated from the leadership style, and the more recognized leadership style classification is composed of the transformational leadership style and transactional leadership style proposed by Burns [9]. Bass extended his research results and formally proposed the theory of transformational leadership [10]. Based on Western research and combined with the reality of our country, Chinese scholars put forward that transformational leadership includes four dimensions: leadership charisma, intellectual stimulation, individualized consideration, and visionary motivation. Transformational tutors are developed based on transformational leadership [11]. Based on the definition of transformational leadership, this study concludes that the connotation of transformational tutoring style can be specifically summarized as a tutoring style that has good character, influences postgraduate students' value perspectives by leading by example, stimulates their high-level needs, appropriately guides and finds their research directions, provides students with the needed guidance and support in research and life and work, enhances intrinsic motivation, stimulates their intellect and thinking, and ultimately achieves the team's common goals.

2.2. Innovative Behavior. Innovative behavior is the result of a combination of individual and environmental factors, and refers to the process by which individuals generate innovative thinking or ideas and use their knowledge and abilities

to produce valuable innovative outputs [12]. Scott and others believe that individual innovation behavior is the process of recognizing problems, generating new ideas, seeking assistance and professional titles, and finally forming and spreading innovative results [13]. Chinese scholars define innovative behavior in two dimensions: the formulation of an innovative idea and the practice of innovation, for example, Gu Yuandong et al. consider innovation behavior as the act of generating an innovative idea or solution to a problem and putting it into practice [14]. According to the above point of view, this study considers the innovative behavior of postgraduate students as the meaningful problems found by postgraduate students in the process of inquiry, putting forward innovative ideas and making plans, seeking resources such as innovative methods or technologies, and applying the new methods and technologies in practice, leading to valuable innovative outputs.

2.3. Social Cognitive Theory. Social Cognitive Theory (SCT) is an educational theory proposed by American psychologist Bandura [15]. It provides a new perspective for explaining the occurrence of individual behaviors and explores the dynamic interrelationships between the environment, individuals, and their behaviors, considering environmental factors, behaviors, and personal factors as theoretical entities that influence each other, depend on each other, and determine each other, build a "ternary interaction model" [16] (Figure 1), which pays more attention to the influence of human self-factors and environmental factors on behavior. The theory suggests that the motivational factors affecting behavior may originate from the individual's core belief that the individual has the power to produce effects through his or her own actions [17].

Based on social cognitive theory, Tierney and Farmer combined creativity theory to propose "creative self-efficacy", which refers to the degree of confidence that individuals believe they have enough knowledge and ability to produce innovative results [18]. The intrinsic factors of an individual and the environment in which the individual is placed can influence the occurrence of individual behaviors; therefore, this study explores whether the emergence of innovative behaviors among postgraduate students is influenced by the combined effect of the environmental factor of the tutor's transformative style and the individual factor of creative self-efficacy. In other words, this paper takes social cognitive theory as the basic scaffold and combines the ternary interaction model to explore the mechanism role of individual postgraduate students' creative self-efficacy and transformative tutor's style to produce innovative behaviors. In other words, this paper uses social cognitive theory as a foundational scaffold, combined with a triadic interaction model, to explore the mechanistic role of individual postgraduate students' creative self-efficacy and transformative tutoring styles working together to produce innovative behavior.

3. Research Hypotheses

3.1. Transformative Tutor Styles and Postgraduate Students' Innovative Behavior. Transformational leaders not only advocate their own innovation and change, but also

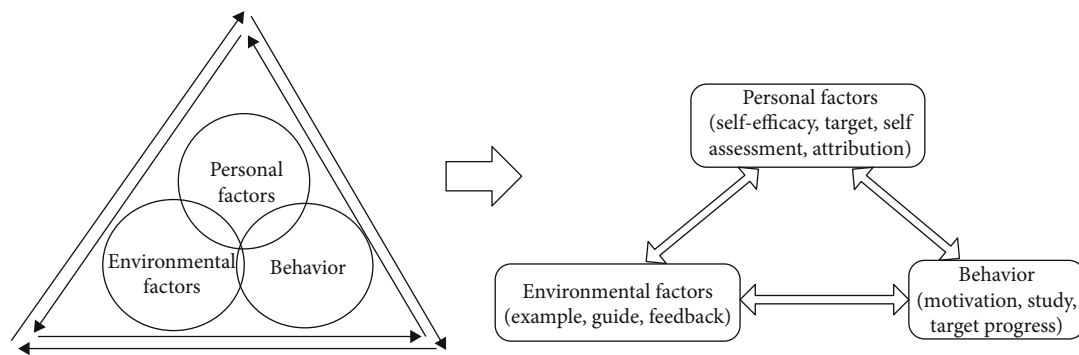


FIGURE 1: The ternary interaction model in social cognitive theory.

encourage subordinates to critically reflect on problems at work, think with an open mind at work, and encourage subordinates to discover their own curiosity, form unique ideas, and help subordinates become more willingness to come up with new solutions to existing problems [19]. It has been shown that transformational leadership style has a predictive effect on individual and organizational innovative behavior. Shin and Shung Jae showed that transformational leadership is significantly and positively related to employee innovation [20]. Gumusluoglu et al. showed through the results of hierarchical linear modeling that there is a positive relationship between transformational leadership and employee creativity, both at the individual adult and organizational levels [21]. Avolio et al. showed that transformational leaders use personal charisma to gain the respect of their members, motivate them to focus more on the work itself, express different care and resource support according to their different needs, and help them to innovate their approaches [22]. At the same time, through the description and transmission of visions and beliefs, original and unique ideas are formed, and they are encouraged to break the original fixed way, improve their exploratory thinking ability [23], and actively seek new ideas and new methods to solve problems [24]. Drawing on transformational leadership in organizational behavior to introduce transformational tutors, tutors who meet the characteristics of transformational leaders influence students' behaviors through personal charisma and values, gain recognition through individualized consideration and concern for students' needs, and draw vision for students to enhance students' enthusiasm, Promote innovative behavior of postgraduate students. Therefore, this study hypothesizes:

H1: Transformational tutor style has a positive impact on postgraduate students' innovative behavior.

3.2. The Mediating Role of Creative Self-Efficacy. Social cognitive theory purports that individuals will improve self-recognition and evaluation according to the environment, build self-efficacy, and then determine their behavior [25]. That is, creative self-efficacy is dynamic, and its changes depend on the impact of the environment on the individual [18]. According to Bandura, personal perceived support such as emotional support, encouragement and role models can be effective in increasing creative self-efficacy [26]. Leadership style plays an important role in the formation of indi-

vidual self-cognition and self-belief, which can promote the generation of innovative thinking and the improvement of creative self-efficacy [27]. On the one hand, transformational leaders tend to actively seek innovation or change, and subordinates often follow transformational leaders as an example, thereby stimulating the generation of creative self-efficacy. The two dimensions of tutor charisma and visionary motivation are to provide role models for the team to model and motivate students to put in more effort to achieve their goals. Individualized consideration is to provide individuals with spiritual and material support, and intellectual stimulation is to encourage and support individuals to think and practice creatively.

On the other hand, creative self-efficacy shows a strong confidence in one's ability to overcome difficulties. The generation and implementation of innovative behavior is a difficult and challenging process, and the psychological support provided by creative self-efficacy can help individuals cope with difficulties. Students are prone to high levels of negative physiological emotions (anxiety or frustration, etc.) during the innovation process, If a tutor guides students in a transformational way, the transformational tutor will show individualized consideration for the student during the innovation process, emphasize change, and the inspiration of the tutor, which helps to reduce negative emotions, set innovation goals, constantly encourage students to think outside the existing framework to reach their innovation goals, and increase their self-confidence. Creative self-efficacy has been proven to be beneficial in enhancing individual innovative behavior in numerous empirical studies, and Swati Mittal et al. found that creative self-efficacy mediates the relationship between transformational leadership and employee creativity through hierarchical regression analysis [28]. Yaping Gong and Jia-Chi Huang et al. found that employee learning orientation and transformational leadership were positively related to employee creativity, and these relationships were mediated by employee creative self-efficacy [29]. The mediating role of creative self-efficacy was verified by Chinese scholars Shi Qing et al. through hierarchical regression methods [30]. It is of great theoretical and practical significance to study the influence of creative self-efficacy as an independent variable on the creative behavior of postgraduate students. In summary, this study proposes the following hypotheses:

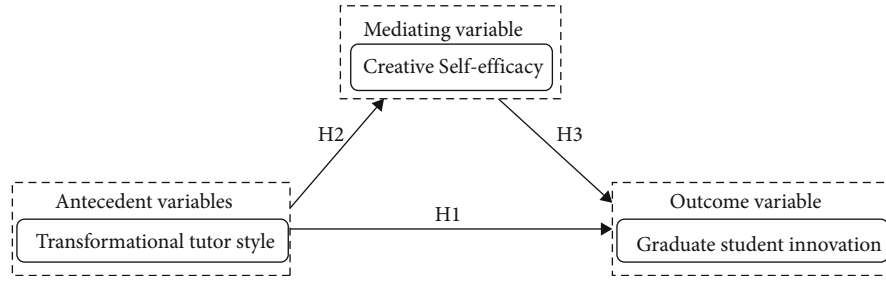


FIGURE 2: Theoretical model of the influence of transformational mentor style on graduate students' innovative behavior.

TABLE 1: Scale development.

Research variables	Measure variable	Measurement factor	Number of items
Transformational tutor style		Individualized consideration	5
		Tutor charisma	5
		Visionary motivation	5
		Intellectual stimulation	3
Creative self-efficacy		—	6
Innovation behavior		—	4

H2: Transformational tutor style has a positive effect on creative self-efficacy.

H3: Creative self-efficacy has a positive effect on postgraduate students' innovative behaviors.

H4: Creative self-efficacy plays a mediating role in the effect of transformational tutor style on graduate students' innovative behaviors.

According to the above research assumptions, the theoretical research framework constructed is shown in the following Figure 2:

4. Research Tools, Objects, and Methods

4.1. Research Tools. In order to ensure the reliability and validity of the measurement, the scales used in this study are all mature scales that have been used in domestic and foreign literature. We translated the scales into Chinese, and then back-translated into English by professionals, and compared the translated English and Due to the differences in the original texts, this study finally made appropriate modifications to the existing mature Chinese scales according to the characteristics of the research objects, as a tool for collecting empirical data. The main variables include transformational tutor style, creative self-efficacy, and innovative behavior, as shown in Table 1. Except for the control variables, the questionnaire topic scales were scored on a Likert5 scale, with scores ranging from low to high indicating the extent to which the respondents were satisfied with the presentation of the question items to their own situation, with 1 being very dissatisfied, 3 being average, and 5 being very satisfied.

4.1.1. Transformational Tutor Style Scale. Based on the transformational leadership scale compiled by Bass and Avolio, it is modified accordingly. It consists of 18 items in

4 levels about individualized consideration, tutor charisma, visionary motivation, and intellectual stimulation [31]. Individualized consideration includes "my tutor believes that each student has different needs, abilities, ambitions", etc., intellectual stimulation includes "my tutor will guide me to look at problems from different perspectives", etc., tutor Charisma includes "my tutor" Open-minded, with a strong sense of innovation, etc., visionary motivation includes "my tutor often analyzes their study and scientific research work together with students" and so on. In this study, the Cronbach's alpha for each subscale were 0.849, 0.774, 0.883, and 0.871, the Cronbach's alpha for the total innovative behavior scale was 0.956.

4.1.2. Creative Self-Efficacy Scale. Referring to the Personal Innovation Efficacy Questionnaire compiled by Carmeli and Schaubroeck [32], make minor modifications according to the characteristics of postgraduate students, including "I think I am good at putting forward creative insights and ideas in the face of problems", etc. (6 items). In this study, Cronbach's alpha for this scale is 0.854.

4.1.3. Innovation Behavior Scale. Referring to the "Innovative Behavior Scale" [13] compiled by Scott and Bruce, which is currently the most widely used, this study has been slightly modified according to the research objects, with a total of 4 items, including "I Always seek new theories, techniques, and methods to solve problems encountered in research", etc. In this study, Cronbach's alpha for this scale is 0.780.

4.1.4. Control Variables. Referring to the practice of previous related studies, we controlled for the demographic variables that may affect the innovative behavior of postgraduate students, including gender, grade, type of master's degree, type of degree and supervisor's title, and used these basic information as the control variables of this study [33–35].

TABLE 2: Reliability and validity test of sample.

Variable	Factor load	Convergent validity		Discriminant validity		
		CR	AVE	Transformational tutor style	Creative self-efficacy	Innovation behavior
Transformational tutor style	0.653-0.791	0.956	0.547	0.740		
Creative self-efficacy	0.669-0.763	0.838	0.509	0.535***	0.713	
Innovation behavior	0.699-0.818	0.733	0.478	0.437	0.532	0.691

*** $p < 0.001$. The diagonal line is the square root of each variable AVE size.

4.2. Research Objects. The study collected self-reported data to test our hypotheses using master's students from a research team at a teacher-training university in southwestern China. Using a random sampling method, teachers and classmates of this teacher training college were recruited to forward the questionnaires, 362 questionnaires were distributed, invalid questionnaires with no difference in filling or more missing information were excluded, and 331 valid questionnaires were recovered, with an effective rate of 91%. Among the respondents, there are 153 boys and 178 girls; 99 are academic postgraduates and 232 are professional postgraduates. In terms of subject distribution, 96 (29%) are in literature and history, 70 (21.15%) in science and engineering, and 70 in arts and sports, there are 106 students (32.02%) in the class and 59 students (17.82%) in other disciplines. In addition, among the supervisor titles of the surveyed research subjects, 35.4% are lecturers or assistant researchers, 34.1% are associate professors or associate researchers, and only 30.5% are professors or researchers. The distribution is relatively uniform and the sample is well represented.

4.3. Research Methods. According to the suggestion of Baron and Kenny, the existence of a correlation between variables is the premise of testing their mediating effect [36]. This study used SPSS 25.0 software for correlation analysis between variables and hierarchical analysis methods to test the research hypotheses, AMOS 24.0 for validated factor analysis (CFA) to test the reliability of the scale, parametric tests to explore whether the standardized path coefficients were significant, and bootstrapping to test whether the mediating effects between the different paths. There is a significant difference between the mediating effects of different paths.

5. Data Analysis and Empirical Testing

5.1. Common Method Variance. Common method variance produces systematic errors that seriously confound study results and are potentially misleading to conclusions. To avoid this problem, the questionnaires in this study were completed anonymously and the Harman one-way test was used to test for common method variance [37]. The questions of all variables in the questionnaire were subjected to unrotated factor analysis, the test results showed that the variance explained by the first-factor principal component was 36.369%, which did not exceed the critical value of 40%. According to the analysis results, there was no com-

mon factor to explain most of the variance, the amount of variation indicates that there is no serious homology bias in this study. That is, the subsequent correlation and regression analysis, structural equation model, and mediation effect test in this study are all statistically significant, and the data analysis results are authentic and credible.

5.2. Confirmatory Factor Analysis. In this study, confirmatory factor analysis was carried out on the scale data by AMOS24.0 software, and measurement model reliability analysis was performed. The study assessed the measurement model and structural model adopting the two-phase method of SEM proposed by Anderson and Gerbing [38]. The data analysis results (Table 2) showed that the factor loadings of the items included in each variable were all above 0.6, which met the judging criteria and have convergent validity. The combined reliability (CR) was greater than 0.7, the threshold recommended by Fornell and Larcker is 0.6 [39], indicating that all constructs have internal consistency. The study shows that AVE values between 0.36 and 0.5 are acceptable, while the ideal state AVE value should be greater than 0.5, and the average variance extracted (AVE) values of all variables are greater than 0.45, and the reliability of each dimension reaches an acceptable or ideal range with good convergent validity [38, 39]. Discriminant validity reflects the degree of difference between latent variables, and discriminant validity is performed by comparing the average extraction amount of variables and the square of the Pearson correlation coefficient between variables. The value of the average variance extraction of each variable (0.740, 0.713, and 0.691) was greater than the square of the Pearson correlation coefficient, indicating that the measurement model had good discriminant validity. Therefore, this study has good reliability and validity.

5.3. Correlation between Variables. This study uses SPSS25.0 to take the mean, standard deviation, and correlation analysis for each indicator variable (as shown in Table 3), aiming to explore whether the relationship between variables is consistent with the prediction of the research hypothesis. Correlation analysis shows that all dimensions of transformational tutor style are significantly positively correlated with postgraduate innovation behavior ($p < 0.01$) and are significantly positively correlated with creative self-efficacy ($p < 0.01$), and postgraduate innovation behavior and creative self-efficacy variables ($p < 0.01$) were significantly positively correlated, and the research hypotheses have been preliminarily verified.

TABLE 3: Means, standard deviation, and correlations among variables.

	M	SD	1	2	3	4	5	6
Transformational tutor style	59.108	17.180						
1. Creative self-efficacy	19.682	5.078	1					
2. Innovation behavior	13.741	3.502	0.437**	1				
3. Individualized consideration	16.253	4.911	0.412**	0.322**	1			
4. Visionary motivation	16.380	5.228	0.496**	0.357**	0.811**	1		
5. Tutor charm	16.662	5.300	0.459**	0.356**	0.820**	0.868**	1	
6. Intellectual stimulation	9.813	3.034	0.445**	0.350**	0.805**	0.779**	0.787**	1

** $p < 0.01$.

5.4. Hypothesis Testing

5.4.1. Multivariate Regression Analysis. After examining the relationship between transformational tutor style, creative self-efficacy, and innovative behavior, hierarchical regression was used to further understand the relationship between the dimensions of transformational tutor style and postgraduate students' innovative behavior. After controlling the control variables, a hierarchical regression analysis was performed, and the test results are shown in Table 4. Model1 failed the F -test; that is, the control variables did not affect the results of data analysis. The rest of the model regression equations pass the F -test, which means that the independent variables as a whole have a significant linear relationship to the dependent variable. Intellectual stimulation (Model3, $\beta = 0.357$, $p < 0.001$), tutor charisma (Model5, $\beta = 0.204$, $p < 0.05$) had a positive impact on postgraduate students' innovative behavior, and individualized consideration (Model4, $\beta = 0.118$, $p > 0.05$), visionary motivation (Model6, $\beta = 0.146$, $p > 0.05$), and postgraduate students' innovative behaviors had no significant correlation; intellectual stimulation (Model10, $\beta = 0.437$, $p < 0.001$), tutor charisma (Model12, $\beta = 0.251$, $p < 0.05$), visionary motivation (M13, $\beta = 0.354$, $p < 0.001$) were significantly positively correlated with creative self-efficacy, but there was no significant relationship between individualized consideration (Model11, $\beta = 0.142$, $p > 0.05$) and creative self-efficacy relationship. However, the total dimension of the transformational tutor style has a significant positive relationship with innovative behavior (Model2, $\beta = 0.384$, $p < 0.001$) and creative self-efficacy (Model9, $\beta = 0.481$, $p < 0.001$). Model7 ($\beta = 0.437$, $p < 0.001$) can positively predict the innovative behavior of postgraduate students. Thus, H1, H2, and H3 are verified.

5.4.2. Structural Equation Model Testing. In order to consider the interaction among the variables as a whole, to further present the overall influence among transformational tutoring style, creative self-efficacy, and innovation behavior precisely, and to test whether creative self-efficacy plays a mediating role, this study constructs a structural equation model based on hypothesis testing (Figure 3) to further test the research hypothesis and the theoretical model.

The model fit index is shown in Table 5, and the fit indices meet the ideal criteria except for AGFI, which meets the acceptable criteria. Therefore, this study believes that the

structural model fit between the transformational tutor style and graduate students' innovative behavior is relatively high.

There was a positive and significant direct effect of transformational tutoring style on postgraduate innovation behavior ($\beta = 0.20$, $p < 0.05$) (hypothesis H1 holds); there was a positive and significant effect of transformational tutoring on creativity self-efficacy ($\beta = 0.54$, $p < 0.001$) (hypothesis H2 holds); there was a positive and significant effect of creative self-efficacy on postgraduate innovation behavior ($\beta = 0.42$, $p < 0.001$) (hypothesis H3 holds).

5.4.3. Test of Mediation Effect. The study used the self-help method (bootstrapping) in AMOS 24.0 to test the significance of the mediating effect of creative self-efficacy of postgraduate students by setting a deviation-corrected percentile repeated sampling 5000 times and choosing a 95% confidence interval, mainly to examine whether the confidence interval of the mediating effect contains 0. If it does, the mediating effect is not significant, and on the contrary, the mediating effect is significant, so as to the mediating effect of creative self-efficacy was tested.

The results of the mediation effect test are shown in Table 6. The results of the mediation effect test show that the confidence interval of the indirect effect of creative self-efficacy (bias correction confidence interval: 0.106-0.328, percentile confidence interval: 0.1-0.321) and the confidence interval of the direct effect the interval (bias correction confidence interval: 0.038 to 0.308, percentile confidence interval: 0.039 to 0.31) do not include 0, and the z value is greater than 1.96. The specific mechanisms among the study variables are as follows: individualized consideration (0.088~0.260, 0.085~0.247), visionary motivation (0.089~0.295, 0.087~0.291), tutor charm (0.089~0.271, 0.083~0.263), and intellectual stimulation (0.097~0.308, 0.092~0.302); mediation effect intervals were not included 0, with significant indirect effects on postgraduate students' innovative behavior. Therefore, creative self-efficacy plays a partial mediating role between the transformational tutor style and postgraduate students' creative self-efficacy, and this study assumes that H4 holds.

5.5. Theoretical Implications

5.5.1. Transformational Mentoring Style Has a Positive Predictive Effect on Postgraduate Students' Innovative Behavior. The results show that the direct effect of

TABLE 4: Analysis of the relationship between transformational tutoring style, creative self-efficacy, and postgraduate students' innovative behavior.

(a)							
Variable	Innovation behavior						
	Model1	Model2	Model3	Model4	Model5	Model6	Model7
Student's gender	0.033	-0.033	-0.024	-0.028	-0.028	-0.029	-0.004
Student's grade	-0.012	-0.012	-0.021	-0.026	-0.022	-0.015	-0.015
Types of master's students	-0.047	-0.047	-0.061	-0.059	-0.063	-0.066	-0.039
Degree type	-0.037	-0.037	-0.054	-0.054	-0.039	-0.033	0.004
Tutor's title	-0.062	0.062	0.023	0.030	0.046	0.047	-0.018
Transformational mentoring style		0.384***					
Intellectual stimulation			0.357***				
Individualized consideration				0.118			
Mentor charm					0.204**		
Visionary motivation						0.146	
Creative self-efficacy							0.437***
Adjusted R^2	-0.005	0.128	0.112	0.114	0.123	0.124	0.188
F	0.727	8.727***	7.419***	6.610***	6.322***	5.800***	11.856***

(b)						
Variable	Creative self-efficacy					
	Model8	Model9	Model10	Model11	Model12	Model13
Student's gender	0.085	0.009	0.016	0.012	0.011	0.009
Student's grade	0.000	-0.012	-0.010	-0.017	-0.011	0.004
Types of master's students	-0.019	-0.004	-0.036	-0.034	-0.039	-0.047
Degree type	-0.108	-0.106	-0.129	-0.130	-0.111	-0.097
Tutor's title	-0.129	-0.006	-0.026	-0.017	0.003	-0.004
Transformational mentoring style		0.481***				
Intellectual stimulation			0.437***			
Individualized consideration				0.142		
Mentor charm					0.251**	
Visionary motivation						0.354***
Adjusted R^2	0.027	0.238	0.204	0.209	0.223	0.248
F	2.707***	16.801***	14.015***	12.462***	11.933***	12.111***

** $p < 0.01$; *** $p < 0.001$. The values in the table are the standardized coefficients β . Model1-Model6 represent the influence relationship model of independent variable transformational tutor style on the innovative behavior of dependent variable postgraduate students. Model7 represents the relationship model of the influence of the mediator variable creative self-efficacy on the dependent variable innovation behavior. Model8-Model13 represent the relationship between the independent variable transformational tutor style and the mediating variable creative self-efficacy. The above 13 models completely constitute the hierarchical regression analysis of the relationship between the independent variable and the dependent variable and the mediating effect of the mediating variable.

transformational mentors on postgraduate students' innovative behavior is 0.384. According to the results of hierarchical regression analysis, intelligence stimulation (0.357) and tutor charisma (0.204) had significant effects, while visionary motivation (0.146) and individualized consideration (0.118) had no significant effect on postgraduate students' innovative behavior (Table 4). This result is consistent with the exploration of transformational leadership styles and innovative behaviors in different empirical studies [24, 40].

5.5.2. Creative Self-Efficacy Can Promote the Innovation Behavior of Postgraduate Students. The research shows that in the influence mechanism of postgraduate students' innovative behavior, the level of creative self-efficacy is an important factor to determine the occurrence of postgraduate students' innovative behavior [41]. Creative self-efficacy shows a strong belief in success and the confidence to complete difficult tasks. The implementation of innovative behavior itself is a process with difficulties and challenges. The psychological power provided by creative self-efficacy

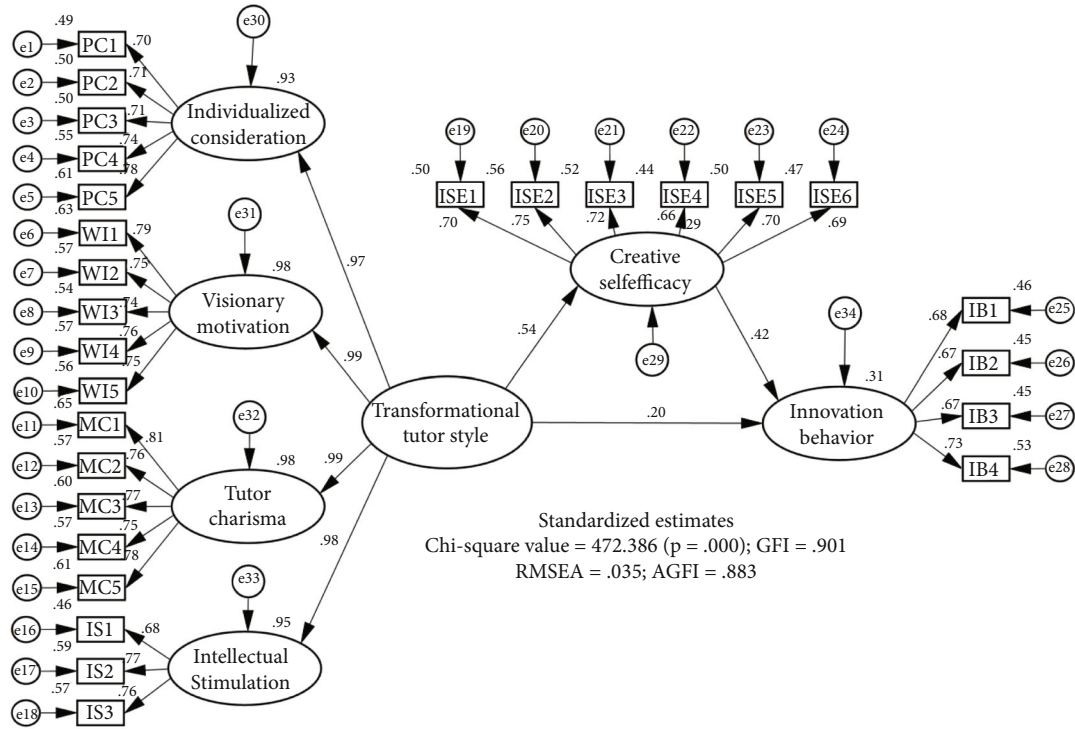


FIGURE 3: Structural equation model diagram of the influence of transformational tutor style on postgraduate students' innovative behavior.

TABLE 5: Goodness of fit index.

Fit indices	χ^2/df	GFI	AGFI	CFI	RMSEA	SRMR
Fit measure	1.377	0.901	0.883	0.972	0.035	0.039
Tolerance range	<3	>0.9	>0.9	>0.9	<0.05	<0.05
Fit discrimination	Pass	Pass	Pass	Pass	Pass	Pass

can help students face difficulties and challenges [42]. Therefore, the higher the creative self-efficacy of postgraduates, the more they can promote the realization of innovative behavior.

5.5.3. Creative Self-Efficacy Plays a Partially Mediating Role in the Process of Transformative Tutor Style Promoting Innovative Behavior in Postgraduate Students. As shown in Table 6, transformational tutoring style affects innovation behavior by influencing creative self-efficacy [43]. It can be seen that creative self-efficacy is an important way for postgraduate students to transform the guiding style they feel into positive innovation. The mediating effect of creative self-efficacy accounts for 53.74% of the total effect, which is an important way for postgraduate students to transform their perceived guiding style into positive innovation. As reported in previous studies, tutors treat students in a transformative way and play a greater role in improving their scientific research ability and their willingness to persevere, enhance confidence, and pursue innovation [44]. Improve postgraduate students' creative self-efficacy, stimulate intrinsic motivation, and further promote the occurrence of postgraduate students' innovative behavior [45].

6. Discussion

The results of the study showed that transformational tutoring style positively predicts postgraduate student innovation behavior. As the main person in charge of postgraduate education, the tutors' actions and behaviors will have a subtle influence on them. Building a team of transformative tutors and constructing an integrated cultivation model of "establishing norms - eliminating heterogeneity - building networks" will promote the creation of innovative behaviors. Encourage tutors to develop the characteristics of a transformative tutor. In terms of individualized consideration, we focus on the different characteristics and needs of individuals. Intellectual stimulation is a trait that encourages postgraduate students to challenge themselves and to explore their potential. In mentor leadership, charisma is demonstrated by articulating a compelling developmental blueprint to students, fully demonstrating personal charisma and good character so that they identify with their leadership style, establish an emotional connection, and commit to a common goal.

Creative self-efficacy plays an important role in the generation of innovative behaviors in postgraduate students. By mobilizing the participation of "multiple" subjects such as school organization managers, supervisors, and individual postgraduate students to form a synergy, the creative self-efficacy of postgraduate students can be enhanced. School administrators can enhance the positive psychological state of postgraduate students through training and regularly understand the dynamics of postgraduate students' participation in innovation efficiency through various channels. Tutors should adopt a more transformative style and give

TABLE 6: Mediation test of creative self-efficacy.

Parameter	Effect	Estimate	Product of coefficients		Bootstrapping (95% CI)				Indirect effect ratio
			SE	z value	Bias-corrected		Percentile method		
					Lower	Upper	Lower	Upper	
Transformational tutor style → creative self-efficacy → innovation behavior	Indirect	0.201	0.055	3.655	0.106	0.328	0.100	0.321	53.74%
	Direct	0.173	0.069	2.507	0.038	0.308	0.039	0.310	
Individualized consideration → creative self-efficacy → innovation behavior	Indirect	0.158	0.042	3.762	0.088	0.260	0.085	0.247	54.30%
	Direct	0.133	0.057	2.333	0.028	0.260	0.025	0.252	
Visionary motivation → creative self-efficacy → innovation behavior	Indirect	0.180	0.052	3.462	0.089	0.295	0.087	0.291	55.90%
	Direct	0.142	0.068	2.088	0.010	0.277	0.012	0.282	
Tutor charisma → creative self-efficacy → innovation behavior	Indirect	0.166	0.045	3.689	0.089	0.271	0.083	0.263	52.37%
	Direct	0.151	0.060	2.517	0.034	0.273	0.036	0.276	
Intellectual stimulation → creative self-efficacy → innovation behavior	Indirect	0.188	0.053	3.547	0.097	0.308	0.092	0.302	54.65%
	Direct	0.156	0.075	2.080	0.024	0.323	0.020	0.319	

timely recognition and affirmation to their innovation achievements, focusing not only on innovation output but also on innovation growth experience to stimulate self-efficacy. In addition, postgraduate students should enhance their own concentration and commitment and actively undertake challenging tasks to enhance their own abilities in various aspects, which is not only conducive to their creative self-efficacy but also greatly helps to generate innovative behaviors.

To promote “learning” by “guiding” around the main role and create a learning-guiding community, the guiding community is based on the premise of the two-way interaction between guiding and learning and establishes a healthy relationship of mutual integration between “benefiting teachers” and “benefiting students” [46]. This study shows that by creating a community of tutors and students, we promote the establishment of complementary strengths and synergistic and innovative tutoring relationships. Tutors should be good at conveying bright future visions to students, understand students’ life, study, etc., and establish emotional communication; if students encounter difficulties in scientific research and innovation, tutors should give more care and support and respect the different needs of students to motivate them and stimulate the generation of innovative thinking. In addition, tutors should enhance their own communication and coordination skills, actively organize academic seminars, provide timely feedback on students’ innovative behaviors, continuously summarize students’ understanding of the significance of their tasks, create good mentoring relationships, enhance students’ creative self-efficacy, and promote innovative behaviors.

7. Conclusion

The study proposes a mediational model based on social cognitive theory that draws on transformational management, creative self-efficacy, and innovative behavior from organizational behavior to apply and validate them in an educational context, providing insight into the impact and mechanisms of action of the dimensions of transformational tutoring style on postgraduate students’ innovative behavior.

Our study has important implications for postgraduate education efforts in universities, but there are limitations to this study due to the research conditions. First, this is a cross-sectional study and exact causal inferences between variables could not be obtained. Second, the applicability of the findings may be diminished due to time and the researcher’s personal ability and effort; in this study, the sample was composed of graduate students from a research team of a teacher training institution. Despite these limitations, this study provides a reference for school administrators and postgraduate student supervisors to draw on our findings to develop strategies for enhancing graduate students’ innovative behavior. In future research, the scope of the study needs to be further expanded to obtain data through multiple research methods to make the findings more accurate.

Data Availability

The data used to support the findings of this study are included within the supplementary information file, and they are available from the first author upon request.

Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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