Article

The Impact of Paradoxical Mentorship Style on Graduate Students' Research Creativity

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Abstract: This study develops a research model in which paradoxical mentorship style serves as the independent variable, harmonious and obsessive academic passion function as mediating variables, graduate students' research creativity acts as the dependent variable, and challenging as well as hindering research stressors play moderating roles. The empirical findings indicate that paradoxical mentorship style exerts a significant positive impact on graduate students' research creativity. Both harmonious and obsessive academic passion partially mediate this relationship. Moreover, challenging and hindering research stressors positively moderate the effects of paradoxical mentorship style on academic passion (both harmonious and obsessive), and further strengthen the mediating role of academic passion. This research clarifies the mechanism through which paradoxical mentorship style fosters graduate students' research creativity and offers targeted recommendations for improvement at three levels: academic institutions, supervisors, and graduate students themselves.

Keywords: paradoxical mentorship style; graduate students; research creativity; academic passion; research stressors

1. Introduction

Graduate students represent a vital reserve of high-level talent for advancement of academic and scientific research. Their research creativity not only determines their individual academic progress but also plays a crucial role in advancing the research capacity of universities and realizing promotion of innovation and research excellence. With the rapid advancement of science and technology and the intensifying global competition for knowledge, enhancing graduate students' research creativity has become an urgent issue of strategic importance.

Research creativity refers to the ability of individuals to generate novel and valuable ideas in the process of conducting research [1]. Its influencing factors include personal attributes such as cognitive style and self-efficacy, as well as organizational and environmental factors such as team atmosphere and supervisory guidance [2-5]. As the primary actor responsible for graduate training, supervisors exert significant influence on graduate students' research performance. Previous studies have demonstrated that supervisory styles—such as supportive, controlling, or paternalistic—affect students' willingness to innovate and their creative behaviors [6-8]. However, these styles tend to emphasize a single orientation of guidance, lacking the ability to address contradictory situations and failing to fully respond to the increasing complexity and uncertainty in today's research environment.

With organizational environments becoming more dynamic and diverse, tensions and contradictions faced by leaders in the supervisory process are becoming increasingly prominent. The traditional "either–or" style of guidance often struggles to reconcile the

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demands of high standards with the developmental needs of subordinates [9]. Against this backdrop, paradoxical leadership has drawn growing scholarly attention. This leadership style adopts a mindset that integrates competing demands, considering issues from multiple perspectives to simultaneously meet organizational goals and individual developmental needs. It addresses organizational challenges through integration and dynamic coordination [10]. By employing paradoxical thinking, leaders are able to balance opposing elements, respond to "both–and" requirements, and transform contradictions into a unity of opposites [11]. Existing research has shown that paradoxical leadership can effectively stimulate employee creativity and foster team innovation in corporate contexts [12,13]. However, limited attention has been paid to its application in higher education, particularly in understanding its influence on graduate students' research creativity.

In the university context, the relationship between supervisors and graduate students resembles that between leaders and subordinates in organizational settings [14]. Building on this analogy, the present study extends paradoxical leadership theory to the higher education domain and introduces the concept of paradoxical mentorship style. Specifically, the study explores its impact on graduate students' research creativity. To further clarify the underlying mechanism, harmonious and obsessive academic passion are incorporated as mediating variables, while challenging and hindering research stressors are included as moderating variables. Accordingly, a comprehensive conceptual model is developed and tested through empirical analysis. This research not only enriches the theoretical perspective on the relationship between supervisory style and graduate students' creativity but also provides practical pathways and strategies for universities to strengthen research capacity and foster innovation among graduate students.

2. Literature Review and Hypotheses Development

2.1. Paradoxical Mentorship Style and Research Creativity

Paradoxical mentorship style refers to a supervisory approach that seeks dynamic balance amid contradictions, integrating seemingly opposing but essentially complementary behaviors in the mentoring process. Drawing on prior leadership studies, Zhang et al. identified five typical dimensions of paradoxical leadership [15]. Within the higher education context, the supervisor–student relationship is analogous to the leader–employee relationship, where paradoxical mentorship style serves as a critical paradigm for supervisors to reconcile multiple role conflicts and respond to students' diverse needs.

Based on prior findings on leadership style and employee creativity, paradoxical mentorship style may enhance graduate students' research creativity through several mechanisms. First, by balancing self-centeredness with other-centeredness, supervisors demonstrate respect and recognition of students' role as the main actors in research, thereby enhancing students' self-esteem, confidence, and self-efficacy, which in turn stimulates creativity [16]. Second, supervisors maintain closeness while also keeping professional distance, fostering positive relationships that encourage students' enthusiasm and vitality for innovation [17]. Third, supervisors treat students equally while allowing them to leverage their unique strengths, which enables students to feel more confident and effective in their research. Fourth, paradoxical mentors balance strictness with flexibility in task management: they ensure progress while leaving space for independent exploration, showing tolerance toward unexpected difficulties in high-level research. Finally, while maintaining authority, paradoxical mentors also grant students certain decision-making power, satisfying their psychological need for autonomy and enhancing their sense of responsibility and intrinsic motivation for innovation [18].

In summary, paradoxical mentorship style helps to reconcile multiple tensions in the supervisory process, creating a research environment that is simultaneously stable and open, which motivates students' innovative behaviors and fosters research creativity. Based on this reasoning, we propose the following hypothesis:

H1: Paradoxical mentorship style has a positive effect on graduate students' research creativity.

2.2. The Mediating Role of Academic Passion

Academic passion is widely recognized as a core factor influencing the quality of graduate education [19]. It refers to graduate students' strong preference, intrinsic motivation, and emotional orientation toward academic activities they consider valuable and enjoyable [8]. Following the dualistic model of passion, academic passion can be categorized into harmonious passion and obsessive passion, depending on the extent to which students internalize academic activities as part of their identity [20].

From the perspective of leader–member exchange theory, paradoxical mentors adopt inclusive supervision, respecting individual differences, providing substantive support, and granting moderate academic autonomy. Under such conditions, students are more likely to develop a sense of psychological safety, especially when encountering research bottlenecks. Supervisors' differentiated strategies, including tolerance of trial and error, reduce students' anxiety about negative evaluation, allowing them to dedicate more cognitive resources and time to research tasks. This process strengthens students' sense of self-efficacy, encouraging them to break away from conventional thinking and engage in exploratory innovation, ultimately enhancing research creativity [21].

Prior studies have suggested that either form of academic passion—harmonious or obsessive—can positively influence research capacity [22]. Zhang et al. further demonstrated that both harmonious and obsessive academic passion mediate the relationship between paternalistic supervisory style and graduate students' creativity [23]. Accordingly, we propose:

H2a: Harmonious academic passion mediates the relationship between paradoxical mentorship style and graduate students' research creativity.

H2b: Obsessive academic passion mediates the relationship between paradoxical mentorship style and graduate students' research creativity.

2.3. The Moderating Role of Research Stressors

Research has shown that different types of stressors have heterogeneous psychological effects on graduate students in their academic work [24]. According to cognitive appraisal theory, when faced with challenging research stressors (e.g., innovative experimental designs or demanding academic tasks), students are likely to appraise them as opportunities for growth, thereby experiencing positive emotions [25]. This fosters a positive cycle in which self-efficacy and problem-focused strategies—such as effective time management and seeking academic support—enhance both task efficiency and competence.

By contrast, hindering stressors (e.g., repetitive data processing) are perceived as resource-depleting, evoking strong negative stress reactions and reducing motivation [25]. Under such conditions, paradoxical mentors' behavior of "high expectations but low support" may disrupt students' cognitive evaluations, weaken academic passion, and lead to frustration, anxiety, and disengagement [26]. To restore psychological balance, students may reduce their research involvement, thereby undermining creativity. Based on the above, we hypothesize:

H3a: Challenging research stressors positively moderate the effect of paradoxical mentorship style on academic passion (both harmonious and obsessive).

H3b: Hindering research stressors negatively moderate the effect of paradoxical mentorship style on academic passion (both harmonious and obsessive).

Integrating Hypotheses 2 and 3, this study proposes a moderated mediation model: academic passion mediates the relationship between paradoxical mentorship style and research creativity, while research stressors moderate both the direct effect of mentorship

style on passion and the indirect effect of mentorship style on creativity via passion. Specifically, under higher levels of challenging stressors, students are more likely to positively interpret paradoxical mentorship, thereby internalizing its "strict yet tolerant" duality, which fuels academic passion and fosters creativity. Conversely, under high hindering stressors, students may misinterpret paradoxical supervision, leading to diminished academic passion and reduced creative outcomes [27]. Thus, we hypothesize:

H4a: Challenging research stressors positively moderate the mediating effect of academic passion (harmonious and obsessive) between paradoxical mentorship style and research creativity.

H4b: Hindering research stressors negatively moderate the mediating effect of academic passion (harmonious and obsessive) between paradoxical mentorship style and research creativity.

Finally, this study established a moderated mediation model with paradoxical mentorship style as the independent variable, graduate students' research creativity as the dependent variable, academic passion as the mediator, and research stressors as the moderator, as illustrated in Figure 1.

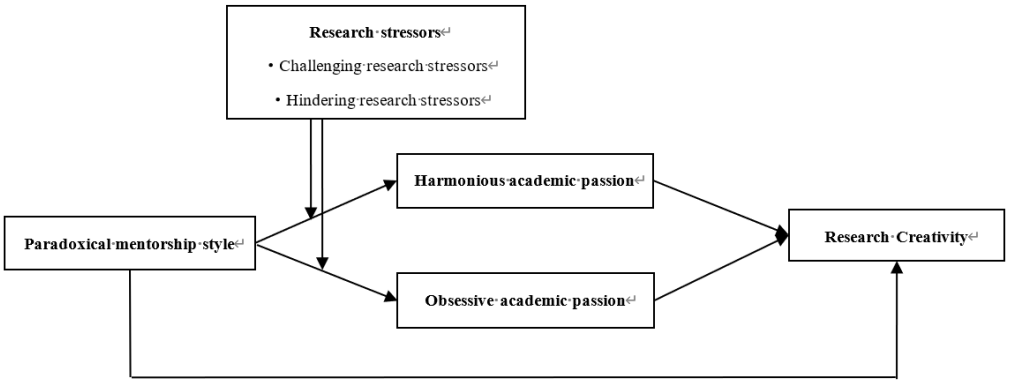

Figure 1. Theoretical Framework Diagram.

3. Research Design

3.1. Research Sample

A questionnaire survey was conducted among graduate students from five universities in Shaanxi and Henan provinces. A total of 340 questionnaires were collected. After excluding incomplete or patterned responses, 273 valid questionnaires were retained, yielding an effective response rate of 80.29%. The demographic distribution of the valid sample is presented in Table 1.

Table 1. Sample Distribution.

Name	Category	Quantity	Percentage (%)	Name	Category	Quantity	Percentage (%)
Gender	Male	131	48.0	Supervisor Gender	Male	167	61.2
	Female	142	52.0		male	106	38.8
Age	≤19 years old	0	0.0	Supervisor Age	≤40 years old	79	29.0
	20 - 25 years old	108	39.6		41 - 49 years old	133	48.7
	26 - 30 years old	92	33.7		≥50 years old	61	22.3
	≥31 years old	73	26.7	Supervisor Title	Professor	101	37.0
Grade	1st - year Master	142	52.0		Associate Professor	130	47.6

	2nd - year Master	46	16.8		Lecturer	42	15.4
	3rd - year Master	37	13.6		Others	0	0.0
	Master+	48	17.6	University Type	Double First-Class	157	57.5
Discipline Type	Science & Engineering	146	53.5		Non-Double First-Class	116	43.5
	Humanities & Social Sciences	127	46.5				

3.2. Measurement Instruments

All measurement items in this study adopted a five-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree").

Paradoxical mentorship style. Adapted from the 22-item scale developed by Zhang et al. on paradoxical leadership, revised to fit the supervisor–graduate student context in universities [15]. The scale covers five dimensions. A sample item is: "My supervisor manages students in a unified manner while also considering their individual needs."

Academic passion. Measured using the scale developed by Vallerand et al., adapted into the Chinese academic context by Wang [28,29]. The scale includes two dimensions: harmonious passion and obsessive passion, with 10 items in total. Sample items include: "No matter how difficult research becomes. I persist in taking on challenges" (harmonious passion); "I cannot imagine my life without academic work" (obsessive passion).

Research stressors. Measured using Cavanaugh et al.'s scale, adapted for graduate research contexts [30]. It includes two dimensions: challenging stressors and hindering stressors, with 11 items in total. Sample items include: "I often feel pressed for time in my research work" (challenging stressor); "My academic career seems to be at a standstill" (hindering stressor).

Research creativity. Measured using the scale adapted by Meng and Luo, consisting of 6 items [31]. A sample item is: "I interpret research problems from new perspectives."

Control variables. Based on prior studies, demographic variables such as gender, grade level, discipline, and supervisor title were included as controls.

SPSS 27 and AMOS 24 were employed to validate the reliability of the scales, test the structural model, and examine the hypotheses.

4. Results and Empirical Analysis

4.1. Descriptive Statistical Analysis

The means, standard deviations, and correlation coefficients of all variables are presented in Table 2. Paradoxical leadership style was significantly positively correlated with harmonious academic passion ($r = 0.516$, $p < 0.01$), obsessive academic passion ($r = 0.497$, $p < 0.01$), and graduate student creativity ($r = 0.475$, $p < 0.01$). Harmonious academic passion was significantly positively correlated with graduate student creativity ($r = 0.586$, $p < 0.01$), and obsessive academic passion was significantly positively correlated with graduate student creativity ($r = 0.552$, $p < 0.01$). The hypotheses H1, H2a, and H2b were preliminarily supported.

Table 2. Means, Standard Deviations, Correlation Coefficients, and Internal Consistency Coefficients of Key Variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Students' Gender	NA													

2. Students' Age	-0.007	NA												
3. Students' Grade	-0.027	0.891***	NA											
4. Students' Discipline Type	0.131**	0.003	0.001	NA										
5. Students' University Type	-0.049	0.045	0.062	-0.103	NA									
6. Supervisors' Gender	-0.002	-0.013	-0.003	0.025	0.015	NA								
7. Supervisors' Age	0.004	-0.008	-0.007	0.055	0.059	-0.021	NA							
8. Supervisors' Title	0.029	0.029	0.028	-0.006	-0.01	-0.012	-0.423***	NA						
9. Paradoxical Mentorship Style	-0.101*	-0.037	-0.03	-0.018	0.03	-0.04	0.014	-0.065	0.965					
10. Challenging Research Stressors	-0.019	-0.07	-0.079	0.013	-0.083	-0.036	0.046	0.008	-0.409***	0.888				
11. Hindering Research Stressors	-0.011	-0.05	-0.076	-0.014	-0.084	-0.013	0.037	0.037	-0.403***	0.891***	0.884			
12. Harmonious Academic Passion	0.053	-0.01	-0.018	0.055	0.069	0.029	0.043	-0.044	0.516***	-0.637***	-0.592***	0.867		
13. Obsessive Academic Passion	-0.017	0.036	0.031	-0.007	0.101*	0.064	-0.025	0.002	0.497***	-0.583***	-0.558***	0.789***	0.801	
14. Research Creativity	-0.014	0.026	-0.007	-0.018	0.135**	-0.004	0.039	-0.038	0.475***	-0.514***	-0.461***	0.586***	0.552***	0.799
Mean	1.52	2.87	1.97	1.47	1.42	1.39	1.93	1.78	3.87	2.25	2.24	3.94	3.94	4.14
SD	0.50	0.80	1.17	0.50	0.50	0.49	0.71	0.69	0.88	0.10	1.03	1.01	0.84	0.67

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; NA = Not Applicable; Bold values represent the Cronbach's α coefficients of each scale.

4.2. Common Method Bias Test

The "Harman single-factor method" was employed to test for common method bias. The test results extracted four factors with eigenvalues greater than 1, and the variance explained by the first factor was 38.30%, which is below the 40% threshold. Therefore, the data in this study do not suffer from serious common method bias.

4.3. Confirmatory Factor Analysis

Confirmatory factor analysis was conducted using AMOS software, and the results are presented in Table 3. It is evident that the six-factor model had the best fit: $\chi^2/df = 1.232$, RMSEA = 0.029, CFI = 0.968, indicating good construct validity.

Table 3. Results of Confirmatory Factor Analysis.

Model	Factor	χ^2	df	χ^2/df	RMSEA	CFI	GFI	NNFI
6 - factor model	A, B, C, D, E, F	1369.75	1112	1.232	0.029	0.968	0.853	0.967
5 - factor model	A + B, C, D, E, F	2397.31	1117	2.146	0.065	0.843	0.843	0.835
4 - factor model	A + B+C, D, E, F	2968.13	1121	2.648	0.078	0.774	0.682	0.763
3 - factor model	A+B+C+D, E, F	3494.01	1124	3.109	0.088	0.71	0.626	0.696
2 - factor model	A+B+C+D+E, F	3668.26	1126	3.258	0.091	0.689	0.607	0.675
Single - factor model	A+B+C+D+E+F	3866.35	1127	3.431	0.095	0.664	0.586	0.65

A, B, C, D, E represent paradoxical mentorship style, challenging research stressors, hindering research stressors, harmonious academic passion, obsessive academic passion, and research creativity respectively; "+" indicates the merging of the two preceding and following factors.

4.4. Hypothesis Testing

4.4.1. Main Effects and Mediation Tests

The hypothesized relationships were tested using hierarchical regression in SPSS 27.0. First, the main effect of paradoxical leadership style on graduate students was examined. As shown in Table 4, Model 6 indicates that, after controlling for graduate students' gender, age, and other control variables, paradoxical leadership style had a significant positive effect on graduate student creativity ($\beta = 0.363$, $p < 0.001$), supporting Hypothesis H1.

Table 4. Results of Hierarchical Regression Analysis for Mediating Effects.

Variables	Harmonious Academic Passion		Obsessive Academic Passion		Research Creativity			
	M1	M2	M3	M4	M5	M6	M7	M8
Control Variables								
Students' Gender	0.083	0.169	-0.020	0.063	-0.012	0.050	-0.012	0.030
Students' Age	0.032	0.054	0.051	0.072	0.134	0.151	0.131	0.127
Students' Grade	-0.034	-0.035	-0.013	-0.014	-0.091	-0.092	-0.079	-0.087
Students' Discipline Type	0.090	0.091	0.009	0.010	-0.006	-0.005	-0.039	-0.008
Students' University Type	0.129	0.104	0.173	0.149	0.184*	0.166*	0.127	0.117
Supervisors' Gender	0.046	0.084	0.108	0.145	-0.006	0.022	-0.009	-0.025

Supervisors' Age	0.025	0.036	-0.040	-0.029	0.018	0.026	0.013	0.036
Supervisors' Title	-0.042	0.002	-0.014	0.029	-0.028	0.004	0.003	-0.005
Independent Variable								
Paradoxical Mentorship Style		0.501***		0.485***		0.363***	0.179***	0.205***
Mediating Variables								
Harmonious Academic Passion							0.367***	
Obsessive Academic Passion								0.325***
R^2	0.015	0.288	0.016	0.267	0.026	0.250	0.400	0.373
F	0.487	11.807***	0.549	10.663***	0.867	9.734***	17.446***	15.618***
ΔR^2	0.015	0.273	0.016	0.251	0.026	0.224	0.150	0.124
ΔF	0.487	100.893***	0.549	90.094***	0.867	78.631***	65.400***	51.685***

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Next, the mediating effects of harmonious academic passion and obsessive academic passion were tested following the steps of Baron and Kenny [32]. Models 2 and 4 show that paradoxical leadership style was significantly positively related to harmonious academic passion ($\beta = 0.501$, $p < 0.001$) and obsessive academic passion ($\beta = 0.485$, $p < 0.001$). Models 7 and 8 indicate that, compared with Model 6, the overall explanatory power increased. After including harmonious academic passion, it significantly positively affected graduate student creativity ($\beta = 0.367$, $p < 0.001$), while the effect of paradoxical leadership style on graduate student creativity remained significant but clearly decreased ($\beta = 0.179$, $p < 0.001$), indicating that harmonious academic passion partially mediates the relationship between paradoxical leadership style and graduate student creativity, supporting Hypothesis H2a. After including obsessive academic passion, it significantly positively affected graduate student creativity ($\beta = 0.325$, $p < 0.001$), while the effect of paradoxical leadership style on graduate student creativity remained significant but clearly decreased ($\beta = 0.205$, $p < 0.01$), indicating that obsessive academic passion partially mediates the relationship, supporting Hypothesis H2b [33].

To further examine the mediating effects of harmonious and obsessive academic passion between paradoxical mentorship style and graduate student creativity, we followed the procedures of Hayes and Chen Rui et al., using the PROCESS macro in SPSS to perform a Bootstrap test (Model 4) with 5,000 resamples and a 95% confidence interval. The results, presented in Table 5, indicate that the confidence intervals for all variables did not include 0, further confirming the proposed hypotheses [34].

Table 5. Results of Bootstrap Test for Mediating Effects.

Variables	Harmonious Academic Passion			Obsessive Academic Passion		
	β	Boot SE	95%CI	β	Boot SE	95%CI
Direct Effect (c')	0.1792	0.0507	[0.0841,0.2843]	0.2053	0.0578	[0.0979,0.3238]
Indirect Effect (a × b)	0.1838	0.0357	[0.1200,0.2610]	0.1577	0.0476	[0.0919,0.2369]

4.4.2. Moderation Tests

To avoid multicollinearity, paradoxical leadership style, harmonious academic passion, and obsessive academic passion were mean-centered before constructing interaction terms. As shown in Table 6, Model 9 indicates that, after including paradoxical leadership

style and challenging research stress, the explanatory power of the main effects on graduate students' harmonious academic passion increased significantly ($\Delta R^2 = 0.213$, $p < 0.001$). Model 10 shows that the interaction between paradoxical leadership style and challenging research stress had a significant positive effect on graduate students' harmonious academic passion ($\beta = 0.229$, $p < 0.001$). Model 13 shows that, after including paradoxical leadership style and challenging research stress, the explanatory power of the main effects on graduate students' obsessive academic passion increased ($\Delta R^2 = 0.161$, $p < 0.001$). Model 14 shows that the interaction between paradoxical leadership style and challenging research stress had a positive effect on graduate students' obsessive academic passion ($\beta = 0.136$, $p > 0.05$), supporting Hypotheses H3a and H3b.

Table 6. Results of Hierarchical Regression Analysis for Moderating Effects.

Variables	Harmonious Academic Passion				Obsessive Academic Passion			
	M9	M10	M11	M12	M13	M14	M15	M16
Control Variables								
Students' Gender	0.111	0.145	0.125	0.156	0.011	0.032	0.022	0.042
Students' Age	0.044	0.023	0.087	0.064	0.063	0.051	0.102	0.088
Students' Grade	-0.061	-0.046	-0.084	-0.064	-0.037	-0.028	-0.059	-0.046
Students' Discipline Type	0.096	0.104	0.073*	0.079	0.014	0.019	-0.008	-0.004
Students' University Type	0.043	0.042	0.047*	0.043	0.095	0.094	0.095	0.093
Supervisors' Gender	0.039	0.051	0.065*	0.079	0.105	0.112	0.127	0.136
Supervisors' Age	0.071	0.060	0.071	0.056	0.001	-0.005	0.003	-0.007
Supervisors' Title	0.008	0.035	0.025*	0.036	0.034	0.050	0.050	0.057
Main Effects								
Paradoxical Mentorship Style	0.297***	0.244***	0.323	0.269***	0.306	0.274***	0.320***	0.286***
Challenging Research Stressors	-0.431***	-0.388***			-0.379***	-0.354***	-0.345***	
Hindering Research Stressors			-0.373***	-0.350***				-0.330***
Moderating Effects								
Paradoxical Mentorship Style × Challenging Research Stressors		0.229***				0.136***		
Paradoxical Mentorship × Hindering Research Stressors				0.200***				0.129**
R^2	0.500	0.555	0.460	0.501	0.429	0.448	0.412	0.428

F	26.230***	29.567***	22.294***	23.802***	19.669***	19.241***	18.323***	17.778***
ΔR^2	0.213	0.055	0.172	0.041	0.161	0.019	0.144	0.017
ΔF	111.416***	31.951***	83.383***	21.469***	74.057***	8.977***	64.197***	7.669***

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Similarly, for hindering research stress, Models 11, 12, 15, and 16 indicate that its effects on harmonious academic passion ($\beta = 0.200$, $p < 0.001$) and obsessive academic passion ($\beta = 0.129$, $p < 0.001$) were both significant and positively moderating, therefore Hypotheses H3b and H4b were not supported.

To visually illustrate the moderating effects of challenging research stress, this study followed the method recommended by Cohen et al. and plotted the differences in graduate students' responses in harmonious and obsessive academic passion to paradoxical leadership style under different levels of challenging and hindering research stress, as shown in Figure 2 [35].

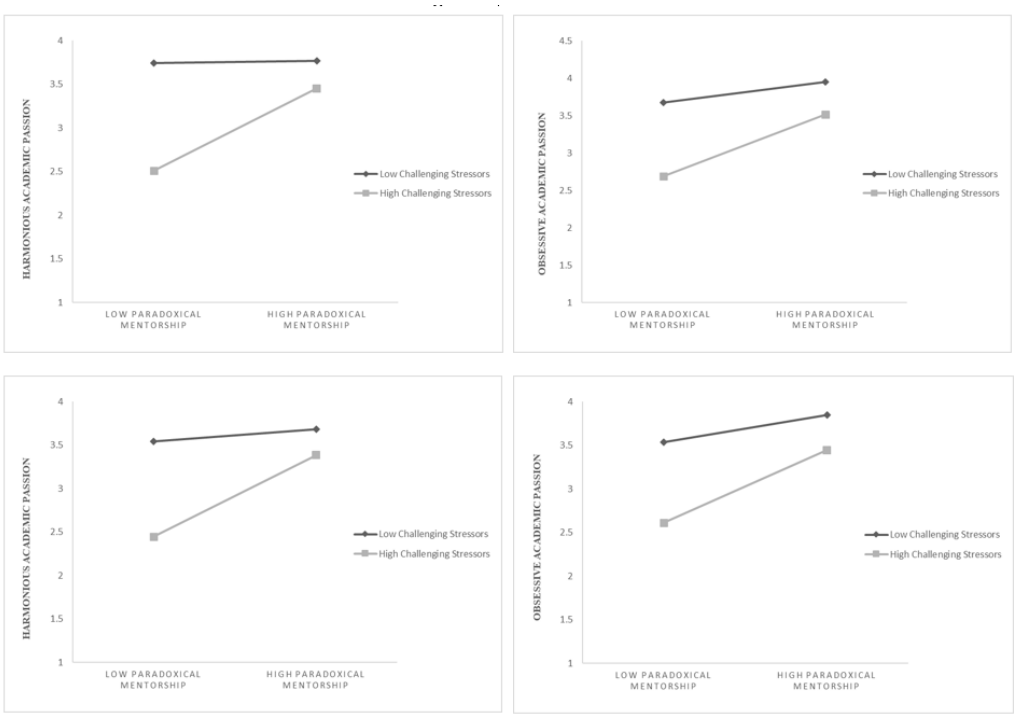

Figure 2. The Moderating Role of Research Stressors.

5. Conclusions and Implications

5.1. Research Conclusions

5.1.1. Paradoxical Mentorship Style Has a Significant Positive Impact on Graduate Students' Research Creativity

By adopting seemingly contradictory behaviors, paradoxical mentors provide both academic and emotional support. They enforce strict requirements while allowing flexibility, avoid excessive criticism when mistakes occur, and enhance students' sense of psychological safety. This supervisory style fosters initiative and responsibility, which in turn stimulates creativity.

5.1.2. Both Harmonious and Obsessive Academic Passion Mediate the Relationship between Paradoxical Mentorship Style and Research Creativity

Paradoxical mentors strike a dynamic balance in their relationships with students—maintaining closeness without over-familiarity and offering guidance that is neither overly authoritarian nor excessively indulgent. This duality effectively stimulates both harmonious and obsessive academic passion, which in turn positively contributes to research creativity.

5.1.3. Challenging Research Stressors Positively Moderate the Effects of Paradoxical Mentor-Ship Style on Academic Passion and Strengthen the Mediating Mechanism between Mentorship Style and Creativity

When graduate students face high levels of challenging stressors, paradoxical mentors' strategies—combining respectful guidance with motivational support—reduce defensive psychological reactions. Empowering students with academic autonomy allows them to integrate resources effectively, achieve innovative outcomes, and continuously enhance their self-efficacy. Consequently, students' passion and intrinsic motivation for research are significantly elevated.

5.1.4. Hindering Stressors Also Exhibited a Positive Moderating Effect, Contrary to Expectations

Data analysis revealed that hindering stressors unexpectedly strengthened the positive association between paradoxical mentorship style and academic passion. Under high hindrance conditions, such as complex tasks and tight deadlines, students tended to narrow their academic goals and prioritize key research tasks. In this context, the authoritative dimension of paradoxical mentorship reinforced students' focus and persistence, leading to increased immersion in academic activities. Though counterintuitive, this suggests that high-pressure contexts may sometimes catalyze passion and engagement, thereby indirectly supporting research creativity.

5.2. Practical Implications

5.2.1. For Graduate Training Institutions

Institutions should foster supervisors' ability to apply paradoxical behaviors contextually—for example, maintaining strict deadlines while allowing flexible methods for task completion. Training programs could include case-based simulations to improve supervisors' "paradox management" capacity. Moreover, evaluation systems should incorporate indicators of supervisory paradoxical effectiveness, avoiding reliance on purely quantitative metrics.

5.2.2. For Supervisors

Supervisors should clearly communicate research standards and timelines at key milestones (e.g., proposal defense, mid-term evaluation) while allowing students autonomy in methodological choices. This ensures progress without stifling creativity. Regular group meetings and one-on-one mentoring should be used to build emotional connections, while supervisors should avoid excessive interference in academic decisions to preserve students' independence.

5.2.3. For Graduate Students

Students should actively interpret the dual logic behind paradoxical supervision. Strict requirements should be seen as training for rigor in innovation, not as mere control. By aligning personal interests with disciplinary frontiers, students can enhance their sense of meaning in research and transform academic passion into sustained creativity.

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