

The Role of Orientation Types and Supervisory Styles in Graduate Students' Research Innovation Behavior: Mediating and Moderating Mechanisms

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Abstract

This study investigates how graduate students' orientation types and supervisory styles influence their research innovation behavior, focusing on the mediating role of self-regulatory fatigue and the moderating role of supervisory styles. Grounded in regulatory focus theory, a two-phase study revealed key findings: (1) Promotion-oriented graduate students exhibit stronger self-regulation, leading to higher levels of research innovation, while prevention-oriented students experience significant self-regulatory fatigue, which hampers their innovative potential. (2) Supervisory styles moderate these dynamics. Charismatic supervisory styles mitigate self-regulatory fatigue in prevention-oriented students, boosting their innovative behavior. Conversely, abusive supervisory styles negatively impact the research innovation of both promotion- and prevention-oriented students. These results enhance understanding of how orientation types and supervisory styles interact to shape graduate students' research innovation behavior. The findings provide theoretical insights and practical guidance for fostering research innovation in higher education.

Keywords: charismatic supervisory style, abusive supervisory style, regulatory focus theory, self-regulatory fatigue, research innovation behavior, higher education management

1. Introduction

Promoting research innovation among graduate students is essential for advancing academic performance, strengthening universities' research competitiveness, and fostering broader societal contributions (Zheng & Hu, 2022). Investigating the key factors that shape graduate students' research innovation behavior holds both theoretical and practical significance.

While existing studies have explored individual determinants such as orientation types, supervisory styles, and self-regulatory abilities (Deci & Ryan, 2000), the complex interplay among these variables remains insufficiently examined. In particular, the mechanisms through which orientation types influence research innovation via self-regulatory fatigue and the moderating role of supervisory styles in this relationship warrant further empirical investigation.

Orientation type, which reflects an individual's motivational focus, is typically classified into promotion-oriented and prevention-oriented (Higgins, 1987). Promotion-oriented individuals prioritize goal attainment and the pursuit of positive outcomes, fostering a mindset conducive to research innovation. Conversely, prevention-oriented individuals are primarily concerned with avoiding failure and mitigating risks, which may lead to heightened self-regulatory fatigue and reduced innovation engagement (Crowe & Higgins, 1997).

In addition to individual motivation, supervisory styles play a crucial role in shaping students' research engagement. Charismatic supervision, characterized by encouragement and intellectual stimulation, enhances graduate students' self-confidence, resilience, and creativity, thereby facilitating research innovation. In contrast, abusive supervision, marked by excessive criticism and psychological pressure, elevates stress and self-doubt,

ultimately impeding innovation (Liu et al., 2012, 2013).

This study examines these dynamics by exploring the mediating effect of self-regulatory fatigue in the relationship between orientation types and research innovation behavior, while also assessing the moderating influence of supervisory styles. Findings from a two-phase empirical study reveal that promotion-oriented students demonstrate higher levels of research innovation due to stronger self-regulatory abilities, whereas prevention-oriented students experience significant self-regulatory fatigue, which hinders innovation. Furthermore, charismatic supervisory styles mitigate self-regulatory fatigue in prevention-oriented students, while abusive supervisory styles exert negative effects on both promotion- and prevention-oriented students.

By elucidating these mechanisms, this study contributes to theoretical advancements in research innovation behavior and offers practical insights for higher education management. The findings inform supervisory training programs and institutional strategies aimed at fostering a supportive research environment that enhances graduate students' innovation capabilities.

2. Theoretical Background

2.1 Regulatory Focus Theory

Regulatory Focus Theory (Higgins, 1997) distinguishes between promotion-oriented and prevention-oriented motivational orientations, which influence how individuals approach goal pursuit and respond to challenges. Promotion-oriented individuals are driven by aspirations and the pursuit of positive outcomes, exhibiting higher resilience, proactive engagement, and cognitive flexibility, all of which facilitate research innovation (Humayun et al., 2024). They are more likely to take risks, explore novel ideas, and persist through challenges, making them well-suited for innovation-driven environments.

Conversely, prevention-oriented individuals prioritize risk aversion and loss prevention, adopting defensive strategies to avoid negative outcomes. This heightened sensitivity to potential failure often leads to anxiety, cognitive overload, and avoidance behaviors, which can suppress creativity and hinder research innovation (Su & He, 2023). While this cautious approach may be advantageous in structured, low-risk environments, it may be less effective in the uncertain and exploratory nature of research innovation. These motivational orientations provide a theoretical foundation for understanding individual differences in graduate students' engagement in innovative research (Usher & Schunk, 2017).

2.2 Supervisory Styles

Supervisors play a critical role in shaping graduate students' research behavior, motivation, and psychological well-being (Wingfield & Wingfield, 2023). Existing research highlights two contrasting supervisory styles—charismatic and abusive—which exert distinct influences on students' research engagement and innovation.

Charismatic supervision is characterized by inspirational leadership, emotional support, and intellectual stimulation. Supervisors adopting this style foster a psychologically safe research environment that enhances students' confidence, intrinsic motivation, and willingness to take intellectual risks (Conger & Kanungo, 1987). By providing constructive feedback, encouragement, and autonomy, charismatic supervisors cultivate a culture that nurtures creativity and research innovation.

In contrast, abusive supervision is marked by excessive control, criticism, and emotional hostility (Martinko et al., 2013). This leadership style induces psychological distress, erodes students' confidence, and diminishes their willingness to engage in innovative thinking (Tepper, 2000; Mackey et al., 2018). Prolonged exposure to abusive supervision heightens stress levels, triggers self-doubt, and increases self-regulatory fatigue, ultimately impairing students' research productivity and innovation potential. These contrasting supervisory styles highlight the significance of leadership approaches in fostering or inhibiting research innovation among graduate students.

2.3 Self-Regulatory Fatigue

Self-regulation refers to an individual's ability to manage emotions, sustain motivation, and regulate cognitive processes to achieve long-term goals (Baumeister & Heatherton, 1996). In research settings, self-regulatory fatigue emerges when prolonged cognitive and emotional effort depletes an individual's regulatory capacity, leading to diminished persistence, reduced cognitive flexibility, and impaired problem-solving abilities (Demetriou, 2000; Zimmerman, 1995).

The extent to which graduate students experience self-regulatory fatigue is influenced by their regulatory orientation. Promotion-oriented students typically demonstrate higher resilience and adaptive coping mechanisms, allowing them to sustain motivation and innovative engagement despite research challenges. Their

ability to reframe failures as learning opportunities enables them to navigate setbacks without significant depletion of self-regulatory resources.

In contrast, prevention-oriented students are more prone to stress, self-doubt, and over-monitoring their actions, which can lead to heightened anxiety, procrastination, and cognitive exhaustion (Higgins, 1997). This increased cognitive load exacerbates self-regulatory fatigue, making it more challenging for them to sustain creative problem-solving and research innovation. Recognizing the role of self-regulatory fatigue in shaping students' research behavior is crucial for developing targeted interventions that support sustained academic creativity.

2.4 Research Innovation Behavior

Research innovation behavior encompasses the creation, application, and implementation of novel ideas and methodologies within the realm of academic research. This process involves a spectrum of cognitive and behavioral activities, including identifying research gaps, formulating hypotheses, experimenting with innovative methods, and applying findings to practical contexts (Sloane et al., 1980). These endeavors are the driving force behind scientific progress and intellectual growth, establishing research innovation as a crucial indicator of graduate students' academic achievements.

Engagement in research innovation among graduate students is influenced by both intrinsic factors, such as regulatory orientation and self-regulatory capacity, and extrinsic factors, including supervisory style and institutional support. Understanding the factors that facilitate or impede research innovation is vital for optimizing higher education policies, enhancing research training programs, and fostering an academic environment that nurtures creativity and knowledge generation.

3. Hypothesis Development

3.1 The Relationship between Orientation Types and Self-Regulatory Fatigue

Regulatory focus theory (Higgins, 1997) posits that individuals exhibit distinct goal-directed behaviors based on their orientation type—either promotion-focused or prevention-focused. Promotion-oriented individuals are driven by aspirations and the pursuit of growth and achievement. They prioritize attaining positive outcomes, exhibit higher intrinsic motivation, and employ adaptive coping strategies when faced with challenges. This proactive approach enables them to effectively manage emotional and behavioral responses, thereby fostering resilience and sustained engagement in research innovation (Baumeister & Heatherton, 1996; Jason & S. N., 2021).

In contrast, prevention-oriented individuals prioritize risk avoidance and loss prevention. Their propensity to focus on potential failure often results in heightened anxiety, excessive self-monitoring, and self-doubt, thereby increasing their susceptibility to self-regulatory fatigue (Adriaanse & Broeke, 2022). Self-regulatory fatigue manifests as diminished emotional resilience, mental exhaustion, and difficulty sustaining cognitive effort, all of which can impede creative problem-solving and research innovation (Usher & Schunk, 2017). Given these distinct psychological mechanisms, it is anticipated that promotion-oriented students will experience lower levels of self-regulatory fatigue and demonstrate higher engagement in research innovation compared to their prevention-oriented counterparts.

Hypothesis 1: Graduate students with a promotion orientation will experience lower self-regulatory fatigue and demonstrate higher engagement in research innovation behavior compared to those with a prevention orientation.

3.2 The Mediating Role of Self-Regulatory Fatigue

Self-regulation refers to an individual's capacity to monitor, control, and adjust behaviors and emotions in response to stress and challenges (Bandura, 1988). Research innovation, characterized by its inherent uncertainty, demands high levels of cognitive flexibility, persistence, and emotional resilience (Jalonen, 2011). Consequently, an individual's self-regulatory capacity is pivotal in determining their ability to navigate setbacks and maintain sustained engagement in innovative research activities.

Promotion-oriented graduate students, endowed with stronger self-regulation abilities, are more adept at managing stress, maintaining focus, and persevering through research difficulties, thereby exhibiting higher levels of innovation behavior (Vohs & Baumeister, 2016). Conversely, prevention-oriented students, who are highly sensitive to potential failure, tend to experience elevated anxiety and cognitive strain, which exacerbates self-regulatory fatigue and undermines their capacity to engage in research innovation (Klenk et al., 2011).

Grounded in these theoretical foundations, this study posits that self-regulatory fatigue functions as a key mediating mechanism in the relationship between orientation type and research innovation behavior. Promotion-oriented individuals, owing to their superior self-regulation, experience lower levels of fatigue and

consequently exhibit enhanced innovation behavior. In contrast, prevention-oriented individuals, due to their heightened susceptibility to fatigue, demonstrate lower levels of research innovation behavior.

Hypothesis 2: Self-regulatory fatigue mediates the relationship between orientation types and research innovation behavior, such that prevention-oriented students exhibit lower innovation due to higher levels of self-regulatory fatigue compared to promotion-oriented students.

3.3 The Role of Supervisory Styles in Shaping Research Engagement

Supervisory styles are instrumental in molding academic trajectories (Deci et al., 1991), as they significantly influence graduate students' engagement in research, psychological resilience, and capacity to handle self-regulatory fatigue. This study delves into how different supervisory approaches—specifically, charismatic and abusive styles—affect students' innovation behaviors within research settings.

Charismatic supervisory styles, characterized by emotional support, inspiration, and trust, create a psychologically safe research environment that enhances intrinsic motivation, self-efficacy, and resilience (Shea & Howell, 1999). Such supervision is particularly advantageous for prevention-oriented students, who are more prone to self-doubt and anxiety. By mitigating self-regulatory fatigue and alleviating the fear of failure, charismatic supervision fosters greater engagement in research innovation. However, for promotion-oriented students, who inherently possess robust self-regulatory mechanisms, the impact of charismatic supervision may be less pronounced.

Conversely, abusive supervisory styles, marked by excessive criticism, control, and emotional hostility, undermine students' sense of autonomy, motivation, and psychological well-being (Tepper, 2000; Tepper et al., 2017; McEachern et al., 2008). Such negative supervision exacerbates anxiety, fuels self-doubt, and heightens self-regulatory fatigue, thereby significantly hindering innovation. Prevention-oriented students are particularly susceptible to these detrimental effects, as their aversion to failure and excessive cognitive load intensify stress and exhaustion. Nevertheless, even promotion-oriented students, despite their adaptive coping abilities, may experience a decline in innovation behavior under abusive supervision due to accumulated psychological stress and demotivation (Pearsall et al., 2022). Given these moderating effects, we propose the following hypothesis:

Hypothesis 3: Supervisory styles moderate the relationship between self-regulatory fatigue and research innovation behavior. Charismatic supervision mitigates the adverse effects of self-regulatory fatigue on research innovation, particularly for prevention-oriented students. Conversely, abusive supervision exacerbates self-regulatory fatigue and further inhibits research innovation behavior for both promotion- and prevention-oriented students.

The conceptual framework is illustrated in Figure 1.

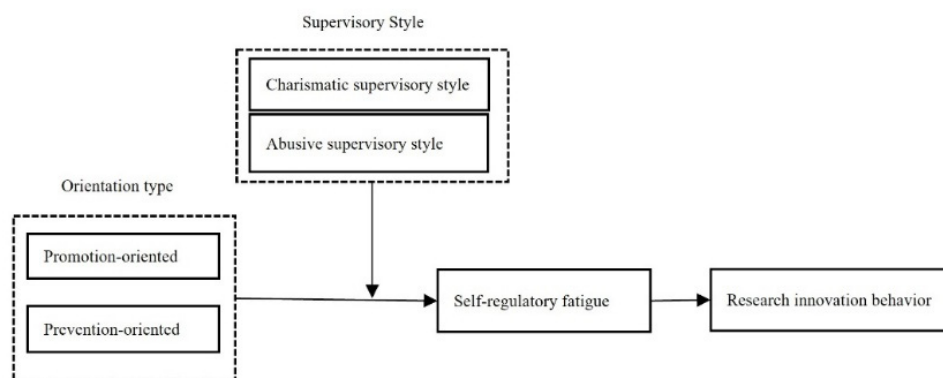


Figure 1 Conceptual framework

4. Methodology and Variable Operationalization

4.1 Research Design

This study employed a two-stage survey design to test the proposed hypotheses and analyze the roles of orientation types, supervisory styles, and self-regulatory fatigue in shaping graduate students' research innovation behavior. By temporally separating the measurement of key variables, this design enhances causal

validity and minimizes potential common method bias. Both surveys were administered on-site through an online platform, ensuring confidentiality to promote data reliability.

The study sampled master's degree students from a university in China. In Stage 1, participants were assessed on orientation types, self-regulatory fatigue, and research innovation behavior to examine the mediating effect of self-regulatory fatigue. In Stage 2, supervisory styles were measured to evaluate their moderating role in these relationships. Participants were assessed on orientation types, self-regulatory fatigue, and research innovation behavior and supervisory styles to examine the moderating role of supervisory styles. This approach allowed for a comprehensive understanding of the psychological, behavioral, and contextual factors influencing research innovation.

4.2 Sample Characteristics

This study utilized a diverse sample of graduate students from a comprehensive university in China to ensure broad academic representation. In Study 1, data were collected from 318 graduate students, with a response rate of 90.8%. In Study 2, the sample included 455 graduate students, with a response rate of 94.8%. Participants were drawn from various academic disciplines, including finance (Study 1: 34.6%, Study 2: 44.2%), management (Study 1: 35.2%, Study 2: 22.6%), and economics (Study 1: 30.2%, Study 2: 33.2%).

Regarding demographic distribution, in Study 1, 32.7% of the participants were male ($n = 104$), and 67.3% were female ($n = 214$). In Study 2, 35.2% were male ($n = 160$), and 64.8% were female ($n = 295$), reflecting a gender composition consistent across both samples.

The sample also captured variations in academic experience. In Study 1, 35.2% were first-year students ($n = 112$), 36.2% were second-year students ($n = 115$), and 28.6% were third-year students ($n = 91$). In Study 2, the distribution was 19.3% first-year students ($n = 88$), 39.3% second-year students ($n = 179$), and 41.3% third-year students ($n = 188$).

Additionally, the sample included both three-year programmed academic master's (Study 1: 20.8%, Study 2: 22.2%) and two-year programmed professional master's students (Study 1: 79.2%, Study 2: 77.8%), providing a balanced representation of different graduate education paths.

This diverse distribution across disciplines, gender, and academic levels enhances the robustness of the findings, allowing for a more comprehensive understanding of research innovation behavior among graduate students.

4.3 Translation and Adaptation of Measurement Scales

To ensure the linguistic and cultural validity of the measurement scales, we employed a rigorous translation-back-translation procedure in accordance with Brislin's (1970) guidelines. The initial phase, Translation, involved two bilingual experts independently translating the original English scales into Chinese. Subsequently, in the Back-Translation phase, two additional bilingual experts—unfamiliar with the original scales—conducted a back-translation from Chinese to English. The Discrepancy Resolution phase then ensued, during which the research team meticulously compared the back-translated version with the original scales. Any discrepancies identified were resolved through consensus discussions among the translators. Finally, the Pilot Testing phase was implemented to evaluate comprehension and item clarity. This phase involved a small-scale pilot study with 30 graduate students, whose feedback informed minor refinements to enhance the accuracy and readability of the translated items prior to the administration of the final survey.

4.4 Variable Measurement and Reliability

All key variables were measured using well-established scales, adapted to the study's context. Participants responded to each item on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The reliability (Cronbach's α) and sample items for each scale are presented below:

Charismatic Supervisory Style was assessed using the Charismatic Leadership Scale developed by Conger et al. (1997) and adapted for academic supervision by Liu et al. (2013). This scale measures supervisors' ability to inspire and support students. Participants responded to items like "My supervisor sets inspiring research goals" ($\alpha = 0.934$).

Abusive Supervisory Style was measured using the Abusive Supervision Scale developed by Tepper (2000) and revised for academic settings by Liu et al. (2013). This scale captures students' perceptions of supervisors' hostile and controlling behaviors. Sample items include "My supervisor mocks my ideas" ($\alpha = 0.978$).

Promotion/Prevention Orientation was assessed using the Regulatory Focus Scale by Lockwood et al. (2002). This scale evaluates individuals' goal orientation—whether they focus on achieving success (promotion) or avoiding failure (prevention). Sample items include "I often imagine how to achieve my ambitions" and "I'm

generally more concerned with eliminating negative events in my life.” ($\alpha = 0.756$).

Self-Regulatory Fatigue was measured using the Self-Regulatory Fatigue Scale (SRF-S) developed by Nes et al. (2013) and revised by Wang et al. (2015). This scale assesses individuals' depletion of self-control resources in managing stress and effort. Participants responded to items like “I feel energetic” ($\alpha = 0.906$).

Research Innovation Behavior was evaluated using the Innovation Behavior Scale by Scott & Bruce (1994). This scale measures the extent to which students engage in innovative thinking and problem-solving in research. Sample items include “I propose creative ideas” ($\alpha = 0.904$).

5. Data Analysis and Results

Study 1: The Impact of Orientation Types on Research Innovation Behavior through Self-regulatory fatigue

In the first stage of this study, we explored how graduate students' orientation types influence their research innovation behavior through self-regulatory fatigue. The hypothesis of this experiment was that graduate students with a promotion orientation, due to their stronger self-regulation abilities, are better equipped to cope with the pressures and challenges of research, leading to higher research innovation behavior. In contrast, students with a prevention orientation, due to anxiety and a tendency to avoid failure, are more likely to encounter self-regulatory fatigue, which suppress their research innovation behavior.

Data were collected using a questionnaire that assessed three variables: orientation type, self-regulatory fatigue, and research innovation behavior. The participants were graduate students from various disciplines, with a total sample size of 318. All participants were current graduate students.

A one-way analysis of variance (ANOVA) revealed that the promotion-oriented students scored significantly higher in research innovation behavior compared to the prevention-oriented students ($M_{\text{Promotion}} = 4.41$, $SD = 0.57$ vs. $M_{\text{Prevention}} = 3.80$, $SD = 0.55$, $F = 91.770$, $p < 0.001$). Additionally, prevention-oriented students showed significantly higher self-regulatory fatigue scores than promotion-oriented students ($M_{\text{Prevention}} = 2.49$, $SD = 0.90$ vs. $M_{\text{Promotion}} = 1.49$, $SD = 0.73$, $F = 117.989$, $p < 0.001$), indicating that student orientation type significantly influenced self-regulatory fatigue.

The mediation analysis demonstrated that self-regulatory fatigue significantly mediates the relationship between student orientation and research innovation behavior ($\beta = -0.303$, $p < 0.001$). Specifically, it was found that student orientation significantly reduces self-regulatory fatigue (Model 1: $\beta = -1.055$, $p < 0.01$), while self-regulatory fatigue exerts a significant negative impact on research innovation behavior (Model 3: $\beta = -0.303$, $p < 0.01$). Moreover, the direct effect of student orientation on research innovation behavior remained significant (Model 2: $\beta = 0.614$, $p < 0.01$). These findings substantiate the hypothesis that self-regulatory fatigue mediates the relationship between student orientation and research innovation behavior, indicating that student orientation enhances research innovation behavior by alleviating self-regulatory fatigue. Control variables, including gender, grade (year in program), and major, were incorporated into the analysis. The overall model accounted for a substantial proportion of the variance in research innovation behavior ($R^2 = 0.372$, Adjusted $R^2 = 0.362$, $F(5, 312) = 36.898$, $p < 0.001$). The model explaining self-regulatory fatigue also accounted for a significant proportion of variance ($R^2 = 0.332$, Adjusted $R^2 = 0.323$, $F(4, 313) = 38.897$, $p < 0.001$), as did the model for research innovation behavior without the mediator ($R^2 = 0.235$, Adjusted $R^2 = 0.225$, $F(4, 313) = 23.991$, $p < 0.001$) (refer to Table 1 for details).

Table 1. Evaluation of mediating effect

Variable	Self-regulatory Fatigue		Research Innovation Behavior	
	Model 1		Model 2	Model 3
Controls				
Gender	-0.236*		0.121	0.05
Grade	-0.354**		0.036	-0.072
Major	0.758**		-0.07	0.16
Student Oriented	-1.055**		0.614**	0.294**
Self-regulatory fatigue				-0.303**
R ²	0.332		0.235	0.372
Adjusted R ²	0.323		0.225	0.362
F-value	F (4,313) =38.897, p=0.000		F(4,313) =23.991, p=0.000	F (5,312) =36.898, p=0.000

Notes. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0010$.

In summary, the impact of orientation type on research innovation behavior is mediated by self-regulatory fatigue. Promotion orientation enhances graduate students' research innovation behavior, while prevention orientation suppresses innovation behavior due to increased self-regulatory fatigue.

Study 2: The Moderating Effect of Supervisory Styles

The primary objective of Study 2 is to examine the moderating role of supervisory styles in the relationship between orientation types and research innovation behavior. Building on the findings from Study 1, this phase incorporates supervisory styles as a moderating variable to investigate how different supervisory approaches influence graduate students' research innovation behavior. It is hypothesized that supervisory styles may exert differential impacts on students with distinct orientation types, particularly in terms of their influence on self-regulatory fatigue.

Data for this study were collected through a comprehensive questionnaire, encompassing variables such as orientation types, self-regulatory fatigue, research innovation behavior, and supervisory styles (charismatic and abusive). The sample comprised 455 graduate students from the same university.

The results of the data analysis revealed that supervisory style significantly moderates the relationship between orientation type and research innovation behavior. Initially, we compared the outcomes across all experimental groups and found that a charismatic supervisory style significantly reduced self-regulatory fatigue for prevention-oriented students, thereby enhancing their research innovation performance. Specifically, under charismatic supervisors, prevention-oriented students exhibited significantly lower self-regulation barrier scores compared to those under abusive supervisors ($M_{\text{charismatic}} = 1.95$, $SD_{\text{charismatic}} = 0.71$ vs. $M_{\text{abusive}} = 2.79$, $SD_{\text{abusive}} = 0.87$, $F = 50.938$, $p < 0.01$), although their research innovation behavior scores did not differ significantly from the abusive group ($M_{\text{charismatic}} = 3.92$, $SD_{\text{charismatic}} = 0.66$ vs. $M_{\text{abusive}} = 3.75$, $SD_{\text{abusive}} = 0.48$, $F = 4.226$, $p < 0.05$).

Further analysis indicated that for promotion-oriented students, the impact of supervisory style on research innovation behavior was more pronounced. In the charismatic supervisory group, promotion-oriented students demonstrated significantly higher research innovation behavior scores compared to prevention-oriented students ($M_{\text{charismatic}} = 4.70$, $SD_{\text{charismatic}} = 0.40$ vs. $M_{\text{abusive}} = 3.83$, $SD_{\text{abusive}} = 0.40$, $F = 256.627$, $p < 0.01$). This suggests that the strong self-regulation abilities of promotion-oriented students amplify the moderating effect of supervisory style.

The abusive supervisory style negatively affected both orientation types. Specifically, prevention-oriented students under abusive supervisors had higher self-regulation barrier scores ($M_{\text{abusive}} = 2.79$, $SD_{\text{abusive}} = 0.87$) and lower research innovation behavior scores ($M_{\text{abusive}} = 3.75$, $SD_{\text{abusive}} = 0.48$), indicating that the abusive supervisory style particularly hindered the innovation capabilities of prevention-oriented students. Promotion-oriented students under abusive supervisors also exhibited lower research innovation behavior scores ($M_{\text{abusive}} = 3.83$, $SD_{\text{abusive}} = 0.40$), despite their stronger self-regulation abilities, showing that the negative impact of abusive supervision still impaired their innovative behavior.

Multiple moderation analysis further indicated that supervisory style significantly moderated the relationship between orientation type and research innovation behavior. Specifically, charismatic supervisors were found to reduce self-regulatory fatigue and significantly enhance research innovation behavior among prevention-oriented students. These findings underscore the critical influence of supervisory style on graduate students' research innovation abilities, particularly for students with weaker self-regulation skills. A supportive supervisory style appears to be a key factor in fostering innovative behavior.

Discussion

This study highlights the critical role of supervisory style in moderating the relationship between orientation type and research innovation behavior, particularly through the mechanism of self-regulatory fatigue. Our findings indicate that charismatic supervision can mitigate self-regulatory fatigue and enhance research innovation, particularly for prevention-oriented students, whereas abusive supervision negatively impacts innovation across both orientation types.

While prior research suggests that promotion-oriented individuals exhibit greater innovation due to strong self-regulation, the potential for prevention-oriented individuals to succeed under certain conditions remains unclear. Studies indicate that they can perform well in structured, low-risk environments where attention to detail is critical and ego involvement is high (Toyama et al., 2020; Liu et al., 2023). However, research innovation requires risk-taking and adaptability, which may disadvantage prevention-oriented individuals who prioritize

error avoidance and predictability (Pearsall et al., 2022). Additionally, while moderate stress can enhance their performance, high-pressure research settings may lead to cognitive overload, increasing self-regulatory fatigue and hindering innovation (Lanaj et al., 2012).

By integrating these perspectives, our revised discussion offers a more nuanced interpretation of how prevention orientation interacts with research innovation. These insights underscore the importance of tailoring supervisory styles to address the specific self-regulation challenges faced by different student orientations. In particular, charismatic supervision emerges as a key factor in supporting prevention-oriented students, helping them manage stress and sustain engagement in research.

These findings contribute to a broader understanding of regulatory focus theory in academic settings, offering both theoretical insights and practical recommendations for higher education institutions seeking to optimize research training environments and enhance graduate students' innovation capabilities.

6. Conclusion

6.1 Theoretical Significance

This study provides a comprehensive examination of the mechanisms that shape graduate students' research innovation behavior, focusing on the interplay between orientation types, self-regulatory fatigue, and supervisory styles. By integrating insights from regulatory focus theory and leadership research, the study advances the theoretical understanding of how individual motivation and external supervisory influences interact to shape research innovation in academic settings.

First, this study extends the literature on regulatory focus theory by elucidating the differential effects of promotion- and prevention-oriented orientations on research innovation behavior. The findings indicate that promotion-oriented graduate students, motivated by goal achievement and personal growth (Higgins, 1997), exhibit stronger self-regulatory capacity, which enables them to navigate research challenges more effectively and engage in higher levels of innovative behavior. In contrast, prevention-oriented students, who emphasize failure avoidance and risk minimization, are more susceptible to anxiety and self-doubt, leading to increased self-regulatory fatigue and diminished research innovation. This study refines self-regulation theory by demonstrating how motivational orientations shape cognitive and emotional responses in highly uncertain academic environments, contributing to a more nuanced understanding of innovation-related behaviors in higher education.

Second, the study provides new insights into the moderating role of supervisory styles in the relationship between self-regulatory fatigue and research innovation. The results highlight that charismatic supervisory style, characterized by motivational encouragement and emotional support (Conger et al., 1997), play a critical role in buffering the negative effects of self-regulatory fatigue, particularly for prevention-oriented students, thereby fostering their research innovation potential. Conversely, abusive supervisory styles, marked by criticism, control, and psychological pressure (Tepper, 2000), significantly exacerbate self-regulatory fatigue, particularly among prevention-oriented students, further suppressing their capacity for innovative behavior. These findings underscore the importance of supervisory guidance in shaping graduate students' research engagement, emphasizing the need for supportive mentorship approaches that enhance psychological resilience and foster an environment conducive to academic creativity.

By integrating insights from motivation theory and leadership research, this study contributes to a more comprehensive understanding of the psychological and contextual factors that drive or hinder research innovation in graduate education. The findings provide a theoretical foundation for future research on academic motivation and supervision strategies, while also offering practical implications for improving mentorship practices in higher education institutions.

6.2 Practical Implications

The findings of this study offer valuable insights for higher education management and academic supervision practices, emphasizing the importance of individualized mentorship, leadership development, and institutional policies in fostering graduate students' research innovation.

First, the results underscore the necessity of adapting supervisory strategies to align with students' orientation types. Promotion-oriented students, who thrive on goal achievement and exploration, benefit from greater autonomy and exposure to complex research challenges, which can further enhance their proactive engagement and innovative thinking. Conversely, prevention-oriented students, who are more risk-averse and prone to self-regulatory fatigue, require structured emotional support, targeted self-regulation training, and stress management interventions. Universities should incorporate psychological coaching programs and research skills

workshops to reduce anxiety, strengthen self-efficacy, and help these students overcome regulatory barriers, thereby unlocking their full potential for research innovation.

Second, this study highlights the pivotal role of supervisory styles in shaping graduate students' research behavior and psychological resilience. Charismatic supervision, which fosters a supportive, motivational, and psychologically safe environment, is particularly effective in mitigating self-regulatory fatigue and promoting creative risk-taking (Kiersma et al., 2012). Academic institutions should invest in supervisor training programs to develop leadership competencies that emphasize emotional intelligence, positive reinforcement, and student-centered mentoring approaches. Additionally, to counteract the detrimental effects of abusive supervision, institutions should establish formal monitoring mechanisms and intervention policies to identify and address supervisory misconduct (Zellars et al., 2002). By promoting transparent evaluation systems and encouraging a culture of academic mentorship accountability, universities can minimize the negative psychological impact of poor supervision and enhance students' academic performance.

Finally, effective communication and structured feedback mechanisms between supervisors and graduate students are essential for fostering a constructive and innovation-driven academic environment. Universities should implement regular mentorship evaluations, structured advisory meetings, and anonymous feedback systems that enable supervisors to gauge students' emotional and academic well-being, address their challenges, and refine their guidance strategies accordingly. Interactive academic communities, such as research collaboration forums, interdisciplinary workshops, and peer mentorship programs, can further cultivate a culture of intellectual exchange and innovation. These initiatives not only enhance students' research capabilities but also contribute to a more dynamic, inclusive, and high-quality research ecosystem in higher education.

6.3 Limitations and Future Directions

While this study offers valuable insights, several limitations should be considered. First, as the data were primarily collected from Chinese universities, the findings may not be fully generalizable to other cultural or institutional settings. Future research should expand the sample to include more diverse educational systems to enhance external validity. Second, the sample is predominantly composed of students from finance, business, and economics. While this focus offers meaningful insights, it may limit applicability to other disciplines. Future studies should include a more diverse range of academic fields to ensure broader generalizability. Finally, the cross-sectional design limits the ability to assess long-term changes in research innovation behavior. Longitudinal studies would provide deeper insights into how these behaviors evolve over time under different academic and supervisory conditions.

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Obtained.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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References

- Adriaanse, M. A., & Ten Broeke, P. (2022). Beyond prevention: Regulating responses to self-regulation failure to avoid a set-back effect. *Applied Psychology: Health and Well-Being*, 14(1), 278-293. <https://doi.org/10.1111/APHW.12302>
- Bandura, A. (1988). Self-regulation of motivation and action through goal systems. In V. Hamilton, G. H. Bower, & N. H. Frijda (Eds.), *Cognitive perspectives on emotion and motivation* (pp. 37-61). Springer Netherlands. https://doi.org/10.1007/978-94-009-2792-6_2
- Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. *Psychological Inquiry*, 7(1), 1-15. https://doi.org/10.1207/s15327965pli0701_1
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. <https://doi.org/10.1177/135910457000100301>
- Conger, J. A., & Kanungo, R. N. (1987). Toward a behavioral theory of charismatic leadership in organizational settings. *Academy of Management Review*, 12(4), 637-647. <https://doi.org/10.2307/258069>
- Conger, J. A., Kanungo, R. N., Menon, S. T., & Mathur, P. (1997). Measuring charisma: Dimensionality and validity of the Conger-Kanungo Scale of Charismatic Leadership. *Canadian Journal of Administrative Sciences*, 14(3), 290-301. <https://doi.org/10.1111/j.1936-4490.1997.tb00136.x>
- Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes*, 69(2), 117-132. <https://doi.org/10.1006/obhd.1996.2675>
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/s15327965pli1104_01
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325-346. <https://doi.org/10.1080/00461520.1991.9653137>
- Demetriou, A. (2000). Organization and development of self-understanding and self-regulation. In *Handbook of self-regulation* (pp. 209-251). Elsevier. <https://doi.org/10.1016/b978-012109890-2/50036-6>
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12), 1280-1300. <https://doi.org/10.1037/0003-066X.52.12.1280>
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94(3), 319-340. <https://doi.org/10.1037/0033-295X.94.3.319>
- Humayun, S., Saleem, S., Azeem, M. U., Murtaza, G., & Haq, I. U. (2024). Paradigm shift in sustained employability: Relevance of workaholism, job insecurity, job crafting, and presenteeism. *International Journal of Human Resource Management*, 35(16), 2705-2741. <https://doi.org/10.1080/09585192.2024.2371809>
- Jalonen, H. (2011). The uncertainty of innovation: A systematic review of the literature. *Journal of Management Research*, 4(1). <https://doi.org/10.5296/jmr.v4i1.1039>
- Jason, V., & S. N., G. (2021). Regulatory focus and innovative work behavior: The role of work engagement. *Current Psychology*, 40(6), 2791-2803. <https://doi.org/10.1007/s12144-019-00220-1>
- Kiersma, M. E., Hagemeyer, N., Chen, A. M. H., Melton, B., Noureldin, M., & Plake, K. S. (2012). A graduate student mentoring program to develop interest in research. *American Journal of Pharmaceutical Education*, 76(6), 104. <https://doi.org/10.5688/ajpe766104>
- Klenk, M. M., Strauman, T. J., & Higgins, E. T. (2011). Regulatory focus and anxiety: A self-regulatory model of

- GAD-depression comorbidity. *Personality and Individual Differences*, 50(7), 935-943. <https://doi.org/10.1016/j.paid.2010.12.003>
- Lanaj, K., Chang, C. H., & Johnson, R. E. (2012). Regulatory focus and work-related outcomes: A review and meta-analysis. *Psychological Bulletin*, 138(5), 998-1034. <https://doi.org/10.1037/a0027723>
- Liu, D., Liao, H., & Loi, R. (2012). The dark side of leadership: A three-level investigation of the cascading effect of abusive supervision on employee creativity. *Academy of Management Journal*, 55(5), 1187-1212. <https://doi.org/10.5465/amj.2010.0400>
- Liu, J., Liao, Z., & Gao, Z. (2013). Abusive supervision and employee resistance: The role of negative attribution and organization-based self-esteem. *Chinese Journal of Management*, 10(6), 839-846.
- Liu, X., Read, S. J., Rabin, A., Pollard, K. A., & Files, B. T. (2023). Prevention focus and conscientiousness drive accurate responding in stimulus detection. *Journal of Research in Personality*, 104430. <https://doi.org/10.1016/j.jrp.2023.104430>
- Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 83(4), 854-864. <https://doi.org/10.1037/0022-3514.83.4.854>
- Mackey, J. D., Brees, J. R., McAllister, C. P., Zorn, M. L., Martinko, M. J., & Harvey, P. (2018). Victim and culprit? The effects of entitlement and felt accountability on perceptions of abusive supervision and perpetration of workplace bullying. *Journal of Business Ethics*, 153(3), 659-673. <https://doi.org/10.1007/s10551-016-3348-7>
- Martinko, M. J., Harvey, P., Brees, J. R., & Mackey, J. (2013). A review of abusive supervision research. *Journal of Organizational Behavior*, 34(S1), S120-S137. <https://doi.org/10.1002/job.1888>
- McEachern, A. G., Aluede, O., & Kenny, M. C. (2008). Emotional abuse in the classroom: Implications and interventions for counselors. *Journal of Counseling & Development*, 86(1), 3-10. <https://doi.org/10.1002/j.1556-6678.2008.tb00619.x>
- Nes, L. S., Ehlers, S. L., Whipple, M. O., & Vincent, A. (2013). Self-regulatory fatigue in chronic multisymptom illnesses: Scale development, fatigue, and self-control. *Journal of Pain Research*, 6, 181-188. <https://doi.org/10.2147/JPR.S40014>
- Pearsall, M. J., Siegel, C. J., Burgess, R. V., & Leigh, A. (2022). Preventing success: How a prevention focus causes leaders to overrule good ideas and reduce team performance gains. *Journal of Applied Psychology*. <https://doi.org/10.1037/apl0000596>
- Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580-607. <https://doi.org/10.5465/256701>
- Shea, C. M., & Howell, J. M. (1999). Charismatic leadership and task feedback. *Leadership Quarterly*, 10(3), 375-396. [https://doi.org/10.1016/S1048-9843\(99\)00020-X](https://doi.org/10.1016/S1048-9843(99)00020-X)
- Sloane, H. N., Endo, G. T., & Della-Piana, G. M. (1980). Creative behavior. *Behavior Analyst*, 3(1), 11-21. <https://doi.org/10.1007/BF03392374>
- Su, P., & He, M. (2023). The impact of innovative behaviors on academic misconduct among graduate students: A mediated moderation model. *Frontiers in Psychology*, 14, 1276700. <https://doi.org/10.3389/fpsyg.2023.1276700>
- Tepper, B. J. (2000). Consequences of abusive supervision. *Academy of Management Journal*, 43(2), 178-190. <https://doi.org/10.5465/1556375>
- Tepper, B. J., Simon, L., & Park, H. M. (2017). Abusive supervision. *Annual Review of Organizational Psychology and Organizational Behavior*, 4(1), 123-152. <https://doi.org/10.1146/annurev-orgpsych-041015-062539>
- Toyama, M., Nagamine, M., Tang, L., Xiao, Y., Miwa, S., & Aikawa, A. (2020). Does prevention-focused orientation affect poor creative performance? *Japanese Journal of Psychology*, 91(3), 155-164. <https://doi.org/10.4992/jjpsy.91.19022>
- Usher, E. L., & Schunk, D. H. (2017). Social cognitive theoretical perspective of self-regulation. In D. H. Schunk & J. A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (pp. 19-35). Routledge. <https://doi.org/10.4324/9781315697048-2>

- Vohs, K. D., & Baumeister, R. F. (Eds.). (2016). *Handbook of self-regulation: Research, theory, and applications*. Guilford Publications.
- Wang, L., Zhang, J., Wang, J., Tao, T., Fan, C., & Gao, W. (2015). Validity and reliability of the Chinese version of the self-regulatory fatigue scale in young adults. *Chinese Mental Health Journal*, 29(4), 290-294.
- Wingfield, M. J., & Wingfield, B. D. (2023). Musings on mentorship. *South African Journal of Science*, 119(3/4). <https://doi.org/10.17159/sajs.2023/15483>
- Zellars, K. L., Tepper, B. J., & Duffy, M. K. (2002). Abusive supervision and subordinates' organizational citizenship behavior. *Journal of Applied Psychology*, 87(6), 1068-1076. <https://doi.org/10.1037/0021-9010.87.6.1068>
- Zheng, R., & Hu, J. (2022). Behavior logic and mechanism innovation in cultivating graduate students' scientific research ability. *Higher Education Development and Assessment*, 38(1), 73-81.
- Zimmerman, B. J. (1995). Self-regulation involves more than metacognition: A social cognitive perspective. *Educational Psychologist*, 30(4), 217-221. https://doi.org/10.1207/s15326985ep3004_8

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