The effect of supervisors' ethical leadership on graduate students' academic procrastination in China: a moderated mediation model

Wenhao Wu*, Dhirapat Kulophas and Penvara Xupravati

Faculty of Education, Chulalongkorn University, Bangkok, Thailand

Introduction: Academic procrastination is a pervasive challenge among graduate students that undermines their academic excellence and career advancement while compromising the effectiveness and quality of university academic environments. To address this issue, it is crucial to explore its antecedents. This research investigates the impact of supervisors' ethical leadership on graduate students' academic procrastination, employing social learning theory to construct a moderated mediation model.

Methods: A comprehensive dataset was gathered from 338 graduate students using a three-stage time-lagged method, which ensured the robustness of the empirical analysis. The research utilized a moderated mediation model to examine the relations between supervisors' ethical leadership, graduate students' followership, academic interests, and academic procrastination.

Results: The analysis revealed a significant negative effect of supervisors' ethical leadership on graduate students' academic procrastination, with this relation mediated by graduate students' followership. Furthermore, graduate students' academic interests moderated the relation between followership and academic procrastination, as well as the effect of supervisors' ethical leadership on academic procrastination through the mediation of followership.

Discussion: The findings offer valuable insights into the factors shaping graduate students' academic behaviors and provide practical guidance for enhancing their academic success and fostering positive academic environments in universities.

KEYWORDS

ethical leadership, academic procrastination, followership, academic interests, social learning theory

Introduction

Graduate education is crucial in cultivating professionals and driving scientific progress, and its significance is increasingly prominent in the modern society. With the global expansion of graduate admissions, the issues related to education quality, especially academic procrastination, have garnered widespread attention (Ryan and Zuber-Skerritt, 2017). Graduate students' academic procrastination is the deliberate postponement of academic tasks or activities, resulting in delayed progress or missed deadlines during their graduate studies, which directly affects their learning quality and graduation rate, potentially leading to mental health issues (He, 2017). Moreover, it can undermine the entire system of universities by hindering research output, slowing academic

progress, and potentially diminishing their overall reputation. Therefore, understanding the antecedents of graduate students' academic procrastination is important to prevent its occurrence. Existing research has indicated that graduate students' academic procrastination is related to various factors, including internal factors such as perfectionism (Onwuegbuzie, 2000) and self-efficacy (Cerino, 2014), as well as external factors such as task nature (He, 2017; Moonaghi and Beydokhti, 2017), social support (Sari and Fakhruddiana, 2019), and social stress (Grunschel et al., 2013). These factors have the potential to impact graduate students' motivation to engage in assigned academic tasks, subsequently influencing the level of academic responsibilities fulfillment and the possibility of meeting deadlines. Among these factors, the role of supervisors stands out as particularly significant. Research has confirmed that supervisors remarkably influence graduate students' academic progress and quality (Wang et al., 2018; Ma et al., 2019). However, such research often considers the antecedents of graduate students' academic procrastination from the perspective of academic guidance and emotional support provided by supervisors (Ni et al., 2015; Wang et al., 2018), but has overlooked graduate students' inclination to actively learn from the supervisors due to the appreciation for supervisors' exceptional qualities, potentially reducing the chance of graduate students' academic procrastination. Given that supervisors are the authority in the graduate students' research area, actively learning from supervisors becomes imperative to achieve academic development.

In the hierarchical relationships within the business organizations, superiors' leadership has been proven to be a key factor influencing the subordinates' attitudes and behaviors (Yahaya and Ebrahim, 2016; Al-Malki and Juan, 2018). With the increasing societal demands for ethical standards and obligations, the concept of ethical leadership emerged, as defined by Brown and Treviño (2006) in their research, involving guiding individuals or groups with a focus on ethical decision-making, to promote ethical behavior and avoid unethical behavior (Brown and Treviño, 2006). Based on psychological contract theory, previous research concluded that ethical leadership could establish work values and stimulate subordinates' intrinsic motivation, thereby enhancing their work engagement (Chu and Fang, 2017). Meanwhile, some research based on cognitive evaluation theory, believed that ethical leaders would foster the sense of belonging and trust among employees through demonstrating exemplary behavior, then enhance their creativity (Feng et al., 2018) and job performance (He and Gao, 2017). In response to the societal demands for the commitment to ethical principles, the universities actively promote the environment that reflects ethical values, thereby witnessing the concept of ethical leadership being introduced into higher education research. Recent research on ethical leadership in academic settings indicates that ethical leadership significantly enhances trust, job satisfaction, and overall academic performance among faculty and students, and leaders themselves (Jia et al., 2022; Xu and Ju, 2024), fostering a positive and ethical educational environment (Ahmed, 2023). Supervisors' ethical leadership involves demonstrating integrity, guiding students in academic and ethical growth, and setting positive examples in both realms. In the interaction between supervisors and graduate students, supervisors' ethical leadership assumes a pivotal role in shaping graduate students' ethical awareness, social responsibility, and academic integrity (Brown and Treviño, 2006). Previous research on supervisors' ethical leadership suggested that supervisors not only provided guidance in research directions and academic knowledge, but also offered emotional support, thus

fostering graduate students' comprehensive growth in both academic and personal aspects (Wang et al., 2022). However, above research mainly emphasized supervisors' impact on graduate students, neglecting the perspective of graduate students actively learning from supervisors. Therefore, in the view of supervisors' ethical leadership bearing important responsibilities in shaping graduate students' academic development and overall growth, it is necessary to delve into how graduate students consciously observe, reflect, and emulate supervisors' ethical leadership. Based on social learning theory, this research underscores graduate students' proactive learning through the observation of supervisors' ethical exemplars and the active emulation of academic motivation and professional acumen, time management, consequently mitigating academic procrastination.

Social learning theory posits that individuals shape their own attitudes and behaviors by closely observing those esteemed as exemplary models, which involves a meticulous examination of the models' values and behaviors, followed by engaging in the imitation and internalization of these positive attributes (Bandura and Walters, 1977). Relevant literature had underscored the key qualities of supervisors' ethical leadership, including diligence, prioritizing research tasks, integrity, and responsibility (Brown and Treviño, 2006). Graduate students will express admiration and exhibit a propensity for emulation, draw upon these exemplary qualities and apply them into their own academic career, which translates into diligence and persistence, resulting in academic progress (Li and Shang, 2023). Consequently, this research, based on social learning theory, proposes a negative relation between supervisors' ethical leadership and academic procrastination. Additionally, graduate students' followership refers to their behavior and response patterns, characterized by engagement, cooperation, and adherence to the guidance, directives, and ethical standards set forth by their supervisors. Graduate students' identification with supervisors' ethical leadership is fostered by their charismatic personality and ethical qualities, contributing to profound respect and trust in the supervisors, laying the foundation for the graduate students to follow their supervisors' academic arrangement and guidance (Stern, 2021). Graduate students' followership involves engaging in academic collaboration and making efforts to achieve academic goals, thereby deliberately avoiding distractions and reducing the possibility of academic procrastination (Pan, 2013). Therefore, graduate students' followership serves as a mediator between supervisors' ethical leadership and graduate students' academic procrastination. Besides, significant individual differences exist in the formation and development of graduate students' academic procrastination (Gustavson and Miyake, 2017). Academic interests refer to individuals' curiosity, engagement, and enthusiasm in a specific research field or a particular subject within the academic domain (Lent et al., 1994). Graduate students' academic interests reflect their passion and commitment to academic activities (Gemme and Gingras, 2012). Driven by admiration for supervisors' ethical qualities and professional integrity, graduate students develop a compelling motivation to follow their supervisors (McCallin and Nayar, 2012). Also, graduate students' academic interest refers to their specific areas of curiosity, passion, or focus within their field of study or research. Graduate students themselves possess curiosity and dedication towards academic knowledge and research, which strengthens their inclination to follow their supervisors to focus on academic pursuits, mitigating tendencies toward procrastination as their engagement aligns with both supervisors' ethical leadership and their own academic interests (Steel

and Klingsieck, 2016). Therefore, graduate students' academic interests play a moderating role between supervisors' ethical leadership and graduate students' followership, which further affects graduate students' academic procrastination, and constitutes a moderated mediation model.

In summary, this research, grounded in social learning theory, has developed a moderated mediation model to elucidate the mechanism by which supervisors' ethical leadership affects graduate students' academic procrastination, which incorporates the mediating factor of graduate students' followership and the moderating factor of graduate students' academic interests, aiming to innovate in three main aspects compared to existing literature. To begin with, different from previous research that explored the effect of supervisors' ethical leadership from the perspectives of psychological contract theory (Chu and Fang, 2017) and cognitive evaluation theory (Feng et al., 2018), this research, based on social learning theory, reveals the relation between supervisors' ethical leadership and graduate students' academic procrastination, with the focus on graduate students as the research subjects and the emphasis on their role in active learning. The research conclusions not only expand the theoretical perspectives on the relation between supervisors' ethical leadership and graduate students' academic procrastination, but also broaden the application scope of social learning theory. Furthermore, followership has been extensively studied in the field of leader-employee relation in the business organization, and previous research had proven the effects of ethical leadership on followership (Van Vugt, 2006) and recognized the influence of followership on employees' attitudes and behaviors (Shen and Abe, 2023). However, few attentions have been paid to the concept of followership in supervisor-graduate student relationship. In this research, while investigating the relation between supervisors' ethical leadership and graduate students' academic procrastination, followership is introduced as a mediating variable, which not only provides a detailed interpretation of the underlying mechanisms between the two variables, but also further expands the research on followership in business organizations (Chu and Fang, 2017; Feng et al., 2018). Finally, although researchers have contributed many findings concerning academic interests, they mainly analyzed the promoting effects of individual study and research experiences on academic interests. Moreover, previous research was primarily conducted on a broad spectrum rather than focusing graduate students (Schiefele et al., 1992). This research regards graduate students' academic interests as a moderating variable, indicating that it can enhance the effect of graduate students' followership on graduate students' academic procrastination and the influence of supervisors' ethical leadership on graduate students' academic procrastination through graduate students' followership, which enriches the research on academic interests.

Theoretical framework and research hypotheses

Supervisors' ethical leadership and graduate students' academic procrastination

Graduate students' academic procrastination refers to the intentional delay or postponement of academic tasks or other academic-related activities during the pursuit of graduate studies, which may manifest as slow progress or missed deadlines in coursework assignments, thesis writing, experimental projects, or other academic tasks (Ryan and Zuber-Skerritt, 2017). The consequences of graduate students' academic procrastination are potentially diversified and severe. For instance, it often leads to poor performance in academic area, as well as postpone of graduation, which may not only cause self-doubt, and even a complete self-negation of academic competence among graduate students (Onwuegbuzie and Collins, 2001; He, 2017), but may also disrupt the overall research achievements and academic reputation of universities. Existing research exploring the antecedents of graduate students' academic procrastination has delved into both internal and external factors. Reviewing the internal factors, individuals may experience anxiety or fear due to excessively high self-set goals before completing tasks (Onwuegbuzie, 2000), or exhibit a lack of self-efficacy, leading to distrust in their own abilities (Cerino, 2014), consequently delaying academic tasks. As for the external factors, the complexity and difficulty of academic tasks (He, 2017; Moonaghi and Beydokhti, 2017), combined with a lack of external support and guidance (Sari and Fakhruddiana, 2019), can result in graduate students postponing the initiation and completion of tasks to alleviate pressure (Grunschel et al., 2013). Among these triggering factors, the role of supervisors has gained widespread attention. For example, supervisors' abusive supervision causes challenges for graduate students to maintain focus on demanding tasks, and when faced with external pressure, graduate students employing maladaptive cognitive-emotional coping strategies may find it hard to rationally consider the consequences of academic procrastination (Ni et al., 2015). Conversely, supervisors' supportive supervision style fosters an environment conducive to the academic development of graduate students, inspiring their academic interests, enhancing academic creativity, and reducing academic procrastination (Ma et al., 2019). Therefore, a harmonious supervisor-graduate student relationship is the key for enhancing satisfaction with learning, reducing pressure, improving psychological health, and subsequently lowering the possibility of academic procrastination (Wang et al., 2018).

Supervisors' ethical leadership refers to the demonstration of high ethical standards and leadership presence by supervisors in academic pursuit and interpersonal interactions (Li and Bao, 2020), involving guiding students in cultivating virtues, actively learning knowledge, advocating for upright, just, and responsible academic practices, with characteristic feature lies in setting behavioral examples in both ethical and academic aspects (Nejati and Shafaei, 2018). Through subtle and implicit daily interactions, supervisors exert influence on graduate students' thoughts and behaviors, leading them to voluntarily emulate supervisors, actively adhere to ethical norms and academic endeavor, thereby achieving comprehensive development in ethical and academic excellence (Nejati and Shafaei, 2018). So far, previous research on the effectiveness of supervisors' ethical leadership mainly focuses on two perspectives. First, researchers, including Devos et al. (2015) and He and Zhu (2023), based on basic needs theory, believe that supervisors not only helped graduate students determine research directions, develop research plans, and cultivate independent thinking, but also, through high-quality academic guidance, imparted knowledge and skills, enhancing the academic abilities and efficiency of graduate students, then reducing academic procrastination. Second, some others, based on self-determination theory, argued that

emotional supports from supervisors, such as respect and encouragement can activate graduate students' learning motivation, contribute to shaping a positive emotional and mental state, instill a positive learning concept, significantly improve academic performance, and reduce academic procrastination (Ryan and Deci, 2006; Shao et al., 2023). Therefore, previous research has generally focused supervisors as the research subject, widely recognizing the positive effects of supervisors exercising ethical leadership on graduate students' attitudes and behavior, neglecting to interpret the connotation of supervisors' ethical leadership from graduate students' perspective.

Social learning theory emphasizes the crucial role of the social environment in individual learning, asserting that learning is a social activity, advocating that individuals acquire new values and behavioral patterns through social interaction by observing others and imitating them, which highlights how individuals gain knowledge and skills through social interactions (Bandura and Walters, 1977). In the daily interactions and academic exchanges with graduate students, supervisors demonstrate outstanding ethical qualities, professional ethics, and academic pursuits, through which they serve as role models for graduate students to observe and emulate, showcasing the importance of ethical guidance and behavioral demonstration. First, graduate students observe the supervisors' meticulous attitude in handling academic issues and other related tasks, leading to genuine recognition and the adoption of similar methods in academic tasks, fostering a rigorous scholarly attitude. Secondly, inspired by supervisors' dedication and academic pursuit, graduate students acknowledge and admire their qualities and behavior, review supervisors as learning exemplars, embrace their high-level academic aspirations, and willingly spend time and efforts to pursue academic success. Third, graduate students understand and accept the outstanding qualities demonstrated by supervisors' ethical leadership, and they will proactively internalize these qualities into their own values and ethical standards, holding higher expectations for themselves and willingly taking action to face and overcome academic challenges, thus motivating themselves to achieve academic accomplishments. In summary, based on social learning theory, this research proposes the following hypotheses:

> *H1*: Supervisors' ethical leadership negatively affects graduate students' academic procrastination.

The mediating effect of graduate students' followership

Research on the antecedents of employees' followership has yielded rich insights in the fields of psychology and organizational behavior. Previous research has extensively revealed the key role of employees' individual traits in shaping their followership. For instance, employees with higher emotional intelligence tend to better understand and manage their own and others' emotions, which facilitates the establishment of an emotional connection with leaders, enhancing the sense of identification and trust, thereby fostering a willingness to follow leaders (Martin, 2015). Guay et al. (2019) suggests that employees with conscientiousness actively take on tasks, strive to fulfill job responsibilities, and pursue outstanding

performance, driving them more inclined to understand and support leaders' decisions and consequently develop followership. Additionally, researchers have focused on the effects of external situational factors on employees' followership. Positive leadership styles such as transformational, supportive, and empowering leadership can enhance employees' perception of the significance and value of their work, leading to a more intensive followership (Luo et al., 2018; Salas-Vallina et al., 2020; Kim and Beehr, 2021). Simultaneously, when employees face changes and challenges in the work environment, decreased psychological safety is often accompanied by uncertainty anxiety, leading them to seek guidance and support from leaders, potentially cause followership towards leaders to meet psychological safety needs (Khan, 2021). Despite the importance of employees' personality traits, leadership styles, and work environmental changes in shaping followership, more research acknowledges the importance of leaders' behaviors (Nahrgang et al., 2009). The concept of graduate students' followership originates from the business domain, specifically referring to the trust, respect, and willingness to accept guidance from supervisors in the academic and professional fields, which reflects graduate students' identification with supervisors' academic and professional orientation and recognition to supervisors' professional authority in academic and research matters (Wang, 2020). However, there is currently limited research on graduate students' followership in an academic context, and the exploration of its antecedent variables remains a research gap. This research aims to draw on the existing research findings on the antecedents of employees' followership and, from the perspective of supervisors, delve into the effects of ethical leadership on graduate students' followership.

According to social learning theory, individuals cultivate awareness by observing and imitating the behaviors of others, involving internalizing ethical standards demonstrated by ethical leaders, which cultivates trust and admiration and contributes to the strengthening of their followership (Rendell et al., 2010). First, supervisors serve as convincing models by consistently engaging in active academic exploration, making intensive career efforts, and demonstrating exemplary professional ethics (Nejati and Shafaei, 2018). When graduate students observe ethical decision-making and principled actions from their supervisors, they are likely to view them as role models, leading to resonance with supervisors' values, an aspiration to become peers, and a willingness to adopt ethical decisions as part of their own learning and development (Löfström and Pyhältö, 2020). Second, through demonstrating ethical conducting, outstanding academic and professional performance, as well as sincere concern for the development of graduate students, supervisors form a trustworthy image within graduate students built upon their reliability and integrity, providing a solid basis to build trust and rapport with graduate students (Mayer and Davis, 1999), which only instills a sense of dependance within graduate students in the academic environment but also lays the ground for the formation and enhancement of followership. Finally, social learning theory emphasizes the key role of cognitive processes in learning by observation (Bandura and Walters, 1977), positing that individuals identify with and model themselves after those they perceive as similar or desirable (Bandura, 1986), internalizing the qualities as personal orientations. Observing supervisors' ethical behaviors provides a cognitive framework for graduate students to understand their ethical principles, and subsequently internalize and model these principles

themselves, exerting a positive influence on followership. Based on the above inferences, this research proposes the following hypothesis:

> *H2*: Supervisors' ethical leadership positively affects graduate students' followership.

It is revealed by social learning theory that graduate students' followership towards supervisors can be facilitated through social learning interactions, such as observation, imitation, and social identification (Bandura and Walters, 1977), promoting academic development and reducing academic procrastination. First, social learning theory suggests that once individuals identify with someone, they tend to imitate his or her behavior (Rendell et al., 2010). When graduate students develop followership, it will enhance their alignment with the supervisors' actions and values, leading them to emulate supervisors' commitment and persistence to academic rigor and research endeavor, actively engaging in learning and research activities. Second, driven by followership, graduate students tend to heed supervisors' academic advice, concentrating their attention, time, and energy on pursuing academic excellence, avoiding distractions from other irrelevant activities, which fosters a dedicated attitude and devotion to study and research tasks, thereby reducing the possibility of academic procrastination (Zeb et al., 2023). Third, social learning theory emphasizes the impact of social interactions on individual identity and belonging. By establishing positive social relationships with supervisors, graduate students find it easier to integrate into academic communities, deepen their identification with the supervisors' academic domain, transfer their academic guidance into personal pursuit, and shape graduate students' own academic principles, consistent with the ethical standards based on their academic experience (Khuram et al., 2023), thereby contributing to academic advancement, and further reducing procrastination. Based on above argument, a hypothesis is proposed as below:

> *H3*: Graduate students' followership negatively affects graduate students' academic procrastination.

As per social learning theory, learning is a social process in which individuals acquire knowledge, skills, and attitudes by observing others' behaviors, absorbing others' experiences, and engaging in social interactions, which shapes their behavioral patterns and values, emphasizing the importance of the social environment in learning and behavior formation (Bandura and Walters, 1977). This research posits that supervisors with ethical leadership exhibit positive performance in ethical standards, interpersonal communication, and academic pursuits. Through serving as role models, providing consistent guidance, and inspiring trust and respect from graduate students through social interaction, supervisors create a conducive academic atmosphere, thereby triggering followership among graduate students. Meanwhile, followership among graduate students indicates a tendency to trust, respect, admire, and willingly accept guidance from supervisors (Zhu et al., 2023). Graduate students, by resonating with supervisors, sharing values and academic concepts (Wang et al., 2022), actively accepting advice in learning and research (Parker-Jenkins, 2018), establishing connections with supervisors, and integrating into the corresponding academic community (Fan et al., 2019), can focus more on their academic tasks, achieve higher efficiency in learning and research, and cultivates academic confidence and enthusiasm.

This process contributes to graduate students' academic development, and further reduces academic procrastination. Therefore, based on the social learning theory, this research proposes the following hypotheses:

> *H4*: Graduate students' followership mediates between supervisors' ethical leadership and graduate students' academic procrastination.

The moderating effect of graduate students' academic interests

Graduate students' academic interests refer to their passion and enthusiasm for a specific discipline or field, propelling them to immerse themselves in knowledge, employ critical thinking, and pursue innovative exploration to satiate their intellectual curiosity and contribute to pertinent research outcomes (Lee and Durksen, 2021), which is frequently demonstrated through sustained focus on relevant issues, proactive engagement in academic activities, and an enduring commitment to academic achievement. Prior research has affirmed that the academic interest of graduate students is typically linked with in-depth research and the pursuit of academic achievements, bolstering their academic motivation and compelling them to actively participate in research and learning tasks (Ma et al., 2019), ultimately contributing to overall academic performance, augmenting research output, and fostering creativity (Löfström and Pyhältö, 2020). According to social learning theory, the imitation of observed behaviors depends on individuals' enthusiasm for those behaviors (Rendell et al., 2010). Therefore, while the process of graduate students following supervisors is commonly viewed as the optimal means of acquiring professional knowledge and academic experience, suggesting that graduate students' followership is positively significant for mitigating academic procrastination, the strength of this relation is also influenced by graduate students' academic interests (Lent et al., 1994).

Imitating the behaviors of ethical supervisors, focusing on academic advice, and establishing identity through active social interactions are crucial factors in reducing graduate students' academic procrastination (Rendell et al., 2010; Khuram et al., 2023; Zeb et al., 2023), which influences the attitudes and behaviors of graduate students in academic tasks, ultimately deciding their academic performance. To begin with, when graduate students express profound interests in their research areas, their identification with supervisors tends to be intensified, inspiring them to actively emulate supervisors' behaviors and academic pursuits, thus diminishing the possibility of academic procrastination (Rendell et al., 2010). Furthermore, academic interests may act as a driving force for graduate students to prioritize and heed supervisors' academic advice, encouraging them to concentrate on academic activities and effectively cope with academic challenges, ultimately reducing the risk of academic procrastination (Zeb et al., 2023). Lastly, academic interests also contribute to graduate students' positive social interactions with supervisors, as well as academic communities, and academic enthusiasm may lead them to establish close relationship with supervisors, obtain motivation and academic guidance through social interactions, reduce feelings of isolation, and deepen their sense of belonging to the academic community (Khuram et al., 2023),

thereby decreasing the chances of academic procrastination. Conversely, low academic interests among graduate students may diminish their identification with supervisors' behaviors, reduce the emphasis on academic advice, and limit enthusiasm for social interactions, potentially increasing the risk of academic procrastination. Therefore, considering that the academic interests of graduate students can stimulate positive academic attitudes and behaviors of graduate students, contributing to academic performance improvement, it is speculated that academic interests may play a crucial moderating role in the relation between graduate student motivation and academic procrastination, which is expected to strengthen the effects of graduate students' followership on academic procrastination. Based on the above inference, the following hypothesis is proposed in this research:

> *H5*: Graduate students' academic interests play an enhancing moderating role in the process where graduate students' followership affects academic procrastination. Specifically, when graduate students have higher academic interests, the negative effect of graduate students' followership on their academic procrastination is more substantial.

This research further hypothesizes that graduate students' academic interests will have an enhancing moderating effect on the indirect negative effect of supervisors' ethical leadership on graduate students' academic procrastination through the mediating role of graduate students' followership. Graduate students specifically perceive supervisors with ethical leadership as role models and internalize their high academic ethics and professional pursuits, thereby enhancing their followership and further devoting attention to academic progress to reduce academic procrastination (Chu and Fang, 2017). Meanwhile, graduate students' strong academic interests in their professional field enhances shared topics and goals with their supervisor, fostering a closer academic collaboration. In that case, graduate students' strong academic interests are more inclined to reinforce the influence of their followership on the ethical qualities and behavioral norms related to academic pursuits, effectively reducing academic procrastination (Ma et al., 2019). Conversely, a lack of enthusiasm for academic endeavors hampers the transmission of these professional standards (Lent et al., 1994). As disinterested graduate students may be less inclined to internalize and exemplify the ethical guidelines and behavioral norms displayed by supervisors, which may reduce the engagement and commitment of graduate students to their academic pursuits (Bieber and Worley, 2006), thereby limiting their followership to the ethical principles and behavioral expectations established by supervisors, and further diminishing the

effect of followership as a mediating factor in conveying the ethical standards and behavioral norms set by supervisors. Thus, this research proposes the following hypothesis:

> *H6*: Graduate students' academic interests moderate the indirect negative effect of supervisors' ethical leadership on graduate students' academic procrastination through the mediating role of graduate students' followership. Alternatively, when graduate students have higher academic interests, the indirect negative effect of supervisors' ethical leadership on graduate students' academic procrastination through the mediating role of graduate students' followership is more substantial.

In summary, the theoretical model of this research is illustrated in Figure 1.

Methodology

Procedure

The data for this research was collected using questionnaires. A sample of graduate students from 16 universities from the provinces of Tianjin, Jiangsu, Guangxi, and Hainan in China was selected with the assistance of staff involved in graduate student education and management. The surveyed graduate students were explicitly informed about the meaning of the questionnaire items, assured of the anonymity of their responses, and promised that the data collected would be used solely for academic research purposes, ensuring their privacy would not be compromised and contributing to the scientific validity of the sampling process to a considerable extent. To avoid artificial covariation caused by common method variance (Podsakoff et al., 2003), this research employed a 6-month time-lagged survey. In the first stage of the survey, participants were required to answer the questionnaires on their demographic information, including gender, level of education, job status, field of study and years of study, as well as their supervisors' ethical leadership. After 3 months, postgraduate students were requested to evaluate their followership to supervisors by filling questionnaires. In the final stage, graduate students reported their academic procrastination and academic interest. This research set time intervals of two consecutive 3-month, which enhanced the interaction between supervisors and postgraduate students, and better revealed the potential positive effect of ethical leadership of supervisors on postgraduate students. Throughout the survey process, the research adhered to the guidelines outlined in the Declaration of Helsinki to ensure the privacy and anonymity of the participants. Informed consent was obtained from all participants.
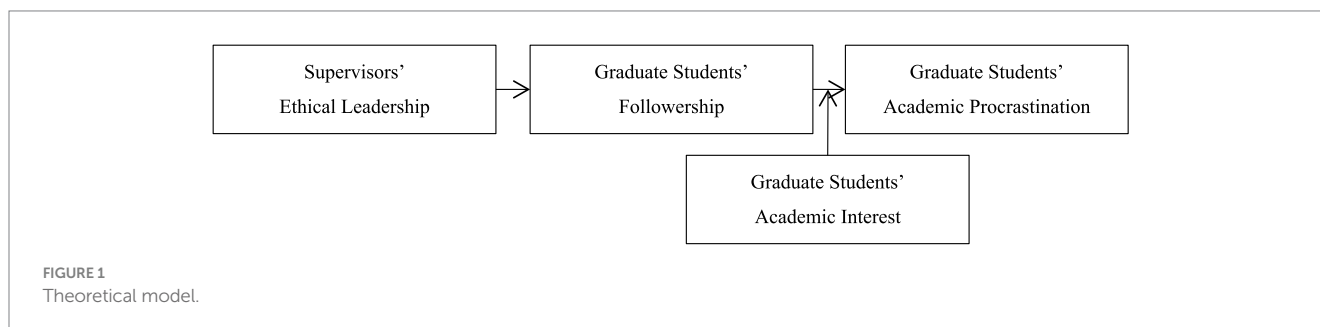

FIGURE 1
Theoretical model.

Participant

In the 450 questionnaires distributed, 396 were collected, among which 338 valid responses were analyzed after excluding incomplete or biased questionnaires. The effective recovery rate was 75.11%. Among the 338 valid responses, 176 respondents were identified as male, representing 52.07% of the sample. The distribution in terms of educational level comprised 157 doctoral students and 181 master's degree candidates. Notably, 154 respondents pursued their academic program while concurrently engaged in employment, constituting 45.56% of the surveyed population, while the remaining 54.44% were full-time students. Regarding the academic disciplines, respondents were distributed across various fields: 25.74% in sciences, 15.39% in social sciences, 11.83% in engineering, 21.89% in medicine, and 25.15% in arts. The distribution across academic program years included 26.63% in the first year, 14.79, 19.23, 15.09, and 24.26% in the second, third, fourth, and fifth years of their programs, respectively.

Measure

Based on a comprehensive review of existing literature, this research examined prior research methodologies pertaining to the assessment of ethical leadership, academic procrastination, followership, and academic interests. Widely accepted scales were employed during the research process. Given that the primary language of instruction for participants in this research was Chinese, the questionnaire items were formulated in Chinese to ensure a general understanding by participants. Moreover, considering the unique research context and the specific survey population, adjustments were made to the original item expressions to align with the requirements of this research. This was done to ensure the content validity and face validity of the questionnaire items. Likert-7 scales were utilized for quantitative assessment, where participants were required to select a number between 1 and 7 to indicate varying degrees of intensity.

Supervisors' ethical leadership

This research referred to Erben and Güneşer (2008) 6-item scale on ethical leadership, and adjusted to item expressions, for example "My supervisor does not use guanxi (personal relationships) or back door practices to obtain illicit personal gain," "My supervisor does not take the credit for my achievements and contributions for himself/herself," "My supervisor does not take advantage of me for personal gain," etc. In this research, Cronbach's α coefficient of this scale is 0.966 with saturated results.

Academic procrastination

The academic procrastination of graduate students was assessed using a modified 5-item scale derived from McCloskey's (2011) academic procrastination instrument, as adapted by Yockey (2016). This research requested graduate students to evaluate their academic procrastination through items, such as "I put off projects until the last minute," and "I know I should work on assignment, but I just do not do it." The internal consistency of this instrument was evaluated using Cronbach's α coefficient, demonstrating a high-reliability score of 0.963.

Graduate students' followership

This research employed an adapted 5-item scale of followership initially developed by Deng, 2017 and adjusted the item expression to "I am very passionate about the academic tasks assigned by my supervisor," "I will actively develop my academic skills to make myself more valuable to my supervisor," "When taking on a new task from my supervisor, I will strive to make progress in a short period of time," "I always make an effort to keep my supervisor informed about my achievements" and "I always make an effort to ensure that my supervisor is aware of my contributions." Its Cronbach's α coefficient is 0.984.

Graduate students' academic interests

This research used the 4-item academic interests scale by Ma et al. (2019) with items, such as "I actively participate in team meetings and discussions," "I often engage in discussions with classmates in different research fields" and so on. In the reliability test, Cronbach's α coefficient is 0.936.

Control variables

Level of education, field of study (Wang and Gao, 2021) and years of study (Rosário et al., 2009) have been confirmed to exert an impact on graduate students' academic procrastination, as accumulation in years of study may occur with greater academic responsibilities and pressure, potentially leading to an increase in academic procrastination. Also, gender distinguishes graduate students' academic stress, self-confidence on academic skills, motivation for academic achievement (Turhan, 2020), thereby influencing their academic procrastination. Moreover, their job status decides time and attention devotion to academic task (Chinyakata et al., 2019), which affects academic procrastination. Thus, above factors were employed as control variables.

Data analysis and results

Common method derivation

The variance explained by the first factor is 39.160%, which is below the empirical threshold of 50%. When four factors are extracted, showing consistency with the number of variables in the theoretical model, the cumulative variance explained is 88.035%.

Confirmatory factor analysis

AMOS was used to conduct confirmatory factor analysis on the data collected from the survey to test the matching degree between data and model, as well as the discriminant validity between variables. As shown in Table 1, the four-factor model structure including supervisors' ethical leadership, graduate students' academic procrastination, graduate students' followership and academic interests have a good fitting effect ($\chi^{2/DF} = 1.952 < 5$, RMSEA $= 0.053 < 0.08$, CFI $= 0.983 > 0.9$, GFI $= 0.912 > 0.9$, TLI $= 0.980 > 0.9$). The results are better than three-factor, two-factor, and single-factor structural models after factor combination. The four-factor structure involved in this research have good discriminant validity.

TABLE 1 Confirmatory factor analysis results.

Model	χ^2	df	χ^2/df	CFI	GFI	TLI	RMSEA
Four-Factor Model (Supervisors' Ethical Leadership, Graduate Students' Followership, Graduate Students' Academic Procrastination, Graduate Students' Academic Interests)	320.177	164	1.952	0.983	0.912	0.980	0.053
Three-Factor Model (Supervisors' Ethical Leadership, Graduate Students' Followership + Graduate Students' Academic Interests, Graduate Students' Academic Procrastination)	1600.748	167	9.585	0.840	0.642	0.818	0.160
Double-Factor Model (Supervisors' Ethical Leadership + Graduate Students' Followership + Graduate Students' Academic Interests, Graduate Students' Academic Procrastination)	4513.248	169	26.706	0.516	0.396	0.456	0.276
Single-Factor Model (Supervisors' Ethical Leadership + Graduate Students' Followership+ Graduate Students' Academic Procrastination + Graduate Students' Academic Interests)	6359.866	170	37.411	0.311	0.297	0.230	0.329

χ^2/df means chi-square to degrees of freedom ratio, CFI means comparative fit index, GFI means goodness-of-fit index, TLI means Tucker-Lewis Index, RMSEA means root mean square error of approximation.

TABLE 2 Descriptive statistics and correlation analysis.

Control variables	M	SD	1	2	3	4	5	6	7	8	9
1. Gender	0.479	0.500	1								
2. Level of education	1.536	0.499	−0.175**	1							
3. Job status	1.456	0.499	0.074	0.042	1						
4. Field of study	3.053	1.553	−0.056	0.304***	−0.246***	1					
5. Years of study	2.956	1.529	−0.213***	0.163**	−0.043	0.015	1				
6. Supervisors' ethical leadership	4.900	1.343	−0.003	0.117*	−0.128*	0.218***	−0.049	1			
7. Graduate students' followership	5.315	1.394	−0.041	−0.020	−0.099	0.090	0.004	0.259***	1		
8. Graduate students' academic procrastination	5.590	1.260	0.063	−0.056	−0.241***	0.108*	−0.202***	−0.143**	−0.233***	1	
9. Graduate students' academic interests	5.029	1.484	0.030	−0.018	−0.050	0.013	−0.042	0.120*	0.234***	−0.616***	1

*$p<0.05$ **$p<0.01$ ***$p<0.001$.

Descriptive statistics and correlation analysis

Table 2 mainly shows the mean value, standard deviation, and correlation coefficient among variables by SPSS. There is a significant negative correlation between supervisors' ethical leadership and graduate students' academic procrastination ($r = -0.143$, $p < 0.01$), Meanwhile, there exists a significant positive correlation between supervisors' ethical leadership and graduate students' followership ($r = 0.259$, $p < 0.001$). A significant negative correlation between graduate students' followership and academic procrastination ($r = -0.233$, $p < 0.001$), a significant negative correlation between graduate students' academic interests and academic procrastination ($r = -0.616$, $p < 0.001$).

Above results provide a basis for the hypothesis test process of this research.

Hypothesis test

In order to test the direct effect of supervisors' ethical leadership on graduate students' academic procrastination, and the mediating effect of graduate students' followership between supervisors' ethical leadership and graduate students' procrastination, and the moderating effect of graduate students' academic interests on the relation between followership and academic procrastination, this research used the hierarchical regression test method by SPSS to test the hypotheses (Baron and Kenny, 1986).

TABLE 3 Supervisors' ethical leadership, graduate students' followership, and graduate students' academic procrastination.

Variables	Graduate students' academic procrastination											
	Model 1			Model 2			Model 3			Model 4		
	β	95%CI		β	95%CI		β	95%CI		β	95%CI	
Gender	0.093	−0.173	0.359	0.090	−0.176	0.355	0.114	−0.146	0.374	0.111	−0.149	0.372
Level of education	−0.064	−0.343	0.215	−0.084	−0.363	0.195	−0.038	−0.311	0.235	−0.049	−0.323	0.225
Job status	−0.596***	−0.865	−0.327	−0.573***	−0.842	−0.304	−0.557***	−0.821	−0.294	−0.548***	−0.813	−0.284
Major	0.051	−0.039	0.141	0.037	−0.054	0.129	0.037	−0.052	0.125	0.031	−0.059	0.120
Years of study	−0.166***	−0.253	−0.079	−0.160***	−0.247	−0.074	−0.166***	−0.250	−0.081	−0.163***	−0.248	−0.078
Supervisors' ethical leadership				−0.290*	0.006	0.191				−0.045	−0.054	0.145
Graduate students' followership							−0.190***	0.099	0.281	−0.179***	0.085	0.273
R^2	0.108			0.118			0.151			0.153		
Adjusted R^2	0.095			0.101			0.136			0.136		
$\triangle R^2$	0.108			0.010			0.043			0.036		
F	7.323***			8.050***			9.845***			8.547***		

***$p < 0.001$.

TABLE 4 Supervisors' ethical leadership and graduate students' followership.

Variables	Graduate students' followership					
	Model 1			Model 2		
	β	95%CI		β	95%CI	
Gender	−0.111	−0.421	0.198	−0.121	−0.421	0.179
Level of education	−0.138	−0.463	0.186	−0.196	−0.511	0.120
Job status	−0.204	−0.517	0.108	−0.139	−0.443	0.166
Major	0.076	−0.029	0.181	0.037	−0.066	0.140
Years of study	−0.001	−0.102	0.100	0.014	−0.084	0.113
Supervisors' ethical leadership				0.262***	0.151	0.373
R^2	0.018			0.077		
Adjusted R^2	0.003			0.061		
$\triangle R^2$	0.018			0.060		
F	1.183			4.619***		

***$p < 0.001$.

Supervisors' ethical leadership and graduate students' academic procrastination

The hypothesis test results of supervisors' ethical leadership affecting graduate students' academic procrastination are shown in Table 3. In model 2, the regression coefficient of supervisors' ethical leadership on graduate students' academic procrastination is negative and significant ($−0.290$, $p < 0.05$), indicating that supervisors' ethical leadership has a negative relation with graduate students' academic procrastination. Hypothesis 1 is proved.

The mediating effects of graduate students' followership

The hypothesis test results of supervisors' ethical leadership affecting graduate students' followership are shown in Table 4. In model 2, the regression coefficient of supervisors' ethical leadership on graduate students' followership is positive and significant (0.262, $p < 0.001$), indicating that supervisors' ethical leadership has a positive impact on graduate students' followership. Hypothesis 2 is proved.

The hypothesis test results of postgraduate students' followership affecting academic procrastination are shown in Table 3. In model

3, the regression coefficient of postgraduate students' followership on academic procrastination is negative and significant (-0.190, $p < 0.001$), indicating that postgraduate students' followership has a negative effect on academic procrastination. Hypothesis 3 is proved. In model 4 of Table 3, the regression coefficient of supervisors' ethical leadership affecting postgraduate students' academic procrastination is negative and insignificant ($\beta = -0.045$, $p > 0.05$), but the regression coefficient of postgraduate students' followership affecting academic procrastination is negative ($\beta = -0.179$, $p < 0.001$), indicating that postgraduate students' followership plays an mediating role in the relation between supervisors' ethical leadership and postgraduate students' academic procrastination. Hypothesis 4 is proved.

The moderating effect of postgraduate students' academic interests

The hypothesis test results of the moderating effect of postgraduate students' academic interests on the relation between followership and academic procrastination are shown in Table 5. In Model 4, regression coefficient of the interaction between postgraduate students' followership and academic interests on academic procrastination is negative and significant ($\beta = -0.184$, $p < 0.001$). Furthermore, given that the regression coefficient direction of the effect of postgraduate students' followership on academic procrastination is consistent ($\beta = -0.075$, $p < 0.05$), academic interests exhibits an enhancing moderating effect on the relation between postgraduate students' followership and academic procrastination. Hypothesis 5 is proved.

Then, a schematic diagram of the interaction is drawn to present the direction and trend of the moderating effect of postgraduate students' academic interests. As can be seen from Figure 1, under conditions of high postgraduate students' academic interests, the regression slope of postgraduate students' followership on academic

procrastination is lower and steeper. Conversely, under conditions of postgraduate students' academic interests, the regression slope of the effect of postgraduate students' followership on academic procrastination is higher and more gradual. Thus, it is evident that postgraduate students' academic interests enhance the negative relation between postgraduate students' followership and academic procrastination, as hypothesized, and this is further supported by the graphical representation in Figure 2.

Model 15 in the SPSS Process plugin was applied to test the moderating effects of postgraduate students' academic interests on the mediating effect of postgraduate students' followership between supervisors' ethical leadership and postgraduate students' academic procrastination. It was found that under low levels of postgraduate students' academic interests, the indirect negative effect of supervisors' ethical leadership on postgraduate students' academic procrastination through postgraduate students' followership is not significant (effect = -0.0196, 95%CI = [-0.0640, 0.0293], confidence interval includes 0). However, under high levels of postgraduate students' academic interests, the indirect negative effect of supervisors' ethical leadership on postgraduate students' academic procrastination through postgraduate students' followership is significant (effect = 0.0545, 95%CI = [0.0139, 0.1178], confidence interval does not include 0). The results in Table 6 indicate that postgraduate students' academic interests have a strengthening effect on the indirect negative effect of supervisors' ethical leadership on postgraduate students' academic procrastination through followership. Hypothesis 6 is confirmed.

Discussion

Based on social learning theory, this research systematically analyzed the effect of supervisors' ethical leadership on graduate

TABLE 5 The moderating effect of graduate students' academic interests.

Variables	Graduate students' academic procrastination											
	Model 1			Model 2			Model 3			Model 4		
	β	95%CI		β	95%CI		β	95%CI		β	95%CI	
Gender	0.093	−0.173	0.359	0.114	−0.146	0.374	0.064	−0.143	0.270	0.049	−0.154	0.251
Level of education	−0.064	−0.343	0.215	−0.038	−0.311	0.235	−0.045	−0.262	0.171	−0.034	−0.245	0.178
Job status	−0.596***	−0.865	−0.327	−0.557***	−0.821	−0.294	−0.506***	−0.715	−0.297	−0.498***	−0.702	−0.293
Major	0.051	−0.039	0.141	0.037	−0.052	0.125	0.044	−0.026	0.114	0.046	−0.023	0.115
Years of study	−0.166***	−0.253	−0.079	−0.166***	−0.250	−0.081	−0.148***	−0.215	−0.080	−0.159***	−0.225	−0.093
Graduate students' followership				−0.190***	0.099	0.281	−0.167*	0.007	0.141	−0.075*	0.003	0.148
Graduate students' academic interests							−0.492***	0.423	0.561	−0.459***	0.390	0.529
Graduate students' followership * Academic interests										−0.184***	0.094	0.275
R^2	0.108			0.151			0.468			0.492		
Adjusted R^2	0.095			0.136			0.456			0.480		
$\triangle R^2$	0.108			0.043			0.316			0.025		
F	8.050***			9.845***			39.898***			41.424***		

*$p < 0.05$ ***$p < 0.001$.

FIGURE 2
Schematic diagram of interaction effect of graduate students' academic interests.
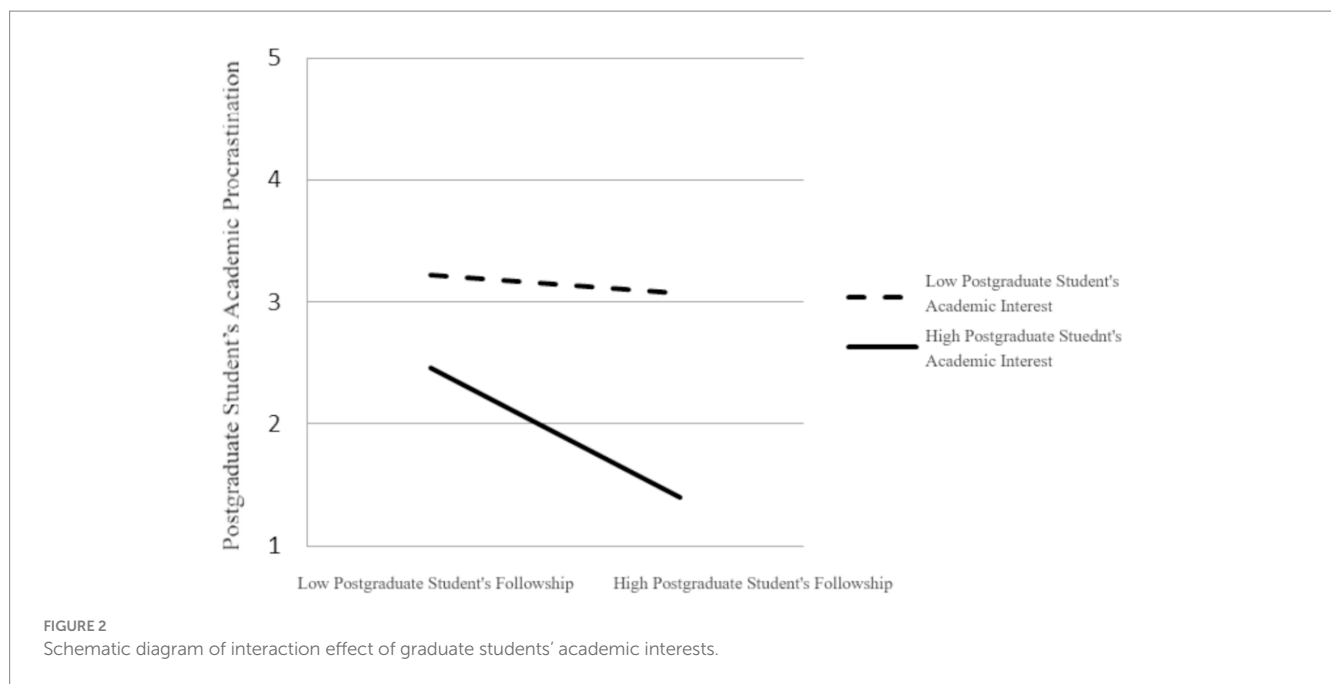
TABLE 6 Moderated mediation analysis.

Variables	Level	Effect	BootSE	BootLLCI	BootULCI
Graduate students' academic interests	Low (3.5446)	−0.0196	0.0230	−0.0640	0.0293
	Medium (5.0288)	0.0175	0.0160	−0.0064	0.0563
	High (6.5131)	0.0545	0.0270	0.0139	0.1178

Bootstrapping is a statistical resampling method that estimates the distribution of a statistic by repeatedly sampling from observed data, enabling calculation of confidence intervals and hypothesis testing without relying on population distribution assumptions, useful for small sample sizes or non-parametric scenarios.

students' academic procrastination and its underlying mechanisms. Through empirical evidence, the following conclusions were drawn: (1) Supervisors' ethical leadership negatively affects graduate students' academic procrastination; (2) The graduate students' followership serves as a mediating factor between supervisors' ethical leadership and graduate students' academic procrastination; (3) Graduate students' academic interests exert an enhancing moderating effect on the relation between graduate students' followership and academic procrastination, playing a moderating role in the mediation process of supervisors' ethical leadership and graduate students' academic procrastination through graduate students' followership.

Theoretical significance

The theoretical significance of this research can be summarized in three main aspects. Firstly, it elucidates the relation between supervisors' ethical leadership and graduate students' academic procrastination. Previous research has often emphasized the impact of supervisors on graduate students' academic performance from the perspectives of academic guidance and emotional support (Steel and Klingsieck, 2016), overlooking the decisive role of graduate students learning from their supervisors can significantly impact their academic progress and performance. On the basis of social learning theory, this research underscores the pivotal role of supervisors'

ethical leadership in the academic journey of graduate students, revealing that ethical leadership not only guides but also serves as an exemplary influence, contributing to improved academic performance (Ma et al., 2019) and a reduction in academic procrastination (Sari and Fakhruddiana, 2019). This research contributes by empirically affirming the significance of supervisors' ethical leadership in shaping graduate students' academic procrastination, consolidating existing literature. It also provides additional insights and nuances, enriching the understanding of the relationship between supervisors and students, which builds upon and refines existing knowledge, offering a valuable innovative perspective.

Secondly, it explains the mechanism by which supervisors' ethical leadership affects graduate students' academic procrastination. Previous research on the effects of supervisors' ethical leadership mainly relied on basic need theory (Devos et al., 2015; He and Zhu, 2023) and self-determination theory (Ryan and Deci, 2006; Shao et al., 2023), saying that supervisors' academic procrastination can alleviate graduate students' academic procrastination by academic guidance and emotional support, enhancing students' academic abilities and activating learning motivation, which alleviate academic procrastination. Instead, this research introduced the concept of followership from business organization research as the mediator and applied social learning theory to examine how supervisors' ethical leadership influences graduate students. Previous research on followership has predominantly focused on the enterprise context,

with a particular emphasis on antecedent variables (Martin, 2015; Guay et al., 2019; Salas-Vallina et al., 2020; Khan, 2021; Kim and Beehr, 2021). This research regards graduate students as the research subject, considering graduate students' followership as an intermediate variable, which not only deepened the understanding of the essence of graduate student followership but also expanded upon the antecedents revealed by previous research. In addition, the identification of followership as a mediator suggests a nuanced understanding of the dynamic processes through which ethical leadership shapes students' behaviors and attitudes (Zeb et al., 2023), shedding light on the mechanisms by which positive supervisor-student interactions contribute to enhanced efficiency, confidence, and enthusiasm in academic tasks (Fan et al., 2019; Zhu et al., 2023), adding a novel layer to the exploration of the supervisor-student relationship, contributing to a more comprehensive understanding of the factors at play in academic settings.

Thirdly, introducing graduate students' academic interests further clarifies the boundary conditions under which their followership becomes effective to reduce academic procrastination. Previous studies often considered graduate students' academic work as a creative task with high intellectual demands (Liu et al., 2020), primarily focusing on the roles of external support (Nejati and Shafaei, 2018) and individual capabilities in mitigating academic procrastination (Liu et al., 2020) while paying less attention to their interests levels in the academic subject itself. In recent years, researchers have gained a growing awareness of the impact of academic interests, prompting a focus on this personal variable in understanding their following and study behaviors (Ma et al., 2019). In line with this, this research indicates that when graduate students have low academic interests, the effectiveness of their followership in reducing academic procrastination is limited. This expands the understanding of individual differences in graduate students' academic performance. This research explores academic procrastination, echoing previous researchers and revealing a enhancing moderating effect of graduate students' academic interests on their procrastination behavior, as well as a enhancing moderating effect on academic procrastination through followership towards supervisors, which enriches the understanding of academic procrastination and expands the application of academic interests to improve academic environments and enhance graduate students' academic performance.

Practical significance

First, due to the significant effect of graduate supervisors' ethical leadership on supervisee's academic performance, especially academic procrastination, universities should take targeted measures to strengthen supervisors' ethical leadership. First, clear ethical guidelines and expectations for supervisory relationship shall be established to ensure supervisors understand their roles and responsibilities. Universities should prioritize the ethical leadership training programs within faculty development, for example ethical decision-making workshops, integrity and accountability training, and communication and conflict resolution skills development, equipping supervisors with the necessary skills to model and foster ethical behavior. Regular workshops and seminars, such as mentorship

programs pairing experienced supervisors with newer supervisors, diversity and inclusion training, and continuous professional development sessions, can serve as platforms for supervisors to engage in discussions to exert ethical leadership, and implementing a system for anonymous reporting of ethical concerns can further encourage a culture of accountability. Lastly, universities should periodically assess and recognize supervisors who consistently demonstrate exemplary ethical leadership, reinforcing the importance of these values in the academic community and encouraging widespread adherence to ethical standards.

Fostering graduate students' followership to supervisors involves establishing effective communication channels and building a foundation of trust. Encouraging open dialog, active listening, and providing regular, constructive feedback create an environment where students feel heard and supported. For instance, supervisors can set open office hours, organize regular progress reviews as well as peer feedback sessions for graduate students, and engage in collaborative goal setting. Additionally, carefully pairing students with compatible supervisors based on shared research interests and working styles enhances the quality of the student-supervisor relationship, fostering positive followership. Universities shall create a supportive environment that values and recognizes graduate students' achievements and contributions by establish policies that promote work-life balance, giving awards, scholarships, and public acknowledgments to reinforce their sense of value and motivation, which adds further reinforcement to followership to supervisors. Creating a supportive work environment that values and recognizes students' contributions adds further reinforcement to followership. By inspiring and acknowledging graduate students' achievements, supervisors not only cultivate a sense of belonging but also motivate students to actively engage in their academic pursuits. Ultimately, a symbiotic relationship built on trust, communication, and mutual recognition is key to fostering strong followership among graduate students towards their supervisors.

To kindle academic interests among graduate students, an emphasis shall be place on supervisors, who should actively foster a supportive environment, encouraging exploration of diverse topics, facilitating collaborative projects and networking opportunities. Providing constructive feedback creates an atmosphere valuing academic excellence, nurturing students' intrinsic curiosity and intellectual passions. Supervisors also need inspire active learning and encourage in-depth research exploration aligned with students' interests. Practical and application opportunities integrating academic knowledge with real-world problems should be provided, cultivating a profound understanding of the discipline. To be more specific, universities can structure courses to include project-based learning, where students tackle real-world issues within their discipline. Offering research internships and collaborations with industry partners allows graduate students to apply theoretical concepts to practical scenarios. Incorporating case studies and simulations tailored to academic research challenges enriches students' understanding and problem-solving skills. Creating rich academic resources and environments, such as libraries, laboratories, and academic communities, broadens students' perspectives. Encouraging interdisciplinary collaboration, diverse research projects, and comprehensive disciplinary cognition further stimulates academic

enthusiasm, while recognizing and incentivizing students' achievements serves as a powerful motivator.

Research limitations and future prospects

This research has several limitations. Firstly, although the sample size of this research meets the sampling size criteria (Pituch and Stevens, 1992), but the moderate expansion of the sample size can enhance the statistical reliability and robustness of analysis results and render research conclusions more generalizable and applicable. Future endeavors shall be dedicated to involving more participants, thereby enhancing the scientific rigor of the research. Secondly, all measurement variables are self-assessed by graduate students, potentially causing common method bias. Although relevant tests suggest that the standard method bias in this research is not severe, it is essential for future research to augment the methodology by incorporating more external assessments or employing objective scoring methods. Thirdly, although this research examined data with a time lag, without eliminating endogeneity issues among variables. Future research could address this issue by collecting longitudinal data and conducting cross-lagged analysis to validate causal relation between variables. The combined use of these methods will facilitate a deeper exploration of research questions and a more accurate understanding of the mechanisms at play among variables. Fourth, this research considers ethical leadership as a unidimensional variable, but previous research has divided ethical leadership into two dimensions, namely ethical person and ethical manager (Trevino et al., 2000). Therefore, it potentially neglects the distinct effects that may arise from not delineating its specific dimensions and connotations. Subsequent research could further refine the conceptualization of supervisors' ethical leadership by delineating its dimensions, elevating it to a higher-order construct, and examining the differential effects among these dimensions in reducing graduate students' academic procrastination. Finally, this research barely addressed the potential influence of cultural differences on the generalizability of its findings. Future endeavors should meticulously integrate cultural factors into research design, which targets graduate students from diverse cultural backgrounds, including thorough analysis and discussion of these cultural variations when interpreting research results.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Author contributions

WW: Conceptualization, Formal analysis, Methodology, Resources, Writing – original draft, Writing – review & editing. DK: Funding acquisition, Supervision, Writing – review & editing. PX: Project administration, Writing – review & editing, Software.

Funding

Conflict 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.

Publisher's note

References

Ahmed, E. I. (2023). A systematic review of ethical leadership studies in educational research from 1990 to 2022. *Educ. Manag. Adm. Leadersh*. Advance online publication. 17411432231193251. doi: 10.1177/17411432231193251

Al-Malki, M., and Juan, W. (2018). Leadership styles and job performance: a literature review. *Journal of Psychoeducational Assessment*. 3, 40–49. doi: 10.18775/jibrm.1849-8558.2015.33.3004

Bandura, A. (1986). Social foundations of thought and action, vol. *1986*. Englewood Cliffs, NJ, 2.

Bandura, A., and Walters, R. H. (1977). Social learning theory, vol. *1*. Prentice Hall, NJ: Englewood cliffs.

Baron, R. M., and Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol*. 51, 1173–1182. doi: 10.1037/0022-3514.51.6.1173

Bieber, J. P., and Worley, L. K. (2006). Conceptualizing the academic life: graduate students' perspectives. *J. High. Educ*. 77, 1009–1035. doi: 10.1080/00221546.2006.11778954

Brown, M. E., and Treviño, L. K. (2006). Ethical leadership: a review and future directions. *Leadersh. Q*. 17, 595–616. doi: 10.1016/j.leaqua.2006.10.004

Cerino, E. S. (2014). Relationships between academic motivation, self-efficacy, and academic procrastination. *Psi Chi J. Psychol. Res*. 19, 156–163. doi: 10.24839/2164-8204.JN19.4.156

Chinyakata, R., Raselekoane, N. R., and Mphahlele, R. R. C. (2019). Factors contributing to postgraduate students working and studying simultaneously and its effects on their academic performance. *Afr. Renaissance* 16, 65–81. doi: 10.31920/2516-5305/2019/V16n1a4

Chu, H., and Fang, X. (2017). A study on the influence of principal's moral leadership on teachers' work engagement: the moderating role of work values. *J. Educ. Stud.* 6, 60–68. doi: 10.27149/d.cnki.ghdsu.2022.004185

Deng, S. (2017). The influence of followership on employee work engagement: The mediating role of affective commitment and the moderating role of supervisor's organizational embodiment.(Master's thesis, Jiangxi University of Finance and Economics).

Devos, C., Van der Linden, N., Boudrenghien, G., Azzi, A., Frenay, M., Galand, B., et al. (2015). Doctoral supervision in the light of the three types of support promoted in self-determination theory. *Int. J. Dr. Stud.* 10, 439–464. doi: 10.28945/2308

Erben, G. S., and Güneşer, A. B. (2008). The relationship between paternalistic leadership and organizational commitment: investigating the role of climate regarding ethics. *J. Bus. Ethics* 82, 955–968. doi: 10.1007/s10551-007-9605-z

Fan, L., Mahmood, M., and Uddin, M. A. (2019). Supportive Chinese supervisor, innovative international students: a social exchange theory perspective. *Asia Pac. Educ. Rev.* 20, 101–115. doi: 10.1007/s12564-018-9572-3

Feng, J., Zhang, Y., Liu, X., Zhang, L., and Han, X. (2018). Just the right amount of ethics inspires creativity: a cross-level investigation of ethical leadership, intrinsic motivation, and employee creativity. *J. Bus. Ethics* 153, 645–658. doi: 10.1007/s10551-016-3297-1

Gemme, B., and Gingras, Y. (2012). Academic careers for graduate students: a strong attractor in a changed environment. *High. Educ.* 63, 667–683. doi: 10.1007/s10734-011-9466-3

Grunschel, C., Patrzek, J., and Fries, S. (2013). Exploring reasons and consequences of academic procrastination: an interview study. *Eur. J. Psychol. Educ.* 28, 841–861. doi: 10.1007/s10212-012-0143-4

Guay, R. P., Kim, Y. J., Oh, I. S., and Vogel, R. M. (2019). The interaction effects of leader and follower conscientiousness on person-supervisor fit perceptions and follower outcomes: a cross-level moderated indirect effects model. *Hum. Perform.* 32, 181–199. doi: 10.1080/08959285.2019.1649677

Gustavson, D. E., and Miyake, A. (2017). Academic procrastination and goal accomplishment: a combined experimental and individual differences investigation. *Learn. Individ. Differ.* 54, 160–172. doi: 10.1016/j.lindif.2017.01.010

He, S. (2017). A multivariate investigation into academic procrastination of university students. *Open J. Soc. Sci.* 5, 12–24. doi: 10.4236/jss.2017.510002

He, H., and Gao, G. (2017). The impact of human resource allocation on exhibitor performance: from the perspective of temporary team. *Commercial Res.* 59, 33–39. doi: 10.13902/j.cnki.syyj.2017.09.006

He, F., and Zhu, Z. (2023). On the influence of supervisors' support on doctoral students' academic competence. *J. Grad. Educ.* 1, 11–20. doi: 10.19834/j.cnki.yjsjy2011.2023.01.02

Jia, K., Zhu, T., Zhang, W., Rasool, S. F., Asghar, A., and Chin, T. (2022). The linkage between ethical leadership, well-being, work engagement, and innovative work behavior: the empirical evidence from the higher education sector of China. *Int. J. Environ. Res. Public Health* 19:5414. doi: 10.3390/ijerph19095414

Khan, S. N. (Ed.) (2021). Leadership and followership in an organizational change context. Hershey, PA: IGI Global.

Khuram, W., Wang, Y., Ali, M., Khalid, A., and Han, H. (2023). Impact of supportive supervisor on doctoral students' research productivity: the mediating roles of academic engagement and academic psychological capital. *SAGE Open* 13:21582440231185554. doi: 10.1177/21582440231185554

Kim, M., and Beehr, T. A. (2021). The power of empowering leadership: allowing and encouraging followers to take charge of their own jobs. *Int. J. Hum. Resour. Manag.* 32, 1865–1898. doi: 10.1080/09585192.2019.1657166

Lee, J., and Durksen, T. L. (2021). Global academic interest scale for undergraduate and graduate students. *J. Psychoeduc. Assess.* 39, 182–196. doi: 10.1177/0734282920946144

Lent, R. W., Brown, S. D., and Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *J. Vocat. Behav.* 45, 79–122. doi: 10.1006/jvbe.1994.1027

Li, C., and Bao, Y. (2020). Ethical leadership and positive work behaviors: a conditional process model. *J. Manag. Psychol.* 35, 155–168. doi: 10.1108/JMP-10-2018-0475

Li, D., and Shang, C. (2023). The power of example: the relationship between supervisors' and employees' organizational citizenship behavior. *Soc. Behav. Personal. Int. J.* 51, 1–10. doi: 10.2224/sbp.12172

Liu, G., Cheng, G., Hu, J., Pan, Y., and Zhao, S. (2020). Academic self-efficacy and postgraduate procrastination: a moderated mediation model. *Front. Psychol.* 11:1752. doi: 10.3389/fpsyg.2020.01752

Löfström, E., and Pyhältö, K. (2020). What are ethics in doctoral supervision, and how do they matter? Doctoral students' perspective. *Scand. J. Educ. Res.* 64, 535–550. doi: 10.1080/00313831.2019.1595711

Luo, J., Yan, J., and Jia, J. (2018). A study in relationship between employees' positive trait and followership behavior based on social construction review. *Chinese J. Manag.* 15, 971–979. doi: 10.3969/j.issn.1672-884x.2018.07.004

Ma, Y., Wu, D., and Liu, X. (2019). The influence of supervisor student relationship on doctoral students' creativity: the mediating role of academic interest. *Tsinghua Univ. Educ. Res.* 40, 117–126. doi: 10.14138/j.1001-4519.2019.06.011709

Martin, R. (2015). A review of the literature of the followership since 2008: the importance of relationships and emotional intelligence. *SAGE Open* 5:215824401560842. doi: 10.1177/2158244015608421

Mayer, R. C., and Davis, J. H. (1999). The effect of the performance appraisal system on trust for management: a field quasi-experiment. *J. Appl. Psychol.* 84, 123–136. doi: 10.1037/0021-9010.84.1.123

McCallin, A., and Nayar, S. (2012). Postgraduate research supervision: a critical review of current practice. *Teach. High. Educ.* 17, 63–74. doi: 10.1080/13562517.2011.590979

McCloskey, J. (2011). Finally, my thesis on academic procrastination. (Master's thesis, University of Texas at Arlington).

Moonaghi, H. K., and Beydokhti, T. B. (2017). Academic procrastination and its characteristics: a narrative review. *Fut. Med. Educ. J.* 7, 43–50. doi: 10.22038/FMEJ.2017.9049

Nahrgang, J. D., Morgeson, F. P., and Ilies, R. (2009). The development of leader–member exchanges: exploring how personality and performance influence leader and member relationships over time. *Organ. Behav. Hum. Decis. Process.* 108, 256–266. doi: 10.1016/j.obhdp.2008.09.002

Nejati, M., and Shafaei, A. (2018). Leading by example: the influence of ethical supervision on students' prosocial behavior. *High. Educ.* 75, 75–89. doi: 10.1007/s10734-017-0130-4

Ni, S., Yang, R., Dong, R., and Wang, R. (2015). The effect of abusive mentoring styles on graduate student academic procrastination: validation of a multiple mediation model. *Chin. J. Clin. Psych.* 23, 1112–1115. doi: 10.16128/j.cnki.1005-3611.2015.06.036

Onwuegbuzie, A. J. (2000). Academic procrastinators and perfectionistic tendencies among graduate students. *J. Soc. Behav. Pers.* 15, 103–110.

Onwuegbuzie, A. J., and Collins, K. M. (2001). Writing apprehension and academic procrastination among graduate students. *Percept. Mot. Skills* 92, 560–562. doi: 10.2466/pms.2001.92.2.560

Pan, M. (2013). An effective way to construct a collaborative leadership model. *Leadersh. Sci.* 6, 46–57. doi: 10.19572/j.cnki.ldkx.2013.05.015

Parker-Jenkins, M. (2018). Mind the gap: developing the roles, expectations and boundaries in the doctoral supervisor–supervisee relationship. *Stud. High. Educ.* 43, 57–71. doi: 10.1080/03075079.2016.1153622

Pituch, K. A., and Stevens, I. P. (1992). Applied multivariate statistics for the social sciences. New York: Routledge.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88:879. doi: 10.1037/0021-9010.88.5.879

Rendell, L., Boyd, R., Cownden, D., Enquist, M., Eriksson, K., Feldman, M. W., et al. (2010). Why copy others? Insights from the social learning strategies tournament. *Science* 328, 208–213. doi: 10.1126/science.1184719

Rosário, P., Costa, M., Núñez, J. C., González-Pienda, J., Solano, P., and Valle, A. (2009). Academic procrastination: associations with personal, school, and family variables. *Span. J. Psychol.* 12, 118–127. doi: 10.1017/s1138741600001530

Ryan, R. M., and Deci, E. L. (2006). Self-regulation and the problem of human autonomy: does psychology need choice, self-determination, and will? *J. Pers.* 74, 1557–1586. doi: 10.1111/j.1467-6494.2006.00420.x

Ryan, Y., and Zuber-Skerritt, O. (2017). *Quality in postgraduate education*. London: Routledge.

Salas-Vallina, A., Simone, C., and Fernández-Guerrero, R. (2020). The human side of leadership: inspirational leadership effects on follower characteristics and happiness at work (HAW). *J. Bus. Res.* 107, 162–171. doi: 10.1016/j.jbusres.2018.10.044

Sari, W. L., and Fakhruddiana, F. (2019). Internal locus of control, social support and academic procrastination among students in completing the thesis. *Int. J. Eval. Res. Educ.* 8, 363–368. doi: 10.11591/IJERE.V8I2.17043

Schiefele, U., Krapp, A., and Winteler, A. (1992). "Interest as a predictor of academic achievement: A meta-analysis of research," in *The role of interest in learning and development*. eds. K. A. Renninger, S. Hidi and A. Krapp (Hillsdale, NJ: Lawrence Erlbaum Associates). 183–212.

Shao, B., Lin, X., and Duan, J. (2023). How leader emotional labour is associated with creativity: a self-determination theory perspective. *Appl. Psychol.* 72, 1020–1042. doi: 10.1111/apps.12418

Shen, L., and Abe, T. (2023). How do followership behaviors encourage job performance? A longitudinal study. *Curr. Psychol.* 42, 14652–14662. doi: 10.1007/s12144-021-02545-2

Steel, P., and Klingsieck, K. B. (2016). Academic procrastination: psychological antecedents revisited. *Aust. Psychol.* 51, 36–46. doi: 10.1111/ap.12173

Stern, J. (2021). Do you follow? Understanding followership before leadership. *Manag. Educ.* 35, 58–61. doi: 10.1177/0892020620942504

Trevino, L. K., Hartman, L. P., and Brown, M. (2000). Moral person and moral manager: how executives develop a reputation for ethical leadership. *Calif. Manag. Rev.* 42, 128–142. doi: 10.2307/41166057

Turhan, N. S. (2020). Gender differences in academic motivation: a meta-analysis. *Int. J. Psychol. Educ. Stud.* 7, 211–224. doi: 10.17220/ijpes.2020.02.019

Van Vugt, M. (2006). Evolutionary origins of leadership and followership. *Personal. Soc. Psychol. Rev.* 10, 354–371. doi: 10.1207/s15327957pspr1004_5

Wang, L. (2020). Dimensions and scale development of implicit followership of university research team leadership-based on the theory of KAQ. *Oper. Res. Manag. Sci.* 29, 222–232. doi: 10.3969/j.issn.2096-8256.2020.03.01

Wang, L., and Gao, Y. (2021). Achievement goal orientation for postgraduates and academic procrastination at research universities: the mesomeric effect of academic self-efficacy. *J. Grad. Educ.* 3, 26–34. doi: 10.19834/j.cnki.yjsjy2011.2021.03.05

Wang, W., Guo, N., and Wang, Y. (2018). Study on the status quo of the supervisor-postgraduate relationship and influence factors. *J. Grad. Educ.* 6, 76–82. doi: 10.3969/j.issn.2095-1663.2018.06.015

Wang, Q., Xin, Z., Zhang, H., Du, J., and Wang, M. (2022). The effect of the supervisor–student relationship on academic procrastination: the chain-mediating role of academic self-efficacy and learning adaptation. *Int. J. Environ. Res. Public Health* 19:2621. doi: 10.3390/ijerph19052621

Xu, Z., and Ju, D. (2024). Ethical leadership behaviors are their own reward for leaders: a moderated mediation model. *J. Manag. Psychol.* 39, 483–498. doi: 10.1108/JMP-02-2023-0120

Yahaya, R., and Ebrahim, F. (2016). Leadership styles and organizational commitment: literature review. *J. Manag. Dev.* 35, 190–216. doi: 10.1108/JMD-01-2015-0004

Yockey, R. D. (2016). Validation of the short form of the academic procrastination scale. *Psychol. Rep.* 118, 171–179. doi: 10.1177/0033294115626825

Zeb, A., Goh, G. G. G., Javaid, M., Khan, M. N., Khan, A. U., and Gul, S. (2023). The interplay between supervisor support and job performance: implications of social exchange and social learning theories. *J. Appl. Res. High. Educ.* 15, 429–448. doi: 10.1108/JARHE-04-2021-0143

Zhu, C., Zhang, F., Ling, C. D., and Xu, Y. (2023). Supervisor feedback, relational energy, and employee voice: the moderating role of leader–member exchange quality. *Int. J. Hum. Resour. Manag.* 34, 3308–3335. doi: 10.1080/09585192.2022.2119093