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Academic Procrastination and Malevolent Creativity: The Serial Mediating Roles of Professional Commitment and Psychological Capital, with Teacher Support as a Moderator

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Abstract

Background

Academic interest in malevolent creativity among university students has increased substantially. However, the potential intermediary and moderating functions of professional commitment, PsyCap, and teacher support on the association between academic procrastination and malevolent creativity have yet to be fully investigated.

Methods

This study is based on stratified random sampling. Survey questionnaires were gathered from 1,087 college students in central China. Data on their malevolent creativity, academic procrastination, professional commitment, psychological capital and teacher support were collected. Descriptive and correlational analyses were carried out using SPSS, while the PROCESS macro was utilized to test the hypothesized model.

Results

(1) AP has a remarkable positive predictive influence on malevolent creativity. (2) In the association between academic procrastination and MC, professional commitment and psychological capital serve as independent mediators and exhibit a sequential mediating effect. (3) Teacher support significantly moderated both the AP–PC and AP–PsyCap pathways. Specifically, higher teacher support strengthened the negative association between academic procrastination and professional commitment, whereas it buffered the negative association between academic procrastination and psychological capital. (4) The conditional indirect effect through professional commitment was significant at high levels of teacher support but not at low levels.

Conclusions

The findings suggest that the association between AP and malevolent creativity among university students, investigate the chain-mediating roles of professional commitment and PsyCap, and examine whether teacher support moderates the AP–PC and AP–PsyCap pathways. These results offer a more differentiated comprehension of the psychological and contextual mechanisms linking academic procrastination with malevolent creativity among college students.

Introduction

Creativity is generally conceptualized as the capacity to produce ideas, solutions, or products that are novel, original, and useful [1, 2]. In traditional thinking, creativity is often linked to positive traits including

altruism [3], positive well-being [4], and resilience [5]; it is a constructive, positive, and highly appealing trait that solves problems and drives the progress of civilization [6]. However, since the concept of creativity as a “double-edged sword” was first proposed, an increasing number of researchers have realized that creativity may also have a darker side [7]. For example, Clark & James explicitly distinguish between positive creativity and negative creativity [8]; other scholars have noted that when a creative individual harbors malicious intent, their behavior may pose a threat to society and others [9, 10].

Against this backdrop, researchers have progressively distinguished different manifestations of the dark side of creativity. On the one hand, “negative creativity” refers to ideas that produce “collateral damage” namely, ideas that unintentionally cause harm to others. Another form of creativity that has been extensively studied is malevolent creativity (MC), which denotes the novel and effective ability of individuals or groups to consciously employ creative thinking to harm society, others, or property [11]. MC manifests not only in extreme acts of malice, such as terrorist attacks, serial murders, and property damage, but also in everyday situations, such as harassment, bullying, and deception [12].

On this basis, scholars have gradually started to explore the underlying mechanisms of MC from a multidimensional perspective [13]. Previous studies have identified individual characteristics such as personality traits [14], sensitivity to justice [15], aggression [16], and moral disengagement [17]; psychological factors, such as perceived unfairness [8, 18] and hostile attributions [19]; and social contexts, such as social exclusion [20] and social threat [21], which can influence the development of MC. This clearly represents a context-sensitive tendency toward creative behavior induced by the interplay of personal psychological characteristics, psychological factors, and external contextual factors [22]. Adolescents are at a critical developmental stage during which their value systems are still evolving and their behavioral norms are still in the process of being established [23, 24]. Once MC is triggered, it is more likely to manifest as behavior that poses a real-world threat [25]; therefore, identifying its key behavioral predictors has become a major focus of current research.

Academic procrastination (AP), a widely observed and contextually persistent form of self-regulation failure among college students, may result in a series of adverse psychological and behavioral outcomes [26]. A considerable amount of research demonstrates that AP is markedly related not only with negative outcomes comprising poor academic performance [27], academic anxiety [28], and self-doubt [29] but also with persistent frustration, perceived obstacles to goal attainment, and low self-confidence [30].

Research by scholars indicates that in situations marked by persistent setbacks and diminished self-worth, creative thinking may no longer serve the purposes of learning and growth but instead be used to evade responsibility, manipulate rules, or secure short-term gains, thereby fostering the development of MC [31]. However, to date, research that directly examines the relationship between AP and MC from an empirical perspective is lacking.

The AMORAL model posits that MC emerges from the multi-source interaction of social contexts, individual cognition, and psychological resources, suggesting the presence of underlying mechanisms linking AP and MC [11, 32]. This perspective suggests that AP may indirectly foster the development of

MC by influencing students' professional identities, psychological resources, and perceptions of external support systems. However, existing research on the mechanisms underlying the development of MC tends to focus on a single pathway, with few studies providing a systematic analysis from the perspective of the integration of multi-level psychological resources.

This study adopts the dynamic "resource acquisition–depletion–adaptation" process derived from resource conservation theory as its overarching analytical framework. It defines AP as a behavioral manifestation of resource depletion in academic contexts and views professional commitment (PC) and PsyCap as the core psychological resources influencing an individual's behavioral adaptation. Building on this foundation, we integrated AMORAL theory with social cognitive career theory to develop a chain-mediation model comprising "AP—PC—PsyCap—MC." We also incorporated teacher support as a key contextual variable to clarify the boundary conditions of the resource transformation process.

Through this integrative analytical framework, this study aims to examine how individuals in resource-constrained contexts shape pathways toward deviant creative behavior (i.e., MC), through the reallocation and transformation of psychological resources, as well as how external support resources moderate and reinforce this process.

Literature review and hypotheses

Academic Procrastination and Malevolent Creativity

AP is commonly regarded as a classic type of self-regulation breakdown, defined by an individual's inclination to postpone academic tasks even when fully cognizant of their importance and associated deadline [33]. Although a few studies have suggested that, under certain conditions, procrastination may help avoid hasty decisions and lead to greater task engagement and efficiency [34, 35], a large body of empirical research consistently shows that AP has significant negative effects on physical and mental health [36]. For example, studies have demonstrated that AP is frequently associated with elevated emotional distress, depression, anxiety, and persistent depletion of psychological resources [37, 38], as well as sleep disturbances, pain, and health-related problems [39].

Although prior studies have not directly examined the impact of AP on MC, the relevant literature provides important clues regarding the potential link between the two. Some studies distinguish between active and passive procrastination, noting that active procrastinators may promote creative thinking by enhancing their sense of personal control and creative self-concept while preserving a sense of control over their goals [40]. However, passive procrastination is marked by self-regulatory failure and a loss of control over personal goals; when individuals experience prolonged task-related stress and frustration, their goal orientation and behavioral strategies may shift [41]. The AMORAL theoretical model of dark creativity emphasizes that dark (malevolent) creativity does not stem from an abnormality in creativity itself but rather from an imbalance in an individual's internal and external psychological and situational mechanisms; its core characteristics manifest as distortions in the motivational system and

deviations in behavioral regulation [11]. When AP disrupts self-regulation and contributes to shifts in an individual's goal orientation and behavioral strategies, creative thinking may be more likely to deviate from its original functions in learning and development. Instead, it may be redirected toward evading responsibility, manipulating rules, or pursuing short-term gains, thereby contributing to the emergence of MC.

On this basis, the present study puts forward the following hypothesis:

H1 AP positively predicts MC

The Mediating Role of Professional Commitment

Becker first introduced the concept of organizational commitment, emphasizing individuals' sustained attachment to an organization and the psychological mechanisms of this commitment [42]. Aranya subsequently extended commitment theory to the professional domain, arguing that professional identity manifests as an individual's internal recognition of professional values and a sense of psychological belonging to a professional role, which is further externalized as sustained engagement in learning and work practices and a long-term pursuit of professional development goals [43]. Research has further demonstrated that job commitment is typically associated with positive outcomes, such as higher levels of job identification [44], job-related skills [45], and motivation to learn [46].

Empirical research directly examining the influence of AP on PC is scarce. However, the literature provides a fairly consistent theoretical framework for the potential link between the two. From the perspective of self-regulation breakdown, AP is viewed as a typical form of goal management failure, often occurring alongside a decline in self-control and obstacles to achieving academic goals [47], and further leads to persistent negative emotional experiences and the depletion of psychological resources [48]. Related research indicates that stable goal-setting ability [49] and self-management ability [50] are important psychological foundations for the development of PC. It can therefore be inferred that frequent AP may weaken students' professional identity and commitment by impairing self-control and eroding self-efficacy, thereby negatively affecting their PC.

Although direct investigations into the association between PC and MC are still scarce at present, existing studies have thoroughly examined the link between PC and creativity. For example, existing research has shown that a sense of mission not only directly and positively predicts an individual's level of creativity but also further enhances their creative performance by increasing their organizational commitment [51]. Furthermore, Leung & Lin reported that when individuals develop a stable sense of identity within their professional field and consistently invest in their professional development, their intrinsic motivation and task engagement significantly increase, increasing their likelihood of generating and implementing innovative ideas [52]. PC, as an important internal psychological resource, helps to activate and sustain creative engagement.

However, when the aforementioned PC resources lose their effectiveness or when individuals' identification with their professional role becomes weakened, creative cognition may shift in direction. Scholars generally agree that MC emerges when creative thinking deviates from constructive goals under specific psychological and situational conditions and instead serves to harm others or violate social norms [53]. Furthermore, when individuals lack an internal sense of professional values and a stable commitment to their roles, their behavior is more likely to be driven by situational pressures than guided by internal norms, thereby weakening the accountability associated with creative activities [54] and increasing the likelihood that creative resources will manifest as defensive or even destructive forms of MC.

On this basis, the subsequent hypothesis is put forward:

H2 PC acts as a mediator in the association between AP and MC.

The Mediating Role of Psychological Capital

PsyCap denotes a collection of positive psychological resources characterized by hope, resilience, optimism, and self-efficacy. It reflects an individual's intrinsic psychological capacity to maintain positive responses, sustained engagement, and effective self-regulation when facing challenges and stress [55]. Multiple studies have consistently shown that PsyCap is significantly positively correlated with academic motivation, learning engagement [56, 57], and mental health [58].

As mentioned above, AP is a risky behavior that continuously depletes an individual's positive psychological resources. AP not only reduces learning efficiency and academic performance but is also frequently accompanied by adverse emotional experiences comprising anxiety, worry, guilt, depression, and an expectation of failure. When students remain in a state of AP for an extended period, these negative experiences accumulate and trigger a "spiral of resource depletion," accelerating the depletion of positive PsyCap. Prior studies have indicated that AP is significantly and inversely related to PsyCap; students with higher levels of procrastination tend to demonstrate lower levels of hope, self-efficacy, psychological resilience, and optimism [59]. In addition, research by scholars focusing on nursing students has revealed that rumination and AP jointly influence PsyCap; procrastination significantly exacerbates negative cognitive processing and further erodes an individual's level of PsyCap [60]. This finding suggests that persistent procrastination not only reflects impaired self-regulation but also exacerbates negative learning cycles by depleting key psychological resources.

PsyCap is regarded as an important positive psychological resource that supports goal monitoring, emotional regulation, and behavioral inhibition [61]. Previous research has shown that PsyCap can effectively mitigate self-regulation failure, such as procrastination, by enhancing self-regulated learning abilities and levels of responsibility while also promoting sustained engagement and normative behavior [59]. Moreover, PsyCap can alleviate the harmful effects of adverse emotional experiences on learning behavior, thereby maintaining an individual's emotional stability and goal orientation in stressful

situations [62]. In addition, research by scholars has shown that higher levels of PsyCap help individuals develop stable emotional regulation skills and positive cognitive evaluation patterns, thereby enhancing their psychological resilience in the face of stressful situations and experiences of unfairness, as well as their normative self-discipline [63, 64]. Given that MC essentially stems from the redirection of creative cognition toward instrumental and utilitarian goals in contexts where normative constraints are weakened [65], PsyCap may play a crucial buffering and inhibitory role in MC under adverse conditions.

On the basis of the theoretical derivations outlined above, this study argues that AP undermines students' capacity to deal with stress and regulate their emotions by continuously depleting their PsyCap, whereas higher levels of PsyCap help prevent the emergence of MC.

On this basis, we propose the following hypothesis:

H3 PsyCap acts as a mediator in the association between AP and MC.

The Chain Mediation Effect of Professional Commitment and Psychological Capital

PC and PsyCap are likely to be important mediating variables in the relationship between AP and MC, and there is also a close association between them [66, 67]. Empirical research indicates that there is a significant and positive association between PC and PsyCap [68]. Therefore, PC and PsyCap may form a continuous psychological pathway linking AP and MC, namely, "AP → PC → PsyCap → MC." On the basis of this theoretical framework, this study argues that academic procrastination may not merely directly influence MC but also exercise an indirect impact through the chained mediation of PC and PsyCap.

Accordingly, this study proposes the following hypothesis:

H4 PC and PsyCap mediate the association between AP and MC in a chained manner.

Social support resources theory posits that social support, as a vital external contextual resource, can enhance an individual's internal psychological resources, thereby improving their ability to cope with stressful and risky situations [69, 70]. Scholars believe that teacher support is a crucial external protective factor in adolescent development; it not only directly promotes positive developmental outcomes but also enhances the role of other facilitating factors in producing specific outcomes [71]. A three-year longitudinal structural equation modeling study revealed that teacher support consistently promotes adolescents' internal motivation and academic self-efficacy and indirectly improves academic performance through these two key psychological mechanisms [72]. Findings from another qualitative study indicate that teachers' emotional support, trust-based communication, and individualized attention help strengthen adolescents' self-confidence, emotional regulation skills, and sense of belonging, thereby laying the foundation for their emotional maturity and psychological security [73].

On the basis of the theoretical perspective outlined above, we hypothesize that the relationship between AP and PC may be moderated by teacher support, an external protective factor.

On this basis, the following hypothesis is proposed:

H5 Teacher support moderates the relationship between AP and PC.

Teacher support may function as an external protective factor that moderates the association between AP and PsyCap. As mentioned above, in the high-risk academic context of procrastination, students often experience a sense of blocked goals and feelings of failure. Without sufficient external support, these adverse experiences may diminish positive psychological resources comprising hope, self-efficacy, optimism, and resilience, which may subsequently be linked to reduced levels of PsyCap. Based on conservation of resources theory, individuals tend to acquire, maintain, and accumulate resources that are valuable for their learning and development, and different types of resources often interact to create a dynamic process of resource gain or loss [74]. In educational settings, teacher support, as one of the most representative contextual social resources in higher education, provides students with essential contextual resources through affirmation of their abilities, constructive feedback, and the establishment of a supportive learning environment. Such support may help students cope more effectively with the academic difficulties associated with AP and protect their positive psychological resources from further depletion [75], thereby buffering the negative effect of AP on PsyCap.

Thus, we anticipate that the negative association between AP and PsyCap will be attenuated among college students with higher levels of teacher support. Grounded in this reasoning, the following hypothesis is proposed:

H6 Teacher support moderates the relationship between AP and PsyCap.

In brief, five variables were incorporated in the proposed theoretical model. We hypothesized a series of pathways to build a holistic understanding of how AP, PC, PsyCap, and teacher support influence MC (see Fig. 1).

Materials and Methods

Research design

To investigate the association between AP and MC, as well as the mediating roles of PC and PsyCap, the researchers designed the following study protocol. First, we reviewed previous literature to develop the theoretical model and hypotheses. After ethical approval was obtained from Jiangxi University of Technology, participants were notified of the survey's aim in accordance with the distribution guidelines and then asked to provide an informed consent form; those who did not consent were allowed to quit the study. Lastly, data validation and modeling analysis were conducted.

Participants and procedure

This study was conducted at a university in central China from August 11 to October 24, 2025. Given the differences in academic backgrounds among students from different schools or departments within the university, we employed a stratified random sampling method to select students by school or department to account for disciplinary and departmental heterogeneity within the university and improve the diversity of the sample.

Before the administration of this questionnaire, the researchers obtained the permission and support of school administrators and homeroom teachers, who helped explain the study to potential participants. The aforementioned informed consent information was provided online through a consent form on the survey home page, which clearly described the aim of the research, assured respondents of anonymity and data confidentiality, explained the voluntary nature of the participation, and informed the target samples that the data would be utilized. Participants could proceed to the main questionnaire only after reading the consent information and selecting “Agree”; those who did not agree were automatically redirected to the end of the questionnaire. Approximately 10 minutes were needed to complete the entire questionnaire. Ethical approval was secured from Jiangxi University of Technology before data collection, and all procedures were performed in compliance with the Declaration of Helsinki. Initially, 1102 students completed the questionnaire. After excluding invalid data, such as responses completed too quickly or those exhibiting response patterns, a total of 1,087 valid questionnaires were retained.

Male participants constituted 64.5% of the sample, whereas females accounted for 35.5% of the sample; students aged 18 accounted for 19.4%, those aged 19 accounted for 36.9%, those aged 20 accounted for 20.3%, those aged 21 accounted for 12.2%, and those aged 22 and older accounted for 11.1%. First-year students accounted for 44.9%, second-year students accounted for 22.6%, third-year students accounted for 26.3%, and fourth-year students accounted for 6.2%. The relatively small proportion of fourth-year students was mainly because many of them were participating in off-campus internships during the data collection period. Students in the humanities and social sciences make up 13.8%, those in economics and management 33.6%, those in science and engineering 32.6%, medical students 5.6%, students in the arts 10.5%, and students in other disciplines 4%. Overall, the sample covered students from multiple disciplines and grade levels within the participating university.

Instruments

The questionnaire collected demographic information, including gender and field of study. The five scales are the AP scale, the MC scale, the PsyCap scale, the PC scale and the teacher support scale. After the English sections were rendered into Chinese, inconsistencies were resolved via the back-translation method before data collection. A 5-point Likert scale was used to measure the frequency of malevolent creative thoughts or behaviors in daily life; a greater total score signifies a higher level of MC in daily life.

This study used the MC scale created by Hao et al. [76] to evaluate the levels of MC among college students. The instrument comprises 13 items organized into three dimensions: harming others, lying, and deceit, such as “I will use some clever tactics to take revenge on the person I hate without getting caught”. In the current study, Cronbach’s α for the scale was 0.974.

This study employed the AP scale created by Aitken and modified by Chen et al. [77]. The scale consists of 16 items, such as “I tend to put off doing things I don’t like” and “Even though I know that doing this today would help me improve, I still do not do it.” In this study, the scale’s Cronbach’ s α was 0.933.

This study employed the PC measurement tool developed by Wu and Lian [78]. The scale consists of 15 items (e.g., “I truly enjoy reading books related to my field of study,” “Jobs related to my field of study pay very well”). The 15-item scale exhibited high internal consistency, with a Cronbach’s α of 0.971.

This study employs the PsyCap scale developed by Luthans et al. [79], which comprises four dimensions: self-efficacy, hope, optimism, and resilience. The original scale consists of 18 items, such as “I can come up with many ways to achieve the goals I have set for myself”. The study revealed that Cronbach’s α for the PsyCap scale was 0.980.

This study employed the Teacher Support Scale adapted by Ouyang [80], which consists of 19 items, such as “The teacher often recommends that I participate in various activities or competitions”. The study revealed that the Cronbach’s α for the Teacher Support Scale was 0.943.

Data analysis

Data analysis was carried out via IBM SPSS Statistics (Version 25.0). First, we performed a Pearson correlation analysis to analyze the relationships among the major variables. Second, to examine the hypothesized chain-mediation model (AP → PC → PsyCap → MC), we used the PROCESS Model 6 to test the relevant effects. Subsequently, PROCESS Model 84 was used to examine whether teacher support moderated the relationships between AP and the two mediators (PC and PsyCap). The bootstrap method with 5,000 resamples was applied to estimate the 95% confidence intervals. An effect was deemed statistically significant if its 95% confidence interval did not include zero. Demographic variables, comprising gender, age, grade level, and major were included in the analysis as covariates. The significance level was set at $\alpha = 0.05$.

Results

Control and Testing of Common Method Bias

This study implemented several procedural improvements: the data were collected in phases, reverse-scored items were used to reduce response pattern bias, and anonymity was ensured to minimize social desirability bias.

Since this research relies on self-report questionnaires for data gathering, it may bring about typical methodological biases. Therefore, to ensure the validity of the data analysis, Harman's single-factor test was performed prior to data processing to evaluate common-method bias [81]. The findings indicated that the eigenvalues of all four factors exceeded 1 and that these factors collectively accounted for 75.033% of the total variance. The initial factor explained 35.024% of the total variance, which is under the 40% threshold, suggesting that serious common method bias was unlikely to be a dominant concern.

Descriptive Statistics and Correlation Analysis

Using SPSS version 25.0, we calculated descriptive statistics, including measures of central tendency, measures of dispersion, and Pearson correlation coefficients for AP, MC, PC, and PsyCap. As presented in Table 1, the mean score for MC among the respondents was 1.711, with a standard deviation of 0.809; the mean score for AP was 2.494, with a standard deviation of 0.770; the mean score for PC was 3.387, with a standard deviation of 0.902; and the mean score for PsyCap was 3.631, with a standard deviation of 0.805. The means and standard deviations of all the variables fall within a reasonable range, and the data are well distributed. Furthermore, students' MC is positively correlated with AP ($r = 0.430$, $p < 0.01$) and negatively correlated with PC ($r = -0.153$, $p < 0.01$) and PsyCap ($r = -0.213$, $p < 0.01$); AP is inversely related to PC ($r = -0.115$, $p < 0.01$) and PsyCap ($r = -.242$, $p < 0.01$); and PC is directly related to PsyCap ($r = 0.522$, $p < 0.01$). The results of the correlation analysis provide preliminary support for subsequent tests of mediating and moderating effects.

Table 1
Descriptive statistical analysis and correlation of the four observed variables

MC	M	SD	MC	AP	PC	PsyCap
	1.711	**0.809**	**1**			
AP	2.494	0.770	.430**	1		
PC	3.387	0.902	− .153**	− .115**	1	
PsyCap	3.631	0.805	− .213**	− .242**	.522**	1
Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.						

Testing the Mediator Model

The mediation model was tested using the PROCESS macro with 5,000 bootstrap samples. The independent variable of this study was AP, the outcome variable was MC, and the mediating variables were PC and PsyCap. We analyzed the serial mediating effects of PC and PsyCap in the association between AP and MC and evaluated these effects with 95% confidence intervals. As shown in Table 2, this study sets AP as the independent variable and MC as the dependent variable while introducing PC and PsyCap as mediating variables. Additionally, gender, age, grade level, and major were included as covariates.

The findings of the regression analyses show that all the regression equations are statistically significant. In the regression equation with MC as the dependent variable, AP exerts a notable positive predictive influence on MC (B = .429, t = 15.801, p < .001), which indicates that the higher the level of AP is, the higher the individual's level of MC.

Further analysis of the mediating pathways revealed that, in the regression equation with PC as the dependent variable, AP significantly and negatively predicted PC (B = -0.136, t = -3.871, p < .001), which suggests that the greater the level of AP is, the lower an individual's level of PC. Moreover, major was also markedly associated with PC (B = -0.050, t = -3.989, p < .001).

In the regression equation with PsyCap as the dependent variable, AP was markedly and negatively associated with PsyCap (B = − 0.195, t = − 7.285, p < .001), suggesting that greater levels of AP were linked to reduced levels of PsyCap. At the same time, PC was markedly and directly related to PsyCap (B = .438, t = 19.027, p < .001), suggesting that greater levels of PC were associated with higher levels of PsyCap.

In the regression equation with MC as the dependent variable, after simultaneously including AP, PC, and PsyCap, the results show that AP remains a significant predictor of MC (B = .416, t = 14.325, p < .001), and its regression coefficient was lower than that observed before the mediators were included. Meanwhile, PC (B = -0.068, t = -2.429, p < .05) and PsyCap (B = -0.100, t = -3.113, p < .01) both significantly and negatively predicted MC.

Table 2
Results of the main and mediation effect analyses

Variable	**Outcome:MC**		**Outcome:PC**		**Outcome:PsyCap**		**Outcome:MC**	
	B	**t**	**B**	**t**	**B**	**t**	**B**	**t**
Gender	-0.17	-6.191***	-0.183	-3.206**	-0.087	-2.008*	-0.316	-6.868***
Age	-0.037	-0.785	-0.036	-1.003	0.027	0.976	-0.025	-0.842
Grade	0.078	1.645	-0.010	-0.206	-0.016	-0.443	0.061	1.596
Major	0.007	0.266	-0.050	-3.989***	-0.013	-1.421	-0.004	-0.422
AP	0.429	15.801***	-0.136	-3.871***	-0.195	-7.285***	0.416	14.325***
PC					0.439	19.027***	-0.068	-2.429*
PsyCap							-0.100	-3.113**
R^2	0.217		0.042		0.312		0.238	
F	59.763***		9.376***		81.461***		48.249***	

Note. AP = Academic Procrastination; PC = Professional Commitment; PsyCap = Psychological Capital; MC = Malevolent Creativity. * *p* < .05, ** *p* < .01, *** *p* < .001.

As presented in Table 3, PC and PsyCap play significant mediating functions in the association between AP and MC. Specifically, the total effect was B = 0.451, the direct effect was B = 0.416, and the total indirect effect was B = 0.035 (Boot 95% CI [0.016, 0.057]). The confidence interval for the total indirect effect did not include zero, suggesting that the overall mediating effect was statistically significant. However, the magnitude of the indirect effect was relatively small, representing 7.72% of the overall effect.

Further examination of the specific mediating pathways revealed the following. First, AP exerts a notable indirect impact on MC through PC (Effect = 0.009, 95% CI [0.002, 0.020]), accounting for 2.06% of the total effect. Second, AP exerts a notable indirect effect on MC through PsyCap (Effect = 0.020, 95% CI [0.006, 0.035]), accounting for 4.35% of the total effect. Third, AP exerts a significant indirect effect on MC through the serial pathway of "PC → PsyCap" (Effect = 0.006, 95% CI [0.001, 0.013]), accounting for 1.33% of the total effect. These results collectively support the presence of both parallel and serial mediation mechanisms linking AP to MC.

Table 3
Results of total, direct, and mediating effect analyses

Path	Effect (B)	Boot SE	BootLLCI	BootULCI	Effect Ratio
Total	0.451	—	—	—	100%
Direct(AP → MC)	0.416	—	0.359	0.473	92.28%
Total Indirect	0.035	0.011	0.016	0.057	7.72%
Ind1 (AP → PC → MC)	0.009	0.005	0.002	0.020	2.06%
Ind2 (AP → PsyCap → MC)	0.020	0.007	0.006	0.035	4.35%
Ind3(AP → PC → PsyCap → MC)	0.006	0.003	0.001	0.013	1.33%

Note: Bootstrap confidence intervals were based on 5,000 resamples. AP = academic procrastination; PC = professional commitment; PsyCap = psychological capital; MC = malevolent creativity.

Testing the Moderated Serial Mediation Model

This study used the PROCESS Model 84 to investigate the moderating role of teacher support in the relationships between AP and PC and PsyCap. After controlling for gender, age, grade level, and major, the findings of the regression analysis indicated that teacher support had a significant moderating effect on both pathways (Table 4).

In the regression equation predicting PC, the interaction between AP and teacher support was statistically significant (B = − 0.111, t = − 2.845, $p < .01$), and the overall regression model was significant ($R^2 = .237$, F = 47.990, $p < .001$). These results indicate that teacher support moderated the relationship between AP and PC. Simple slope analysis revealed that the relationship between AP and PC was

nonsignificant at low levels of teacher support but became significantly negative at high levels of teacher support. Specifically, the conditional effect of AP on PC was 0.0311 (p = .5167) at low teacher support and − 0.1261 (p = .0007) at high teacher support. Thus, higher teacher support strengthened the negative association between AP and PC.

In the regression equation predicting PsyCap, the interplay between AP and teacher support was also statistically significant (B = 0.085, t = 3.273, p < .01), and the entire regression model was notable (R^2 = .580, F = 186.200, p < .001). These findings suggest that teacher support moderated the association between AP and PsyCap. Simple slope analysis showed that AP significantly and negatively predicted PsyCap at both low and high levels of teacher support; however, this negative association was weaker at elevated levels of teacher support. Specifically, the conditional effect of AP on PsyCap was − 0.2289 (p < .001) at low teacher support and − 0.1087 (p < .001) at high teacher support. Thus, teacher support buffered the negative association between AP and PsyCap.

Table 4
Results of moderated chain mediation effect analyses

Variable	**Outcome: PC**		**Outcome: PsyCap**	
	B	**t**	**B**	**t**
Gender	-0.064	-1.234	-0.007	-0.191
Age	-0.020	-0.608	0.033	1.524
Grade	-0.057	-1.322	-0.068	-2.397*
Major	-0.038	-3.337***	-0.011	-1.478
AP	0.340	2.296*	-0.465	-4.734***
PC			0.210	10.433***
Teacher Support	0.828	8.423***	0.462	6.870***
AP × Teacher Support	-0.111	-2.845**	0.085	3.273***
R^2	0.237		0.580	
F	47.990***		186.200***	

Note: AP = Academic procrastination; PC = Professional commitment; PsyCap = Psychological capital; MC = Malevolent creativity. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Furthermore, conditional indirect effects were examined using 5,000 bootstrap samples to determine whether the indirect effects of AP on MC varied across levels of teacher support (see Table 5). The conditional indirect effects were calculated at low (W = 2.79, M − 1 SD) and high (W = 4.21, M + 1 SD) levels of teacher support. Additionally, the indices of moderated mediation and their bootstrap

confidence intervals were examined to assess whether the indirect effects varied significantly as a function of teacher support.

First, for the indirect pathway “AP → PC → MC,” the conditional indirect effect was nonsignificant at low levels of teacher support (Effect = − 0.0021, Boot 95% CI [− 0.0128, 0.0062]), whereas it was significant at high levels of teacher support (Effect = 0.0086, Boot 95% CI [0.0011, 0.0204]). This pattern suggests that the indirect effect of AP on MC through PC emerged primarily at higher levels of teacher support. The index of moderated mediation was 0.0076 (Boot 95% CI [0.0000, 0.0199]).

Second, for the indirect pathway “AP → PsyCap → MC,” the conditional indirect effect was significant at both low levels of teacher support (Effect = 0.0229, Boot 95% CI [0.0069, 0.0432]) and high levels of teacher support (Effect = 0.0109, Boot 95% CI [0.0035, 0.0206]). However, the magnitude of this indirect effect decreased as teacher support increased. The index of moderated mediation was − 0.0085 (Boot 95% CI [− 0.0204, − 0.0003]), indicating that teacher support significantly weakened the indirect effect of AP on MC through PsyCap.

Third, for the serial indirect pathway “AP → PC → PsyCap → MC,” the conditional indirect effect was nonsignificant at low levels of teacher support (Effect = − 0.0007, Boot 95% CI [− 0.0035, 0.0021]) but significant at high levels of teacher support (Effect = 0.0027, Boot 95% CI [0.0004, 0.0063]). This pattern suggests that the serial indirect effect emerged primarily under conditions of higher teacher support. The index of moderated mediation was 0.0023 (Boot 95% CI [0.0000, 0.0059]).

Table 5
Results of conditional indirect effects and moderated mediation analyses

Path	TS Level	Effect	BootSE	BootLLCI	BootULCI
AP → PC → MC	Low	-0.0021	0.0047	-0.0128	0.0062
	High	0.0086	0.005	0.0011	0.0204
AP → PsyCap → MC	Low	0.0229	0.0094	0.0069	0.0432
	High	0.0109	0.0044	0.0035	0.0206
AP → PC → PsyCap → MC	Low	-0.0007	0.0014	-0.0035	0.0021
	High	0.0027	0.0015	0.0004	0.0063
Index of moderated mediation					
AP → PC → MC	Index	0.0076	0.0052	0.0000	0.0199
AP → PsyCap → MC	Index	-0.0085	0.0052	-0.0204	-0.0003
AP → PC → PsyCap → MC	Index	0.0023	0.0015	0.0000	0.0059

Note: AP = academic procrastination; PC = professional commitment; PsyCap = psychological capital; MC = malevolent creativity. Low and high teacher support represent M − 1 SD and M + 1 SD, respectively. Bootstrap confidence intervals were based on 5,000 resamples. The moderated mediation index investigates whether the indirect effect changes as a function of teacher support.

To further demonstrate the moderating influence of teacher support, this study plotted simple slope plots (see Figs. 2 and 3). These results suggest that teacher support significantly moderated the “AP → PsyCap” pathway and exerted a buffering effect. Simple slope analysis indicated that AP negatively predicted PsyCap under both low and high levels of teacher support; however, under conditions of high teacher support, the negative predictive effect of AP on PsyCap was weaker than under conditions of low teacher support. These findings indicate that teacher support serves a buffering role in this pathway by weakening the negative association between AP and PsyCap.

Teacher support also significantly moderated the “AP → PC” pathway. Specifically, under low teacher support, the relationship between AP and PC was weak and close to zero, whereas under high teacher support, AP showed a stronger negative association with PC. These findings suggest that higher teacher support strengthened the negative relationship between AP and PC.

Discussion

Discussion of Results

This study collected data via stratified random sampling and employed the PROCESS macro to test the proposed model. The findings suggest that AP exerts a notable positive predictive influence on MC; PC and PsyCap both play independent mediating roles and have a sequential mediating effect on the relationship between AP and MC. Moreover, teacher support significantly moderated both the AP–PC and AP–PsyCap relationships, although the patterns of moderation differed across the two pathways.

Firstly, the results align with relevant perspectives from H1 and AMORAL theory, indicating that conclusions regarding the effect of negative learning behaviors on MC are largely consistent with prior research [82]. AMORAL theory posits that MC stems from a disequilibrium between internal and external psychological and situational mechanisms within an individual, with its core characteristics manifesting as distortions in the motivational system and deviations in behavioral regulation [11]. Students who exhibit high levels of AP may experience persistent goal obstruction, depletion of self-regulatory resources, and an accumulation of negative experiences through repeated avoidance of tasks. This process may lead individuals to modify their goal orientation and behavioral strategies, causing creative thinking to deviate from constructive purposes and instead be directed toward evading responsibility, manipulating rules, or pursuing short-term gains, thereby substantially increasing the risk of MC.

Second, this study further revealed that PC and PsyCap partially mediate the relationship between AP and MC among college students, confirming Hypotheses 2 and 3. This suggests that AP may be associated with greater MC through its negative associations with college students' PC and PsyCap. These findings suggest the explanatory role of resource conservation theory. Conservation of resources theory posits that, when under stress or when losing resources, an individual is prone to fall into a vicious cycle of resource loss if he or she is unable to effectively recoup or defend his or her key resources [83]. Previous studies have demonstrated that AP is not merely a problem of time management but also a classic self-regulation failure, accompanied by persistent emotion-regulation strain and depletion of self-control resources [84]. As the time, energy and self-regulation resources that individuals originally invest in pursuing academic goals are continually depleted, individuals' PC and PsyCap, which are resources of value-based motivation and positive psychological resources, become increasingly vulnerable. These findings repeatedly indicate that PsyCap constitutes a vital positive psychological resource, the level of may vary depending on environmental stress, resource depletion, or adverse events [85, 86]. Moreover, some scholars have proposed that when key resources (such as commitments) are continuously lost and cannot be efficiently recovered, individuals are more prone to fall into a state of resource loss [87]. When a key resource level decreases, an individual's creative cognition is more likely to change to short-term utilitarian or avoidative objectives, resulting in an increasing possibility for malicious creative expression [88].

Thus, this study reveals a key psychological chain through which AP influences MC: "AP → decreased PC → insufficient PsyCap → increased MC." This provides a more integrated explanatory framework for understanding how learning behaviors influence and shape the functional orientation of creativity through the motivational-resource mechanism. Third, this study further reveals that teacher support does not simply have a "reinforcing role" in the chained mediation pathway through which AP influences

MC via PC and PsyCap; rather, teacher support has a “moderating” pattern with “pathway-specific differences”. The specific findings of the analysis are as follows:

In the “AP → PC” pathway, teacher support strengthened the negative effect of AP on PC; that is, under conditions of high teacher support context, the inhibitory effect of AP on PC was more pronounced. However, in the “AP → PsyCap” pathway, teacher support clearly exerted a positive buffering effect; as the intensity of teacher support increased, the negative impact of AP on PsyCap gradually weakened. This further broadens the explanatory scope of resource protection theory. Traditional views have largely emphasized the “protective function” of external resources in stressful situations [89]. This study revealed that teacher support can mitigate resource depletion not only through resource replenishment mechanisms [90], but may also exacerbate resource loss along specific pathways. This phenomenon suggests that external support is not a unidirectional factor that promotes stability in individual development but rather exhibits a complex pattern of action in which “resource amplification” and “resource buffering” coexist across various psychological mechanisms. One possible explanation is that, in contexts characterized by high levels of teacher support, students have a clearer understanding of academic demands and role expectations; when they nevertheless procrastinate, they may be more susceptible to cognitive dissonance and self-evaluation pressure, thereby intensifying the decline in PC. At the same time, the emotional support and feedback offered by teachers can, to some extent, mitigate the further depletion of an individual’s psychological resources and reduce the erosive effect on their PsyCap [91, 92]. Thus, teacher support exhibits pathway-specific effects, strengthening the negative AP–PC association while buffering the negative AP–PsyCap association.

Specifically, in the chain “AP → PC → PsyCap → MC”, the indirect effect was significant only under conditions of high teacher support, suggesting that teacher support alters the strength of the sequential risk-transmission process rather than exerting a uniformly protective effect. This conforms to previous findings [93]; that is, where teacher support is strong, teachers play a significant role in the growth of students’ individual development, providing students with stable, consistent resources such as academic supervision, emotional support, and feedback on students’ capabilities [94].

Therefore, the emergence of MC is associated not only with negative behavior but also with changes in the interaction between individual psychological resources and the external supportive environment. This finding suggests that, in educational interventions, teachers’ support should not be regarded merely as a single protective factor; rather, greater attention should be given to its differentiated roles across various psychological mechanisms to facilitate targeted interventions for students’ behavioral risk.

Theoretical and Practical Significance

From a theoretical standpoint, this study reveals the associations between AP and MC among college students. This work thereby deepens the discussion on the impact of AP on MC and expands the body of relevant research. Furthermore, we found that PC and PsyCap each serve as independent mediators in the effect of AP on MC and together form a significant chained mediation pathway. This finding

suggests that AP is not only directly associated with higher levels of MC but is also indirectly associated with MC through lower PC and PsyCap.

At the practical level, this study broadens the interpretive scope of research on the consequences of AP by examining the “dark side” of creativity, thereby providing direct evidence for understanding how learning behaviors shape the functional orientation of creativity. These findings also suggest that the development of MC is not driven solely by individual negative behaviors (such as procrastination) but rather emerges gradually through the interaction between an individual’s internal psychological resources and the external supportive environment. Thus, teachers should regard AP as an important psychological warning sign and strengthen academic support systems while enhancing students’ self-control skills. In this way, students may be better able to activate their creative potential and transform it into constructive creativity, thereby promoting academic growth and social adaptation while reducing the emergence of MC.

On the basis of resource conservation theory, AMORAL theory and social cognitive career theory, this study examines the relationship between AP and MC among college students. It constructs and tests a moderated chain mediation model of AP and MC that includes PC, PsyCap and teacher support. TThe findings indicated that AP was directly related to MC, with significant statistical indirect effects through PC, PsyCap, and the serial pathway from PC to PsyCap. At the same time, PC and PsyCap not only function as mediators themselves but also jointly constitute the serial mediation pathway “AP → PC → PsyCap → MC”. A further test revealed that teacher support played an important role in this effect: On the one hand, teacher support markedly moderated the association between AP and PC; on the other hand, it also markedly moderated the association between AP and PsyCap. These findings suggest that MC does not emerge from individuals possessing a “negative personality” or “abnormal creative ability” but rather from the combined effects of negative learning behavior, decreasing internal motivation, diminished positive psychological resources and a negative external environment within an academic setting. In other words, AP is not simply associated with reduced learning efficiency or inferior academic outcomes; its deeper influence on students lies in the fact that it may alter the functional orientation of one’s creative thinking, and creative thinking may instead be directed toward avoiding responsibility, manipulating rules, and satisfying short-term utilitarian goals instead of learning, adaptation and growth.

Moreover, the moderating influence of teacher support further means that the external educational context is not merely a background condition for students’ academic behaviors but also one of the key contextual situations that influence how students’ psychological resources are used. These findings suggest that teacher support functions as a pathway-specific contextual resource rather than exerting a uniformly protective or reinforcing effect. This implies that explanations of MC should not be limited to the individual student level. Instead, school support, represented by teacher support, should also be taken into consideration. Particular attention should be given to the role of the educational context in shaping students’ psychological resources and behavioral attitudes.

Limitations and Recommendations

Although this study has made some progress at both the theoretical and empirical levels, certain limitations still exist that should be noted. First, this study adopted a cross-sectional design, which can reveal only the statistical correlation between AP, PC, PsyCap, and MC; it is difficult to conduct strict inference about causality among these factors. Future studies can adopt long-term longitudinal designs or experimental designs to further explore the dynamic and psychological mechanisms underlying the effects of AP on MC.

Second, the data used in this study were mostly obtained from self-report questionnaires; although statistical control was adopted in this study, the findings may still be affected by social desirability bias, common method bias and recall bias. Subsequent research could also adopt multisource data collection methods (e.g., external assessment, behavioral tracking measures, or task-based measurements in situ) to improve the robustness of the research findings.

Finally, this study did not conduct an in-depth subgroup analysis of potential heterogeneity factors (such as gender, year of study, or major), possibly masking differences in the mechanism of action on AP and MC between different student subgroups. Future studies could systematically explore the differences in the mechanisms of different subgroups by adopting multi-group structural equation modeling or hierarchical analysis methods, thereby providing a basis for different students' educational interventions and psychological support.

Given these limitations, subsequent research can be further progressed in the following aspects: (1) increase the use of longitudinal or experimental research designs to investigate the causal relationships among AP, psychological resources, and MC; (2) expand the sample's demographic and cultural variation to increase the external validity of the research results; (3) use multiple measurement tools for measurement to avoid bias caused by a single measurement tool; (4) add new potential mediating or moderating factors to build a complete theoretical model of MC; and (5) conduct heterogeneity analysis to determine the critical risk mechanism of MC among different student subgroups.

Abbreviations

AP
Academic Procrastination
MC
Malevolent Creativity
PC
Professional Commitment
PsyCap
Psychological Capital

Declarations

Ethics approval and consent to participate

Ethical approval for this study was obtained from Jiangxi University of Technology prior to data collection (Approval No. 101; approved on 5 August 2025). The research was carried out in compliance with the Declaration of Helsinki and pertinent institutional guidelines. All participants were 18 years of age or above and gave informed consent before taking part.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no conflicts of interest.

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Author Contribution

X.Z. and Y.Z. contributed to the conceptualization of the study. Y.Z. contributed to the methodology, formal analysis, data curation, and visualization. X.Z. and Y.Z. contributed to writing the original draft and reviewing and editing the manuscript. Both authors read and approved the final manuscript.

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Availability of data and materials

The data underpinning the findings of this research are obtainable from the corresponding author upon reasonable request.

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Figures

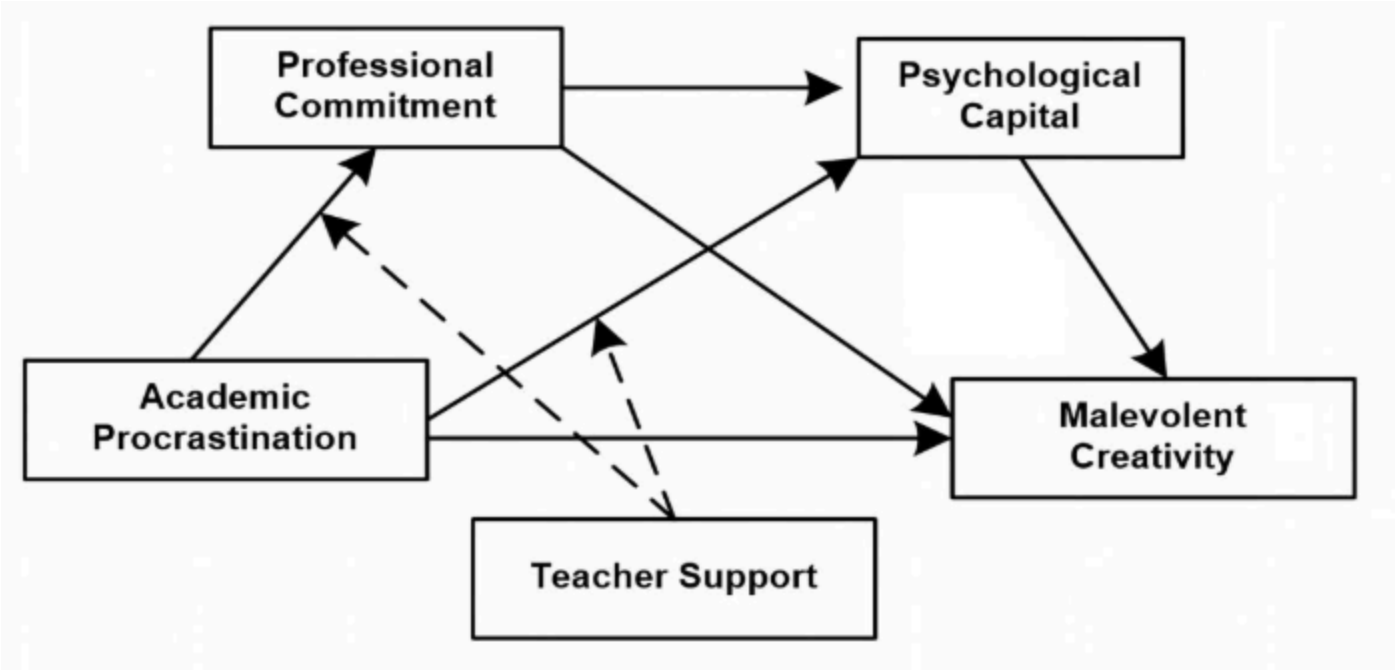


Figure 1

Proposed conceptual model of the relationships among academic procrastination, professional commitment, psychological capital, teacher support, and malevolent creativity.

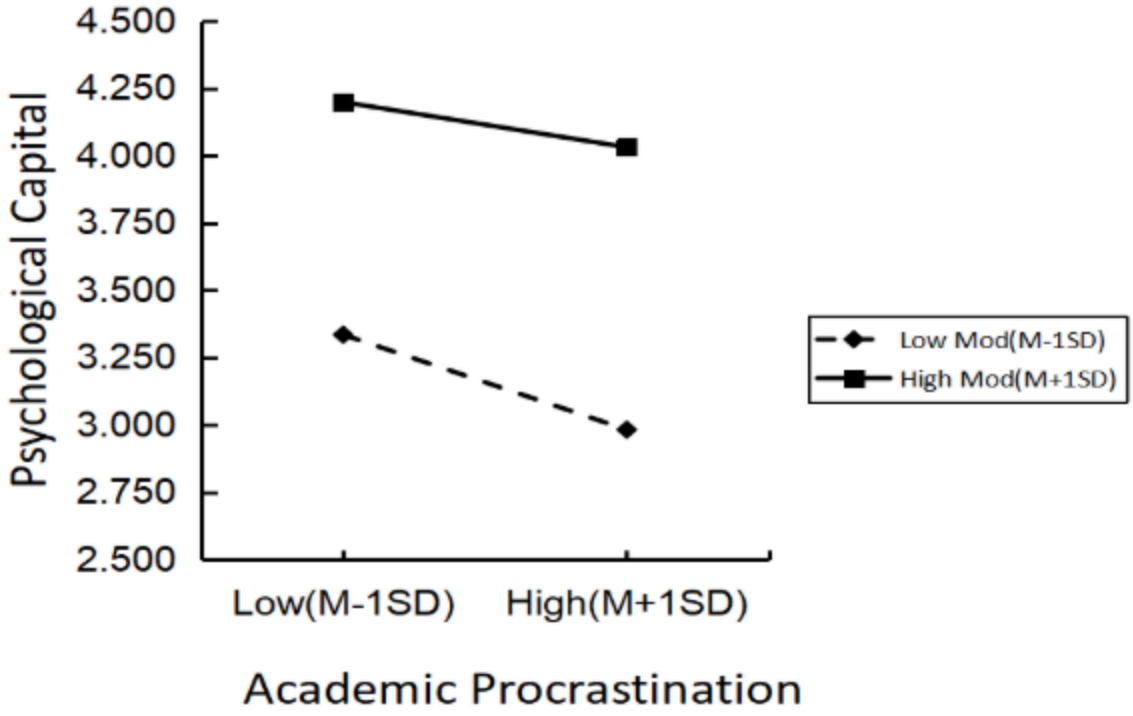


Figure 2

Moderating effect of teacher support on the relationship between academic procrastination and psychological capital.

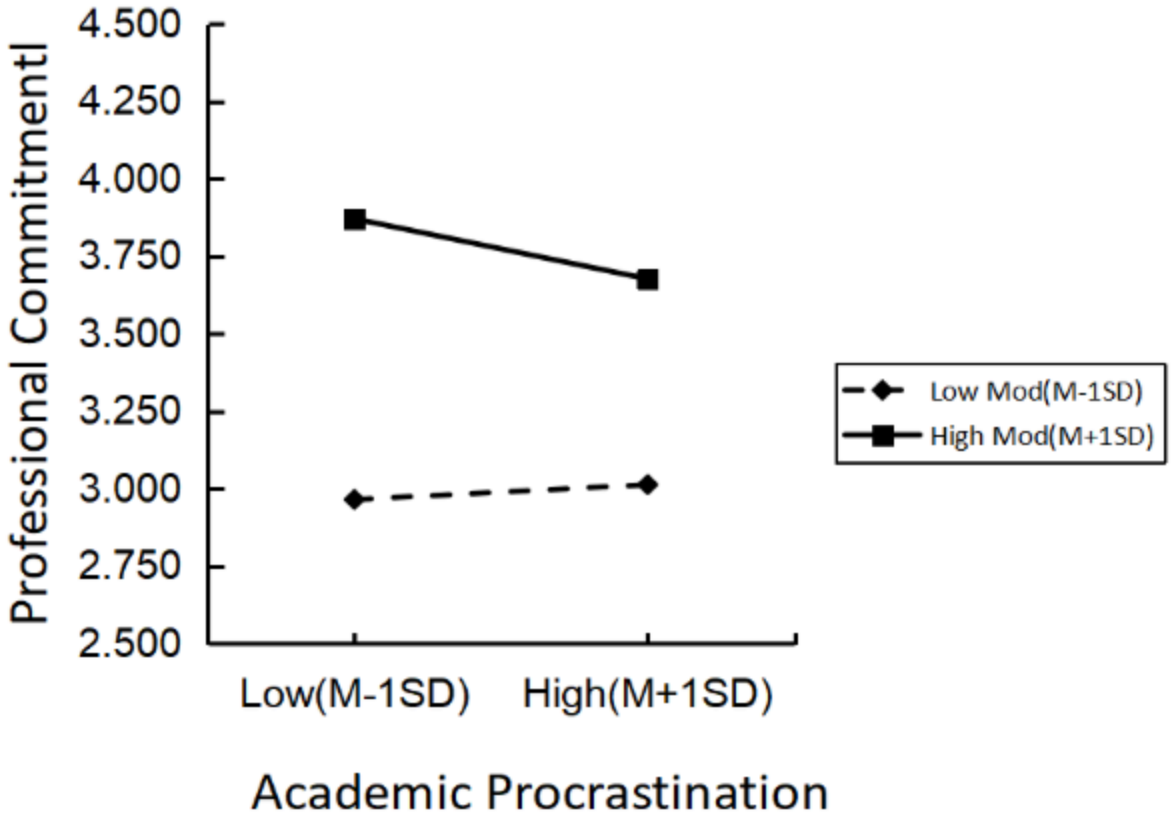


Figure 3

Moderating effect of teacher support on the relationship between academic procrastination and professional commitment.