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Original Article

The mediating role of academic optimism in the relationship between academic self-regulation, academic self-efficacy, and academic passion in medical students exhibiting self-handicapping behaviors

Seyyed Gholamreza Jafari[1], Tayebeh Sharifi[1*], Maryam Chorami[2], Reza Ahmadi[1]

[1]Department of Psychology, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran
[2]Department of Psychology and Counselling, Farhangian University, Tehran, Iran

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Abstract

Background: Academic self-regulation, academic self-efficacy, and academic passion are crucial factors in medical students' academic success. However, self-handicapping behaviors, such as procrastinating, making excuses, or setting unrealistic goals, can hinder these positive aspects of learning. This study explores how academic optimism mediates the relationships between self-regulation, self-efficacy, and passion in medical students prone to self-handicapping behaviors.

Methods: This research adopted a descriptive, correlational design to investigate the interrelationships between the variables in a structural equation modeling (SEM) framework. The target population encompassed all undergraduate medical students with self-handicapping behaviors enrolled at Jundishapur University of Medical Sciences in 2022. A purposive sampling strategy yielded a sample of 204 medical students who completed self-report questionnaires assessing the aforementioned constructs. SEM analysis was conducted to test the hypothesized model, with bootstrapping procedures employed to evaluate indirect effects.

Results: Academic self-regulation and optimism were directly associated with academic passion ($P<0.001$), while self-efficacy did not show a direct effect. Both self-regulation and self-efficacy indirectly influenced passion in medical students with self-handicapping behaviors through academic optimism ($P<0.01$).

Conclusion: These findings highlight the importance of fostering not only academic self-regulation skills but also academic optimism among students with self-handicapping behaviors. Interventions that promote positive academic expectations could be particularly beneficial in promoting academic passion even in the absence of a direct effect from self-efficacy.

Introduction

Higher education plays a pivotal role in the advancement of society's sub-groups across various dimensions, including scientific, cultural, and economic spheres.[1] The global population surge has led to an increased demand for medical services, consequently resulting in a rise in the number of medical schools and healthcare students.[2] Within this continuous cycle, educational quality holds paramount importance.[3] Unfortunately, the expansion of student enrollment has not been accompanied by a proportionate growth in other aspects of the higher education system.[4] Upon entering university, most students lack adequate knowledge regarding academic matters, often encountering challenges throughout their academic journey. It is crucial to identify, prevent, and mitigate these issues.[5] One of the primary concerns within the educational system is academic self-handicapping.[6]

Academic competition can push individuals towards unrealistic standards that may exceed their actual abilities. This can lead to the adoption of self-handicapping behaviors, which are actions or strategies that serve as excuses for potential failure.[7] Self-handicapping represents a form of causal attribution accompanied by defensive behaviors or mechanisms. It encompasses any action or choice that allows individuals to attribute their failures to external factors while attributing their successes to internal ones.[8] Self-handicapping strategies enable self-handicapping learners to portray themselves as victims of circumstances rather than victims of their inadequacies. These strategies are considered self-handicapping because

***Corresponding author:** Tayebeh Sharifi, Emails: tsharifb@gmail.com; Ta.Sharifi@iau.ac.ir

their implementation ultimately undermines individual performance.[9] While some researchers suggest that self-handicapping may lead to a temporary increase in self-regulation, repeated self-handicapping behaviors are associated with a decline in self-regulation over the long term.[10]

Medical students, like students in other fields, are susceptible to academic stressors that can negatively impact their mental health and academic performance.[11] A critical factor in mitigating these challenges and fostering student success is academic passion. This construct refers to a deep, enduring interest and commitment to learning and academic pursuits.[12] Academic passion is characterized by three key components: (1) emphasis on learning, which reflects students' intrinsic motivation and enjoyment of the subject matter; (2) trust in instructors, which indicates students' confidence in their teachers' guidance and support; and (3) sense of identity within the university, which represents students' feelings of belonging and connection to the academic community.[13] Research has consistently shown that academic passion is positively correlated with academic achievement, persistence, and overall well-being.[14] Conversely, the absence of academic passion can lead to negative consequences, such as academic stagnation, maladaptive behaviors, and increased risk of dropping out.[15] Therefore, cultivating academic passion among medical students is essential for promoting their success and resilience in the face of academic challenges.

Academic self-efficacy, a key construct in Bandura's social cognitive theory, refers to an individual's belief in their ability to successfully perform academic tasks.[16] This belief plays a pivotal role in shaping students' motivation, effort, and persistence in learning. Research has consistently shown that students with high self-efficacy are more likely to exhibit greater academic passion and engagement.[17] When students believe in their capabilities, they are more inclined to set ambitious goals, persevere through challenges, and adopt effective learning strategies. Moreover, high self-efficacy can foster a positive mindset that enhances students' intrinsic motivation and enjoyment of learning. As such, academic self-efficacy emerges as a crucial factor in understanding and nurturing academic passion.[18]

Academic self-regulation, a cornerstone of successful learning, refers to the individual's ability to consciously control and direct their thoughts, feelings, and behaviors to achieve academic goals.[19] This construct encompasses various strategies, including goal setting, time management, self-monitoring, and seeking help when needed. Research has consistently highlighted the critical role of self-regulation in fostering intrinsic motivation and academic passion.[20] By enabling students to actively engage in their learning, self-regulation can enhance their cognitive, behavioral, and emotional enthusiasm for both the subject matter and the learning environment. Previous studies have demonstrated that self-regulated learners are more likely to exhibit a deep level of engagement, persevere in the face of challenges, and ultimately achieve higher academic outcomes.[21] This is because self-regulation skills empower individuals to take ownership of their learning, set realistic goals, and develop effective strategies to overcome obstacles. As such, self-regulation emerges as a key variable in understanding and nurturing academic passion.

Academic optimism among students is significantly associated with academic passion-related behaviors.[22] Academic optimism, a relatively new construct introduced by Tschannen-Moran et al,[23] encompasses beliefs regarding the strengths and capacities of the learning environment to foster academic progress. These beliefs are grounded in the interplay of academic emphasis, self-efficacy, and trust, which collectively contribute to a positive learning environment for students.[24] Academic optimism represents a positive belief among learners that they can cultivate their academic advancement by emphasizing their learning, trusting their instructors, and fostering a sense of belonging to the university. It comprises three key dimensions: students' emphasis on learning, their sense of identity within the university, and their trust in their instructors.[25]

Academic passion holds immense significance for medical students. It serves as the driving force behind successful task completion, educational goal attainment, and the achievement of a desired level of competency, enabling students to excel in their learning and academic progress. A decline in academic passion is not merely a personal concern for students but also a pressing societal issue and a growing phenomenon among medical students.[26] This educational dilemma carries substantial weight due to its adverse economic repercussions and its impact on the development of human resources in the healthcare sector. If substantial measures are not taken to identify associated factors, implement preventive strategies, and mitigate its prevalence, the consequences will extend beyond the individual student and impact society and the nation's healthcare system, given the sensitive nature of medical professions and their direct connection to patient health and well-being. Recognizing the importance of this issue and the existing knowledge gap in the context of medical schools, this study aimed to investigate the mediating role of academic optimism in the relationship between academic self-regulation, academic self-efficacy, and academic passion among medical students exhibiting self-handicapping behaviors.

Methods

This study utilized a descriptive, correlational design to explore the relationships between academic self-regulation, academic self-efficacy, academic optimism, and academic passion in medical students exhibiting self-handicapping behaviors. Structural equation modeling

(SEM) was employed to analyze the hypothesized relationships. The target population encompassed all undergraduate medical students enrolled at Jundishapur University of Medical Sciences in Ahvaz, Iran, during the academic year 2022. A targeted sampling strategy was employed, involving the distribution of questionnaires to the entire student body (n = 800). Following data collection, incomplete responses were excluded, resulting in a final sample of 204 students who self-reported engaging in self-handicapping behaviors. Inclusion criteria for participation in the study were as follows: (1) undergraduate student status, (2) scoring above the mean on a validated self-handicapping behaviors questionnaire, and (3) providing written informed consent. Students unwilling to participate or who failed to complete all questionnaire items were excluded from the analysis.

Instruments

Academic Self-Handicapping Scale

The Academic Self-Handicapping Scale (SHS) developed by Jones and Rhodewalt[27] was employed to assess self-handicapping behaviors among participants. This well-validated 25-item instrument utilizes a 6-point Likert scale (0 = strongly disagree, 5 = strongly agree) to measure self-reported self-handicapping tendencies. Scores are interpreted based on a pre-established continuum: 0-50 indicates low self-handicapping, 51-100 reflects moderate self-handicapping and scores exceeding 100 suggest high levels of self-handicapping. The Persian version of the SHS has demonstrated acceptable internal consistency reliability, with studies reporting Cronbach's alpha coefficients exceeding 0.78.[28] Furthermore, Raeisi et al[28] confirmed the validity of the Persian version of the SHS, with a content validity index (CVI) of 0.89 and a content validity ratio (CVR) of 0.86.

Academic Passion Scale

The Academic Passion Scale (APS) developed by Fredricks et al[29] was utilized to measure academic passion in the current study. This 14-item instrument assesses three subscales: behavioral (items 1-4), emotional (items 5-10), and cognitive (items 11-14). Participants respond using a 5-point Likert scale ranging from 1 (never) to 5 (always). The Persian version of the APS has demonstrated good internal consistency reliability, with alpha coefficients exceeding 0.86.[30] Furthermore, Izadpanah[30] confirmed the validity of the Persian version of the APS, with a CVI of 0.99 and a CVR of 0.97.

Academic Self-Efficacy Questionnaire

The Academic Self-Efficacy Questionnaire (ASEQ), developed by Jinks and Morgan,[31] was employed to assess students' self-perceptions of academic capabilities. This 30-item instrument comprises three subscales: talent (perceived natural ability), effort (belief in the impact of hard work), and texture (confidence in managing academic challenges). Participants rated their agreement with each statement on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The Persian version of the ASEQ has demonstrated strong internal consistency reliability in previous studies, with Cronbach's alpha coefficients exceeding 0.74.[32] Hosseinkhani et al[32] established the questionnaire's validity (CVI = 0.89, CVR = 0.84).

Academic Self-Regulation Scale

The Academic Self-Regulation Scale (ASRS) developed by Bouffard et al[33] was utilized to assess participants' self-regulatory behaviors in the academic domain. This 14-item instrument employs a 5-point Likert scale ranging from 1 ("does not match me at all") to 5 ("matches me completely") and is comprised of three subscales: cognition, metacognition, and motivation. Total scores range from 14 (minimum self-regulation) to 70 (maximum self-regulation). The Persian version of the ASRS has demonstrated good internal consistency reliability, with studies reporting Cronbach's alpha coefficients exceeding 0.85.[34] Furthermore, Bakhtiary Javan et al[34] confirmed the validity of the Persian version of the ASRS, with a CVI of 0.82 and a CVR of 0.85.

Academic Optimism Questionnaire

The Academic Optimism Questionnaire (AOQ), a 28-item instrument developed by Tschannen-Moran et al,[23] was employed to measure participants' academic optimism. Utilizing a 5-point Likert scale ranging from 1 (very low) to 5 (very high), participants rated their agreement with each statement. Items 17, 23, and 28 were reverse-coded before scoring. Total scores were calculated by summing responses across all items, with possible scores ranging from 28 (minimum optimism) to 140 (maximum optimism). Higher scores reflect greater levels of academic optimism. The Persian version of the AOQ has demonstrated good internal consistency reliability, with studies reporting Cronbach's alpha coefficients exceeding 0.95.[35] Furthermore, Ghadampour et al[35] confirmed the validity of the Persian version of the AOQ, with a CVI of 0.99 and a CVR of 0.98.

Data analysis

Data analysis was conducted using two primary software programs. Descriptive statistics (means and standard deviations) and Pearson's correlation coefficients were computed using SPSS version 27. To examine the hypothesized relationships between the study variables, SEM was performed using AMOS version 24. To evaluate the adequacy of the SEM model, the following model fit indices were used: (χ^2/df) (ratio of chi-square to degrees of freedom), TLI (Tucker-Lewis index), CFI (comparative fit index), RFI (relative fit index), NFI (normed fit index), and RMSEA (root mean square error of approximation). The cutoff criteria for acceptable model fit were as follows:

χ^2/df less than 5, TLI, CFI, RFI, and NFI greater than 0.90, and RMSEA less than 0.08. By examining these indices, the study was able to determine the extent to which the hypothesized model provided a good fit to the data.

Results

A total of 204 medical students exhibiting self-handicapping behaviors participated in this study. The participants' ages ranged from 19 to 24 years with a mean age of 21.07 years (SD = 2.38). The sample comprised 111 females (54.4%) and 93 males (45.6%). Descriptive statistics (means, standard deviations, skewness, and kurtosis) for all study variables are presented in Table 1.

Bivariate correlations revealed significant positive relationships between all study variables (academic passion, self-efficacy, self-regulation, and optimism) ($P < 0.01$)(Table 2). These findings suggest that these constructs are interconnected and support the notion that academic passion is multifaceted, influenced by a combination of self-regulatory, self-efficacy, and optimistic beliefs. Based on these correlations, a theoretical model was developed to examine the direct and indirect effects of these variables on academic passion (Figure 1). The proposed model posits that academic self-regulation, self-efficacy, and optimism positively influence academic passion.

Table 1. Means, standard deviations (SD), skewness, and kurtosis of study variables

Variables	Mean	SD	Skewness	Kurtosis
Academic passion	42.36	6.98	-0.1	1.16
Academic self-efficacy	75.51	12.90	0.06	0.31
Academic self-regulation	42.17	7.97	0.01	-0.41
Academic optimism	94.43	14.25	0.03	-0.70

Table 2. Pearson correlation coefficients of the study variables

Variables	1	2	3	4
1- Academic passion	1			
2- Academic self-efficacy	0.40**	1		
3- Academic self-regulation	0.38**	0.35**	1	
4- Academic optimism	0.47**	0.39**	0.53**	1

** $P < 0.01$.

The initial model assessment revealed a suboptimal fit, as indicated by the RMSEA of .238 (Table 3). Model respecification was conducted by removing the non-significant path from academic self-efficacy to academic passion. The revised model demonstrated an excellent fit with an RMSEA of 0.001, suggesting a strong alignment between the proposed model and the observed data. The revised model is presented in Figure 2.

Table 4 presents the standardized path coefficients for the hypothesized model. Contrary to expectations, academic self-efficacy did not exert a direct influence on academic passion (β = 0.05, $P = 0.640$). However, a significant positive relationship emerged between academic self-regulation and academic passion (β = 0.35, $P < 0.001$). Both academic self-efficacy (β = 0.55, $P < 0.001$) and academic self-regulation (β = 0.31, $P < 0.001$) positively predicted academic optimism, which in turn, exerted a significant direct effect on academic passion (β = 0.46, $P < 0.001$). Furthermore, academic optimism was found to significantly mediate the relationships between both academic self-regulation (β = 0.08, $P = 0.010$) and academic self-efficacy (β = 0.21, $P = 0.010$) with academic passion.

Discussion

This study aimed to investigate the mediating role of academic optimism in the relationship between academic self-regulation, academic self-efficacy, and academic passion in medical students exhibiting self-handicapping behaviors. The findings revealed a non-significant relationship between academic self-regulation and academic passion. However, a statistically significant

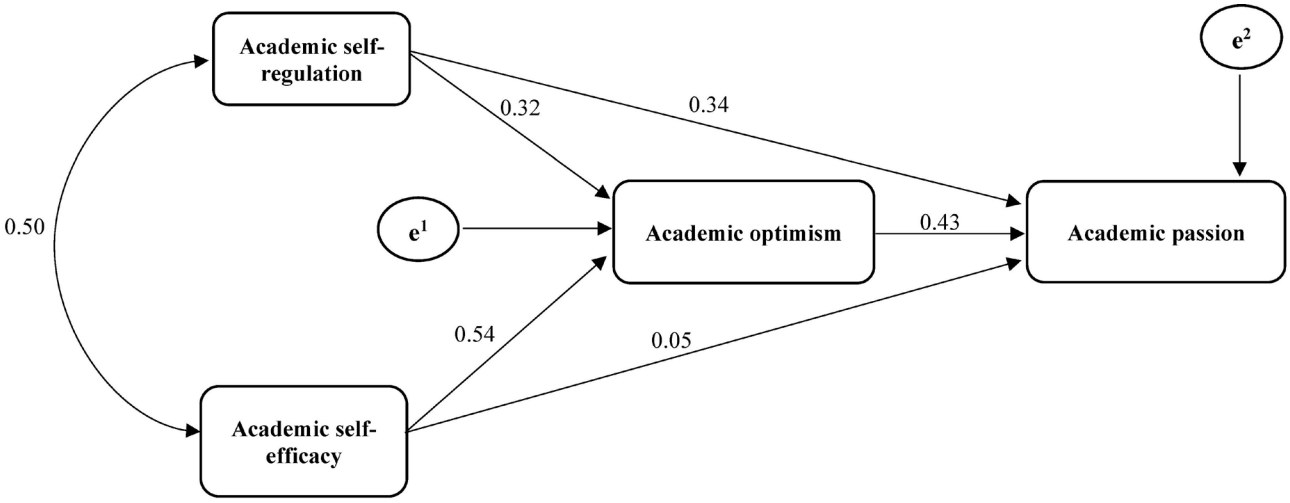

Figure 1. Proposed model for predicting academic passion based on academic self-regulation, self-efficacy, and optimism

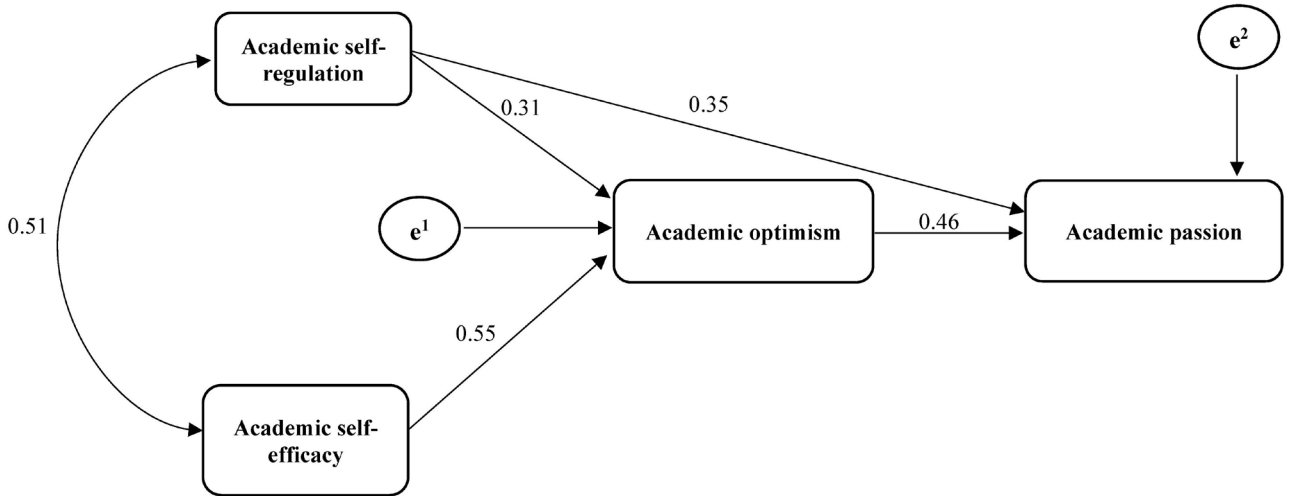

Figure 2. Revised model for predicting academic passion based on academic self-regulation, self-efficacy, and optimism

Table 3. Fit indices for initial and revised models

Fit indicators	χ^2	df	(χ^2/df)	TLI	CFI	RFI	NFI	RMSEA
Initial model	34.62	38	0.91	0.94	0.99	0.95	0.97	0.238
Revised model	34.84	39	0.89	0.99	0.99	0.98	0.98	0.001

Table 4. Path coefficients and standardized path coefficients for the revised model

Path	Revised model	
	β	*P*
Academic self-regulation → Academic passion	0.35	0.001
Academic self-efficacy → Academic passion	0.05	0.640
Academic self-regulation → Academic optimism	0.31	0.001
Academic self-efficacy → Academic optimism	0.55	0.001
Academic optimism → Academic passion	0.46	0.001
Academic self-regulation → Academic passion through the academic optimism	0.08	0.010
Goal orientation → Academic passion through the academic optimism	0.21	0.010

positive correlation was observed between academic self-efficacy and academic passion, as indicated by a significant Pearson correlation coefficient. Furthermore, the results demonstrated a significant positive relationship between academic optimism and academic passion, indicating that academic optimism positively influences academic passion. These findings align with the results of previous studies by Sayadi and Soleimani,[19] Ansar-al-Hossaini et al,[36] and Panahi et al.[37]

Highly self-regulated students employ various strategies to enhance the attractiveness and enjoyment of their academic tasks. Through motivational self-talk, they emphasize the importance of learning and recognize that task completion contributes to mastery and proficiency. Performance self-talk enables them to overcome motivational barriers and articulate internal goals. Environmental control involves arranging suitable study environments and minimizing distractions. Self-reward maintains and enhances motivation by promising rewards for task completion. These behaviors collectively promote engagement in activities such as student-faculty interactions, planning, classroom participation, role fulfillment, and study behaviors, reflecting emotional, cognitive, and behavioral engagement.[38] Since cognitive, behavioral, and emotional engagement with education and the learning environment are crucial indicators of intrinsic motivation, self-regulation serves as a critical predictor of university engagement. Self-regulatory skills focus on the individual's role in the learning process and encompass strategies employed to regulate cognition. Self-regulation entails active involvement in personal, behavioral, motivational, and cognitive learning efforts to achieve meaningful academic goals. It empowers individuals to control their actions and adjust their performance to attain predetermined objectives.[19]

While self-efficacy did not have a direct effect on academic passion in this study, its significant positive correlation suggests that it plays an indirect role in fostering academic passion. Individuals with high self-efficacy are more likely to engage in activities that promote their development and abilities, leading to greater cognitive and emotional engagement in learning.[39] The lack of a direct effect between self-efficacy and academic passion might be attributed to several factors. First, self-efficacy may be a necessary but not sufficient condition for academic passion. Other factors, such as interest, values, and social support, may also be crucial in shaping academic passion. Second, the study's cross-sectional design limits the ability to establish causal relationships. Longitudinal studies are needed to examine the temporal

dynamics between self-efficacy and academic passion. These findings have important implications for both theory and practice. From a theoretical perspective, the results suggest that a multi-faceted approach is necessary to understand and nurture academic passion. While self-efficacy is a critical factor, it should be considered in conjunction with other variables, such as interest, values, and social support. In educational settings, these findings highlight the importance of fostering self-efficacy in students. By promoting students' belief in their abilities, educators can create a positive learning environment that encourages engagement, motivation, and ultimately, academic passion.[40]

Optimism plays a crucial role in student success and learning. It is a psychological trait that can be learned, enhanced, and contributed to a positive educational environment, regardless of ability or motivation. Academic optimism motivates students to focus on their learning, trust their instructors, and develop a sense of belonging to the learning environment, thus fostering their academic progress. Moreover, university engagement, a persistent internal state that drives involvement and well-being in school activities, is considered essential in educational research. Therefore, it can be inferred that as academic optimism among students increases, their university engagement also improves.[13]

The findings revealed a statistically significant mediating role of academic optimism in the relationship between academic self-regulation and university engagement. Direct relationships analysis indicated that academic self-regulation was significantly associated with university engagement. Furthermore, academic self-regulation was found to enhance academic optimism among students, thereby increasing their university engagement. Self-regulation provides an appropriate theoretical framework for fostering learning growth. According to self-regulation theory, each individual has the opportunity to control their learning. On the other hand, based on Bandura's self-efficacy theory, students who perceive their learning ability as self-acquired are more likely to be intrinsically motivated and exhibit higher levels of self-efficacy in learning situations. Similarly, these high levels of self-efficacy beliefs can provide a healthy cognitive foundation for the application of high-level cognitive strategies (such as metacognitive self-regulation) since engaging in self-regulation and deep processing requires self-efficacy, perseverance, patience, and a willingness to persist in tasks.

The findings further revealed a statistically significant mediating role of academic optimism in the relationship between academic self-efficacy and university engagement. Contrary to expectations, the direct relationships analysis indicated no significant direct association between academic self-efficacy and university engagement. However, the indirect relationship demonstrated that academic self-efficacy positively influences university engagement only through its effect on enhancing academic optimism among students. This finding can be explained by suggesting that students have reached the formal operational stage of cognitive development and recognize their abilities and limitations. Additionally, students with high academic self-efficacy hold optimistic beliefs about the future and their abilities to achieve positive outcomes and solve problems in various academic and social domains. These characteristics align with the traits of individuals with high self-efficacy. When faced with tasks that evoke fear of failure, these individuals prefer to exert more effort, as they perceive the lack of effort as a greater threat than a lack of ability. Consequently, their self-efficacy increases towards the task, and these factors, along with the absence of fear of failure, do not hinder their enthusiasm in various emotional, cognitive, and behavioral domains.

The findings of this study have significant implications for fostering academic passion and success among medical students. Specifically, the results highlight the crucial mediating role of academic optimism in the relationships between academic self-regulation, academic self-efficacy, and academic passion. A positive and supportive learning environment can foster students' sense of belonging and trust in their instructors. This can be achieved through initiatives such as mentoring programs, peer support groups, and open communication channels between students and faculty. Educators can highlight the intrinsic rewards of learning and the long-term benefits of academic success. This can be done through engaging teaching methods, real-world examples, and opportunities for students to explore their interests. By providing students with opportunities to succeed and offering constructive feedback, educators can help students develop a belief in their abilities. This can be achieved through well-designed assessments, individualized support, and encouragement to take on challenging tasks. Encourage students to view challenges as opportunities for growth and learning rather than as threats to their self-worth. This can be done through discussions about the concept of a growth mindset, role-modeling positive attitudes toward challenges, and providing students with strategies for overcoming obstacles.

While the study provides valuable insights into the relationships between the variables of interest, it is important to acknowledge certain limitations. The use of self-report measures can introduce biases such as social desirability bias and recall bias. To mitigate these limitations, the study employed validated instruments and conducted a confirmatory factor analysis. Furthermore, the convenience sampling approach may limit the generalizability of the findings to other populations of medical students. Future research could explore these relationships in a more diverse sample of medical students.

Conclusion

This study investigated the interrelationships between

academic self-regulation, academic self-efficacy, academic optimism, and academic passion among medical students exhibiting self-handicapping behaviors. The findings revealed a complex interplay between these constructs, with academic optimism emerging as a pivotal mediator in their relationships with academic passion. Specifically, the study demonstrated that academic self-regulation and academic optimism were directly associated with academic passion, while academic self-efficacy, though not directly linked to academic passion, indirectly influenced it through its positive impact on academic optimism. These findings underscore the significance of fostering academic optimism among medical students to enhance their academic passion and success. Based on these results, educational institutions can implement several strategies to promote academic optimism, such as creating a supportive learning environment, emphasizing the value of learning, building students' self-efficacy, and fostering a growth mindset. By implementing these interventions, educational institutions can establish a more conducive learning environment that supports academic passion and assists medical students in achieving their academic goals.

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Authors' Contribution

Conceptualization: Seyyed Gholamreza Jafari.
Data curation: Seyyed Gholamreza Jafari.
Investigation: Tayebeh Sharifi.
Methodology: Seyyed Gholamreza Jafari.
Project administration: Maryam Chorami.
Resources: Reza Ahmadi.
Software: Reza Ahmadi.
Supervision: Tayebeh Sharifi.
Writing–original draft: Tayebeh Sharifi.
Writing–review & editing: Tayebeh Sharifi.

Competing Interests

The authors declare no conflict of interest.

Ethical Approval

This study was approved by Islamic Azad University - Shahrekord Branch under the ethical approval code of IR.IAU.SHK.REC.1402.082.

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