Original Article

The relationship between achievement goal orientations and academic burnout among medical students: The mediating role of academic grit

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Abstract

Background & Objective: Academic burnout is a prevalent and unwanted syndrome that affects a large number of students. Therefore, it is necessary to determine the possible variables that might safeguard students from burnout. The aim of this study was to examine how academic grit acts as a mediator in the relationship between achievement goal orientations and academic burnout among Iranian medical students.

Material & Methods: The current study was descriptive with a correlational design. The sample for this study included students enrolled at Kashan University of Medical Sciences during the academic year 2022-2023. A total of 391 students were chosen as participants using a multi-stage selection method. The data collection tools were Elliot and McGregor's Achievement Goal Orientations Questionnaire, Bresó et al.'s Academic Burnout Questionnaire, and Duckworth and Quinn's Grit Scale. The data were analyzed using Structural Equation Modeling (SEM) in smart-PLS software.

Results: The findings indicated that mastery-approach (ß = -0.216, p = 0.001) and performance-approach (ß = -0.165, p = 0.003) goal orientations directly and adversely predicted academic burnout. Moreover, mastery-avoidance (ß = 0.172, p < 0.001) and performance-avoidance (ß = 0.205, p < 0.001) goal orientations directly and significantly predicted academic burnout. Furthermore, academic grit mediated the association between all types of achievement goal orientations, except mastery avoidance, and academic burnout.

Conclusion: Given the adverse effects of academic burnout, it is suggested that responsible bodies in medical science universities take significant measures to promote mastery-approach and performance-approach goal orientations and decrease mastery-avoidance and performance-avoidance goal orientations among students. Further, students' academic grit could be increased via educational workshops and counseling sessions.

Keywords: achievement goal orientation, academic burnout, academic grit, medical students

Introduction

Medical science students encounter a wide range of challenges, such as the necessity of successfully performing their academic tasks, frequent interpersonal interactions, an uncertain job outlook, and related decisions, which could possibly trigger considerable stress (1) and result in their burnout (2). Burnout is a major challenge in academia, and recent research has shown that 61.3% and 36.5% of health sciences students suffer from medium and high levels of burnout (3). Academic burnout, which is defined as chronic feelings of emotional exhaustion, cynicism, and inefficacy, could be caused by different factors, such as unsuitable learning environments and some individual differences, like low self-efficacy (4). Students suffering burnout pay scanty attention to their learning, have lesser levels of dedication to their studies, and display more non-adaptive behaviors (5). In addition, they demonstrate unwillingness to study the assigned instructional materials, have increased absenteeism, are eager to engage in classroom activities, and develop feelings of inefficacy in their studies (6). Therefore, burnout is seen as harmful to students' academic achievement and could potentially impact other elements of their lives.

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Achievement goal orientations, as a major motivating component for explaining behavior in educational environments, have been demonstrated to alter students' academic achievement. Goal orientations refer to students' motives for achieving success as well as their competence in doing academic assignments. Different theories and models have been presented regarding goal orientations, such as Elliot and McGregor's framework, which incorporates four aspects: mastery approach, mastery avoidance, performance approach, and performance avoidance (7). In doing academic activities, students with mastery approach goal orientation attempt to increase their abilities and competence and overcome potential challenges (8). Mastery-avoidance students exert effort only to avoid misunderstandings and failing to learn materials, as well as striving not to make any errors or miss skills (7). Students who have a performance-oriented goal orientation tend to outperform their peers and validate their competence and skills by seeking other people's positive judgments (9). Finally, students holding performance avoidance goal orientation devote efforts to their learning mostly to avoid experiencing failure and receiving others' negative judgments, as well as appearing incompetent (7).

Each goal orientation may lead to particular cognitive, motivational, emotional, and behavioral consequences. For example, learners with mastery approach goal orientation devote more efforts to their learning and have higher levels of academic achievement, which may consequently result in less burnout. These learners' stronger intrinsic motivation for learning encourages them to value learning as an important goal and overcome obstacles to promote their competence and academic achievement. Consequently, they may suffer from lower levels of emotional exhaustion and develop less negative and passive attitudes toward performing their academic tasks (10, 11).

As students with performance approach goal orientation consider obtaining higher marks and outperforming others as desirable, they may be more willing to invest effort in their learning, which could lead to higher levels of self-sufficiency, more positive feedback, and consequently increased learning quality and academic performance (12). These features indicate a positive link between students' goal orientation and their academic performance, which is the opposite of academic burnout (13, 14). In contrast, performance avoidance or mastery avoidance goals are related to poor study habits, anxiety, and self-handicapping (15). Students with performance avoidance or approach avoidance have lower levels of academic achievement, which may lead to their burnout due to avoiding tasks, experiencing lower motivation for exerting effort, and feeling incompetent (16).

It is important to investigate the underlying mechanism through which students' goal orientations may predict their academic burnout. Understanding this mechanism helps shed more light on this link, which assumes added importance as it can inform designing effective interventions for reducing students' academic burnout. In this vein, it seems that academic grit, defined as passion and perseverance for achieving long-term goals (17), may play a mediating role in the association between goal orientations and academic burnout. In other words, grit could be considered a kind of self-regulation that helps students maintain their interests, sustain their efforts, and overcome barriers and obstacles in the long run (18). Gritty students exert considerable effort for their long-term goals, are highly focused, believe in their goals, and do not surrender when facing failures and challenges; thus, they are less pessimistic about their tasks and university, feel less fatigue, and consequently experience lower levels of burnout (19). Additionally, they do not easily give up and are able to establish more long-term goals for themselves, which could potentially decrease their burnout (18).

The results of studies by Alhadabi and Karpinski (20) and Park (21) indicated that students with mastery goals, compared with those with performance goals, show more perseverance and interest, which helps them get higher scores (22). Hence, students with higher grit levels are more successful in their university courses, can more successfully adapt to the university environment, and consequently have higher academic achievement and reduced burnout (23). Interestingly, Zhang (24) showed performance avoidance goals have a negative relationship with academic grit.

Given that academic burnout is a significant obstacle to students' academic achievement and success and could result in decreased performance, imposing considerable costs on both the students and the educational system, it is crucially important to investigate its potential causes for preventing its undesirable consequences. Additionally, identifying the factors that may possibly protect students against burnout can help responsible bodies in education design effective interventions for implementing better strategies to deal with academic burnout. Past research has shown that approach and avoidance orientations have positive and negative relationships, respectively, with academic burnout (25). Moreover, Akin and Arslan (22) found that approach and

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avoidance orientations were positively and negatively, respectively, linked to students' academic grit. Furthermore, the results of other studies have shown that grit could be considered a good predictor of students' academic burnout (19), achievement (26), and engagement (27). However, to the best of our knowledge, no study has examined the mediating role of academic grit in the association between achievement goal orientations and academic burnout among students of medical sciences. Therefore, the present study aims to address this research gap, proposing the following hypotheses:

H1: There is a relationship between students' goal orientations and academic burnout.

H2: Students' academic grit can play a mediating role in the link between their goal orientations and academic burnout.

Material & Methods

Design and setting(s)

This descriptive-correlational study was conducted at Kashan University of Medical Sciences (KUMS) (Iran).

Participants and sampling

The statistical population comprised all students of Kashan University of Medical Sciences (N = 3300) in the 2022–2023 academic year. According to Cochran's formula for limited populations (α = 0.05, standard deviation = 0.50, error estimation = 0.50), 345 students were needed. However, considering the possible attrition, a total of 400 students were chosen using multi-stage sampling, which requires two or more random samplings based on the hierarchical structure of natural clusters in a particular population (28). First, three faculties (medicine, hygiene, and nursing & midwifery) were selected. Then, from each faculty, 10-15 classes were chosen, followed by randomly selecting 10–12 students from each class. The inclusion criteria were: a) being a student at KUMS in the 2022–2023 academic year; and b) willingness to participate in the study. The exclusion criteria included: a) severe stress due to different causes such as death of a close relative and divorce in the past three months; b) chronic psychological problems; c) being under treatment; and d) incomplete questionnaires.

Tools/Instruments

The data collection instrument comprised a section for obtaining the participants' demographic information as well as another section including Elliot and McGregor's goal orientation questionnaire (7), Bresó et al.'s academic burnout questionnaire (29), and Duckworth and Quinn's grit questionnaire (18).

Achievement goal orientations: The participants goal orientations were assessed using Elliot and McGregor's questionnaire with four dimensions (mastery approach, mastery avoidance, performance approach, and performance avoidance) on a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). This scale has 12 items, and its possible score range is 12–60. Elliot and McGregor (7) reported high Cronbach's alpha for different sub-scales of this questionnaire: mastery approach (α = 0.94), performance approach (α = 0.92), mastery avoidance (α = 0.88), and performance avoidance (α = 0.83). Also, they used exploratory factor analysis, corroborating the four-factor structure of this questionnaire, which accounts for 81.5% of the total variance. Additionally, their confirmatory factor analysis verified the 2×2 pattern of achievement goal orientations. Furthermore, Moshtaghi et al. (30) reported Cronbach's alpha coefficients of 0.79, 0.75, 0.75, and 0.68 for different dimensions, respectively, and the results of their exploratory factor analysis using principal component analysis with varimax orthogonal rotation indicated that this questionnaire has four significant factors explaining 54.74% of the total variance. Their confirmatory factor analysis also verified the fit of the model with the empirical data.

Academic Burnout: Bresó et al.'s (29) questionnaire with three sub-scales, namely, exhaustion (5 items), cynicism (4 items), and academic inefficacy (6 items), was used to measure students' academic burnout. All items were based on a five-point Likert scale, and the score range was 15–75. The score ranges of 15–37, 37–60, and 60–75 are indicative of mild, moderate, and extreme academic burnout, respectively. Bresó et al. (29) reported satisfactory validity for this questionnaire by applying confirmatory factor analysis. As for reliability, the Cronbach's alpha coefficients for the three sub-scales were 0.70, 0.82, and 0.75. The reliability of this questionnaire was also investigated by Naami et al. (31) in an Iranian sample, yielding α coefficients of 0.79, 0.82, and 0.75, respectively. Additionally, the three sub-scales exhibited strong relationships with student stressors (r = 0.38, 0.42, and 0.45; p < 0.001).

Academic Grit: A short version of Duckworth and Quinn's (18) questionnaire was used to test students' academic grit. This questionnaire contains two sub-scales involving persistence of effort and constancy of

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interest on a five-point Likert scale. Higher scores suggest more academic grit. The Cronbach's alpha coefficients for the complete questionnaires as well as the two sub-scales were 0.75, 0.67, and 0.64, respectively (18). Duckworth and Quinn also evaluated the face, content, and criterion-related validity of this questionnaire as good. Additionally, Ghasemi Vajargah and Fazli (32) employed this scale in an Iranian sample and evaluated its reliability as 0.83. Furthermore, they tested its content, divergent, and convergent validity. Content validity was checked by experts, and the findings of evaluating divergent and convergent validity suggested that this questionnaire had sufficient levels of these two forms of validity.

Data collection methods

After acquiring the ethical code, the researchers referred to the Kashan University of Medical Sciences to do sampling. They explain the study objectives to the participants. Within two weeks, the respondents provided their demographic data and completed Elliot and McGregor's achievement goal orientations, Bresó et al.'s academic burnout, and Duckworth and Quinn's grit questionnaires.

Data analysis

The missing data were first checked using Little's (33) test, indicating that the data were Missing Completely At Random (MCAR) (χ^2 = 1091.47, df = 1147, P = 0.878), and the missing probability was independent of the observed and unobserved data and the same for all cases. Expectation-Maximization (EM) technique was utilized for imputing the missing data. Next, univariate and multivariate outliers were analyzed using Z standard values and Mahalanobis distances, respectively, which resulted in deleting two univariate outliers. Out of the 400 questionnaires distributed among the students, 7 incomplete questionnaires and 2 outlier instances were excluded from the study, resulting in 391 questionnaires in the data analysis. The participants' demographic features were initially investigated. Next, the convergent validity of the measurement model was examined using Average Variance Extracted (AVE), while its divergent validity was studied by Fornell-Larker and the Heterotrait-Monotrait (HTMT) ratio. Moreover, the reliability of the instruments was assessed by composite reliability (31) and Cronbach's alpha coefficient. SEM was done in SmartPLS (version 3) to examine the data.

Results

In terms of gender, 244 and 147 of the participants were male (62.4%) and female (37.6%), respectively, with an age range of 19–28 years old and a mean age of 21.29 ± 1.85. There were no significant differences between male (Mage = 21.52) and female (Mage = 21.15) participants with respect to their age (t = 1.92, p = 0.116). The participants were from different faculties: medicine (n = 202, 51.6%; Mage = 21.30 ± 1.80), hygiene (n = 91, 23.3%; Mage = 21.42 ± 1.88), and nursing and midwifery (n = 98, 25.1%; Mage = 21.14 ± 1.94). There was no significant difference between the mean ages of the students in the three faculties (F = 564, p < 569). As for the participants' burnout, their mean score was 50.13 ± 9.57, and 43 (11%), 297 (76%), and 51 (13%) of them had low, medium, and high burnout, respectively. Table 1 shows the means and standard deviations of the study variables.

Measurement model

Table 1 shows convergent validity based on the Fornell-Larcker criterion and HTMT ratios for the study variables. As can be seen, the square root of the AVE values (i.e., values in bold on the diagonal) is higher than the correlations between the constructs (values below the diagonal). Moreover, all HTMT values (above the diagonal) are less than the permissible threshold of 0.85 (34), showing the discriminant validity of the constructs. Additionally, the AVE values are greater than 0.5 and the composite reliability of all constructs exceeds 0.7, which supports the convergent validity of the constructs and the internal consistency of the instruments, respectively.

Structural model

After assessing the fit of the measurement models, we studied the model fit of the structural model using partial least score modeling of structural equations (PLS-SEM). Unlike measurement models, in which the relationships between latent and observable variables are examined, the structural model takes into consideration the linkages between latent variables based on t values. Table 2 displays standardized coefficients for direct, indirect, and total effects as well as the variation explained by each variable.

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Table 1. Fornell-Larker criterion, HTMT ratios, and reliability indices

Construct	Mastery-approach	Mastery-avoidance	Performance-approach	Performance-avoidance	CI	PE	Exhaustion	Cynicism	Inefficacy
Mastery-approach	0.84	0.41	0.41	0.05	0.70	0.61	0.42	0.46	0.51
Mastery-avoidance	-0.03	0.78	0.17	0.051	0.17	0.13	0.28	0.31	0.27
Performance-approach	0.33	0.006	0.82	0.16	0.31	0.34	0.28	0.20	0.46
Performance-avoidance	0.03	0.37	0.11	0.80	0.24	0.17	0.39	0.27	0.15
CI	0.54	-0.13	0.22	-0.18	0.73	0.81	0.51	0.55	0.49
PE	0.49	-0.10	0.26	-0.12	0.61	0.76	0.53	0.53	0.49
Exhaustion	-0.34	0.25	-0.23	0.30	0.39	-0.42	0.73	0.83	0.54
Cynicism	-0.37	0.27	-0.17	0.32	-0.43	-0.42	0.68	0.79	0.58
Inefficacy	-0.42	0.22	-0.37	0.10	0.38	-0.39	0.43	0.47	0.71
AVE	0.73	0.60	0.68	0.64	0.54	0.58	0.54	0.63	0.50
CR	0.89	0.81	0.86	0.84	0.82	0.84	0.85	0.87	0.86
Cronbach's alpha	0.82	0.71	0.77	0.72	0.72	0.76	0.78	0.81	0.80
Mean	6.33	8.01	6.34	7.24	11.34	10.63	15.12	13.06	21.94
Standard deviation	2.54	2.54	2.34	2.13	2.66	3.15	4.11	3.70	3.77

Note: The values (in bold) on the diagonal are the square root of AVE values. The values below the diagonal indicate the correlations between the constructs. The values above the diagonal show the HTMT ratios.
Abbreviations: CI, consistency of interest; PE, Perseverance of effort; CR, composite reliability; AVE, average variance extracted

Table 2. Direct, indirect, and total effects and 95% confidence intervals for the structural model

Path	β	SE	t	p value	Lower bound	Upper bound
Direct effects						
Mastery-approach → Grit	0.540	0.038	14.306	0.000	0.463	0.616
Mastery-avoidance → Grit	-0.058	0.044	1.318	0.188	-0.152	0.022
Performance-approach → Grit	0.129	0.042	3.073	0.002	0.049	0.212
Performance-avoidance → Grit	-0.192	0.048	4.023	0.000	-0.287	-0.095
Mastery-approach → Burnout	-0.216	0.062	3.474	0.001	-0.334	-0.086
Mastery-avoidance → Burnout	0.172	0.044	3.907	0.000	0.081	0.262
Performance-approach → Burnout	0.165	0.055	3.015	0.003	-0.273	-0.056
Performance-avoidance → Burnout	0.205	0.038	0.797	0.000	0.121	0.288
Grit → Burnout	-0.329	0.050	6.565	0.000	-0.433	-240
indirect effects						
Mastery-approach → Grit → Burnout	-0.178	0.032	5.561	0.000	-0.246	-0.123
Mastery-avoidance → Grit → Burnout	0.019	0.015	1.295	0.206	-0.008	0.050
Performance-approach → Grit → Burnout	-0.042	0.016	2.660	0.008	-0.076	-0.016
Performance-avoidance → Grit → Burnout	0.063	0.019	3.274	0.001	0.030	0.103
Total effect						
Mastery-approach → Burnout	-0.393	0.050	7.822	0.000	-0.490	-0.297
Mastery-avoidance → Burnout	0.191	0.047	4.039	0.000	0.091	0.286
Performance-approach → Burnout	-0.208	0.053	3.964	0.000	-0.316	-0.106
Performance-avoidance → Burnout	0.269	0.043	6.204	0.000	0.185	0.352

Note: All statistical tests are two-tailed, and significance is assessed at the 0.05 level.
Abbreviations: β, standardized regression coefficient; SE, standard error; t, t-value (calculated as the ratio of the β coefficient to its SE); P, probability

Based on the structural coefficients in Table 2, both mastery and performance approaches are favorably and substantially connected with academic grit, whereas they are adversely and significantly related to academic burnout. Moreover, mastery-avoidance goal-orientation is not considerably associated with academic grit but has a positive and significant association with academic grit. Additionally, performance-avoidance goal orientation is adversely and positively associated with academic grit and burnout, respectively. In addition, grit has a negative link to academic burnout. Given the indirect impact coefficients in Table 2, grit plays a mediating function in the relationships of mastery-approach, performance-approach, and performance-avoidance goal orientations with academic burnout. However, it does not significantly influence the link between mastery-avoidance goal orientation and academic burnout.

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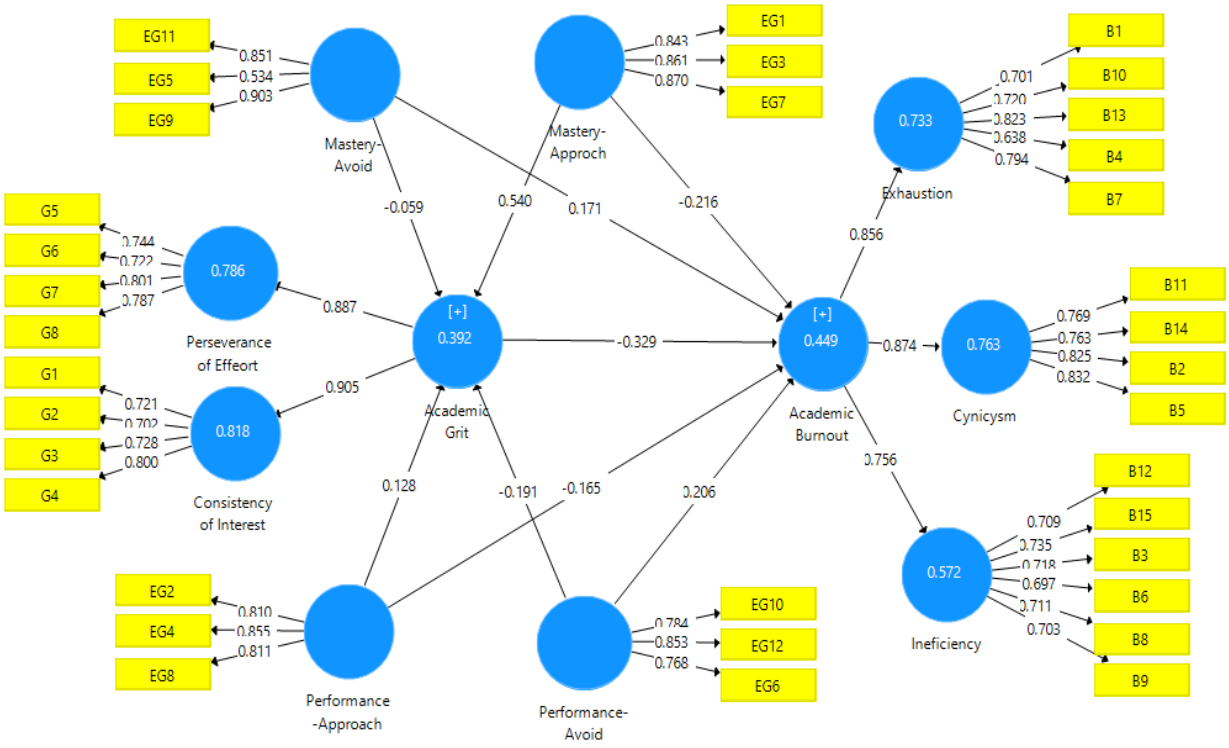

Figure 1. Standardized coefficients of the structural model

As shown in Figure 1, the explained variances of grit and burnout are 0.392 and 0.449, respectively; in other words, 39.2% of the variance of grit is explained by the four types of goal orientations, 44.9% of the variance of academic burnout is explained by grit as well as the four types of goal orientations, and the remaining variance is explained by other external factors. Goodness of Fit (GOF) is the overall measure of model fit for PLS-SEM and incorporates both measurement and structural models. This index is used as an indicator for predicting the overall performance of the model. According to Wetzels (36), values of 0.01, 0.25, and 0.36 imply poor, medium, and high goodness of fit, respectively. The overall fit of the model is 0.457, which might be viewed as high based on the aforementioned criteria.

Discussion

The research being conducted aims to evaluate the association between goal orientations and academic burnout by examining the mediation effect of academic grit among medical sciences students. The data revealed that mastery and performance approach goal orientations inversely and significantly influenced academic burnout, which is consistent with Poorgholamy et al. (11). Students with mastery approach goal orientation invest more time to their studies, pursue their educational goals for their own personal satisfaction, and value effort for achievement in and mastery of their learning. For these students, learning and increasing skills have an intrinsic worth, which is a vital precondition in participating in tough activities. Thus, they are more willing and have higher levels of grit to expend effort and time to their academic tasks, which can in turn promote their academic achievement. A considerable body of research has shown that pursing mastery goals could result in several adaptive outcomes such as high intrinsic motivation, use of deep cognitive strategies and self-regulation, persistence when facing failure, self-efficacy, and positive learning emotions (15). In other words, as students having mastery-approach goal orientations are more motivated and interested in instructional materials and have higher academic achievement, they are less likely to lose their concentration and suffer from emotional exhaustion.

As for students with performance-approach goal orientation, they view their competence as being better than others, having a more prominent standing in their group, and excelling in doing homework, which can result in higher levels of academic achievement and less burnout. Additionally, they consider effort in validating

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their competence and displaying their outperformance as an important challenge, which causes emotions to motivate them to have more concentration on their academic tasks.

The positive association between mastery-avoidance and academic burnout is consistent with the results of Chang, Seong, and Lee (10), who found that students with mastery-avoidance goal orientations, in spite of their mastery over academic tasks, sometimes feel anxious when failing to understand, which can negatively affect their performance and lead to burnout. In addition, Naidoo (25) showed that these students do not pay attention to social comparisons and are unwilling to promote themselves. Therefore, they get low scores in their academic tasks, i.e., experience reduced academic achievement, which may lead to their burnout (27). Moreover, they are more likely to consider help-seeking as a threat, thereby experiencing higher levels of stress and anxiety (7).

Furthermore, the results showed that performance-avoidance orientation is directly related to academic burnout, which is consistent with Babazadeh et al. (13) and Fazli and Fouladchang (16). Students tend to avoid negative judgments about their competence and abilities, experience increasing anxiety, and consider learning as a tool for avoiding failure. Therefore, higher levels of performance-avoidance academic goal orientation may decrease academic achievement, which can consequently lead to academic burnout. Overall, mastery-approach and performance-approach goal orientations negatively predicted academic burnout; however, mastery-avoidance and performance-avoidance goal orientations positively predicted academic burnout. Therefore, it is essential that policymakers and educational stakeholders pay significant attention to long-term programs such as re-considering and revising the assessment system by promoting more effective goal orientations (i.e., mastery-approach and performance-approach) among students. Additionally, they can encourage teachers to use effective teaching methods, take measures to modify their educational attitudes, and correct the learning-teaching process, which can considerably enhance students' learning and decrease their academic burnout.

Another finding was the mediating role of academic grit in the associations between students' goal orientations (except mastery avoidance) and academic burnout. In other words, mastery-approach and performance-approach goals could significantly and negatively predict academic burnout by increasing academic grit, which is in line with Alhadabi and Karpinski (20) and Park (21). Students with mastery-approach goals are less concerned about outperforming others and mostly take measures for their personal development and mastery over academic tasks. These students are more engaged in learning processes as they are highly interested in their studies, show considerable perseverance, and have higher levels of thinking skills. Moreover, they are more autonomous, highly value learning, and exert more effort in performing their academic tasks; therefore, when facing academic challenges, they show adaptive motivational patterns, perseverance, and problem-solving strategies, which can result in higher levels of academic achievement (18). In addition, having more interest and intrinsic motivation, as well as more positive attitudes toward academic tasks, can have an undeniably important role in reducing their dropout rates. Consequently, these students exert more effort in achieving their goals and seek challenging situations, which can promote their perseverance and, in turn, their academic achievement. Hence, students with mastery-approach goal orientation may have higher levels of intrinsic motivation (21) and more long-lasting academic achievement (20) in comparison to other students while encountering challenging academic tasks.

The finding indicating the mediating role of academic grit in the association between performance-approach goal orientation and academic achievement is in agreement with Debicki, Kellermanns, and Barnett (12). Students who do their best to be positively judged by others and display behaviors to prove their competence to others are more intrinsically motivated and, consequently, have better academic achievement and lower levels of cynicism (12). Given the characteristics of individuals with performance goals, it is expected that they show more perseverance in facing challenges and obstacles. Past research has shown that students adopting performance-approach orientations are not interested in challenging tasks as such tasks threaten the representation of their competence; in addition, they show less persistence when facing failures and are more likely to quit (12). Therefore, to reduce academic burnout, it is suggested that suitable interventions be performed to enhance students' academic grit through promoting their intrinsic motivation.

Although this study did not take into account the mediating role of academic grit in the relationship between mastery-avoidance goal orientation and academic burnout, Akin and Arslan (22) state that this type of goal orientation causes students to show less academic grit and effort and consequently have lower

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academic achievement, which is in line with the weak but non-significant correlation between mastery-avoidance goal orientation and academic burnout in this study. Moreover, the analysis of the indirect relationship between performance-avoidance orientation and academic burnout was mediated by academic grit, which is consistent with Han (14) and Zhang (24). Students with a performance-avoidance orientation are more hesitant, invest little effort in, and do not value their academic tasks. Thus, their academic performance reduces, which can result in getting low marks in different courses. Due to fear of failure, they are very hesitant to do their academic tasks, which can lead to reduced performance and enthusiasm in their studies.

This study has some limitations. The participants were students of a medical science university in Iran; thus, care should be taken when generalizing the findings to other universities and populations. Another limitation is the use of self-report questionnaires for data collection; therefore, future research should use other techniques such as interviews and adopt a longitudinal design for obtaining more precise results. Furthermore, it is recommended that future studies consider the mediating (e.g., self-regulation) and moderating (e.g., classroom environment and individual differences) roles of other factors in the relationship between students' goal orientations and academic burnout.

Conclusion

The obtained findings indicated that approach goal orientations could protect students in the medical sciences against academic burnout. More specifically, in comparison to performance-approach, goal orientation had a more influential role in reducing students' burnout. Additionally, academic grit played a significant role in decreasing students' academic burnout since gritty students, when facing challenges and obstacles, are still able to exert effort, sustain their interest in performing academic tasks, remain engaged, and enjoy dealing with challenges (37). In other words, students with greater levels of grit are more determined and committed and are able to maintain concentration on their academic duties. Therefore, considerable initiatives might be implemented to build grit among students who are prone to experiencing burnout. For example, effective interventions might be created to increase students' grit, which can in turn play a crucial role in fixing students' academic challenges and avoiding their burnout.

Ethical considerations

The study reported here was based on a research project approved by the ethical committee of the Kashan University of Medical Sciences (Iran) (ethical code: IR.KAUMS.REC.1401.011). The informed consent of all participants was obtained, and they could withdraw from the study at any stage. All the collected data was treated as anonymous and confidential, and the students were assured that the data would be aggregated to protect their anonymity.

Artificial intelligence utilization for article writing

The authors declare that they did not use generative Artificial Intelligence (AI) and AI-assisted technologies in the writing process of this paper.

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Conflict of interest statement

The authors declare that they have no conflict of interest.

Author contributions

Majid Sadoughi: Designing the study, analyzing the data, reviewing the article, and supervising all stages of the study implementation. Najmeh Eskandari: Collecting data, writing the manuscript, and reviewing the article. Both authors read and approved the final version of the manuscript.

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Data availability statement

Data and materials could be made available upon reasonable request.

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