



## Original Article



## Exploring the Relationship between Achievement Emotions and Academic Performance in Dental College

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## ABSTRACT

Achievement emotions, such as anxiety, enjoyment, and confidence, significantly influence students' academic performance. Understanding these emotions can enhance educational strategies and student outcomes, especially in high-stress environments like dental colleges.

**Objective:** To investigate the achievements and emotions effects on academic performance in Pakistani dental colleges. **Methods:** A cross-sectional study was conducted at Islamic International Dental College, using convenient sampling across all professional years. Students scoring 50% or higher were classified as "pass," while those below 50% were labeled as "fail." Achievement emotions were measured using the Achievement Emotions Questionnaire, and logistic regression was used to analyze their impact on performance. Data were processed using Jaffery Amazing Statistical Package (JASP). **Results:** The study included 212 students (average age 21.25 years, 73.6% female). Females had higher average scores (375.64 vs. 342.79) and pass rates (75.6% vs. 67.9%) compared to males. Day scholars outperformed hostilities (377.70 vs. 358.41). Anxiety was common, with 60.9% of students experiencing moderate to high levels. While 35.8% disliked exams, 34.4% felt moderate pressure, and 54.2% were moderately confident. Concerns about grades were prevalent, with 36.3% worrying about poor grades and 47.2% caring about good grades. Negative emotions significantly reduced the likelihood of passing ( $p = 0.040$ ), whereas positive emotions did not have a significant effect ( $p = 0.367$ ).**Conclusion:** Negative emotions significantly decreased the likelihood of passing exams, while positive emotions did not have a significant impact.

## INTRODUCTION

The relationship between achievement emotions and academic performance has garnered increasing attention in educational research, particularly in the demanding fields of medical and dental education. Achievement emotions, which encompass students' emotional responses to success or failure in academic tasks, play a crucial role in shaping their motivation, learning strategies, and overall academic success. Emerging evidence indicates that Emotional Intelligence (EI) is linked to improved academic outcomes across various professions [1]. Individuals with higher levels of EI are better equipped

to maintain stability and navigate social challenges effectively. EI is described as "the capacity to recognize, understand, and manage one's own emotions, as well as those of others, and to use this emotional awareness to guide thought and behavior [2]." A strong correlation has been identified between Emotional Intelligence (EI) and academic success among medical students [3]. Academic performance is closely tied to a range of achievement emotions, which are feelings linked to success or failure in academic contexts. Among dental students, these emotions often carry an added weight due to the rigorous



nature of their studies and the high standards expected in their field. Achievement emotions feelings directly linked to success or failure in academic settings play a significant role in dental students' educational experiences. Positive emotions such as enjoyment and pride can enhance motivation and learning, while negative emotions like anxiety and shame may impede academic performance [4]. Positive emotions like pride and hope can drive motivation and enhance learning, while negative emotions such as anxiety, shame, and frustration may hinder academic performance and overall well-being [5, 6]. The demanding curriculum, competitive environment, and clinical responsibilities unique to dental education amplify these emotions, making it essential to address their impact on students' academic and personal lives. Learning medicine is a complex process that involves acquiring medical knowledge, developing clinical skills, and cultivating professional attitudes. Research has shown that emotions play a leading role in this process [7]. Specific emotions in educational settings influence academic performance, assessments, feedback reception, exam results, and overall satisfaction with the learning experience [8]. Medical students, in particular, face a range of emotions due to challenging circumstances such as heavy academic workloads, high competitiveness, memorizing large volumes of information, managing busy schedules, taking difficult exams, and fearing failure [9]. During clinical years, anxiety may arise when dealing with suffering, sick, or dying patients, and collaborating with other healthcare professionals.

This study aimed to explore the intricate connections between different achievement emotions such as anxiety, pride, and hopelessness and their impact on academic outcomes among medical and dental students. By analyzing these relationships, we seek to provide valuable insights into emotional regulation and its potential to enhance student performance, well-being, and educational success in health-related disciplines.

## METHODS

This cross-sectional study was conducted among students of International Islamic Dental College Rawalpindi over six months (June to December 2023) using a convenient sampling technique. The study included participants from all professional years who provided informed consent and completed the study questionnaire. The sample size was calculated using OpenEpi (Version 3) for a finite population of 470, with a hypothesized frequency of 50%, a margin of error of  $\pm 5\%$ , and a 95% confidence level, resulting in a required sample size of 212. Achievement Emotions Questionnaire (AEQ): The AEQ comprised 24 items, assessing students' emotional responses during exams. Total scoring ranged from 24 to 120, with higher scores indicating greater emotional intensity. The AEQ is validated

with a Cronbach's alpha of 0.89, demonstrating high reliability. The study included students enrolled in all professional years at the college who provided informed consent and completed the AEQ. Exclusion criteria comprised students who did not provide consent, had incomplete questionnaires, or were on leave or not actively attending classes during the study period. Academic performance data were available for all included participants. Ethical approval was obtained from the Ethical Review Committee (ERC) at Islamic International Medical and Dental College (Ref: Riphah/IIMC/IRC/23/3025, dated 30th January 2023). Informed verbal consent was obtained from all participants in accordance with the Helsinki Declaration. Academic performance was categorized as "pass" for scores of at least 50% and "fail" for scores below 50%. Descriptive statistics (mean, standard deviation) were used for continuous variables such as age and obtained marks, while frequency distributions were employed for categorical variables like AEQ scores, gender, results, residence, and professional year. For inferential analysis, logistic regression was used to assess the effects of positive and negative emotions on academic performance, with results presented as odds ratios with 95% confidence intervals and a 5% significance level. Data were analyzed using JASP (Jeffrey's Amazing Statistical Package).

## RESULTS

The study's findings offer a detailed analysis of the demographic and academic performance of medical students, alongside their emotional responses to exams and the impact on academic outcomes. Table 1 summarizes the demographic characteristics and academic performance of the participants. The sample comprised predominantly female students, who displayed slightly higher average marks and pass rates compared to males. Performance varied based on professional year and residence type, with day scholars outperforming hostelites on average.

**Table 1:** Demographic and Academic Performance Analysis of Dental Students

Variables	Frequency (%)	Mean $\pm$ SD	Range
<b>Age</b>			
Age	212 (100%)	21.25 $\pm$ 1.707	17-25
<b>Gender-Wise Distribution of Age</b>			
Female	156 (73.585%)	21.929 $\pm$ 1.745	17-25
Male	56 (26.415%)	21.536 $\pm$ 1.572	18-25
Total	212 (100%)	-	-
<b>Gender-Wise Distribution of Age Examination Results Outcome (Pass)</b>			
Female	118 (75.641%)	-	-
Male	38 (67.857%)	-	-
Total pass	156	-	-

Gender-wise distribution of Age Examination Results Outcome (Fail)			
Female	38 (67.86%)	-	-
Male	18 (32.14%)	-	-
Total fail	56 (100%)	-	-
Grand total	212 (100%)	-	-
Gender-Wise Distribution of Obtain Marks			
Female	156 (73.585%)	375.641 ± 91.026	128-544
Male	56 (26.415%)	342.786 ± 104.254	88-520
Total	212 (100%)	366.962 ± 95.554	88-544
Professional			
1 <sup>st</sup> Year BDS	51 (24.057%)	339.902 ± 104.689	80-620
2 <sup>nd</sup> Year BDS	51 (24.057%)	396.745 ± 96.933	162-520
3 <sup>rd</sup> Year BDS	55 (25.943%)	364.509 ± 67.423	176-488
4 <sup>th</sup> Year BDS	55 (25.943%)	386.891 ± 103.672	128-544

Total	212 (100%)	-	-
Obtain Marks Residence Wise			
Day Scholar	94 (44.340%)	377.702 ± 91.060	88-544
Hostelite	118 (55.660%)	358.407 ± 98.534	88-520
Total	212 (100%)	-	-

Table 2 presents the distribution of students' perceptions regarding various aspects of exams based on a Likert scale. A significant proportion reported moderate to high anxiety levels during exams, with 32.1% feeling moderately anxious and 28.8% feeling very anxious. The majority did not enjoy taking exams, as 35.8% reported not enjoying them at all. Pressure during exams was prevalent, with 34.4% feeling moderate pressure and 33.5% feeling very pressured.

**Table 2:** Distribution of Students' Perceptions of Exam-Related Factors using Achievement Emotion Questionnaire (AEQ) (n=212)

Variables	Frequency (%)				
	Not at all	Slightly	Moderately	Very Much	Extremely
How anxious do you feel when you are taking an exam?	17 (8.019%)	37 (17.453%)	68 (32.075%)	61 (28.774%)	29 (13.679%)
How much do you enjoy taking exams?	76 (35.849%)	52 (24.528%)	58 (27.358%)	22 (10.377%)	4 (1.887%)
How much pressure do you feel when you are taking an exam?	12 (5.660%)	29 (13.679%)	73 (34.434%)	71 (33.491%)	27 (12.736%)
How confident do you feel about your ability to perform well in exam?	18 (8.491%)	26 (12.264%)	115 (54.245%)	45 (21.226%)	8 (3.774%)
How much do you worry about getting a bad grade in exam?	13 (6.132%)	34 (16.038%)	51 (24.057%)	77 (36.321%)	37 (17.453%)
How much do you care about getting a good grade in exam?	8 (3.774%)	14 (6.604%)	47 (22.170%)	100 (47.170%)	43 (20.283%)
How much do you feel that the exam accurately reflects your knowledge and skills?	23 (10.849%)	35 (16.509%)	98 (46.226%)	45 (21.226%)	11 (5.189%)
How much do you feel that the exam is fair?	20 (9.434%)	40 (18.868%)	94 (44.340%)	47 (22.170%)	11 (5.189%)
How much do you feel that the exam is important?	13 (6.132%)	32 (15.094%)	56 (26.415%)	89 (41.981%)	22 (10.377%)
How much do you feel that the exam is challenging?	1 (0.472%)	21 (9.906%)	73 (34.434%)	94 (44.340%)	23 (10.849%)
How much do you feel that the exam is interesting?	41 (19.340%)	68 (32.075%)	76 (35.849%)	25 (11.792%)	2 (0.943%)
How useful do you feel that the exam is?	18 (8.491%)	30 (14.151%)	75 (35.377%)	76 (35.849%)	13 (6.132%)
How much do you feel that the exam is a waste of time?	82 (38.679%)	51 (24.057%)	46 (21.698%)	24 (11.321%)	9 (4.245%)
How much do you feel that the exam is too difficult?	10 (4.717%)	39 (18.396%)	94 (44.340%)	50 (23.585%)	19 (8.962%)
How much do you feel that you are prepared for the exam?	13 (6.132%)	42 (19.811%)	112 (52.830%)	43 (20.283%)	2 (0.943%)
How much do you feel that the exam is a good measure of your understanding of the subject?	18 (8.491%)	46 (21.698%)	83 (39.151%)	58 (27.358%)	7 (3.302%)
How much do you feel that the exam is an effective way to evaluate your progress in the subject?	15 (7.075%)	47 (22.170%)	70 (33.019%)	67 (31.604%)	13 (6.132%)

Table 3 presents the logistic regression analysis examining the impact of negative emotions on passing outcomes. Negative emotions significantly reduced the likelihood of passing ( $\beta = -0.467$ ,  $p = 0.040$ ), though the overall effect size was modest (Nagelkerke  $R^2 = 0.030$ ).

**Table 3:** Logistic Regression Analysis for Negative Emotion Impact

Variables	Estimate	Standard Error	Z	Wald Statistic	df	p-Value
(Intercept)	2.482	0.739	3.356	11.264	1	< 0.001
Negative Emotions	-0.467	0.228	-2.051	4.207	1	0.040

Table 4 summarizes the logistic regression analysis for positive emotions. Positive emotions did not significantly impact the likelihood of passing ( $\beta = 0.218$ ,  $p = 0.367$ ), indicating a minimal role in predicting academic outcomes.

**Table 4:** Logistic Regression Analysis for Positive Emotion Impact

Variables	Estimate	Standard Error	Z	Wald Statistic	df	p-Value
(Intercept)	0.390	0.710	0.540	0.290	1	0.580
Negative Emotions	0.210	0.240	0.900	0.810	1	0.360

## DISCUSSION

The current study provides a detailed overview of medical students' demographics, academic performance, and emotional responses to exams. The Achievement Emotion Questionnaire revealed that many students experienced moderate anxiety and pressure during exams, with mixed

perceptions about fairness and usefulness. Studies further showed that negative emotions significantly reduced the likelihood of passing, while positive emotions had no significant effect on pass/fail outcomes. Addressing negative emotions is crucial for enhancing academic success among medical students. The findings from this study provide valuable insights into the relationship between emotional factors and academic outcomes among medical students. The demographic analysis indicates that female students represent the majority of the sample, and they demonstrate slightly higher academic performance in terms of average marks and pass rates compared to their male counterparts. Some studies reported that males had higher Emotional Intelligence (EI) scores, while others indicated that females achieved higher EI scores [10-12]. However, many studies did not find a statistically significant gender difference in EI. Results on gender and EI also varied by region. Notably, males scored better in self-awareness, social awareness, and social skills, suggesting they may possess slightly higher EI capacities in these areas [13-15]. Additionally, day scholars appear to slightly outperform hostilities, although performance differences between residence types are minimal. Emotional responses to exams, as captured by the Achievement Emotion Questionnaire (AEQ), revealed significant levels of anxiety, pressure, and concern regarding grades among students. A substantial portion of students reported moderate to high levels of anxiety and pressure during exams, with a strong emphasis on achieving good grades. These findings underscore the importance of emotional factors in the academic experience of medical students, with many feelings anxious and worried about their performance. The scientific literature showed that anxiety and depression can have both negative and positive effects on the academic performance of medical students. Severe anxiety often hinders performance by impairing memory, concentration, and cognitive function. Most studies link anxiety and depression with lower academic outcomes, such as lower GPAs and more failed courses [16, 17]. However, some studies suggest that moderate levels of anxiety may boost motivation and academic performance, as students tend to study harder and aim for higher scores when feeling manageable anxiety [15, 18]. The results were similar to these findings. Negative emotions, significantly reduced the likelihood of passing. This suggests that students who experience higher levels of negative emotions, such as anxiety and stress, are at a greater risk of academic underperformance. The model fit improved significantly with the inclusion of negative emotions as a predictor, indicating that these emotions have a meaningful and detrimental effect on passing rates. Most studies indicated similar results to the study by showing a negative correlation between test anxiety and academic performance, with higher test anxiety linked to lower exam scores and overall academic achievement [19, 20]. According to the control-value theory, test anxiety arises from a student's negative appraisal of exam difficulty and outcome expectations. A meta-analysis by Von der Embse revealed moderate negative correlations between test anxiety, test performance, and GPA [21]. Cultural differences also play a significant role, influencing how students experience and express test anxiety. Studies showed variations between countries in physiological and

cognitive responses to anxiety, emphasizing the need for culturally validated tools and further research to explore these complexities in diverse settings [22]. Positive emotions did not show a significant influence on pass/fail outcomes. While positive emotions were associated with a small increase in the likelihood of passing, this effect was not statistically significant. The findings suggest that while negative emotions have a clear and direct impact on academic performance, positive emotions alone may not be enough to significantly improve outcomes. The minimal influence of positive emotions could indicate that they do not substantially buffer against the detrimental effects of negative emotions in high-pressure exam situations. Previously published studies explored the link between emotions and medical students' academic performance. Behrens *et al.*, in 2019 found that students felt more positive and motivated in challenging, manageable clinical cases, with mild anxiety being beneficial [21]. However, frustration reduced interest, decision-making, and self-esteem, showing weak correlations between emotions and performance. Overall, positive emotions correlated with academic success, while negative emotions led to poor outcomes, aligning with control-value theory. The limited sample size and single setting place was the major limitation of this study.

## CONCLUSIONS

In conclusion, this study emphasizes the importance of addressing negative emotions to improve academic performance among medical students. While positive emotions do not appear to significantly enhance the likelihood of passing, mitigating the impact of negative emotions may be key to fostering better academic outcomes. Interventions aimed at reducing stress, anxiety, and other negative emotions could play a critical role in enhancing both the emotional well-being and academic success of students in rigorous medical programs.

## Authors Contribution

Conceptualization: MOS

Methodology: ES, FA

Formal analysis: ES

Writing, review and editing: SA, MA, WS

All authors have read and agreed to the published version of the manuscript

## Conflicts of Interest

All the authors declare no conflict of interest.

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