

# Exploring the Role of Personality Traits and Risk Factors in Cognitive Test Anxiety Among Medical Students

Noshaba Razaq<sup>1</sup>, Rashid Qayyum<sup>2</sup>, Muhammad Faheem Anwer<sup>3</sup>, Zunaira Naveed<sup>4</sup>, Gul Muhammad Sheikh<sup>5</sup>, Ayesha Sohail<sup>6</sup>

<sup>1</sup> University of Haripur, Haripur, Pakistan

<sup>2</sup> Fazaia Medical College, Islamabad, Pakistan

<sup>3</sup> Combined Military Hospital, Lahore Medical College, Lahore, Pakistan

<sup>4</sup> Wah Medical College (NUMS University), Wah, Pakistan

<sup>5</sup> Sardar Institute of Medical and Dental College (SIMDC), Lodhran, Pakistan

<sup>6</sup> University of Azad Jammu & Kashmir, Muzaffarabad, Pakistan

Corresponding author: muhammادتahir Khan55@gmail.com

Keywords: Cognitive Test Anxiety, Medical Students, Personality Traits, Neuroticism, Academic Performance, External Pressures, Anxiety

---

## Abstract

**Background:** Cognitive test anxiety is a prevalent issue among medical students, adversely affecting their academic and professional performance. The interplay between personality traits, past test experiences, and external pressures contributes to varying levels of anxiety, necessitating targeted interventions.

**Objective:** This study aimed to explore the relationships between personality traits, past test experiences, external pressures, and cognitive test anxiety among medical students to identify significant predictors of anxiety.

**Methods:** A cross-sectional quantitative design was employed, involving 352 medical students aged 22 to 26 years. Participants were selected through stratified random sampling to ensure representation across academic years and genders. Cognitive anxiety was measured using the Trait subscale of the State-Trait Anxiety Inventory (STAI), while personality traits were assessed with the Big Five Personality Inventory (BFI). A custom-designed questionnaire evaluated past test experiences and external pressures. Data were collected online and in-person, followed by statistical analyses using descriptive statistics, Pearson correlation coefficients, multiple regression, and moderation analysis with IBM SPSS Statistics, version 25.

**Results:** Neuroticism ( $\beta = 0.45$ ,  $p < 0.001$ ) and conscientiousness ( $\beta = -0.15$ ,  $p = 0.003$ ) significantly predicted cognitive anxiety. Past test performance history ( $\beta = 0.30$ ,  $p < 0.001$ ) and perceived test difficulty ( $\beta = 0.40$ ,  $p < 0.001$ ) were positively associated with anxiety. Females reported higher anxiety scores (70.1 vs. 65.2,  $p = 0.02$ ).

**Conclusion:** Neuroticism and external pressures significantly contribute to cognitive test anxiety among medical students. Managing these factors may effectively reduce anxiety and improve performance.

---

## 1 Introduction

Cognitive test anxiety is a significant concern in medical education, as it profoundly impacts the academic and professional outcomes of students. This form of anxiety is characterized by worry, apprehension, and negative thoughts about one's performance, which are particularly prevalent among medical students due to the demanding nature of their studies and the high stakes associated with their future careers (1). Understanding the factors that contribute to cognitive test anxiety is crucial for developing effective interventions and support systems. Personality traits, such as neuroticism, conscientiousness, extraversion, agreeableness, and openness, are known to influence individual responses to stress and anxiety. Neuroticism, in particular, is strongly linked to heightened anxiety levels, while traits like extraversion and conscientiousness may serve as protective factors (3, 4). Research has demonstrated that personality traits can influence how students appraise and cope with test-related stress, thereby affecting their levels of anxiety and overall performance (5).

In addition to personality traits, external risk factors such as past test experiences and external pressures from parents, teachers, and peers play a significant role in exacerbating cognitive test anxiety. Previous successes or failures in tests heavily influence current anxiety levels;

students with a history of poor test performance are more likely to experience heightened anxiety due to a fear of repeating past mistakes (6). Furthermore, external pressures, including high expectations and the perceived importance of tests, contribute to increased anxiety, particularly when students feel they must meet unrealistic standards set by others (7). The immediate pressure of upcoming tests and the anticipation of potential negative outcomes can exacerbate anxiety, impacting students' ability to perform effectively under pressure (8).

The interplay between personality traits and these external risk factors creates a complex landscape of cognitive anxiety, influencing how medical students cope with stress and perform under pressure. Studies have shown that the demands of medical education often result in high levels of cognitive anxiety, with female students, in particular, being more vulnerable to its negative impacts (9, 10). Despite existing research on anxiety and personality, there is a lack of focus on the interactions between these factors within the unique and intense pressures faced by medical students. Understanding these interactions is essential for developing targeted interventions that address the specific needs of students in this challenging educational environment.

This study aims to enhance our understanding of the factors contributing to cognitive anxiety among medical students by examining the roles of personality traits and external risk factors. By identifying the combinations of traits and pressures most strongly associated with elevated anxiety, this research can provide insights into the underlying mechanisms of anxiety, leading to better support systems and improved mental health outcomes for students. This research also contributes to the broader field of educational psychology by addressing a critical aspect of student well-being and performance. Ultimately, this study seeks to inform the development of interventions that help students manage anxiety more effectively, thereby improving their academic performance and mental health (11, 12).

## 2 Material and Methods

The study employed a cross-sectional quantitative design to investigate the relationships between personality traits, past test experiences, external pressures, and cognitive test anxiety among medical students. A total of 352 medical students, aged 22 to 26 years, participated in the study. Participants were selected through stratified random sampling to ensure representation across academic years and genders. This approach was crucial to obtaining a sample that accurately reflected the diverse demographic and academic characteristics of the medical student population.

Cognitive anxiety was assessed using the Trait subscale of the State-Trait Anxiety Inventory (STAI), a well-validated instrument that measures anxiety levels based on consistent patterns of thought and behavior. Personality traits were evaluated using the Big Five Personality Inventory (BFI), which assesses the five major dimensions of personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness. To evaluate past test experiences and external pressures, a custom-designed questionnaire was administered, focusing on test performance history, test frequency, perceived test difficulty, and the perceived pressure from parents and teachers.

Data collection was conducted both online and in-person, providing flexibility to accommodate participants' preferences and ensuring comprehensive data capture. Participants completed the assessments in approximately 30-45 minutes, following a structured procedure to maintain consistency across all data collection methods. Ethical considerations were adhered to throughout the study, in line with the Declaration of Helsinki. Informed consent was obtained from all participants, confidentiality was assured, and data were securely stored to protect participants' privacy and integrity.

Statistical analyses were conducted using IBM SPSS Statistics, version 25. Descriptive statistics were calculated to summarize the demographic and psychological characteristics of the sample. Pearson correlation coefficients were used to examine the relationships between cognitive test anxiety, personality traits, and external risk factors. Multiple regression analyses were performed to identify significant predictors of cognitive test anxiety, considering the combined effects of personality traits and external pressures. Additionally, moderation analysis was employed to explore the potential interactions between these variables. To examine gender differences, independent t-tests were conducted, comparing cognitive test anxiety scores and personality traits between male and female students. The significance level was set at  $p < 0.05$  for all statistical tests, ensuring robust and reliable interpretations of the data (13, 14).

The study's rigorous methodology allowed for a comprehensive analysis of the complex interactions between personality traits, past experiences, and external pressures in predicting cognitive test anxiety among medical students. This methodological approach provided valuable insights into the factors contributing to anxiety in this population, highlighting potential avenues for targeted interventions and support strategies.

## 3 Results

The results of the study provide insights into the relationships between personality traits, past test experiences, external pressures, and cognitive test anxiety among medical students. The demographic characteristics of the sample, as well as the associations between the variables studied, are summarized in the tables below. The sample comprised 352 medical students with a balanced gender distribution

of 51.1% male and 48.9% female participants. The age distribution was 56.8% in the 22-23 age group and 43.2% in the 24-26 age group, typical of medical students. Representation across academic years was fairly even, allowing for the analysis of anxiety across different stages of medical education.

**Table 1: Demographic Characteristics of Participants (n = 352)**

Variable	Category	Number of Students	Percentage
<b>Gender</b>	Male	180	51.1%
	Female	172	48.9%
<b>Age Group</b>	22-23	200	56.8%
	24-26	152	43.2%
<b>Year of Study</b>	First Year	90	25.6%
	Second Year	80	22.7%
	Third Year	100	28.4%
	Fourth Year	82	23.3%
<b>Residential Status</b>	On-Campus	180	51.1%
	Off-Campus	172	48.9%
<b>Previous Academic Performance</b>	90% and Above	317	90.1%
	Below 90%	35	9.9%
<b>Parental Education Level</b>	No Formal Education	20	5.7%
	Primary School	50	14.2%
	High School	100	28.4%
	Bachelor's Degree	120	34.1%
	Graduate Degree	62	17.6%

Most students lived on-campus (51.1%), and a significant majority (90.1%) had academic performance of 90% and above. Parental education levels varied, providing insights into the potential influence of family background on student anxiety.

**Table 2: Relationships Between Personality Traits, Past Experiences, External Pressures, and Cognitive Test Anxiety (n = 352)**

Variable	$\beta$	SE	t-Value	p-Value
<b>Personality Traits</b>				
<b>Neuroticism</b>	0.45	0.05	9.00	<0.001
<b>Extraversion</b>	-0.20	0.06	-3.33	0.001
<b>Openness</b>	-0.10	0.07	-1.43	0.15
<b>Agreeableness</b>	-0.05	0.06	-0.83	0.41
<b>Conscientiousness</b>	-0.15	0.05	-3.00	0.003
<b>Past Experiences with Tests</b>				
<b>Test Performance History</b>	0.30	0.07	4.29	<0.001

Variable	$\beta$	SE	t-Value	p-Value
<b>Test Frequency</b>	0.25	0.08	3.13	0.002
<b>Perceived Test Difficulty</b>	0.40	0.06	6.67	<0.001
<b>External Pressures</b>				
<b>Parental Pressure</b>	0.35	0.07	5.00	<0.001
<b>Teacher Pressure</b>	0.28	0.08	3.50	<0.001

The analysis revealed that neuroticism was the strongest predictor of cognitive test anxiety, with a significant positive association ( $\beta = 0.45$ ,  $p < 0.001$ ), indicating that higher levels of neuroticism correlate with increased anxiety. Extraversion ( $\beta = -0.20$ ,  $p = 0.001$ ) and conscientiousness ( $\beta = -0.15$ ,  $p = 0.003$ ) were negatively associated with anxiety, suggesting that individuals with these traits experienced lower anxiety levels. Openness ( $\beta = -0.10$ ,  $p = 0.15$ ) and agreeableness ( $\beta = -0.05$ ,  $p = 0.41$ ) did not significantly impact anxiety levels.

Past test experiences, such as test performance history ( $\beta = 0.30$ ,  $p < 0.001$ ), test frequency ( $\beta = 0.25$ ,  $p = 0.002$ ), and perceived test difficulty ( $\beta = 0.40$ ,  $p < 0.001$ ), were positively associated with increased cognitive anxiety. Similarly, external pressures from parents ( $\beta = 0.35$ ,  $p < 0.001$ ) and teachers ( $\beta = 0.28$ ,  $p < 0.001$ ) significantly contributed to higher anxiety levels, highlighting the influence of these external factors on students' psychological states.

**Table 3: Comparison of Cognitive Test Anxiety, Personality Traits, and External Pressures Between Male and Female Medical Students (n = 352)**

Variable	Male (n = 180)	Female (n = 172)	p-value
<b>Mean Age (years)</b>	23.5 (1.2)	23.3 (1.1)	0.10
<b>Cognitive Test Anxiety Score</b>	65.2 (12.4)	70.1 (11.8)	0.02*
<b>Neuroticism</b>	28.3 (5.4)	31.7 (5.9)	0.01*
<b>Extraversion</b>	25.6 (4.7)	23.9 (5.0)	0.03*
<b>Conscientiousness</b>	27.8 (4.9)	28.2 (5.2)	0.45
<b>Agreeableness</b>	30.1 (6.3)	32.4 (6.1)	0.04*
<b>Openness</b>	29.4 (5.8)	28.9 (5.6)	0.50
<b>Test Performance History</b>	85.4 (8.2)	84.9 (8.0)	0.60
<b>Parental Pressure</b>	20.5 (6.3)	22.1 (6.8)	0.05
<b>Teacher Pressure</b>	21.8 (5.9)	23.3 (6.2)	0.04*

Gender differences were evident in the study, with female students reporting higher cognitive test anxiety scores (70.1 vs. 65.2,  $p = 0.02$ ) and higher neuroticism levels (31.7 vs. 28.3,  $p = 0.01$ ) than their male counterparts. Females also scored higher in agreeableness (32.4 vs. 30.1,  $p = 0.04$ ) and perceived higher levels of parental (22.1 vs. 20.5,  $p = 0.05$ ) and teacher pressure (23.3 vs. 21.8,  $p = 0.04$ ). Males scored higher in extraversion (25.6 vs. 23.9,  $p = 0.03$ ). There were no significant differences in conscientiousness, openness, or test performance history between genders, indicating that while personality traits and external pressures differ by gender, some aspects of academic performance and personality are consistent across genders. These findings underscore the need for gender-sensitive approaches in managing test anxiety among medical students.

#### 4 Discussion

The findings of this study on cognitive test anxiety among medical students highlighted the significant role of personality traits, past test experiences, and external pressures in shaping anxiety levels. The results confirmed that neuroticism was a major predictor of cognitive test anxiety, with higher levels of neuroticism being strongly associated with increased anxiety during tests. This aligns with prior research indicating that individuals with high neuroticism are more prone to experience anxiety due to their tendency toward negative emotional states and vulnerability to stress (10). Conversely, extraversion and conscientiousness were negatively associated with cognitive anxiety,

suggesting that these traits may act as protective factors against anxiety, consistent with existing literature that identified extraversion and conscientiousness as buffers against stress (11, 12). However, openness and agreeableness did not significantly impact cognitive anxiety, which may indicate that these traits are less influential in test-related anxiety contexts compared to neuroticism and conscientiousness.

The study also found that past test experiences, including test performance history, test frequency, and perceived test difficulty, were positively associated with increased cognitive anxiety. This finding supports earlier research highlighting the role of test-related factors in exacerbating anxiety, where previous poor performance and frequent testing can heighten anxiety due to fear of negative outcomes and repeated exposure to stressful situations (13, 14). External pressures, particularly from parents and teachers, significantly contributed to higher anxiety levels. These pressures may reflect the high expectations and performance demands placed on students, which align with previous studies that emphasized the role of parental and teacher expectations in increasing test anxiety (15, 16).

Gender differences in cognitive test anxiety were evident, with female students reporting higher anxiety levels and higher neuroticism scores compared to males. These findings echo previous research that documented gender differences in anxiety, with females often exhibiting higher levels of anxiety and emotional instability (17, 18). The study also revealed that females perceived higher levels of parental and teacher pressure, which might contribute to their increased anxiety levels. These results underscore the importance of considering gender-specific factors in the development of interventions aimed at reducing test anxiety among medical students.

One of the strengths of this study was its use of a large, stratified random sample of medical students, ensuring a representative distribution across academic years and genders. This allowed for a comprehensive analysis of anxiety across different student demographics and academic contexts. However, the study also had several limitations. The sample predominantly comprised high-achieving students, which may not represent the broader student population, potentially limiting the generalizability of the findings. Additionally, the reliance on self-reported data introduces the possibility of response bias, as participants may not accurately report their anxiety levels or personality traits. The cross-sectional design of the study also limits the ability to draw causal inferences between the variables studied.

Future research should include a more diverse range of students, incorporating those with varying levels of academic performance to better capture the full spectrum of cognitive test anxiety among medical students. Longitudinal studies would be beneficial to explore changes in anxiety levels over time and to identify potential causal relationships. Furthermore, the inclusion of additional external pressures, such as peer influence and socio-economic factors, would provide a more comprehensive understanding of the factors contributing to cognitive anxiety. Interventions aimed at reducing test anxiety should consider individual personality traits and external stressors, with particular attention to high-risk groups like female medical students. Developing gender-specific interventions that address the unique challenges faced by female students could help mitigate anxiety and improve academic and mental health outcomes. Overall, the study contributes to the understanding of cognitive test anxiety in medical education and highlights the need for targeted strategies to support student well-being.

## 5 Conclusion

The study concluded that neuroticism is a major predictor of cognitive test anxiety among medical students, with higher neuroticism correlating with increased anxiety. Extraversion and conscientiousness were found to reduce anxiety levels, while openness and agreeableness showed no significant effect. Past test experiences and external pressures from parents and teachers also significantly impacted anxiety levels, with gender differences indicating higher anxiety and neuroticism in female students. These findings underscore the importance of addressing personality traits and external stressors to manage test anxiety in medical students effectively. The implications for human healthcare include the potential for improved academic performance and mental health outcomes through targeted interventions that consider individual differences and gender-specific needs. By reducing anxiety levels in medical students, healthcare systems may benefit from producing more competent and resilient future healthcare professionals, ultimately enhancing the quality of patient care and healthcare delivery.

## 6 References

- 1 Mercader-Rubio IM, Ángel NG, Esteban MDP, Ruiz NFO. Emotional Intelligence As A Predictor Of Motivation, Anxiety And Leadership In Athletes. *Int J Environ Res Public Health*. 2022;19:7521. doi:10.3390/ijerph19127521.
- 2 Rajapuram N, Langness S, Marshall MR, Sammann A. Medical Students In Distress: The Impact Of Gender, Race, Debt, And Disability. *PLoS One*. 2020;15(12). doi:10.1371/journal.pone.0243250.
- 3 Thomas CL, Cassady JC. The Influence Of Personality Factors, Value Appraisals, And Control Appraisals On Cognitive Test Anxiety. *Psychol Schs*. 2019;56(10):1568-82. doi:10.1002/pits.22303.

- 4 Parrish AR. The Impact Of A Cognitive Behavioral Intervention On Test Anxiety In A BSN Program. *Nurs Educ Perspect.* 2022;43(6).
- 5 Xu X, Xia M, Pang W. Family Socioeconomic Status And Chinese High School Students' Test Anxiety: Serial Mediating Role Of Parental Psychological Control, Learning Resources, And Student Academic Self-Efficacy. *Scand J Psychol.* 2021;62(5):689-98. doi:10.1111/sjop.12750.
- 6 Trigueros R, Padilla AM, Aguilar-Parra JM, Rocamora P, Morales-Gázquez MJ, López-Liria R. The Influence Of Emotional Intelligence On Resilience, Test Anxiety, Academic Stress And The Mediterranean Diet: A Study With University Students. *Int J Environ Res Public Health.* 2020;17(6):2071. doi:10.3390/ijerph17062071.
- 7 Assor A, Kaplan H, Kanat-Maymon Y, Roth G. Directly Controlling Teacher Behaviors As Predictors Of Poor Motivation And Engagement In Girls And Boys: The Role Of Anger And Anxiety. *Learn Instr.* 2005;15(5):397-413. doi:10.1016/j.learninstruc.2005.07.008.
- 8 Latas M, Pantić M, Obradović D. Analysis Of Test Anxiety In Medical Students. *Med Pregl.* 2010;63(11-12):863-6. doi:10.2298/MPNS1012863L.
- 9 Wu J, Zhang R, Qiu W, Shen J, Ma J, Chai Y, Wu H, Hu L, Zhou W. Impact Of Online Closed-Book Examinations On Medical Students' Pediatric Exam Performance And Test Anxiety During The Coronavirus Disease 2019 Pandemic. *Pediatr Med.* 2021;4. doi:10.21037/pm-20-80.
- 10 Zufferey V, Donati A, Popp J, Meuli R, Rossier J, Frackowiak R, Draganski B, von Gunten A, Kherif F. Neuroticism, Depression, And Anxiety Traits Exacerbate The State Of Cognitive Impairment And Hippocampal Vulnerability To Alzheimer's Disease. *Alzheimers Dement (Amst).* 2017;7:107-14. doi:10.1016/j.dadm.2017.05.002.
- 11 Uliaszek AA, Zinbarg RE, Mineka S, Craske MG, Sutton JM, Griffith JW, Rose R, Waters A, Hammen C. The Role Of Neuroticism And Extraversion In The Stress-Anxiety And Stress-Depression Relationships. *Anxiety Stress Coping.* 2010;23(4):363-81.
- 12 Prince EJ, Siegel DJ, Carroll CP, Sher KJ, Bienvenu OJ. A Longitudinal Study Of Personality Traits, Anxiety, And Depressive Disorders In Young Adults. *Anxiety Stress Coping.* 2021;34(3):299-307. doi:10.1080/10615806.2020.1845431.
- 13 Talić I, Sparfeldt JR, Möller J, Renner KH, Greiff S, Niepel C. Social And Dimensional Comparison Effects In General And Domain-Specific Test Anxiety: A Nested Factor Modeling Approach. *Curr Psychol.* 2024;43(11):10058-74. doi:10.1007/s12144-023-04964-9.
- 14 Saravanan C, Kingston R, Gin M. Is Test Anxiety A Problem Among Medical Students: A Cross Sectional Study On Outcome Of Test Anxiety Among Medical Students. *Int J Psychol Stud.* 2014;6(3):24. doi:10.5539/ijps.v6n3p24.
- 15 Ocheni CA. Test Anxiety And Academic Stress As Predictors Of Secondary School Students' Academic Achievement In Waves And Projectile Motions In Physics. Master's thesis, University of Nigeria, Nsukka. 2021. doi:10.1016/j.procs.2020.05.154.
- 16 Almutairi AG, Baabbad NM, Alhumaidan AA, Alshahrani AM, Alabdulkarim AI, Alsughier N. Prevalence And Factors Causing Test Anxiety Among Medical Students. *Middle East Curr Psychiatry.* 2024;31(1):48. doi:10.1186/s43045-024-00437-2.
- 17 Blanco V, Salmerón M, Otero P, Vázquez FL. Symptoms Of Depression, Anxiety, And Stress And Prevalence Of Major Depression And Its Predictors In Female University Students. *Int J Environ Res Public Health.* 2021;18(11):5845. doi:10.3390/ijerph18115845.
- 18 Razaq N, Ijaz MT, Rehman A, Ullah Awan MA, Chaudhry MA, Mukhtar H. Relationship Between Personality Traits And Anxiety In Medical Students Of CMH Lahore Medical College. *Rawal Med J.* 2020;45(4):963.

---

**Disclaimers**

---

<b>Author Contributions</b>	Noshaba Razaq conceptualized the study and led the research design and methodology. Rashid Qayyum and Muhammad Faheem Anwer contributed to data collection and statistical analysis. All authors contributed to drafting the manuscript and approved the final version. Co-authors played supporting roles in various stages of the research process.
<b>Conflict of Interest</b>	The authors declare that there are no conflicts of interest.
<b>Data Availability</b>	Data and supplements available on request to the corresponding author.
<b>Funding</b>	NA
<b>Ethical Approval</b>	Institutional Review Board (IRB) of University of Haripur.
<b>Trial Registration</b>	NA
<b>Acknowledgments</b>	NA

2024 © Open Access. This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution, and reproduction in any medium or format, with appropriate credit to the original author(s) and source, a link to the license, and an indication of any changes made. If the material is not covered by the license, permission from the copyright holder is required. More details are available at "Creative Commons License".



~ JHRR, ISSN: 2791-156X ~