



## Original Article

## Exploring the Connection Between Myopia and Personality Traits

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## ARTICLE INFO

**Keywords:**

Myopia, Personality Traits, Intelligence, Extroversion, Neuroticism

**How to Cite:**

Jabbar, M., Siddiq, S., Rashid, F., Akhtar, H. M. U., Ali, S., Iqbal, R. N., & Jabbar, K. (2024). Exploring the Connection Between Myopia and Personality Traits. *Pakistan BioMedical Journal*, 7(05). <https://doi.org/10.54393/pbmj.v7i05.1090>

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Received Date: 5<sup>th</sup> April, 2024

Acceptance Date: 23<sup>rd</sup> May, 2024

Published Date: 31<sup>st</sup> May, 2024

## ABSTRACT

Traditionally recognized as the direct result of a distinct physical difference between people, myopia is related to human psychology. **Objectives:** To investigate the relationship between myopia and specific personality features and to ascertain whether the degree of myopia is associated with a higher incidence of personality disorders. **Methods:** A multicenter, cross sectional research was conducted. Non-probability purposive sampling technique used to include 60 participants of aged 15-30 years. All study participants had a thorough evaluation that included obtaining data on each participant's age, gender, academic standing, NEO Personality Inventory-Revised (PI-R) personality test findings, autorefractometry measurements, subjective refraction. A thorough slit-lamp examination was performed to assess the anterior and posterior segments. Data were analyzed by using SPSS software. **Results:** Out of 60 myopes, 38 (63.3%) were female and 22 (36.6%) were male. 18 (30%) had mild myopia, 25 (41.6%) had moderate myopia, and 17 (28.33%) had high myopia. 10 (16.66%) of the mild myopia group displayed affability qualities and 8 (13.33%) had extroverted personalities. Subjects with moderate myopia, 8 (13.33%) showed affability, 16 (26.66%) showed extroversion, and 1 (1.66%) showed neuroticism. 8 (13.33%) of the high myopia group revealed neuroticism, 5 (8.33%) showed an openness to new experiences, and 4 (6.66%) had extroverted dispositions. In contrast to cases with mild and moderate myopia, a substantial connection between high myopia and neuroticism was found. **Conclusions:** A relationship between personality traits and myopia has been identified. Higher neuroticism scores were typically found in those with more severe visual impairment and high myopia.

## INTRODUCTION

About 20-25% of people in the West are affected by myopia; in certain regions of Southeast Asia, this condition is more prevalent [1]. High myopia is defined as axial globe length larger than 26 mm or a spherical refractive error greater than 6 diopters (D) [2]. High myopia is a disease known as multifactorial inheritance, which can be caused by a combination of hereditary and environmental factors [3]. Analyses reveal connections between environmental factors, like exposure to the outdoors, educational attainment and genetic risk variants [4, 5]. Furthermore, it seems that iris color is related to the onset of myopia [6]. Myopia is often associated with other eye disorders such as glaucoma, retinal detachment, and cataracts [7, 8]. Research indicates that people who spend more time

outside are less likely to develop myopia than people who spend more time indoors which has led to debate about the possible influence of vitamin D [9, 10]. According to contemporary psychology, personality is a complex system of fundamental psychological characteristics that are mainly preserved in the subconscious. These characteristics often exhibit resistance to alteration and emerge naturally in a variety of aspects of people's lives [11]. Many academics have claimed throughout the years that people who are myopic often exhibit particular personality qualities like dissatisfaction and introversion [12, 13]. Nonetheless, the psychological consequences in myopic subjects are still up for controversy and lack strong evidence [14]. Certain psychological characteristics have

been linked to myopic individuals, indicating that they are more likely to be reserved, suspicious, too preoccupied on their subject matter, and apprehensive of transition [15, 16]. Others have even gone so far as to suggest that myopic people might be brighter than people with normal vision or farsightedness, claiming that their years of education and intellectual ability are equally important in relation to myopia [17, 18]. Other research papers, in contrast to the aforementioned studies, have indicated that there are no appreciable differences in personality traits between people who have myopia and people who do not [19]. Some of these studies even went so far as to suggest that the idea of a "myopic personality" might not be valid. However, it is still possible that personality has a role in the development of myopia. On the other hand, myopia might have an effect on a person's conduct and personality [20].

The aims of this study was to assess the correlation between certain personality traits or aspects and myopic refractive errors in myopic participants. And to determine whether a correlation exists between the degree of myopia or increasing refractive error and the frequency or severity of personality disorders.

## METHODS

A multicenter, cross sectional study was conducted from August 2023 to January 2024. The University of Faisalabad ethical institutional review board (IRB) granted approval (Reference No # TUF/IRB/249; Dated 11th Aug, 2023) for performing out the study. Non-probability purposive sampling was used in the recruitment procedure. Using Raosoft, the sample size was calculated to be 60. Participants in this study, who were diagnosed with myopia (mild, moderate and high degree), ranged in age from 15 to 30 years. Every recruited subject gave their informed consent voluntarily, indicating that they were willing to take part in the research. The exclusion criteria included those having a history of recognized psychiatric illnesses, significant anisometropia, high cylinder defect, systemic association like (diabetes and hypertension), syndrome subjects like (down syndrome, marfan syndrome) and documented ophthalmological diseases, particularly those pertaining to the retina. All assessments were completed in a single visit. The examination involved auto-refractometry, which evaluated the spherical refractive error (in diopters), power (in diopters), and axis (in degrees) of the cylinder refractive error in both eyes. Intellectual characteristics like education level were obtained, along with personal and familial information like age and gender. Additionally, clinical information about ophthalmological disorders connected to myopia were gathered. A personality test was also used to evaluate each person's unique behaviors, emotions in particular circumstances, basic values, and interests. For this, the Neo PI-R

personality inventory was utilized. This is a widely recognized standardized questionnaire for assessing personality in everyday circumstances. The Neo PI-R is a widely accepted and used framework that includes five main personality qualities. Five essential factors can be assessed using its 240 items, each of which can be responded on a 5-option Likert scale: neuroticism, extroversion, openness, kindness, and responsibility. Statistical analysis was performed on the data using SPSS (version 19.0). Descriptive statistics were performed.

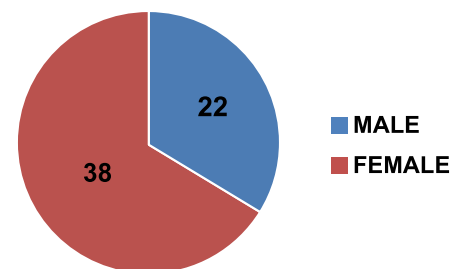
## RESULTS

The mean age of 60 myopic participants were determined to be 22.57 years, with a standard deviation of 2.98 years. The age distribution of the myopic participants varied according to the range of ages; the youngest age was 17 and the maximum age was 27 (Table 1).

**Table 1:** Age Distribution

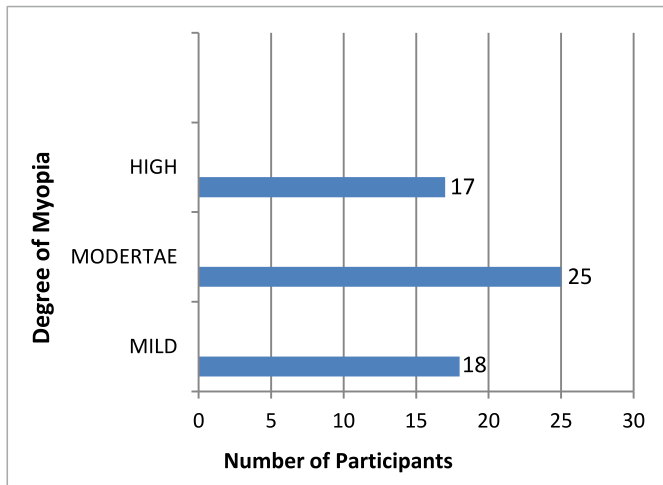
Age of Participants	Mean $\pm$ SD	Maximum	Minimum
	22.57 $\pm$ 2.98	27	18

Demographic data showed that 22 participants (36.6%) were categorized as male and the majority 38 participants (63.3%), were classified as female. The demographics of the myopic sample were revealed by this gender distribution (Figure 1).



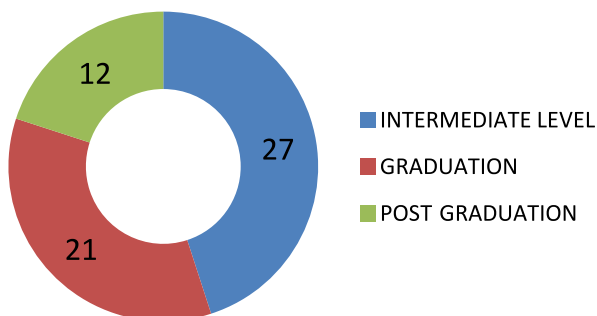
**Figure 1:** Frequency Distribution of Gender in the Participants (n=60)

18 participants (30%) had mild myopia with refractive errors up to three diopters and 25 participants (41.6%) had moderate myopia, defined as 3 to 6 diopters. This is a slightly higher proportion. In addition, 17 participants (28.33%) of the sample, had high myopia, which is defined as refractive errors more than 6 diopters. This classification offers a thorough analysis of the distribution and prevalence of myopia severity across the study participants (Figure 2).



**Figure 2:** Degree of Myopia in Participants (n=60)

Descriptive statistics were used in a comprehensive study including 60 respondents to evaluate the level of education attained by myopic. The results showed a varied distribution among various educational levels. 27 participants (45%) had intermediate qualifications. This intermediate level of education indicates that the myopic population has a diverse range of academic backgrounds. Moreover, 21 participants (35%), had completed a degree, suggesting a sizeable percentage of people with a higher level of education. On the other hand, 12 participants (20%) of the sample, had postgraduate degrees, indicating a portion of the myopic group with greater educational attainment (Figure 3).



**Figure 3:** Frequency Distribution of Education Level in the Participants (n=60)

Personality traits within the cohort of participants with mild myopia showed a pattern. Of the 10 participants, or 16.66% of this subgroup, an impressive 13.33% had affability traits, indicating a tendency toward agreeableness and friendliness. In addition, 8 participants, or 13.33% of the group with mild myopia, had extroverted traits, which are suggestive of an outgoing and social nature. Focusing on the group with moderate myopia, a complex range of personality characteristics emerged. 8 participants, or 13% exhibited affability, indicating a tendency toward friendliness comparable to those in the mild myopia group. Nonetheless, a higher percentage,

26.66%, demonstrated extroverted traits, indicating a higher degree of sociability among those with moderate myopia. Interestingly, 1 participant or (1.66%) in this group showed signs of neuroticism, indicating a higher susceptibility to emotional distress. The group with high myopia displayed a unique set of personality features. Of the 8 participants, or 13.33% of this subgroup, a notable 8.33% showed signs of curiosity and receptivity to new ideas, suggesting an openness to new experiences. In addition, 4 participants or (6.66%) demonstrated outgoing extroverted personalities characteristics. A more noteworthy discovery, was that 8 or (13.33%) of the participants had neuroticism, indicating a strong correlation between high myopia and this specific personality characteristic. The association between the several scales and the degree of myopia was investigated using chi-square analysis. A statistically significant p-value of 0.03 indicated a higher correlation between psychological traits and the degree of myopia (Table 2).

**Table 2:** Myopia and Personality Traits

Level	Affability	Extroverted Personalities	Neuroticism	Openness	p-value
Mild	10	8	-	-	0.03
Moderate	8	16	1	-	
High	-	4	8	5	

## DISCUSSION

Myopia, influenced by genetic and environmental factors, is characterized by an axial length over 26 mm or a refractive error greater than 6 diopters. It's linked to eye disorders like glaucoma and cataracts. Outdoor exposure may reduce myopia risk, potentially due to vitamin D. Psychological studies suggest that myopic individuals might exhibit traits like introversion and intellectual focus, but evidence is mixed, with some research finding no significant personality differences. Our study examined the correlation between personality traits and myopic refractive errors, and the relationship between myopia severity and personality disorders. In our study, the Neo PI-R personality inventory was utilized. This questionnaire used framework that included five main personality qualities. Berg *et al.*, included Australian twins answering an international personality item pool (IPIP) questionnaire, also looked at the same five core personality traits [21]. In our study, there was a significant correlation found between friendliness and myopia ( $r = 0.08$ ;  $p < 0.05$ ). Among the five personality qualities previously mentioned, as well as age, sex, and educational attainment. The comprehensive analysis revealed that openness was the only feature that substantially linked to myopia in the groups of study. This is consistent with other research findings, which suggests that the commonly held belief that myopic people are introverted and stereotyped as being more like associations between intellect and myopia

than reality. These observations highlight the significance of rigorously reassessing assumptions regarding the personality traits of myopic people. In contrast to the reviews and studies mentioned above, additional articles have shown that there are no personality attribute variations between people who are myopic and those who are not [20]. There were no statistically significant differences found between the groups when the scores for different personality traits were examined separately. When patients were divided into subgroups of high and low value, extroversion became apparent as a major factor. Upon doing a thorough individual investigation to identify certain scenarios, the only psychological characteristic that demonstrated statistically significant values was neuroticism. Bullimore et al., identified no appreciable personality differences across groups with different refractive problems [22]. Even in research using greater effectiveness methods, such as a prospective research of 57 university students in Italy (of which 39 were myopic and the remaining 18 ametropic/farsighted). It was discovered that psychophysical stress and personality traits were not the main pathogenic factors for myopia [23]. Nevertheless, it's crucial that you keep in mind that misunderstanding may be influenced by intelligence quotient (IQ) level. It is a common misconception that people who are intelligent are more reserved, introverted, and disciplined. However, myopic subjects scored fairly highly on both the intellectual quotient and educational development scales. These characteristics may be present in myopic people because they are typically thought of being intellectual. One of the future study's research might be conducted to improve the knowledge we have even more. Using this method, patients are chosen from a group of individuals who have been diagnosed with personality disorders or known psychological problems, and they are then examined by an eye care practitioner to determine whether they have myopia. Increasing the sample size or applying multivariate analysis could help to improve the study's statistical power and provide a more thorough and reliable examination of the links being studied.

## CONCLUSIONS

When the results are compared over the range of myopia severity, it is clear that although extroversion and affability are linked to mild and moderate myopia, neuroticism is the only association that stands out with high myopia. This new information on the relationship between different personality factors and the severity of myopia adds a layer of complexity to our knowledge of the interaction between psychological traits and vision impairment in the group under study.

## Authors Contribution

Conceptualization: FR

Methodology: MJ, SA, RNI, KJ

Formal analysis: FR

Writing-review and editing: SS, FR, HMUA

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

## Conflicts of Interest

The authors declare no conflict of interest.

## Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

## REFERENCES

- [1] Spillmann L. Stopping the rise of myopia in Asia. *Graefes Archive for Clinical and Experimental Ophthalmology*. 2020 May; 258(5): 943-59. doi: 10.1007/s00417-019-04555-0.
- [2] Jonas JB, Jonas RA, Bikbov MM, Wang YX, Panda-Jonas S. Myopia: Histology, clinical features, and potential implications for the etiology of axial elongation. *Progress in Retinal and Eye Research*. 2023 Sep; 96: 10156. doi: 10.1016/j.preteyeres.2022.101156.
- [3] Baird PN, Saw SM, Lanca C, Guggenheim JA, Smith III EL, Zhou X et al. Myopia. *Nature Reviews Disease Primers*. 2020 Dec; 6(1): 99. doi: 10.1038/s41572-020-00231-4.
- [4] Plotnikov D, Williams C, Atan D, Davies NM, Mojarrad NG, Guggenheim JA. Effect of education on myopia: evidence from the United Kingdom ROSLA 1972 reform. *Investigative Ophthalmology and Visual Science*. 2020 Sep; 61(11): 7. doi: 10.1167/iovs.61.11.7.
- [5] DeVille NV, Tomasso LP, Stoddard OP, Wilt GE, Horton TH, Wolf KL et al. Time spent in nature is associated with increased pro-environmental attitudes and behaviors. *International Journal of Environmental Research and Public Health*. 2021 Jul; 18(14): 7498. doi: 10.3390/ijerph18147498.
- [6] Rashid F, Jabbar M, Fatima N, Siddique M, Hussain A, Waheed K. Effect of change in iris color on myopia. *Pakistan Journal of Medical and Health Sciences*. 2022 May; 16(04): 289. doi: 10.53350/pjmhs22164289.
- [7] Jabbar M, Fatima N, Siddique M, Rashid F, Qureshi F, Bodla AM. Association between Myopia and Glaucoma; A Cross-sectional Study: Association between Myopia and Glaucoma. *Pakistan Journal of Health Sciences*. 2023 Apr; 133-7. doi: 10.54393/pjhs.v4i04.667.
- [8] Haarman AE, Enthoven CA, Tideman JW, Tedja MS, Verhoeven VJ, Klaver CC. The complications of



- myopia: a review and meta-analysis. *Investigative Ophthalmology and Visual Science*. 2020 Apr; 61(4): 49. doi: 10.1167/iovs.61.4.49.
- [9] Pärssinen O, Lassila E, Kauppinen M. Associations of children's close reading distance and time spent indoors with myopia, based on parental questionnaire. *Children*. 2022 Apr; 9(5): 632. doi: 10.3390/children9050632.
- [10] Jabbar M, Kiran A, Fatima N, Bodla AM, Qureshi F, Perveen S. Effect of Vitamin D Supplement on Axial Length of Myopes: Effect of Vitamin D Supplement. *Pakistan Journal of Health Sciences*. 2023 May: 171-6. doi: 10.54393/pjhs.v4i05.778.
- [11] DeRobertis EM. Profiles of personality: Integration, paradox, and the process of becoming. 2<sup>nd</sup> ed. Colorado Spring: University Professors Press; 2021.
- [12] Wang YY. Research status of personality factors in myopia. *International Eye Science*. 2019: 1150-3.
- [13] Fiedler K, Ermark F, Salmen K. Metacognitive Myopia: An Obstacle to Intelligent Behavior and Lapse of the Evolution. 1<sup>st</sup> edition. Germany: Springer Cham; 2022. doi: 10.1007/978-3-031-04198-3\_10.
- [14] Landy JF and Royzman EB. The moral myopia model: Why and how reasoning matters in moral judgment. 1st edition. Routledge; 2018.
- [15] Ravetz JR. Scientific knowledge and its social problems. 2<sup>nd</sup> ed. Routledge; 2020. doi: 10.4324/9781003075158.
- [16] Belkin M and White C. Intersectionality and Relational Psychoanalysis. 1st edition. London: Routledge; 2020. doi: 10.4324/9780429344312-1.
- [17] Durand RB, Fung L, Limkriangkrai M. Myopic loss aversion, personality, and gender. *Journal of Behavioral Finance*. 2019 Jul; 20(3): 339-53. doi: 10.1080/15427560.2018.1511562.
- [18] Megreli J, Barak A, Bez M, Bez D, Levine H. Association of Myopia with cognitive function among one million adolescents. *BMC Public Health*. 2020 Dec; 20: 1-9. doi: 10.1186/s12889-020-08765-8.
- [19] DEMİR N, OĞUZTÜRK Ö, OĞUREL T, OĞUREL R. A study comparing intelligence scores of patients of hypermetropia and myopia in children. *Journal of Experimental and Clinical Medicine*. 2022 Aug; 39(3): 633-6. doi: 10.52142/omujecm.39.3.7.
- [20] Ali I, Anwar S, Zuliqar B. Behavioral differences between myopes and emmetropes. *Ophthalmology Pakistan*. 2022; 12(1): 12-5.
- [21] Van De Berg R, Dirani M, Chen CY, Haslam N, Baird PN. Myopia and personality: the genes in myopia (GEM) personality study. *Investigative Ophthalmology and Visual Science*. 2008 Mar 1; 49(3): 882-6. doi: 10.1167/iov.07-0930.
- [22] Bullimore MA, Conway R, Nakash A. Myopia in optometry students: family history, age of onset and personality. *Ophthalmic and Physiological Optics*. 1989 Jul; 9(3): 284-8. doi: 10.1111/j.1475-1313.1989.tb00907.x.
- [23] Angi M, Rupolo G, De Bertolini C, Bisantis C. Personality, psychophysical stress and myopia progression: a prospective study on 57 university students. *Graefes' Archive for Clinical and Experimental Ophthalmology*. 1993 Mar; 23: 136-40. doi: 10.1007/BF00920935.