



THE RELATIONSHIP BETWEEN ANXIETY AND PERSONALITY TRAITS IN UNIVERSITY STUDENTS

A relação entre a ansiedade e os traços de personalidade em estudantes universitários

La relación entre ansiedad y rasgos de personalidad en estudiantes universitarios

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Abstract: The objective of this study is to analyze the relationship between the level of anxiety among students at a State Public University and personality traits, measured across five dimensions using the "Big Five Inventory (BFI)". A deeper understanding of the impacts of anxiety, especially in academic contexts, is essential for the development of effective intervention and support strategies aimed at mitigating the negative effects on students' mental health and academic performance. To achieve the proposed objective, primary data were collected from 451 students of the institution. As a methodological procedure, descriptive data analysis and the chi-square test were employed. The results reveal a significant association between personality traits and anxiety. Students with high levels of Neuroticism showed greater susceptibility to anxiety, emphasizing the importance of interventions that enhance emotional resilience. In this sense, the study also reinforces the need for inclusive pedagogical strategies and educational policies that foster both academic and emotional support for students. Moreover, introversion was associated with higher levels of anxiety, suggesting the need for more inclusive social environments. Agreeableness was also impacted by anxiety, indicating that interventions promoting adaptive social behaviors can improve students' emotional well-being.

Keywords: anxiety; personality traits; university students.

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Resumo: O objetivo deste trabalho é analisar a relação entre o grau de ansiedade dos estudantes de uma Universidade Pública Estadual e os fatores de personalidade, mensurados com base em cinco fatores de acordo com o questionário “Big Five Inventory”. Destaca-se que a compreensão aprofundada dos impactos da ansiedade, especialmente em contextos acadêmicos, é fundamental para o desenvolvimento de estratégias eficazes de intervenção e suporte, visando mitigar os efeitos negativos sobre a saúde mental e o desempenho acadêmico dos estudantes. Para atingir o objetivo proposto, foram utilizados dados primários coletados de 451 estudantes da instituição. Como procedimento metodológico, utilizou-se análise descritiva de dados e o teste qui-quadrado. Os resultados revelam uma associação significativa entre traços de personalidade e ansiedade. Estudantes com altos níveis de Neuroticismo mostraram maior propensão à ansiedade, enfatizando a importância de intervenções que aumentem a resiliência emocional. Nesse sentido, o estudo também reforça a necessidade de estratégias pedagógicas e políticas educacionais inclusivas que favoreçam o suporte acadêmico e emocional aos estudantes. Além disso, a introversão foi associada a níveis mais elevados de ansiedade, sugerindo a necessidade de ambientes sociais mais inclusivos. A afabilidade também foi impactada pela ansiedade, indicando que intervenções que promovam comportamentos sociais adaptativos podem melhorar o bem-estar emocional dos estudantes.

Palavras-chave: ansiedade; traços de personalidade; estudantes universitários.

Resumen: El objetivo de este trabajo es analizar la relación entre el grado de ansiedad de los estudiantes de una Universidad Pública Estatal y los rasgos de personalidad, medidos en base a los cinco factores del cuestionario “Big Five Inventory”. Una comprensión profunda de los impactos de la ansiedad, especialmente en contextos académicos, resulta esencial para el desarrollo de estrategias efectivas de intervención y apoyo, con el fin de mitigar los efectos negativos sobre la salud mental y el rendimiento académico de los estudiantes. Para alcanzar el objetivo propuesto se utilizaron datos primarios recolectados de 451 estudiantes de la institución. Como procedimiento metodológico, se empleó el análisis descriptivo de datos y la prueba de chi cuadrado. Los resultados revelan una asociación significativa entre los rasgos de personalidad y la ansiedad. Los estudiantes con altos niveles de Neuroticismo mostraron una mayor propensión a la ansiedad, lo que resalta la importancia de intervenciones que fortalezcan la resiliencia emocional. En este sentido, el estudio también refuerza la necesidad de estrategias pedagógicas y políticas educativas inclusivas que favorezcan el apoyo académico y emocional a los estudiantes. Además, la introversión se asoció con mayores niveles de ansiedad, lo que sugiere la necesidad de entornos sociales más inclusivos. La amabilidad también se vio afectada por la ansiedad, lo que indica que intervenciones que promuevan conductas sociales adaptativas pueden mejorar el bienestar emocional de los estudiantes.

Palabras clave: ansiedad; rasgos de personalidad; estudiantes universitarios.

1 INTRODUCTION

The proportion of people with anxiety disorders has been increasing globally. It is estimated that 4.05% of the global population suffers from an anxiety disorder, which corresponds to approximately 301 million people (Javaid *et al.*, 2023). After Portugal, Brazil ranks as the country with the highest prevalence of anxiety in the world. Furthermore, the COVID-19 pandemic caused a significant increase in the prevalence of anxiety and depression worldwide, with a 25% rise in the first year of the pandemic (WHO, 2022). Anxiety is an emotional state characterized by feelings of tension, worry, and intrusive thoughts related to potential future threats. It is a normal reaction to stressful situations, but it can develop into a disorder when it becomes disproportionate to the situation and interferes with daily life. Anxiety disorders may impair an individual's family, social, academic, or professional life (WHO, 2022). Therefore, it is evident that anxiety disorders have a significant impact on health and may be the second leading cause of disability worldwide.

In this regard, the university environment is particularly prone to uncertainties, exacerbating students' emotional problems, which are often more severe than those observed in the general population (Ibrahim *et al.*, 2013). Many university students display symptoms of anxiety throughout their studies, arising from multiple factors, such as the discrepancy between expectations formed at the beginning of the program and the reality experienced during academic training (Igue; Bariani; Milanesi, 2008). This phenomenon is also observed among senior students, who face the challenging transition from university to the labor market (Del Prette; Del Prette, 2003). The seriousness of this problem is highlighted by studies such as Baldassin *et al.* (2008), who found that 38.2% of medical students exhibited psychological disorders. In the study by Ahmed *et al.* (2023), a systematic review with meta-analysis on the prevalence of anxiety among university students revealed that one-third of undergraduates experience high levels of anxiety.

A deeper understanding of the impacts of anxiety, especially in academic contexts, is crucial for developing effective intervention and support strategies aimed at mitigating its negative effects on students' mental health and academic performance. Thus, understanding the relationship between anxiety and personality traits becomes essential. Accordingly, the objective of this study is to examine the relationship between the level of anxiety among students at a State Public University and personality traits, measured based on the five factors of the "Big Five Inventory" questionnaire.

To achieve the proposed objective, the paper is divided into five sections, beginning with this introduction. The second section presents the theoretical framework, which is grounded in behavioral economics theories. The methodological procedures and the presentation of the object of study (State University of Northern Paraná – UENP) are described in the third section. In the following section, the results are analyzed and discussed in light of the literature. Finally, the last section is devoted to the concluding remarks.

2 THEORETICAL FRAMEWORK

2.1 Choices and Behavioral Economics

University students face a critical phase of transition, in which they are challenged not only academically but also emotionally. Intense emotional problems are frequently observed in this population, requiring a deeper understanding of how psychological factors influence their decisions and economic behaviors both in the present and in the future (Ahmed *et al.*, 2023). Thus, the assessment of personality traits plays a fundamental role in understanding their individual behaviors as well as the economic decisions they make throughout their lives. One of the most widely used instruments for this evaluation is the aforementioned Big Five Inventory (BFI), based on the five dimensions of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience (John; Donahue; Kentle, 1991).

It is worth noting that behavioral economics, an interdisciplinary field that emerged from the contributions of Kahneman and Tversky (1979) and Thaler (1980), offers an innovative perspective by recognizing that emotional and psychological factors play a crucial role in economic decision-making. In the context of university students, personality traits such as low Emotional Stability (high Neuroticism) have been associated with a greater propensity toward emotional problems, such as anxiety and depression (Roberts *et al.*, 2007). However, these traits not only shape students' well-being but also influence their economic choices and future careers. In other words, behavioral economics, by combining insights from psychology with economic theories, recognizes the importance of personality traits in the formation of preferences, decision-making, and economic behaviors, with the BFI standing out for its ability to capture personality nuances that directly influence individuals' economic choices (Thaler; Sunstein, 2008).

According to John and Srivastava (1999, p. 295), "the BFI provides a robust framework for assessing the personality traits that shape individuals' preferences and economic behavior." Traits such as Conscientiousness may influence the propensity for economic planning and prudent resource management, whereas Neuroticism may be associated with greater risk aversion and more cautious consumption behaviors.

Research has shown that the Big Five personality factors can predict important economic behaviors, such as saving, investing, and even career choices (Roberts *et al.*, 2007). These insights are essential not only for academic research but also for public policies aimed at promoting financially healthy decisions and economic well-being, thereby supporting, for instance, the decisions and future perspectives of students.

In this respect, the Big Five Inventory represents a valuable tool for researchers and professionals interested in understanding how personality traits shape individual economic decisions. Integrating behavioral economics with personality assessment provides a holistic approach to comprehending human behavior and enhancing the effectiveness of chosen interventions.

2.2 Anxiety and Personality Traits

Anxiety is a prevalent emotional state that can be influenced by several factors, including personality traits. According to the American Psychiatric Association (2013), anxiety is characterized by feelings of apprehension and intense worry, often accompanied by physical symptoms. Personality traits, on the other hand, refer to enduring and stable characteristics that describe an individual's patterns of thought, emotion, and behavior over time and across different situations.

Personality traits, such as those described in the Big Five Model, have a significant relationship with anxiety. Students with high levels of Neuroticism are more likely to experience anxiety and depression (Costa Jr.; McCrae, 1992; Roberts *et al.*, 2007). The interaction between personality traits and anxiety affects not only students' emotional well-being but also their academic performance and social adaptation (Kotov *et al.*, 2010). The high rate of anxiety disorders among university students can be partly attributed to the high-risk developmental stage of late adolescence and early adulthood, a period during which many young people enter higher education (Arnett, 2000). However, socioeconomic factors also play a crucial role. Students from lower socioeconomic backgrounds, ethnic minorities, and those requiring additional support are particularly vulnerable to mental health problems, which are exacerbated by competitive academic environments and high social expectations (Twenge, 2000).

Studies indicate that students with high levels of perfectionism may be more prone to experiencing anxiety related to academic performance, due to their pursuit of high standards and concerns about making mistakes (Flett; Hewitt, 2002). Similarly, stress sensitivity, which refers to an intense emotional response to stressors, may amplify anxiety levels in demanding academic situations (Kotov *et al.*, 2010).

The interaction between behavioral economics and personality traits provides a useful lens for understanding how these factors influence the economic and academic decisions of university students. Self-efficacy, for example, can serve as a protective resource against anxiety, allowing students with greater confidence in their abilities to face academic challenges with emotional resilience (Bandura, 1997). In this sense, by acknowledging the diversity of personality traits that can influence the experience of anxiety in the university environment, educators and professionals working in higher education can adopt more individualized and effective approaches to foster a positive and inclusive learning environment.

2.3 Personality Traits and Pedagogical Projects

Personality traits, as defined, are stable characteristics that shape patterns of thought, emotion, and behavior over time. In the university context, these traits significantly influence how students face academic challenges, interact with peers, and engage in extracurricular activities.

It is important to note that in Brazil, students who enter university at a very young age may experience additional anxiety due to the abrupt transition from the school environment (with smaller classes, pedagogical guidance, and usually established relationships with peers) to the university setting, which requires rapid adaptation to new academic and social responsibilities. Anxiety may be exacerbated by personality traits that tend to increase sensitivity to stress and concern with performance (Flett; Hewitt, 2002; Kotov *et al.*, 2010).

Integrating students' personality traits and anxiety into university pedagogical projects can be facilitated by the implementation of educational practices that are sensitive to students' emotional development. Academic advising programs and psychological support can help mitigate the negative effects of anxiety, fostering a more welcoming and inclusive environment for young students. Thus, by recognizing and valuing individual personality traits and the specific challenges faced by students at such an early stage, pedagogical projects enable higher education institutions to implement effective interventions that promote a healthy and sustainable adjustment to university life.

By adopting a pedagogical project that takes into account personality traits and, above all, high levels of anxiety (which are natural among young people transitioning into adulthood), universities not only strengthen the effectiveness of teaching and learning but also contribute to the holistic development of students. By embracing educational approaches that respect the diversity of experiences and individual characteristics, universities can cultivate a more inclusive educational environment that is conducive to both academic and personal growth.

3 METHODOLOGICAL PROCEDURES

The objective of this study is to examine the relationship between anxiety and personality traits of students at a State Public University. To achieve this objective, a comprehensive questionnaire was applied, consisting of 38 questions in addition to items designed to capture students' basic characteristics. It is important to highlight that this research instrument was previously approved by the Ethics Committee No. 8123 of the State University of Northern Paraná (UENP), as recorded in the Certificate of Presentation for Ethical Consideration (CAAE) No. 97657018.3.0000.8123.

The research was conducted at the State University of Northern Paraná (UENP), established in September 2006. The Rector's Office is located in the city of Jacarezinho, with campuses in the municipalities of Bandeirantes, Cornélio Procópio, and Jacarezinho. UENP has its roots in history and results from the integration of five traditional colleges with more than 50 years of experience and excellence in teaching.

Since its foundation, the University has been responsible for contributing to the development of the State of Paraná and of Brazil (UENP, 2024).

The State of Paraná has seven State Universities distributed throughout the federative unit. UENP is located in the Pioneer North of the State, with three campuses in the cities of Jacarezinho, Bandeirantes, and Cornélio Procopio. The research was carried out at the Cornélio Procopio Campus, specifically at the Center for Applied Social Sciences. The primary data collection questionnaire was carefully designed to assess multiple dimensions: students' consumption profile (questions 1 to 8), student perceptions regarding the program and the labor market (questions 9 to 14), students' social skills (questions 15 to 21), students' anxiety levels (questions 22 to 28), and personality traits (questions 29 to 38). All questions were administered in a controlled environment to ensure uniform response conditions.

This study is part of a broader research project that relates other factors to students' anxiety levels. For example, Bernardelli *et al.* (2022) analyzed anxiety levels among university students and their relationship with students' social skills, with results showing that anxiety in the university setting is a problem that can considerably affect academic performance, while classroom actions may help mitigate the consequences of this increasingly common issue in Brazilian universities. Other studies may be developed to provide additional insights into this highly relevant theme in higher education in Brazil. Therefore, the present article focused specifically on questions related to social skills and students' anxiety levels (questions 22 to 38), in addition to collecting demographic data such as age, program, gender, year of study, and whether the student already held a previous higher education degree. The questionnaire was administered to 451 students enrolled in Economics, Business Administration, and Accounting, out of a total universe of 816 students in these programs in 2018. The survey was conducted in person, in digital format, in classrooms, and in the presence of professors, ensuring the confidentiality of students' responses, as the questionnaire did not allow the identification of respondents. The instructions for the application of the questionnaire were standardized, following a rigorous protocol of guidance and administration.

The questions related to anxiety were designed to allow the construction of an anxiety signaling indicator that categorizes students in terms of unlikely, possible, or probable anxiety. This indicator was developed using the Hospital Anxiety and Depression Scale (HADS), translated and validated by Botega *et al.* (1995). The HADS was originally designed to detect mild degrees of affective disorders in non-psychiatric environments (Bergerot *et al.*, 2014) and has since been applied in various contexts, including patients in non-psychiatric hospitals (Brady *et al.*, 2005), outpatients (Brandberg *et al.*, 2004), and individuals without diseases (Andrews; Hejdenberg; Wilding, 2006). The scale consists of 14 multiple-choice items, with seven items focused on assessing anxiety (HADS-A) and seven on depression (HADS-D). Each item is scored from 0 to 3, allowing a maximum of 21 points on each subscale (Bergerot *et al.*, 2014). Zigmond and Snaith (1983) recommended two cut-off points: scores above 8 indicate possible cases and scores above 11 indicate probable cases, with a third cut-off point

for severe disorders set at scores above 15. A distinctive aspect of the HADS is the exclusion of somatic symptoms, which prevents interference from physical disorders in the assessment of anxiety and depression. Thus, symptoms such as weight loss, anorexia, insomnia, fatigue, pessimism about the future, headache, and dizziness are excluded from the scale (Marcolino *et al.*, 2007). In this study, only the questions related to anxiety were evaluated, and students scoring above 11 points were classified as probable cases.

The questions related to personality traits were based on the Big-Five Personality Traits questionnaire, a model of personality traits comprising five broad factors that represent personality at the most general level of abstraction. Each dual factor (for example, Extraversion vs. Introversion) summarizes several more specific characteristics (for example, Sociability), which in turn encompass many even more specific traits (for example, talkative, outgoing) (Gosling; Rentfrow; Swann Jr., 2003). This is a personality assessment widely used in the economic literature, since it affects the behavior of economic agents (Borghans *et al.*, 2008). The personality traits are: (i) Extraversion; (ii) Agreeableness; (iii) Conscientiousness; (iv) Neuroticism; and (v) Openness to Experience. Table 1 explains each of these factors.

Table 1 – Definition of the factors of the Big Five Inventory questionnaire

Dimension	Definition
Extraversion	The degree to which a person needs attention and social interaction
Agreeableness	The degree to which a person seeks pleasant and harmonious relationships with others
Conscientiousness	The degree to which a person is willing to follow rules, norms, and conventional standards
Neuroticism	The degree to which a person perceives the world as threatening and beyond their control
Openness to Experience	The degree to which a person seeks intellectual stimulation, change, and variety

Source: adapted from Borghans *et al.* (2008)

Table 1 presents the five dimensions of the Big Five personality model, detailing each of them. Extraversion refers to the degree to which an individual needs attention and social interaction. Agreeableness reflects the need for pleasant and harmonious relationships with others. Conscientiousness demonstrates the willingness to follow rules and conventional standards. Neuroticism measures the tendency to perceive the world as threatening and beyond one's control. Finally, Openness to Experience describes the need for intellectual stimulation, change, and variety. These factors help categorize and understand different aspects of human personality, as adapted from Borghans *et al.* (2008). The Big Five Inventory (BFI) was developed in the late 1980s (John; Donahue; Kentle, 1991) as a concise instrument. At the time, it seemed rather radical to suggest that 44 short-item statements, answered in about 5 minutes, would be sufficient to measure the five broad dimensions of personality (Rammstedt; John, 2007). However, what once seemed extremely short may today appear lengthy, as researchers face increasing time constraints in assessments. Indeed, there has been a

growing trend toward the development of shorter personality instruments (Rammstedt; John, 2007). The Big Five Inventory-10 (BFI-10) was created to capture personality traits in contexts where administration time is limited. The BFI-10 was developed in both English and German, which facilitated its use in studies involving different cultures and samples (Bortoli, 2016). Based on Bortoli's work (2016), this study employs the translated version of the questionnaire. The items used to analyze the five dimensions of the Big Five Inventory can be derived from the scoring represented in Table 2.

Table 2 - Personality dimensions and scoring

Dimension	BFI-10 Item	Never	Rarely	Sometimes	Almost always	Always
Extraversion	It is reserved.	5	4	3	2	1
	It is sociable, outgoing.	1	2	3	4	5
Agreeableness	Generally trusts people.	1	2	3	4	5
	Tends to be critical of others (finds faults)	5	4	3	2	1
Conscientiousness	Tends to be lazy.	5	4	3	2	1
	Persists until the task or work is finished.	1	2	3	4	5
Neuroticism	Is relaxed, handles stress well.	5	4	3	2	1
	Gets nervous easily.	1	2	3	4	5
Openness to Experience	Has few artistic interests.	5	4	3	2	1
	Has a vivid imagination.	1	2	3	4	5

Source: adapted from Bortoli (2016)

Table 2 presents items from the BFI-10 personality inventory, which measures the five dimensions of the Big Five model using a 1-to-5 scale (never to always). For Extraversion, items such as "Is reserved" indicate low Extraversion, whereas "Is sociable, outgoing" indicate high Extraversion. In Agreeableness, "Generally trusts people" suggests high Agreeableness, while "Tends to be critical of others" suggests low Agreeableness. For Conscientiousness, "Tends to be lazy" indicates low Conscientiousness, whereas "Persists until the task is finished" indicates high Conscientiousness. Regarding Neuroticism, "Is relaxed, handles stress well" reflects low Neuroticism, while "Gets nervous easily" reflects high Neuroticism. Finally, in Openness to Experience, "Has few artistic interests" indicates low openness, and "Has a vivid imagination" indicates high openness. These items help create a comprehensive personality profile. Based on students' responses, it is possible to categorize them according to Table 3.

Table 3 - Personality characteristics by score

Low Extraversion Independent, solitary, reserved, difficult to understand	Introverted 1 - 5	Extroverted 6 - 10	High Extroversion Assertive, sociable, optimistic, communicative
Low Agreeableness Skeptical, resistant, questioning, aggressive	Challenger 1 - 5	Adapter 6 - 10	High Agreeableness Trusting, humble, altruistic, conflict-averse
Low Conscientiousness Spontaneous, fun, disorganized, affectionate	Flexible 1 - 5	Focused 6 - 10	High Conscientiousness Reliable, organized, cautious, disciplined
Low Neuroticism Secure, calm, rational	Resilient 1 - 5	Reactive 6 - 10	High Neuroticism Excitable, worried, reactive
Low Openness to Experience Practical, conservative, efficient, specialized	Preserved 1 - 5	Explorer 6 - 10	High Openness to Experience Broad interests, liberal, curious, novelty-seeking

Adapted from Bortoli (2016) and Rammstedt and John (2007)

Table 3 classifies the dimensions of the Big Five model into low, moderate, and high levels, associating each level with specific characteristics. Although the authors originally introduced an intermediate level of personality in this categorization, assigned to respondents who scored 5 points, for methodological reasons it was decided to use only two categories for each classification.

For Extraversion, low scores (1–4) indicate independence and reserve, moderate scores (5) indicate introversion, and high scores (6–10) indicate assertiveness and sociability. In Agreeableness, low scores denote skepticism and aggressiveness, moderate scores (5) indicate negotiators and adapters, while high scores suggest trust and humility. In Conscientiousness, low scores indicate spontaneity and disorganization, moderate scores reflect flexibility and balance, and high scores show reliability and organization. For Neuroticism, low scores indicate security and rationality, moderate scores reflect resilience and responsiveness, and high scores indicate worry and reactivity. Finally, in Openness to Experience, low scores denote conservatism and efficiency, moderate scores reflect a balance between preservation and exploration, and high scores indicate an interest in novelty.

Based on this classification, an indicator was developed to identify students' probable anxiety, analyzed through quantitative techniques and correlated with students' social skills using Pearson's correlation coefficient. The Pearson coefficient is a measure of linear association between variables, ranging from -1 to 1, where the sign indicates the direction of the relationship (positive or negative), and the absolute value represents the strength of the association. According to Figueiredo Filho and Silva Júnior (2009), a perfect correlation (values of -1 or 1) "indicates that the score of one variable can be determined exactly by knowing the score of the other." In contrast, a

correlation value of zero indicates no linear relationship between the variables. This approach is essential for understanding the impact of anxiety on students' social skills, offering a detailed view of the interactions between these psychological dimensions.

Additionally, the chi-square test was employed as a methodological procedure. This nonparametric statistical test is widely used to assess whether the observed distribution of a categorical variable differs from a previously established theoretical distribution. As explained by Fávero (2017), the test is applied to a single sample in which the variable under study assumes two or more categories, making it possible to compare the observed frequencies with the expected frequencies in each category. In this context, the statistical hypotheses are formulated as follows: H_0 : there is no significant difference between the observed and expected frequencies; and H_1 : there is a significant difference between the observed and expected frequencies. The statistical decision is based on the value of the chi-square statistic, calculated from the sum of the squared differences between observed and expected frequencies, weighted by the expected frequencies. If the p-value associated with the calculated statistic is lower than the significance level adopted, H_0 is rejected, indicating that the empirical distribution differs significantly from the theoretical distribution considered.

4 RESULTS

In this section, we presented the results of the research. The main objective is to analyze the relationship between the level of anxiety among students at a state public university and personality traits, measured based on the five factors of the *Big Five Inventory* questionnaire. Table 4 presents the means, and the chi-square test results for students' Extraversion.

Table 4 - Means and chi-square test for the variable Extraversion

Variável	Introverted	Extroverted	p-value*
Anxiety	44%	56%	0,00
Male	37%	63%	0.68
Business Administration	35%	65%	0.33
Accounting	39%	61%	0.67
Economics	43%	57%	0.37
Age (17–18)	45%	55%	0.18
Age (19–20)	42%	58%	0.237
Age (21–22)	34%	66%	0.361
Age (23+)	33%	67%	0.18
Total	37%	63%	-

*refers to the p-value of the chi-square test.

Source: authors' elaboration

Table 4 shows the percentages of introversion and Extraversion across different groups, as well as the chi-square test values used to verify the statistical significance of the observed differences. In the overall sample, 37% of students were categorized as introverts and 63% were extroverts. Among students with anxiety, 44% were introverts and 56% were extroverts, with a $p < 0,001$, which indicated a statistically significant difference and the rejection of the null hypothesis that there is no association between the two variables. The other variables analyzed did not show statistically significant differences.

These results suggest that anxiety may be associated with more reserved and less sociable behaviors compared to the general average. Introverted individuals usually prefer less intense social interactions and may feel overwhelmed in social situations, which can increase anxiety levels. The presence of anxiety may intensify these behaviors, leading individuals to avoid social situations and seek more time alone, perpetuating feelings of isolation and stress. Eysenck's theory of personality proposes that introverts have greater emotional reactivity, contributing to higher levels of anxiety (Eysenck; Eysenck, 1985). Moreover, the Big Five personality model developed by Costa Junior and McCrae (1992) identifies a correlation between low Extraversion (introversion) and higher Neuroticism, a trait strongly associated with anxiety (Costa Junior; McCrae, 1992). Another study by Noya and Vernon (2019) also confirmed that introverted individuals are more likely to experience social anxiety, especially in environments that favor extroverted characteristics. These studies suggest that the way introverted personalities process social stimuli and stressors may increase their vulnerability to anxiety.

On the other hand, among anxious students, 56% were extroverts (compared with 63% in the overall average). Extroverts usually seek social interactions as a way to relieve stress, but when these interactions are not positive or are perceived as threatening, they may also experience high levels of anxiety. The constant search for social validation and acceptance may make extroverts vulnerable to social stress and rejection. The need for social interaction and external validation among extroverts may lead them to higher levels of anxiety when these needs are not met. During the COVID-19 pandemic, research by Bellingtier, Mundet, and Wrzus (2023) revealed that high levels of Extraversion were associated with lower anxiety and depression when social interactions were positive. However, the absence of such interactions or negative interactions may significantly increase anxiety levels for extroverts.

Therefore, both introverts and extroverts may be affected by anxiety, although in different ways: while introverts may avoid social situations, exacerbating feelings of isolation, extroverts may feel anxious in negative social interactions. This shows that anxiety can impact different personalities in diverse ways.

Another important aspect to be analyzed concerns the ability of individuals to be cooperative and engage in interactions with others. Table 5 presents the means and chi-square test results for students' Agreeableness.

Table 5 – Means and chi-square test for the variable Agreeableness.

Variable	Challenger	Adapter	p-value*
Anxiety	37%	63%	0.02
Male	28%	72%	0.189
Business Administration	35%	66%	0.18
Accounting	29%	71%	0.40
Economics	26%	74%	0.42
Age (17–18)	33%	69%	0.76
Age (19–20)	27%	73%	0.16
Age (21–22)	37%	63%	0.08
Age (23+)	29%	71%	0.58
Total	31%	69%	-

*refers to the p-value of the chi-square test.

Source: authors' elaboration

Table 5 shows the percentages of challengers and adapters across different groups, as well as the chi-square test values used to verify the statistical significance of the observed differences. The overall sample indicates that 31% of students were categorized as challengers and 69% were adapters. Among students with anxiety, 37% were challengers and 63% were adapters, with a p-value of 0.02, indicating a statistically significant difference and the rejection of the null hypothesis that there is no association between the two variables. The other variables analyzed did not show statistically significant differences. These results suggest that there is a significant association between anxiety and Agreeableness.

The relationship between anxiety and Agreeableness is complex and significant, as evidenced by the results of Table 5. Students with anxiety showed a higher proportion of challengers (37%) than the overall average (31%), suggesting that anxiety may negatively impact the ability to maintain harmonious and cooperative social interactions. In the study by Wu *et al.* (2024), the results showed a negative correlation with anxiety, suggesting that more anxious individuals are more likely to be challengers, which is consistent with the findings of this study. High anxiety often results in defensive behaviors, irritability, and difficulties in trusting others, which are typical characteristics of individuals with low Agreeableness. These behaviors may create a vicious cycle in which anxiety generates conflict and distrust, leading to negative social interactions that, in turn, increase anxiety levels.

Adapters, who represent 63% of anxious students, still constitute the majority, but in a smaller proportion than the overall average of 69%, suggesting that anxiety may reduce the ability for social adaptation. Recent studies confirm the relationship between Agreeableness and anxiety. According to the network analysis presented by Yang *et al.* (2023), Agreeableness is negatively correlated with anxiety, suggesting that more agreeable individuals tend to experience less anxiety due to their propensity to maintain harmonious relationships and avoid conflict. Furthermore, these authors

argue that Agreeableness is a central trait that protects against symptoms of anxiety and depression.

Table 6 - Means and chi-square test for the Conscientiousness variable

Variable	Flexible	Focused	p-value*
Anxiety	19%	81%	0.056
Male	12%	88%	0.053
Business Administration	16%	84%	0.894
Accounting	18%	82%	0.22
Economics	4%	96%	0.02
Age (17–18)	18%	82%	0.598
Age (19–20)	15%	85%	0.824
Age (21–22)	16%	84%	0.137
Age (23+)	11%	89%	0.09
Total	16%	84%	-

*refers to the p-value of the chi-square test.

Source: authors' elaboration.

Table 6 showed the percentages of individuals categorized as flexible and focused across different groups, as well as the chi-square test values used to verify the statistical significance of the observed differences. The overall sample indicates that 16% of students were flexible and 84% were focused. Among students with anxiety, 19% were flexible and 81% were focused, with a p-value of 0.056, indicating a statistically significant difference at the 10% level and rejecting the null hypothesis that there is no association between the two variables. The other variables analyzed did not show statistically significant differences. These results suggest that there may be an association between anxiety and Conscientiousness, particularly in terms of flexibility and focus.

The relationship between anxiety and Conscientiousness is intriguing, as evidenced by the results in Table 6. Students with anxiety show a slightly higher proportion of flexibility (19%) compared to the overall average (16%), while the majority remain focused (81%). This difference suggests that anxiety may influence the distribution between flexibility and focus, although the relationship is not strongly significant. Focused individuals tend to be organized, disciplined, and less impulsive, characteristics that may help mitigate anxiety by providing a sense of control and predictability (Costa; McCrae, 1992; Flesia *et al.*, 2020). Nikčević *et al.* (2021) indicate in their study that Conscientiousness is a protective factor against anxiety and stress. However, high demands for perfection and rigor may also generate stress, potentially exacerbating anxiety.

On the other hand, more flexible individuals may cope better with uncertainty and change, which can be advantageous in stressful situations, but their lower rigidity

may also lead to feelings of disorganization and lack of control, thereby increasing anxiety (Flesia *et al.*, 2020).

Table 7 – Means and chi-square test for the variable Neuroticism

Variable	Resilient	Reactive	p-value*
Anxiety	15%	85%	0,00
Male	46%	54%	0,00
Business Administration	34%	66%	0.61
Accounting	33%	67%	0.29
Economics	52%	48%	0,00
Age (17–18)	37%	63%	0.70
Age (19–20)	34%	66%	0.73
Age (21–22)	38%	62%	0.43
Age (23+)	33%	67%	0.45
Total	35%	65%	-

*refers to the p-value of the chi-square test.

Source: authors' elaboration

Table 7 shows the percentages of resilient and reactive individuals across different groups, as well as the chi-square test values used to verify the statistical significance of the observed differences. The overall sample indicates that 35% of students were resilient and 65% were reactive. Among students with anxiety, 15% were resilient and 85% were reactive, with a p-value < 0,001, indicating a statistically significant difference at the 1% level and the rejection of the null hypothesis that there is no association between the two variables. These results suggest a significant association between anxiety and Neuroticism. Students with anxiety show a much higher proportion of reactivity (85%) compared to the overall average (65%) and a lower proportion of resilience (15% versus 35% in the overall average). This suggests that anxious individuals tend to be more reactive, displaying intense emotional responses and emotional instability. Nikčević *et al.* (2021) observed that Neuroticism is positively associated with generalized anxiety and depressive symptoms, suggesting that emotional instability plays a central role in the development of these conditions. Similarly, Prince *et al.* (2021) found that high levels of Neuroticism in young adults are significant predictors of the first episodes of anxiety and depressive disorders.

Moreover, the research by Yang *et al.* (2023), using network analysis, highlighted Neuroticism as the most crucial personality trait for symptoms of depression and anxiety among Chinese university students, reinforcing the importance of this trait as a significant risk factor. These results are consistent with the literature, which frequently identifies Neuroticism as a strong predictor of negative emotional experiences, including anxiety and depression. On the other hand, resilient individuals tend to be more emotionally stable and capable of managing stress effectively, which can protect against anxiety. According to Flesia *et al.* (2020), Emotional Stability is an important protective factor, since individuals with high Emotional Stability remain calm in

response to stressful situations and tend to view problems in proportion to their significance, worrying less than individuals with low Emotional Stability.

Table 8 – Means and chi-square test for the variable Openness to Experience

Variable	Low Openness	High Openness	p-value*
Anxiety	12%	88%	0.31
Male	8%	92%	0,00
Business Administration	13%	86%	0.68
Accounting	15%	85%	0.61
Economics	13%	87%	0.88
Age (17–18)	18%	82%	0.28
Age (19–20)	14%	86%	0.96
Age (21–22)	13%	87%	0.92
Age (23+)	12%	88%	0.48
Total	14%	86%	-

*refers to the p-value of the chi-square test.

Source: authors' elaboration

Table 8 shows the percentages of individuals with low and high Openness to Experience across groups, as well as the p-values from chi-square tests assessing the statistical significance of the observed differences. The overall sample indicates that 14% of students were classified as low openness and 86% were high openness. Among students with anxiety, 12% were low openness and 88% were high openness, with a p-value of 0.31, indicating no statistically significant difference and that the null hypothesis of no association between the two variables cannot be rejected. These results suggest that there is no significant association between anxiety and Openness to Experience.

Nikčević *et al.* (2021) reported an interesting finding: a positive association between high openness scores and specific anxiety related to COVID-19. It can be argued that individuals with high openness to new experiences (and therefore more prone to engaging in socio-health risk behaviors during this period) may also be more inclined to worry about and monitor the threats arising from such behaviors.

5 FINAL CONSIDERATIONS

This study investigates the relationship between the level of anxiety among students at a state public university and personality factors as measured by the "Big Five Inventory" questionnaire. The results indicate significant associations between certain personality traits and levels of anxiety. Notably, students with high levels of Neuroticism showed greater vulnerability to anxiety, underscoring the importance of interventions aimed at strengthening emotional resilience. The presence of introversion was also related to higher levels of anxiety, highlighting the need to create

social environments that are comfortable for both introverted and extroverted individuals. Agreeableness, or the ability to maintain harmonious social interactions, was another dimension affected by anxiety, suggesting that intervention strategies should promote adaptive and agreeable behaviors to improve students' emotional well-being.

The association between anxiety and Conscientiousness, particularly in terms of flexibility and focus, points to the need for strategies that balance adaptability with organization. Focused students, characterized by being organized and disciplined, tend to mitigate anxiety by fostering a sense of control, whereas flexibility may be advantageous in stressful situations. However, the high demand for perfection and rigor may also induce stress, thereby exacerbating anxiety. Although the relationship between Openness to Experience and anxiety did not show a significant association, it remains crucial to continue exploring how different personality traits can influence students' mental health. The analysis of these results suggests that individualized approaches that consider students' personality traits may be more effective in promoting mental well-being and academic performance.

These findings emphasize the importance of guidance programs and psychological support that integrate personality assessment, offering more targeted and effective interventions. Educational policies that recognize the diversity of experiences and individual characteristics can contribute to creating a more inclusive and welcoming learning environment. Among the study's limitations, it is worth noting the use of a self-administered questionnaire in the classroom. Although instructions followed a strict protocol and the confidentiality of responses was ensured, it cannot be entirely ruled out that some students may have felt a degree of pressure due to the application context, even though participation was explicitly voluntary. This limitation should be considered when interpreting the results and generalizing the findings. In conclusion, future studies are recommended to further investigate the interactions between personality and anxiety in different academic contexts, broadening the understanding and effectiveness of intervention strategies. The application of such recommendations may not only strengthen teaching and learning effectiveness but also contribute to the holistic development of students.

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Authors' contributions

Luan Vinicius Bernardelli – Study design, questionnaire development, submission to the Ethics Committee, methodology writing, statistical analyses, and integration of results.

Camila Pereira – Primary data collection and discussion of results, linking them with the literature.

Paulo Rogério Alves Brene – Primary data collection and overall manuscript review, ensuring clarity and scientific consistency.

Ronaldo Raemy Rangel – Development of the theoretical framework and conceptual foundation of the research.

Conflict of interest statement

The authors declare that there is no conflict of interest regarding the "The relationship between anxiety and personality traits in university students".

Data availability

The data underlying this study are available from the author upon reasonable request, due to ethical, security, and/or financial restriction.

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