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Mental health of students in the educational process: the relationship between anxiety and motiv

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Abstract

Objective: Mental health has become a growing concern in the university environment, mainly due to the impact of anxiety on the educational process. This study aimed to analyze the relationship between state and trait anxiety symptoms and the motivation to learn among undergraduate students in Accounting Sciences.

Method: This quantitative and descriptive study adopted a survey design. The sample comprised 181 undergraduate students. Data were collected through a questionnaire and analyzed using Structural Equation Modeling.

Results: Trait anxiety, a persistent characteristic related to an individual's personality, was identified as a negative determinant of motivation to learn. Students with high levels of trait anxiety experience difficulties maintaining motivation and focus in their studies, which negatively affects academic performance. In contrast, state anxiety, a temporary reaction to specific situations, did not significantly influence student motivation.

Contributions: This study contributes to Accounting Sciences by emphasizing the need for institutional interventions aimed at enhancing students' mental health and fostering an academic environment that supports learning and the development of more assertive, more resilient professionals. It also underscores the importance of mental health as a key factor in the quality of training and future accounting practice.

Keywords: Anxiety; Motivation to learn; Undergraduate; Mental health.

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1 Introduction

Entering university is an important phase in a student's professional development and involves several changes in their daily lives (Vizzotto, Jesus & Martins, 2017). Costa *et al.* (2017) note that higher education involves circumstances that may lead students to experience signs of anxiety, as they are constantly under pressure and feel uncertain about the future. The authors further emphasize that entering the academic world demands a commitment to lengthy study hours, which may lead to stress and difficulty in performing daily activities, potentially generating or intensifying anxiety disorders.

Justino et al. (2019) state that anxiety negatively affects an individual's professional and academic dimensions, potentially triggering concentration problems and difficulties in performing tasks, such as presenting papers, taking tests, and engaging in debates. Anxiety also adversely impacts the performance of undergraduates, as students with higher levels of anxiety tend to achieve lower grades (Macher *et al.*, 2012). Furthermore, more severe cases of anxiety may lead students to withdraw from their responsibilities, which, in the academic environment, results in learning deficits and a lack of motivation toward their training (Santos, Castro & Vogel, 2018). Consequently, anxiety might hinder future accountants' motivation to learn.

Anxiety is understood from two perspectives: trait anxiety and state anxiety. Although interrelated, these concepts, originally proposed by Cattell (Lipp, 2000) and later developed by Spielberger, Gorsuch, and Lushene (1970), present essential differences. Trait anxiety refers to an individual's stable dispositional characteristic, associated with a predisposition to perceive situations as threatening, influenced by aspects of his/her personality (Ferreira *et al.,* 2009; Weinberg & Gould, 2008). In contrast, state anxiety is temporary and situational, characterized by intense emotional responses such as nervousness, apprehension, and restlessness, triggered by specific events and varying in intensity over time (Clark & Beck, 2012; Cordeiro & Freire, 2016). These dimensions are interdependent, as having state anxiety under control positively influences the reduction of trait anxiety (Lipp, 2000). Furthermore, within the academic context, both can impact the emotional state of students in transitional situations, such as entering university or completing a program, reflecting the interaction between individual and contextual characteristics (Ferreira *et al.*, 2009).

Motivation to learn refers to acquiring knowledge effectively (Tho, 2017). Soares *et al.* (2021) emphasize that, during undergraduate studies, students must apply persistent, organized, and goal-oriented methods to manage their motivation and learning to complete their training. Additionally, undergraduate Accounting students with high levels of psychological capital—comprising self-efficacy, hope, optimism, and resilience—tend to be more motivated to learn, demonstrating higher levels of comprehension and understanding of the content (Zonatto *et al.,* 2020). It is worth noting that investigating the motivation of undergraduate Accounting students can help mitigate adverse consequences, such as lack of attention and dropout. Thus, the question arises: **What is the relationship between accounting students' anxiety symptoms (state and trait) and their motivation to learn?** Hence, the objective is to analyze the relationship between anxiety symptoms (state and trait) and the motivation to learn among undergraduate Accounting Science students.

The relevance of this study on anxiety lies in the fact that this disorder is considered the "evil of the century," negatively impacting individuals' psychological well-being and significantly affecting their quality of life and sense of identity (Iasevoli *et al.*, 2020; Marchi *et al.*, 2013; Santos, Castro & Vogel, 2018). Furthermore, international studies have shown that 25% of individuals experience or will experience anxiety disorder at some point in their lives and that this condition is frequently present in everyday life (Silva, 2011), reinforcing the importance of research focused on anxiety disorder, particularly among students.

Anxiety in the academic context is one of the most significant challenges college students face, as it directly impacts their education and performance. Recent studies indicate that high levels of anxiety can lead to cognitive difficulties, lack of focus, and poorer academic performance, compromising not only learning but also future professional performance (Iasevoli *et al.*, 2020; Peiter *et al.*, 2022). This issue is particularly relevant in accounting, given the high-pressure situations accounting professionals must navigate, such as meeting strict deadlines, analyzing complex data, and adhering to legal and ethical requirements. Understanding how anxiety interferes with students' motivation to learn and their training is essential for universities and institutions to develop practical guidelines that promote a healthier and more conducive learning environment.

Despite the growing relevance of the topic, few studies simultaneously explore the relationship between state anxiety and trait anxiety and motivation to learn constructs in the accounting field. Most investigations focus on general contexts, disregarding the specificities of programs requiring high analytical load and pressure, such as the Accounting program. This study seeks to fill this gap by offering a detailed analysis that contributes to the advancement of scientific knowledge and institutional practices in higher education. By integrating these variables, this study provides findings for educational managers and educators, highlighting the importance of specific areas of mental health in strengthening the quality of accounting education and training professionals who are more resilient and prepared for the job market's challenges.

This article is organized into five main sections in addition to this Introduction. The following section presents the Theoretical Framework, addressing the concepts of state anxiety and trait anxiety, the relationship between these constructs and learning motivation, and their impact on the academic context, focusing on the Accounting program. The third section details the methodological procedures adopted, including the study characterization, the sample, the instruments used, and the approach to data analysis. The fourth section presents the findings and analysis, relating them to the existing literature. Finally, the fifth section offers the final considerations, discussing the implications of the results for both academic and professional spheres, as well as the study's limitations and suggestions for future research.

2. Theoretical Reference

2.1 Anxiety

Anxiety is a complex emotional state often triggered by fear, manifesting as apprehension when individuals believe they cannot control or predict future events (Clark & Beck, 2014). The authors emphasize that when people feel anxious, they experience physical, emotional, and behavioral impacts. Furthermore, Silva (2011) points out that the manifestation of this disorder varies, with differing degrees and intensity levels. Lipp (2000) highlights that excessive anxiety is detrimental in various aspects, including acquiring knowledge, establishing and maintaining interpersonal relationships, and coping with tragic situations—where remaining calm typically leads to better performance. The author further argues that a moderate level of anxiety can motivate individuals to acquire knowledge, while a complete lack of anxiety may lead to discouragement and even a lack of interest in studying.

However, excessive anxiety can lead to a lack of attention and focus, potentially resulting in poor assessment outcomes (Lipp, 2000). Another consequence of anxiety is student attrition from educational institutions due to poor performance (Coelho & Nascimento, 2020). Additionally, Coelho and Nascimento (2020, p. 3) note that mental disorders among students "might lead to a deficit in the supply of qualified labor for the market and a shortage of contributions to the advancement of knowledge that occurs through research, since these professionals do not reach their full potential" (free translation). Therefore, this study specifically addresses undergraduate students.

Psychologist Cattell distinguishes between two important concepts for a better understanding of anxiety: trait anxiety and state anxiety. Although these concepts are interrelated, the latter is temporary, while the former is constant and enduring (Lipp, 2000). Ferreira *et al.* (2009) define trait anxiety as being associated with individual and dispositional characteristics, meaning that every individual carries a greater or lesser predisposition to perceive situations as anxiety inducing, depending on their personality. Regarding state anxiety, Cordeiro and Freire (2009, p. 2) explain that it "refers to unpleasant emotional reactions, characterized by subjective feelings of apprehension, nervousness, and worry, intensifying the activity of the autonomic nervous system, caused by a specific tension" (free translation). Lipp (2000) adds that, although an individual may have a predisposition to feel anxious, controlling this state can reduce the trait, as they are interconnected.

2.2 Motivation to learn

Motivation is the "the processes that account for an individual's intensity, direction, and persistence of effort toward attaining a goal" (Robbins, 2005, p. 132). The concept of "motivation to learn" has been interpreted in various ways. One such interpretation is proposed by Tho (2017), who describes it as undergraduates' interest in understanding the content taught during their training; consequently, those who perform better demonstrate greater adherence to the knowledge conveyed, driven by their willpower throughout the process. Given the relevance of Tho's (2017) contribution to this construct, this study used the scale he validated as a reference.

Neves and Boruchovitch (2006) state that students are motivated by intrinsic and extrinsic motivation. The first refers to the ability to feel enthusiastic, encouraged, and engaged when performing a task, while the second pertains to performing a given activity in exchange for external compensation. According to Moretti (2009), teaching should promote meaningful academic activities that encourage students to approach tasks with respect and commitment, recognizing the value of the acquired knowledge rather than merely fostering competition. From this perspective, the author argues that an educator's teaching method has a motivational impact on students, as how one conducts the teaching process influences students' outcomes.

Zenorini, Santos, and Monteiro (2011) affirm that motivational problems interfere with student learning. Various studies have demonstrated a relationship between academic success and motivation. Therefore, motivation is essential for success in the educational field, as willpower is necessary for students to face academic, professional, and social adversities (Gopalan *et al.*, 2017). Another noteworthy aspect is highlighted by Cunha and Boruchovitch (2013), who emphasize that students who establish analytical strategies and define their objectives have more significant opportunities for effective learning.

In this context, Self-Determination Theory posits that human motivation exists on a continuum between intrinsic and extrinsic motivation, both influenced by social and contextual factors (Sobral, 2008). In the academic context, the Academic Motivation Scale, validated for the Brazilian population by Sobral (2008), identifies dimensions that include intrinsic motivation, extrinsic motivation (i.e., external, introjected, and identified regulation), and the absence of motivation. This approach can help analyze how students engage in learning activities across different scenarios.

Marques, Marques, and Assolari (2024) state that understanding these aspects is essential for fostering pedagogical strategies that promote greater engagement and higher performance. Applying the Self-Determination Theory in the accounting field suggests that high levels of intrinsic motivation are associated with greater resilience in the face of academic challenges and the ability to acquire essential analytical skills (Lima, 2020). These findings indicate that designing educational programs based on this theory can enhance the training of future accountants, ensuring the development of essential job market skills, such as critical thinking and problem-solving.

2.3 Previous Studies and Hypotheses Development

Students face various challenges when transitioning to higher education, including new academic responsibilities, adapting to teaching methodologies, and navigating competitive environments. Mondardo and Pedon (2005) observe that this phase is characterized by high levels of stress, often accompanied by anxiety, which may compromise academic performance and motivation to learn. Moreover, these challenges can become even more pronounced in demanding undergraduate contexts, such as Accounting programs, which require strong analytical skills and emotional resilience.

The undergraduate period is marked by anticipation in both the personal and university contexts. Dealing with uncertainty is challenging and may impact students' motivation and commitment to their studies (Soares *et al*., 2021). As Spielberger, Gorsuch, and Lushene (1970) explain, symptoms of anxiety may emerge in such scenarios.

Recent studies have investigated the relationship between mental health and academic performance. Lopes, Meurer, and Colauto (2020) found that high levels of trait anxiety are associated with reduced engagement, which might negatively affect both learning and motivation. Silva *et al.* (2022) support this perspective, noting that anxiety significantly impacts students' ability to manage time and academic demands. In the accounting context, Vilela and Silva (2022) emphasize that the training of future accountants requires special attention to mental health, given its direct impact on the quality of the skills acquired.

The study by Peiter et al. (2022) is particularly relevant as it shows a negative association between trait anxiety and work engagement, stating that "professionals who present higher levels of trait anxiety tend to be less engaged in their work" (free translation) (Peiter et al., 2022, p. 13). Similarly, Reis, Miranda, and Freitas (2017) report that the same pattern occurs in the academic environment, as students with higher levels of anxiety experience heightened anxiety during assessments, which negatively impacts their undergraduate performance. The authors also indicate that motivation to learn decreases throughout the undergraduate program among these students. They further note that having a job tends to reduce students' commitment to higher education, while participation in university extension projects is associated with higher motivation levels.

The Self-Determination Theory also provides a theoretical framework for understanding the factors that promote academic motivation. According to this theory, motivation is influenced by three basic psychological needs: autonomy, competence, and relatedness. Marques, Marques, and Assolari (2024) applied the Self-Determination Theory to academic studies, showing that high levels of intrinsic motivation can mitigate the adverse effects of anxiety, fostering greater resilience and improved academic performance.

State anxiety is characterized as a specific moment in life when feelings of insecurity and apprehension arise, disrupting an individual's emotional stability (Justino *et al.*, 2019; Ferreira *et al.*, 2009). Based on the previous theoretical discussion, the first hypothesis is proposed:

H_1: State anxiety symptoms determine motivation to learn

The second hypothesis aims to investigate the relationship between trait anxiety symptoms and students' motivation to learn. Trait anxiety involves an individual's personality and predisposition to respond to everyday situations and cope with adversities (Justino *et al.,* 2019; Ferreira *et al.*, 2009). Hence, the second research hypothesis proposes that:

H_2: Trait anxiety symptoms determine motivation to learn.

These hypotheses seek to explore the interaction between anxiety and motivation to learn in a specific academic setting, contributing to a deeper understanding of the challenges faced by undergraduate Accounting students.

3 Methodology

This quantitative study is descriptive in its objectives and employs a survey as its technical procedure. According to data from the Accounting Sciences program at the Federal University of Santa Maria (UFSM), the population consists of 325 students. The sample size was determined according to criteria established by Fonseca and Martins (2012), using Equation 1 for a finite population, with a 95% confidence interval and a 5% standard error.

$$n = \frac{z^2_{\alpha/2} \cdot p \cdot q \cdot N}{e^2(N-1) + Z^2_{\alpha/2} \cdot p \cdot q} \qquad (1)$$

(1)

Where:
e = sample error;
N = population size;
n = Minimum sample;
$\alpha = 0.05$ – Significance level;
$p = 0.5$;
$q = 0.5$; and
$Z^2_{\alpha/2}$ = 1.96 for a 95% Confidence Interval

Therefore, a minimum sample of 177 was estimated for a population of 325 students. The questionnaire addressed 50 items: 40 concerning anxiety, established by Biaggio and Natalício (1979), and five concerning motivation to learn, established by Tho (2017). Five additional questions addressed the participants' sociodemographic profile: semester, shift, employment relationship, gender, and age. Table 1 presents the study's constructs, variables, and acronyms.

Table 1
Dimensions, statements, and acronyms

DIM.	Statement	ACRONYM
	ANXIETY DISORDER	
SA	I feel calm	SA_01
SA	I feel safe	SA_02
SA	I am tense	SA_03
SA	I am sorry	SA_04
SA	I feel at ease	SA_05
SA	I feel upset	SA_06
SA	I am concerned with potential problems	SA_07
SA	I feel rested	SA_08
SA	I feel anxious	SA_09
SA	I feel "at home"	SA_10
SA	I feel confident	SA_11
SA	I feel nervous	SA_12
SA	I am agitated	SA_13
SA	I feel like a I am a nervous wreck	SA_14
SA	I am relaxed	SA_15
SA	I feel satisfied	SA_16
SA	I am concerned	SA_17
SA	I feel super agitated and confused	SA_18
SA	I feel happy	SA_19
SA	I feel good	SA_20
TA	I feel good	TA_01
TA	I get tired easily	TA_02
TA	I feel like crying	TA_03
TA	I wish I could be as happy as others seem to be	TA_04
TA	I miss opportunities because I cannot make decisions quickly	TA_05
TA	I feel rested	TA_06
TA	I am calm, thoughtful and master of myself	TA_07
TA	I feel that difficulties accumulate to such an extent that I cannot resolve them	TA_08
TA	I worry too much about unimportant things	TA_09
TA	I am happy	TA_10
TA	I let myself to be affected a lot by things	TA_11
TA	I do not have much confidence in myself	TA_12
TA	I feel safe	TA_13
TA	I avoid facing crises or problems	TA_14
TA	I feel depressed	TA_15
TA	I am satisfied	TA_16

DIM.	Statement	ACRONYM
TA	Sometimes, unimportant ideas enter my head and worry me	TA_17
TA	I take disappointments so seriously that I cannot get them out of my head	TA_18
TA	I am a stable person	TA_19
TA	I get tense and upset when I think about my current problems	TA_20
	MOTIVATION TO LEARN	
	I try to study the content as best as I can	MA1
	I dedicate a lot of time to studying	MA2
ML	Investing in the program content is my first priority	MA3
	I try to do my best in my studies	MA4
	In general, my motivation to study is very high	MA5

Source: developed by the authors (2023) based on Biaggio and Natalício (1979) and Tho (2017).

The 40 items assessing state anxiety (SA) and trait anxiety (TA) symptoms are rated on a Likert scale from 1 to 5, where 1 represents "absolutely not/never" and 5 represents "very much/always" (Table 1). Scores for positive items are reversed for interpretation (Biaggio & Natalício, 1979). The final five items, which assess motivation to learn (Tho, 2017), are also rated on a Likert scale from 1 to 5, where 1 indicates "strongly disagree" and 5 indicates "strongly agree." This construct contains no reversed items.

Data were collected in person in the Accounting Sciences program classrooms. Participants were informed about the study's objectives and ethical aspects before completing the instrument, were instructed to complete the entire form, and were assured that their identities would remain confidential. They also signed an informed consent form, affirming that the information collected would be used solely for academic purposes. Data collection took place from June 8 to August 14, 2022. A total of 186 completed questionnaires were obtained, exceeding the minimum sample requirement. Data were then tabulated in a spreadsheet for analysis. Five questionnaires were excluded due to missing responses in an entire construct, making analysis unfeasible. Consequently, 181 Accounting Sciences students (56% of the population) were included in the study.

The analysis was conducted using Partial Least Squares Structural Equation Modeling. The criteria for assessing the relationship between anxiety and motivation to learn were based on Lopes *et al.* (2020) and Ringle, Silva, and Bido (2014). The measurement model was initially evaluated for convergent validity using the Average Variance Extracted (AVE). Internal consistency was then assessed using Cronbach's Alpha (α) and Composite Reliability (). Discriminant validity was measured through Cross Loadings, the Fornell-Larcker Criterion, and the Heterotrait-Monotrait Ratio (HTMT) criterion. Finally, the structural model was evaluated for Collinearity (Variance Inflation Factor – VIF), Effect Size (f^2), Explanation Coefficient (R^2), Validity of the Structural Coefficient (β), and Predictive Relevance (Q^2). The results are presented below.

4 Analysis of Results and Discussion

4.1 Respondents' profiles

The sample suitable for analysis consists of 181 students enrolled in the Accounting Sciences program at UFSM from the first to the tenth semester. Table 2 presents the profile results.

Table 2
Pespondents' profiles

Semester	N.º de Resp.	%	Age	N.º de Resp.	%
1st	25	13,81%	Below 18	0	0%
2nd	22	12,12%	From 18 to 29	156	86,19%
3nd	29	16,02%	From 30 to 39	15	8,29%
4nd	12	6,63%	From 40 to 49	7	3,87%
5nd	21	11,60%	From 50 to 59	1	0,55%
6nd	14	7,73%	Above 60	0	0%
7nd	25	13,81%	Did not answer	2	1,10%
8nd	09	4,97%	**Total**	**181**	**100%**
9nd	17	9,39%	Men	77	42,54%
10nd	06	3,31%	Women	96	53,04%
Did not answer	01	0,55%	Did not answer	8	4,42%
Total	**181**	**100%**	**Total**	**181**	**100%**

Shift	Paid Job					
	Yes		No		Total	
	Freq.	%	Freq.	%	Freq.	%
Day	30	26,86%	26	47,27%	56	30,94%
Evening	86	74,14%	29	52,73%	115	63,54%
Did not answer	–	–	–	–	10	5,52%
Total	**116**	**100%**	**55**	**100%**	**181**	**100%**

Source: developed by the authors.s.

More students in the third semester participated in the survey, with 29 respondents (16.02%), followed by the first and seventh semesters, each with 25 participants (13.81%) (Table 2). The lowest percentage of students was observed in the final semester (3.31%), likely because most undergraduates in the Accounting Sciences program can complete their tasks and assignments without needing to attend the university in person. According to Krüger *et al.* (2021, p. 43), many students are only involved with their final paper, which hinders their survey participation, explaining this finding. The semesters are offered during day and evening shifts: 64.09% (116) of the respondents were enrolled in the evening shift, 31.49% (57 students) in the day shift, and the remainder (4.42%, 8 students) did not report their shift. These figures indicate a clear preference for the evening program, with twice as many students enrolled as the day program.

Regarding the participants' employment status, 117 (64.64%) had a paid job, 57 (31.49%) did not, and 7 (3.87%) did not answer this question. Based on this information, the relationship between employment status and the shift attended by undergraduate Accounting Sciences students was investigated. Most employed students attended the evening shift (74.14%). This finding is consistent with Krüger *et al.* (2021) and Souza (2015), who state that students enrolled in the evening shift have the opportunity to gain practical knowledge through professional activities during the day, in addition to the theoretical learning acquired in the academic environment.

Furthermore, slightly more than half of the 56 students attending the day shift (30; 53.57%) had a paid job. This finding can be explained by internships, monitoring activities, and research and extension scholarships, which typically involve shorter workloads and flexible hours. As a result, students can engage in professional activities within the accounting field (Rodrigues, 2015).

The sample was also classified according to the participants' gender. Most of the 181 respondents were women (53.04%), while 42.54% identified as men, and 4.42% did not answer. This finding aligns with the study by Krüger *et al.* (2022), highlighting the significant presence of female participants. However, Krüger *et al.* (2021) also analyzed Accounting students at the same institution and found that most respondents at that time were men.

Regarding the participants' age, the results show a discrepancy, a majority of students being between 18 and 29 years old (86.19%), consistent with the findings of Zonatto *et al.* (2020), in which 77.45% of undergraduates were between 19 and 30 years old. Overall, the sample predominantly consists of female undergraduates aged 18 to 29, attending the evening shift and holding a paid job.

4.2 Determinants of Motivation to Learn Related to Anxiety Symptoms

Structural equation modeling was used to identify the determinants of motivation to learn related to anxiety symptoms. According to Hair Jr., Gabriel, and Patel (2014), this statistical method can measure the relationships among multiple variables, allowing for assessing and excluding those deemed weak. The descriptive statistics of the variables are presented first (Table 3).

Table 3

Descriptive Statistics

Variables	Minimum	Maximum	Median	Mean	Ratio (%)	Standard Deviation	Factor loading	Decision
SA_01i	1	5	3	3,0497	60,99	,91455	0,546	Excluded
SA_02i	1	5	3	2,9282	58,56	1,04898		
SA_03	1	5	3	3,1381	62,76	1,16797	0,412	Excluded
SA_04	0	5	2	2,0442	40,88	1,12459	0,575	Excluded
SA_05i	0	5	3	2,7238	54,48	1,02249		
SA_06	0	5	2	2,0884	41,77	1,09693	0,535	Excluded
SA_07	0	5	4	3,6906	73,81	1,17065	0,518	Excluded
SA_08i	1	5	4	3,7845	75,69	1,03440	0,434	Excluded
SA_09	0	5	4	3,6022	72,04	1,20499	0,401	Excluded
SA_10i	0	5	3	3,1768	63,54	1,13123	0,528	Excluded
SA_11i	1	5	3	2,9503	59,01	1,03428		
SA_12	1	5	3	3,3094	66,19	1,19414	0,469	Excluded
SA_13	1	5	3	3,1602	63,20	1,19339	0,335	Excluded
SA_14	0	5	3	2,7182	54,36	1,33048	0,480	Excluded
SA_15i	1	5	3	3,2044	64,09	1,06311	0,434	Excluded
SA_16i	0	0	3	2,9724	59,45	1,04579		
SA_17	1	5	4	3,4862	69,72	1,07294	0,470	Excluded
SA_18	0	5	3	2,6464	52,93	1,28099	0,549	Excluded
SA_19i	1	5	3	3,0497	60,99	1,01885		
SA_20i	1	5	2	2,9282	58,56	1,04652		
TA_01i	0	5	3	2,3867	47,73	1,01906		
TA_02	1	5	3	3,2155	64,31	1,23062	0,529	Excluded
TA_03	0	5	3	2,3039	46,08	1,48378	0,567	Excluded
TA_04	0	5	3	2,5635	51,27	1,38347	0,573	Excluded
TA_05	1	5	3	2,5691	51,38	1,26576	0,479	Excluded
TA_06i	0	5	2	3,7182	74,36	1,09197	0,531	Excluded
TA_07i	0	5	3	2,9503	59,01	1,17509	0,563	Excluded
TA_08	0	5	3	2,8729	57,46	1,26068		
TA_09	1	5	3	3,2320	64,64	1,40684	0,428	Excluded
TA_10i	0	5	4	2,3536	47,07	1,09385		
TA_11	1	5	4	3,3536	67,07	1,23236	0,534	Excluded
TA_12	0	5	3	2,9006	58,01	1,32541	0,416	Excluded
TA_13	1	5	3	2,9945	59,89	1,10804		
TA_14	0	5	3	3,0939	61,88	1,22792	0,279	Excluded
TA_15	1	5	3	2,3204	46,41	1,20511		
TA_16i	0	5	3	2,9945	59,89	1,17614		
TA_17	0	5	3	3,3536	67,07	1,27229	0,363	Excluded
TA_18	0	5	3	3,1326	62,65	1,31406	0,567	Excluded
TA_19i	0	5	3	2,7514	55,03	1,05886	0,528	Excluded
TA_20	0	5	4	3,3315	66,63	1,29981	0,455	Excluded
ML_01	0	5	4	3,4475	68,95	1,19432		
ML_02	0	5	3	2,6464	52,93	1,19110		
ML_03	1	5	3	2,5746	51,49	1,18847		
ML_04	1	5	4	3,8122	76,24	1,10959		
ML_05	1	5	3	2,9006	58,01	1,15039		

Legend: N. valid = 181; i = inverted for analysis.

Source: developed by the authors.

Table 3 shows that the variables related to anxiety and motivation exhibit consistent ranges, with means indicating moderate levels of perception. The high standard deviations of some variables suggest substantial differences in how respondents experience anxiety and motivation, reflecting the heterogeneity of the sample.

The measurement model was assessed by verifying the convergent validity of the constructs based on the AVE. According to Ringle, Silva, and Bido (2014), the AVE measures the extent to which a variable positively correlates with its construct, with values above 0.5 considered satisfactory. Only the "motivation to learn" construct obtained an adequate result in the first round, with an AVE of 0.575. The other constructs (SA and TA) presented values lower than 0.5.

Variables with low factor loadings (<0.6) were excluded (Hair Jr., Gabriel, & Patel, 2014) over the course of 12 rounds. After these exclusions, both constructs achieved an appropriate AVE, with values of 0.522 for SA and 0.517 for TA. Alongside this parameter, Table 4 presents the internal consistency, verified by Cronbach's Alpha (α) and Composite Reliability (*[Equation]*).

Table 4
Internal consistency and convergent validity

Constructs	Cronbach's Alpha	Composite Reliability	AVE
State Anxiety	0,815	0,866	0,522
Trait Anxiety	0,815	0,865	0,517
Motivation to learn	0,820	0,870	0,576

Source: developed by the authors using SmartPLS® software, v. 4.0.8.2 (Ringle, Wende & Becker, 2022).

Table 4 shows that Cronbach's Alpha (α) ranged from 0.815 to 0.820, while Composite Reliability (*[Equation]*) remained between 0.865 and 0.870. Thus, the three constructs met the criteria established by Hair Jr., Gabriel, and Patel (2014), indicating that the model's dimensions are both reliable and valid.

Next, discriminant validity was assessed using Cross Loadings, the Fornell-Larcker Criterion, and the HTMT Criterion. Table 5 presents the first test, showing the correlation between the Observed Variables (OV), which correspond to the study statements, and the Latent Variables (LV), which represent the constructs, and the external collinearity of the model.

Table 5

Cross loadings and external VIF of the model

OV\LV	State Anxiety	Trait Anxiety	Motivation to learn	External VIF
AE_02	**0,668**	0,594	-0,205	1,466
AE_04	**0,599**	0,370	-0,262	1,228
AE_11	**0,715**	0,545	-0,312	1,418
AE_16	**0,760**	0,579	-0,222	1,764
AE_19	**0,770**	0,620	-0,223	2,514
AE_20	**0,802**	0,682	-0,248	2,733
AT_01	0,567	**0,725**	-0,258	1,627
AT_08	0,456	**0,695**	-0,267	1,424
AT_10	0,671	**0,715**	-0,189	1,695
AT_13	0,591	**0,696**	-0,189	1,649
AT_15	0,567	**0,630**	-0,216	1,428
AT_16	0,594	**0,838**	-0,397	1,835
MA_01	-0,288	-0,348	**0,801**	1,797
MA_02	-0,213	-0,141	**0,752**	1,846
MA_03	-0,196	-0,147	**0,576**	1,347
MA_04	-0,201	-0,217	**0,806**	2,042
MA_05	-0,352	-0,405	**0,833**	1,761

Source: developed by the authors using SmartPLS® software, v. 4.0.8.2 (Ringle, Wende & Becker, 2022).

Table 5 shows that the statements not excluded from the analysis exhibited higher factor loadings within their respective latent variables, indicating that the indicators accurately represent their dimensions rather than other constructs in the model (Hair Jr., Gabriel, & Patel, 2014). Similarly, regarding VIF, the variables did not show signs of strong correlations, indicating adequacy according to Hair Jr. *et al.* (2021), who recommend a VIF threshold of less than 5.

When observed vertically, the state anxiety construct shows that SA_02 (0.668) and SA_04 (0.599) presented values lower than that obtained by TA_10 (0.671). In the trait anxiety construct, TA_15 (0.630) presented a value lower than that of SA_20 (0.682). However, according to Hair Jr. *et al.* (2009), variables are still considered significant if they have factor loadings above 0.45 in samples larger than 150 respondents. Therefore, these variables were not excluded from the model. Table 6 presents the discriminant validity indicators based on the Fornell-Larcker and HTMT criteria.

Table 6
Discriminant validity according to Fornell-Larker and HTMT criteria

Constructs (LV)	√(AVE)	State Anxiety	Trait Anxiety	ML
State Anxiety	0,722	**1**		
State Anxiety	0,719	0,781	**1**	
Motivation to learn	0,759	-0,349	-0,373	**1**
Gender		0,126	0,162	0,067
Age		0,044	0,034	0,034
Semester		0,038	0,028	-0,170
Shift		0,124	0,044	0,185
Employment status	–	-0,011	0,016	0,129
HTMT		**SA**	**TA**	**ML**
State Anxiety				
Trait Anxiety		0,983		
Motivation to learn		0,392	0,377	

Source: developed by the authors using SmartPLS® software, v. 4.1.0.9 (Ringle, Wende & Becker, 2024).

According to Table 6, the square root of the AVE for motivation to learn (0.759) is higher than the correlations observed between the anxiety dimensions (-0.349 and -0.373), indicating the model's discriminant validity. The model was also analyzed, including the control variables (shift, semester, employment status, gender, and age) (Table 6). Furthermore, under the HTMT criterion, this construct also obtained adequate results regarding state anxiety (0.392) and trait anxiety (0.377), in line with the threshold established by Netemeyer, Bearder, and Sharma (2003), which recommends values below 0.9. However, the Fornell-Larcker test showed that the correlation between both anxiety dimensions (0.781) is higher than the square root of the AVE for SA (0.722) and TA (0.719). Similarly, the HTMT criterion revealed a correlation of 0.983 between the anxiety constructs, exceeding the maximum threshold.

Table 7 shows the HTML, which was analyzed by the Bootstrapping method for 5,000 samples.

Table7
HTMT according to the Bootstrapping method

Relations	Original sample	Mean	2,5%	97,5%
Trait Anxiety > Trait Anxiety	0,983	0,984	0,925	1,041
Motivation to learn > State Anxiety	0,392	0,395	0,244	0,546
Motivation to learn > Trait Anxiety	0,377	0,392	0,254	0,550

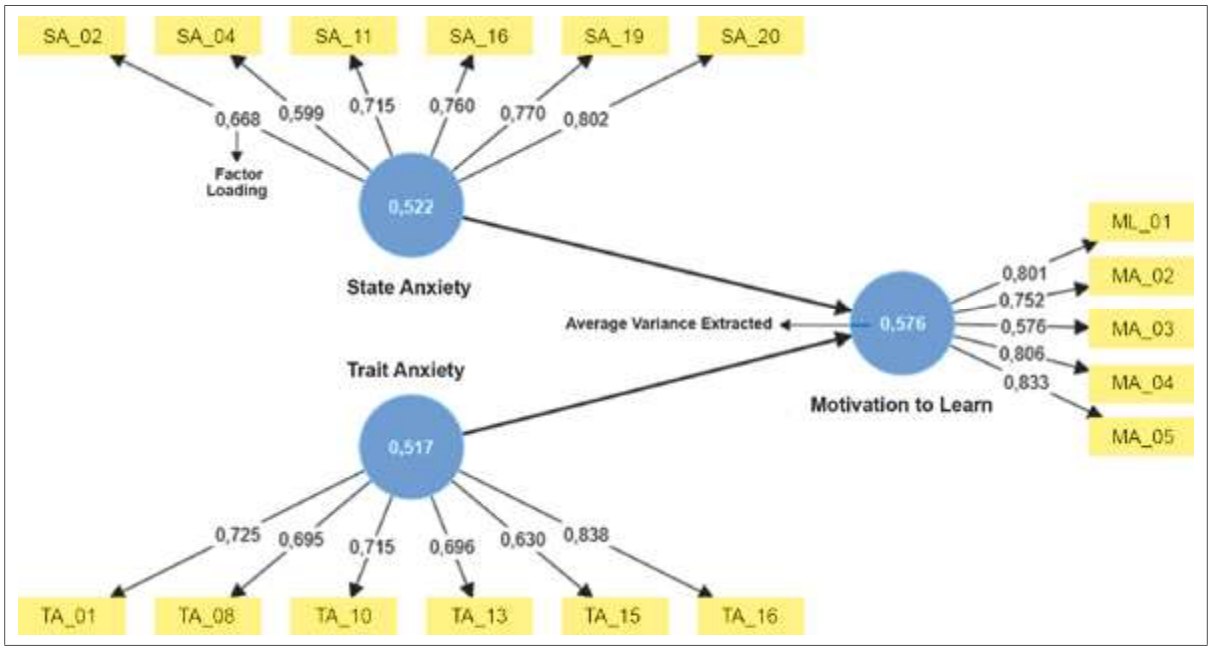
Source: developed by the authors using SmartPLS® software v. 4.0.8.2 (Ringle, Wende & Becker, 2022).

After reanalyzing the data using a new mechanism, an unsatisfactory relationship was found between state anxiety and trait anxiety, with the result slightly exceeding 1.0. This indicates a high correlation between these dimensions and reveals a weakness in the model. In this regard, Lipp (2000) explains that, as the terms are inherently related, managing state anxiety reduces trait anxiety, which may explain this finding.

Despite the high correlation between the two constructs, as evidenced by the Fornell-Larcker criterion and the HTMT, they remain conceptually and empirically distinct (Fornell & Larcker, 1981; Henseler, Ringle, & Sarstedt, 2015). Trait anxiety refers to an individual's stable predisposition to respond anxiously across different situations over time and is closely associated with personality characteristics (Spielberger, Gorsuch, & Lushene, 1970). In contrast, state anxiety represents a transient emotional response triggered by specific and variable environmental stimuli. This distinction between constructs is further supported by studies demonstrating distinct biological patterns associated with each type of anxiety (Grupe & Nitschke, 2013).

Thus, although the correlation between state anxiety and trait anxiety measures is high, it does not indicate conceptual redundancy but instead reflects the interdependence between momentary emotional states and dispositional tendencies to respond to anxiogenic stimuli. To address potential multicollinearity between these constructs, the VIF was calculated and presented below, showing values within acceptable limits (<5), indicating that collinearity does not compromise the robustness of the data modeling.

As the discriminant validity analysis is complete, Figure 1 illustrates the confirmatory structural model.



Source: developed by the authors using SmartPLS® software, v. 4.0.8.2 (Ringle, Wende & Becker, 2022).

Figure 1. Confirmatory structural model

Figure 1 shows that the values obtained for the external factor loadings and the average variance extracted were satisfactory after excluding the state anxiety and trait anxiety variables. Thus, the model shows convergent validity, internal consistency, and discriminant validity between anxiety and motivation to learn.

After performing the measurement validity tests, the structural model was analyzed for internal collinearity (VIF). The overall dimensions demonstrated an adequate VIF (2.562) for the statements, remaining within the maximum limit of 5 established by Hair Jr. *et al.* (2021).

Next, we discuss the model's Effect Size (f^2). State anxiety was found to have no impact on motivation to learn, presenting an f^2 of 0.010 (Lopes *et al.*, 2020). In contrast, trait anxiety showed an effect size of 0.031, which is considered low according to the same authors. Additionally, the analysis between both dimensions revealed an insignificant p-value exceeding 0.05. Although this may affect the Beta value (β), it does not necessarily indicate the absence of a relationship between the constructs (Lopes *et al.*, 2020).

Although statistically significant, the small effect size ($f^2 = 0.031$) suggests that anxiety may not be a central factor in student motivation. This finding indicates that, while a relationship exists, it is subtle and may be mediated by other factors not addressed in this study. Interpreting this effect underscores the importance of exploring mediating variables, such as individual characteristics (e.g., resilience, self-efficacy) and contextual factors (e.g., classroom environment), to understand better the mechanisms linking anxiety to motivation to learn. These findings enhance the relevance of this study by demonstrating that multiple factors must be considered to develop more effective intervention strategies, which future research can further explore.

The model's explanatory power indicates that motivation to learn is moderately influenced by anxiety (0.148), as the R^2 value falls within the range of 0.075 to 0.190 and presents a significant p-value (0.001) (Lopes *et al.*, 2020).

Next, Table 8 presents the validity of the Structural Coefficient (β) to evaluate the research hypotheses.

Table 8
Assessment of structural coefficients

Hypotheses		Beta (β)	Standard Deviation (SD)	*t* statistics (Beta/SD)	*p*–value	Situation
H1	SA → ML	-0,148	0,128	1,149	0,251	Rejected
H2	TA → ML	-0,258	0,132	1,961	0,050	Not rejected
			Model 2			
H1	SA → ML	-0,122	0,120	1,018	0,309	Rejected
H2	TA → ML	-0,269	0,127	2,120	0,034	Not rejected
Gender → MA		0,153	0,066	2,310	0,021	Not rejected
Age → ML		0,106	0,058	1,829	0,067	Rejected
Semester → ML		-0,172	0,075	2,278	0,023	Not rejected
Shift → ML		-0,165	0,067	2,458	0,014	Not rejected
Employment → ML		0,110	0,067	1,639	0,101	Rejected

Source: developed by the authors using SmartPLS® software, v. 4.1.0.9 (Ringle, Wende & Becker, 2024).

Table 8 shows that the first hypothesis (H_1), which addresses the relationship between state anxiety symptoms and motivation to learn, was rejected. Although the Structural Coefficient (β) differs from 0, the other results were inadequate (t-statistic = 1.149 and p-value = 0.251). This outcome was anticipated when the effect of SA on ML was found to be null.

The second hypothesis (H_2), which examines the relationship between trait anxiety symptoms and learning motivation, was not rejected, as significant values were obtained (β = -0.258, t-statistic = 1.961, p-value = 0.050). Thus, TA is negatively predictive of ML, which can be explained by trait anxiety being an inherent part of an individual's personality, exhibiting persistent characteristics, and being more commonly regarded as a disorder (Biaggio & Natalício, 1979).

Additionally, the model was analyzed considering control variables (gender, age, semester, shift, and employment status). Model 2 shows minimal variation in the **β** values for the analyzed hypotheses after including the control variables (Table 8). Analyzing each control variable individually, it becomes evident that age and employment status did not significantly influence the relationship between anxiety and motivation to learn in the studied population. However, gender, semester, and shift presented statistically significant effects within the model.

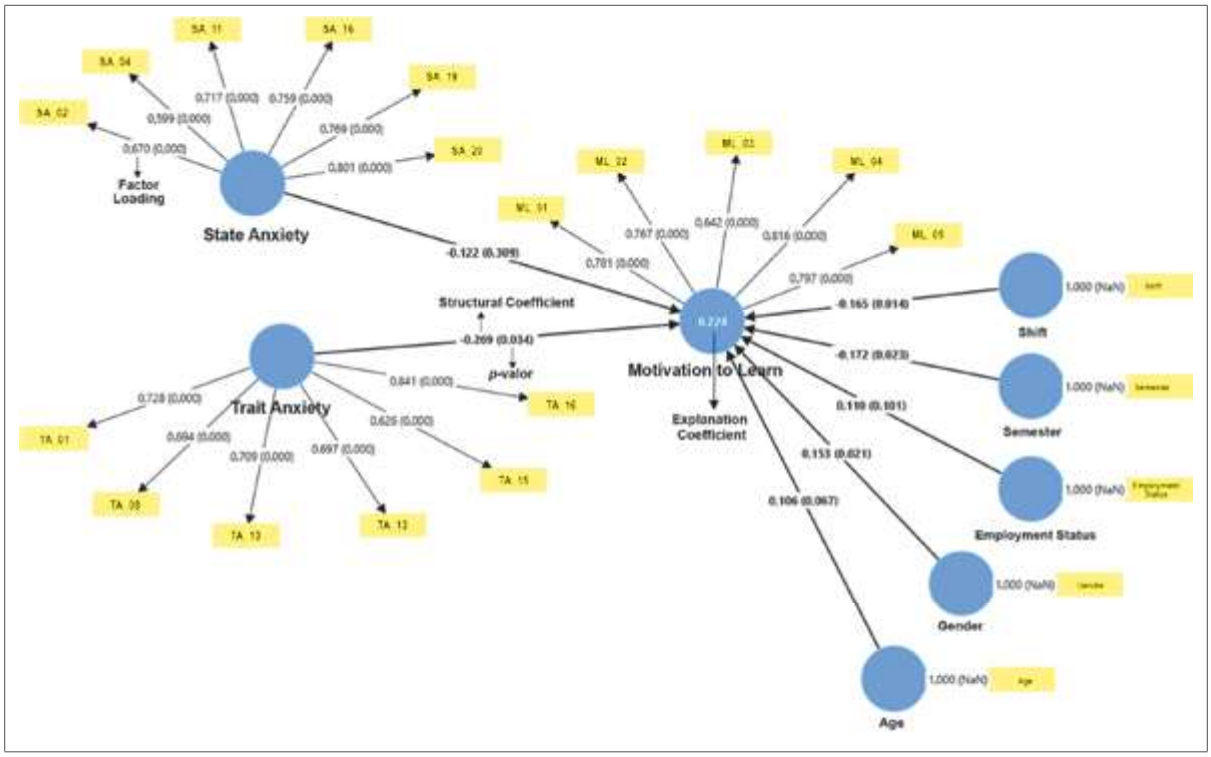
The analysis according to the shift students attended revealed that those in the evening shift had significantly lower motivation to learn than those in the day shift ($\beta = -0.24$; $p < 0.05$). This finding aligns with the results of Zonatto et al. (2020), who emphasize that students balancing work and study tend to experience higher stress levels and reduced availability for independent academic activities, negatively affecting intrinsic motivation.

The analysis by gender shows that women more frequently experienced both state anxiety and trait anxiety compared to men ($\beta = 0.31$; $p < 0.01$), consistent with research indicating a higher prevalence of anxiety symptoms among women in the academic context (Beiter *et al.*, 2015; Peiter *et al.*, 2022). This finding may be explained by sociocultural factors, such as the more significant burden of self-demand and academic expectations often reported by female students (Schiffrin & Nelson, 2010).

Finally, the program's semester also proved to be relevant: students in more advanced semesters demonstrated lower motivation to learn ($\boldsymbol{\beta} = -0.27$; $p < 0.05$). This finding is consistent with Reis, Miranda, and Freitas (2017), who point out that academic motivation tends to decline as students progress through the program, possibly due to the accumulation of responsibilities, pressure to enter the job market, and academic burnout.

These findings highlight the need for targeted institutional interventions, such as academic support policies for students attending the evening shift and mental health initiatives for those in advanced semesters. Such actions can help mitigate the impact of anxiety on motivation to learn and contribute to improved academic performance.

Regarding Figure 2, the final structural model revealed a negative and significant relationship between trait anxiety and motivation to learn ($\beta \neq 0$ and p-value < 0.050), indicating that trait anxiety determines motivation to learn and accounts for approximately 22.4% of its explanatory power (0.224). This link between the dimensions demonstrates relevance and a moderate impact, consistent with the findings of Justino et al. (2019), who emphasize the negative influence of anxiety on students' learning and, consequently, its impact on motivation to learn. Additionally, the control variables (gender, semester, and shift) were significant in the analyzed model.



Source: developed by the authors using SmartPLS® software, v. 4.0.8.2 (Ringle, Wende & Becker, 2022).

Figure 2. Final Structural Model

After completing the tests, the final model was assessed for accuracy using Predictive Relevance (Q^2). The accuracy level was established at 0.108, which is considered moderate, as it falls within the range of 0.075 to 0.25, indicating the model's relevance (Lopes *et al.*, 2020).

Therefore, TA negatively impacts ML. As this anxiety dimension is part of an individual's personality, it is persistent and more commonly considered a disorder, adversely affecting undergraduate students' academic performance. The results obtained in this study have important theoretical and practical implications. Hypothesis (H_1), which examined the influence of state anxiety on motivation to learn, was rejected, suggesting that temporary emotional reactions may not significantly impact the motivation of the Accounting Science students who participated in the study. Conversely, Hypothesis (H_2), which was not rejected, indicates that trait anxiety, as an intrinsic and stable component of personality, negatively predicts academic motivation. These findings align with studies by Justino *et al.* (2019) and Lopes *et al.* (2020), which emphasize the harmful effect of persistent anxiety on learning.

Based on the assessed effect, the results indicate that the impact of anxiety, particularly trait anxiety, on motivation may be of limited magnitude. This finding is consistent with studies identifying multiple factors beyond anxiety that influence academic motivation, such as social support, intrinsic interest, and coping strategies (Marques, Marques, & Assolari, 2024; Lima, 2020). These findings help delineate anxiety as a contributing factor rather than the primary determinant of motivation.

In this sense, institutional strategies to support mental health should be integrated with initiatives to enhance other aspects of the educational experience, such as curricular engagement and social support. The small effect size suggests that isolated interventions targeting anxiety alone may have a limited impact on motivation, reinforcing the need for systemic approaches.

In practice, the results emphasize the need for educational and institutional interventions to identify and mitigate the impacts of trait anxiety among university students. Programs that promote emotional support and develop coping strategies for anxiety can help increase motivation and, consequently, enhance both academic and professional performance. These efforts are particularly relevant in the training of future accountants, a profession that demands strong analytical skills and emotional resilience.

The analysis of sociodemographic variables, such as age, semester, shift, and employment status, together with the constructs of state anxiety (SA), trait anxiety (TA), and academic motivation (AM), revealed some trends. For instance, female students exhibited higher levels of both trait and state anxiety, while students with paid jobs demonstrated greater emotional resilience and academic motivation. These findings align with Silva *et al.* (2022) and Vilela and Silva (2022), who identify significant differences in anxiety and motivation levels based on contextual and individual variables. This analysis complements the study's findings by suggesting that personal and contextual characteristics interact with the constructs examined, influencing motivation and academic performance in diverse ways. In this context, future studies could further investigate these interactions.

5. Final Considerations

In this study, we analyzed the relationship between anxiety symptoms (state and trait anxiety) and motivation to learn among undergraduate Accounting students. A questionnaire was administered in person, incorporating two validated scales: Biaggio and Natalício (1979) for anxiety and Tho (2017) for motivation to learn. Structural equation modeling confirmed that the effect of state anxiety on motivation is null, leading to the rejection of the first hypothesis. However, trait anxiety emerged as a significant and negative determinant of motivation to learn, resulting in the acceptance of the second hypothesis. This finding indicates that trait anxiety negatively impacts motivation to learn, as it reflects an individual's personality and more enduring characteristics, leading to a lack of focus and interest in studies. Additionally, gender, shift, and semester had significant effects on the model: students attending the evening shift or in more advanced semesters were less motivated to learn, while female students exhibited higher levels of anxiety compared to male students.

Thus, the objective of analyzing the relationship between state anxiety (SA), trait anxiety (TA), and motivation to learn among undergraduate Accounting students was achieved. The findings indicate that trait anxiety, an inherent aspect of an individual's personality characterized by its persistence and long-lasting nature, influences how one deals with everyday situations and copes with adversities (Ferreira *et al.*, 2009; Justino *et al.*, 2019). This negative impact on undergraduates' interest in understanding the program's content, i.e., their motivation to learn (Tho, 2017), underscores the relevance of addressing anxiety symptoms in the academic environment. The presence of anxiety symptoms in higher education raises concerns about the mental health of college students, as this disorder can hinder the training of Accounting Sciences undergraduates, potentially affecting their future performance in the accounting field.

The main findings of this study reinforce the need for institutional policies that integrate mental health strategies with effective pedagogical practices. The negative relationship between trait anxiety and motivation to learn suggests that interventions aimed at managing anxiety should be complemented by initiatives that foster a more welcoming and supportive learning environment. Additionally, incorporating contextual and sociodemographic variables in future analyses may enhance the understanding of factors impacting motivation, enabling the development of systemic and personalized approaches in educational and professional accounting.

Moreover, this study makes several academic, professional, and social contributions. The first contribution concerns the originality of simultaneously addressing the two constructs analyzed here—anxiety and motivation to learn—filling a gap in the existing literature. By validating the model, this study found that anxiety negatively influences motivation to learn, advancing the understanding of Accounting Science students' behavior and emphasizing the importance of addressing students' mental health in the learning process.

The second contribution of this study is confirming that students with low levels of anxiety exhibit higher motivation to learn and, consequently, are better prepared to enter the job market—engaged and proficient in the content taught in higher education. Finally, the third contribution highlights the need for institutions to implement measures and provide resources to support students affected by anxiety, given the relationship between anxiety and motivation for consistent professional training.

Regarding this study's limitations, its cross-sectional design stands out, as it captured data at a specific point in time and included only undergraduate students from an Accounting Sciences program at a federal public university. Additionally, the study was limited to a quantitative approach, with data collected through a questionnaire, and the results were restricted to two validated scales: state anxiety and trait anxiety (Biaggio & Natalício, 1979) and motivation to learn (Tho, 2017). There may be other variables influencing the analysis of anxiety symptoms and additional factors determining motivation to learn, which were not considered in this study. Lastly, using different validated scales to assess both constructs also represents a limitation of this research.

Given the previous discussion, future studies are encouraged to adopt a longitudinal approach, covering multiple periods and including a larger sample of students, considering both public and private universities or incorporating other programs. Additionally, a qualitative methodology is recommended to collect and interpret theoretical perspectives in greater depth. Another suggestion is to apply new statistical tests to measure the relationships between the dimensions addressed in this study. Finally, using alternative validated scales proposed by different authors to assess anxiety and motivation and incorporating dimensions not considered in this study could complement the analyses presented here.

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