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EXPLORING MINDFULNESS, ACADEMIC STRESS, AND SATISFACTION WITH ACADEMIC MAJORS AMONG NIGERIAN UNDERGRADUATES: MODERATION EFFECTS OF GENDER AND AGE.

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ABSTRACT

The interplay between mindfulness, stress, and academic major satisfaction remains unexplored in the Nigerian population. This study aimed to investigate these factors among Nigerian undergraduates, exploring the moderating roles of gender and age. A cross-sectional design was employed with 184 undergraduates. Data were collected online using the Mindful Attention Awareness Scale (MAAS), the Academic Major Satisfaction Scale (AMSS), and the Academic Stress Scale (ASS). Pearson correlations and moderation regression analyses were performed. Participants reported moderate mindfulness and academic stress, but low major satisfaction. MAAS negatively correlated with ASS ($r = -0.428$, $p < .001$) and with AMSS ($r = -0.224$, $p = .002$). AMSS positively correlated with ASS ($r = 0.384$, $p < .001$). Gender significantly moderated the MAAS-AMSS relationship ($\beta = 0.072$, $p = 0.014$), with a stronger negative association for males. Age moderated the ASS-AMSS relationship ($\beta = -0.096$, $p = 0.012$) and the combined MAAS-ASS-AMSS relationship ($\beta = 0.011$, $p = 0.038$), weakening the stress-satisfaction link for older students. Mindfulness reduces academic stress, but its relationship with major satisfaction is complex and can be negative. The positive link between stress and satisfaction may reflect deep investment. Gender and age are significant moderators, highlighting the need for tailored interventions for student well-being in Nigerian universities.

Keywords: *Academic major, satisfaction, academic stress, mindfulness, age, gender*

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INTRODUCTION

The transition to undergraduate education represents a pivotal phase of identity exploration, career preparation, and intellectual growth (Christiaens et al., 2021; Hasret & Şahin Baltacı, 2021). Satisfaction with academic majors, which can be explained as alignment between students' interests, skills, and their chosen field, is a critical predictor of engagement and persistence (Manihoro, 2024; Milsom & Coughlin, 2015). This satisfaction is increasingly recognized as a cornerstone of academic success, as it is directly linked to academic persistence, commitment, self-efficacy, and optimism (Elom et al., 2023). However, studies suggest that academic stress, prevalent in higher education globally, undermines this satisfaction, particularly in contexts with limited institutional support (Högberg, 2024; Naeem et al., 2020). While satisfaction with one's academic major increases performance and mental well-being, many students grapple with uncertainty, stress, or misalignment between their chosen field and personal values (Schlechter et al., 2025; Suharno et al., 2023). Academic stress, characterized by perceived pressures to meet academic demands, has been globally linked to lower academic performance (Brata et al., 2025). This affects how well students can adjust to the learning environment (Pozos-Radillo et al., 2016). For Nigerian undergraduates, academic stress, defined as students' perception of academic demands, is endemic in the Nigerian tertiary education system and has been consistently linked to negative outcomes, including poor mental health, reduced academic performance, and higher attrition rates. Stressors such as quality of local infrastructure, financial constraints, and institutional/management inadequacies exacerbate these challenges, often leading to disillusionment with chosen majors (Aya et al., 2024; Ezepue et al., 2022).

Studies highlight that stress impairs self-efficacy and emotional regulation, affecting the learning process and diminishing students' capacity to derive meaning from their academic pursuits (Córdova et al., 2023; Kristensen et al., 2023). However, mindfulness is operationally defined as a non-judgmental, present-moment awareness of one's thoughts, emotions, and experiences, has gained prominence as a resilience-building practice in educational settings (Alomari, 2023). Prior studies demonstrate its efficacy in reducing academic stress among university students (Bordbar et al., 2024) and

fostering higher academic achievement (Alomari, 2023). By increasing emotional regulation and cognitive flexibility, mindfulness may help students reframe academic challenges as manageable, thereby enhancing satisfaction with their academic majors (Bai et al., 2020). In high-stress populations like medical students, mindfulness practices correlate with lower burnout and improved coping strategies (Fazia et al., 2023). However, little research has examined how mindfulness practices influence students' satisfaction with their academic majors, particularly in Nigeria, where cultural nuances may influence adoption and effectiveness (Nweke & Boh, 2024).

The study is guided by the Cognitive Stress Model (CSM) (Lazarus & Folkman, 1984), which posits that stress arises when individuals appraise demands as exceeding their available resources. In this framework, mindfulness is conceptualized as a crucial internal resource that influences cognitive appraisal, enhancing coping strategies and reducing perceived stress. By integrating mindfulness into the CSM, the model predicts that students with higher mindfulness can better regulate their responses to academic demands, potentially moderating the impact of stress on satisfaction with their academic major. This theoretical integration allows for interpreting not only direct relationships but also counter-intuitive correlations, such as mindfulness being associated with lower satisfaction in high-demand academic contexts (Bai et al., 2020; Bordbar et al., 2024).

Gender and age may further shape the relationship between mindfulness, academic stress, and satisfaction. Globally, varying gender-related differences for academic stress have been observed, given particular circumstances for both genders (Graves et al., 2021; Kristensen et al., 2023). While some studies find no gender differences in mindfulness levels (Alomari, 2023), others suggest women may benefit more from mindfulness practices due to greater emotional regulation (Rojiani et al., 2017). Age-related differences are equally salient: older students often exhibit better stress management skills, while younger undergraduates may struggle with transitioning to academic autonomy (Onolemhenhen & Abel, 2020). In Nigeria, where traditional gender roles and age dynamics may influence educational experiences (Nweke & Boh, 2024; Ukoette & Jackson, 2021), these factors may uniquely moderate how mindfulness and academic stress impact academic satisfaction.

Understanding the interplay between academic stress, resilience factors like mindfulness, and academic satisfaction is imperative. Existing research on mindfulness and satisfaction with academic majors predominantly originates from Western contexts, with limited representation from sub-Saharan Africa and Nigeria. The interplay between mindfulness, stress, and academic major satisfaction remains unexplored in the Nigerian population, despite rising mental health crises in Nigerian universities (Buhari et al., 2024). Cross-cultural perspectives are critical since cultural factors, such as communal values and expectations, may influence findings. While previous research has established the general link between mindfulness and stress reduction, the complex interplay between these variables and academic major satisfaction (AMSS) remains poorly understood, particularly its variation across demographic factors like gender and age. This study addresses this gap, we aim to inform interventions that support students in making intentional, fulfilling academic decisions while promoting holistic well-being. Hence, this study investigates mindfulness, academic stress, and satisfaction with academic majors among Nigerian undergraduates, while exploring the moderating roles of gender and age.

Review of Related Literature

The interplay between mindfulness, academic stress, and satisfaction with one's academic major is complex and can be explained through various psychological theories.

For academic stress and satisfaction with one's academic major, their relationship is multifaceted. The Transactional Model of Stress and Coping posits that academic stress emerges from a perceived imbalance between demands (challenges, risks) and available resources (social support) (Dikmen, 2022). Academic stressors directly impact student satisfaction (Zhao, 2024). However, this relationship is significantly influenced by individual psychological resources (Zhao, 2024). Academic self-efficacy, characterised as a student's conviction in their ability to manage academic pressures, serves a crucial moderating function. Students having elevated academic self-efficacy generally experience reduced adverse effects from stress and report greater satisfaction levels (Peng et al., 2015). Self-efficacy serves as a buffer against anxiety and stress (Fürtjes et al., 2023). Similarly, adopting good coping methods, such as

problem solving and seeking social support, has a direct impact on reducing the negative effects of academic stress on student satisfaction (Coiro et al., 2017). This demonstrates that just minimising academic stress may not be adequate; instead, developing internal resources such as self-efficacy and adaptive coping is critical. Thus, this establishes a theoretical connection to mindfulness, recognised for its ability to promote self-efficacy and coping mechanisms (Zhao, 2024), thereby indirectly improving the stress-satisfaction relationship.

The relationship between mindfulness and satisfaction with one's academic major is mediated by robust indirect pathways of well-being and resilience. Mindfulness is consistently demonstrated to alleviate stress, anxiety, and depression, while enhancing general psychological well-being (Ma, 2025). These improvements in fundamental psychological states are expected to positively influence a student's academic experience. Mindfulness facilitates effective stress management, emotional regulation, and reflective decision-making, all of which are essential for psychological and academic well-being (Alvarado-García et al., 2025; Ma, 2025; Salem et al., 2025). In addition, mindfulness has been demonstrated to improve academic resilience, which is characterised as the capacity to respond constructively to stress and adversity in educational settings (Salsabila & Widyasari, 2021). Enhanced resilience, developed through mindfulness practices, correlates with improved academic performance and perseverance (Alwan et al., 2025).

Individual variables, such as gender and age, can theoretically modify the strength or direction of relationships. Gender is hypothesised to influence these relationships based on Gender Role Theory, which asserts that societal role expectations and personality traits affect the psychological and behavioural attributes of individuals across different genders (Stoltzfus et al., 2011). These roles and duties may result in divergent perceptions of stress, coping mechanisms, and academic performance. For example, females exhibit greater emotional expressiveness and may consequently have a more pronounced enhancement in psychological resilience from mindfulness interventions compared to males (Zhang et al., 2024). The theoretical framework provided by gender role theory offers a means to understand why males and females might experience or respond to academic stressors and interventions

differently. This calls for a gender-sensitive approach for the design and implementation of mindfulness therapies, as a uniform approach may not yield optimal effectiveness.

Age, especially during the undergraduate period (often late adolescence to early adulthood), is associated with significant developmental changes, emotional regulation, and evolving life priorities (Park et al., 2020). Developmental theories indicate that older students may possess greater life experience and more advanced coping techniques (Umeozor, 2022; Yunusa & Umar, 2021), thereby affecting their perception and response to academic stress or their engagement with their major.

Specific research on satisfaction with academic major as a distinct construct, and its direct relationships with mindfulness and academic stress in Nigeria, remains limited. However, mindfulness has been reported to influence academic performance positively. In the study by Alomari (2023) involving a sample of 489 male and female students from public universities, a moderate level of mindfulness was observed, with no significant gender differences. Moreover, students with higher academic achievement displayed greater mindfulness in the study (Alomari, 2023). Mindfulness is recognised and empirically supported as a beneficial intervention for stress reduction and academic improvement within this context. A randomised controlled trial conducted in Southeast Nigerian universities found that a combined Cognitive-Behavioural Therapy and Mindfulness-Based Stress Reduction (CBT-MBSR) program significantly reduced test anxiety, improved mindfulness, enhanced academic achievement, and increased well-being among vocational education students (Nwadi et al., 2025). Beyond specific interventions, mindfulness and stress management programs have been shown to positively affect student behaviour and performance more broadly, leading to reduced misconduct, improved emotional stability, relieved stress levels, and increased life satisfaction (Korede, 2025).

Purpose of the Study

1. To determine the relationship between mindfulness and satisfaction with academic majors among Nigerian undergraduates.

2. To determine the relationship between academic stress and satisfaction with academic majors among Nigerian undergraduates.

3. To examine the moderating effect of gender on the relationship between

mindfulness and satisfaction with academic majors among Nigerian undergraduates using regression analysis.

4. To assess the moderating effect of gender on the relationship between academic stress and satisfaction with academic majors among Nigerian undergraduates through regression analysis.

5. To determine whether age moderates the relationship between mindfulness and satisfaction with academic majors among Nigerian undergraduates, employing regression analysis.

6. To investigate whether age moderates the relationship between academic stress and satisfaction with academic majors among Nigerian undergraduates using regression analysis.

METHOD

Design

This study employed a cross-sectional design, presented following the STROBE reporting guideline. Ethical approval was sought and obtained from the research and ethics committee of the University of Nigeria Teaching Hospital, Ituku-Ozalla. The study was conducted at the David Umahi Federal University of Health Sciences (DUFUHS) in Ebonyi State.

Participants

The study included 184 participants (60 males and 124 females) aged between 16 and 32 years, selected from David Umahi Federal University of Health Sciences, Uburu, Ebonyi State, Nigeria. Participants were 200-level students of DUFUHS recruited via an online survey (Google Form).

Inclusion Criteria

The participants were 200-level students from the faculty of basic medical sciences, dentistry, Health Sciences and Technology, Pharmacy, Allied Health Sciences, and Nursing Sciences.

Exclusion criteria

300-level students were not included because they were in the exam class, and those in 100-level were also excluded since they were still fresh in the university during the time of the data collection.

Instruments

Socio-demographic profile:

Mindful Attention Awareness Scale (MAAS)

This 15-item scale was used to assess mindfulness among the participants.

MAAS follows a 6-point Likert response from "1", meaning almost always, to "6", meaning almost never (Brown & Ryan, 2003). The internal consistency is 0.82, with a test-retest reliability of 0.81 (Brown & Ryan, 2003; Park et al., 2013). The scale is scored by computing the mean average of the items. Higher scores reflect higher levels of mindfulness (Brown & Ryan, 2003). This scale has been used across different Nigerian populations (Obi & Bewei, 2020; Odinka et al., 2019).

Academic Major Satisfaction Scale (AMSS)

This is a self-report measure consisting of six items reflecting overall satisfaction with one's major. Responses are presented as a 5-point Likert response system, ranging from 1-strongly disagree to 2- 2-strongly agree (Nuata, 2007). The AMSS is a versatile measure used for screening students' satisfaction and dissatisfaction (Lingán-Huamán et al., 2025). High internal consistencies and adequate test-retest reliabilities have been observed across populations (Nuata, 2007; Silva Soares et al., 2021; Sovet et al., 2013). The scale has also been used among Nigerian students (Ebulum & Chidiobi, 2016).

Academic Stress Scale (ASS)

The ASS assesses how students view their academic situation as stressful (Sheu et al., 2014). It is a 10-item scale rated on a 5-point response system from 0 to 4. Four items are reverse-scored, and higher overall scores indicate higher levels of perceived academic stress (Sheu et al., 2014). Psychometric properties of the ASS are reported adequate (Dwi et al., 2020; Kumar et al., 2023).

Procedure

The study used a cross-sectional design. Approval for the study was obtained from the research and ethics committee of the University of Nigeria Teaching Hospital, Ituku-Ozalla. Approval and consent of each participant were obtained by signing an informed consent form before participating in the study. The study employed a convenient sampling method, which allowed those students who were willing to participate in the study. Out of the 195 data points collected online, 184 were used for analysis after data screening.

Method Analysis

Data analysis was conducted using IBM SPSS Statistics (Version 21), the PROCESS macro (Hayes, 2018), and Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0. Following data screening, descriptive

statistics summarized participant demographics and the main study variables, while scale reliability was assessed using Cronbach's alpha. Bivariate relationships were examined using Pearson's correlation coefficients.

The core analysis employed two complementary approaches. First, moderation regression (PROCESS Macro, Model 1) tested whether gender and age moderated the relationships between mindfulness, academic stress, and academic major satisfaction, with simple slopes analysis probing significant interactions. Second, PLS-SEM was used to validate the measurement model, assessing the relationships between latent constructs and their indicators. All tests used a significance level of $\alpha = 0.05$.

RESULTS

Demographic Profile of Respondents

Table 1: Demographic profile of the Respondents (n=184)

Characteristics	Category	Frequency (N)	Percentage (%)
Gender	Male	60	32.6%
	Female	124	67.4%
Religion	Christianity	183	99.5%
	Islam	1	0.5%
	Traditional	==	==
	Others	==	==
Academic Level	Year 1	4	2.2%
	Year 2	111	60.3%
	Year 3	69	37.5%
	Year 4	==	==
Faculty	Physical science	1	5%
	Health Science and Technology	32	17.4%
	Basic medical science	46	25.0%
	Basic Clinical science	32	17.4%
	dentistry	39	21.2%
	Faculty of Clinical science	1	0.5%
	Medical and Surgery	6	3.3%
	College of medicine	2	1.1%
	Faculty of dental sciences	1	0.5%
	Faculty of dentistry	1	0.5%
	Basic medicine	1	0.5%
	Basic health science	2	1.1%
	Allied health science	2	1.1%
	Pharmaceutical science	3	1.6%
	Natural science	3	1.6
	Nursing science	12	1.1%
Department	Statistics	1	0.5%
	Physiotherapy	28	15.2%
	Medicine and surgery	90	48.9%
	Dentistry	37	20.1%
	MBBS	2	1.1%

	Radiography and radiation science	2	1.1%
	Public health	2	1.1%
	Medicine	3	1.6%
	computer	3	1.6%
	Pharmacy	2	1.1%
	Nursing science	14	7.6%
	Mean Age	Minimum	Maximum
Age	18.61yrs	16yrs	32yrs

Table 1 shows that the study predominantly involved female respondents (67.4%) and identified almost entirely as Christian (99.5%), with only one Muslim participant. Most participants were second-year students (60.3%), and there were no fourth-year students. Faculty representation was highest in Basic Medical Science (25.0%) and Dentistry (21.2%), while the Medicine and Surgery department accounted for nearly half (48.9%) of respondents. The age of participants averaged 18.61 years, with the youngest being 16 and the oldest 32. This demographic profile highlights a significant representation of female, Christian, and second-year students, primarily from medical and health-related disciplines.

Descriptive Statistics

Table 2: Descriptive Statistics

Variable	Mean	Standard Deviation
Mindful Attention Awareness Scale	56.28	13.50
Academic Major Satisfaction Scale	16.29	2.99
Academic Stress Scale	58.48	21.29

Table 2 is the descriptive statistics, which reveals that participants exhibit a moderate level of mindful attention awareness, with a mean score of 56.28 and a high standard deviation of 13.50, indicating significant variability in responses. In terms of academic major satisfaction, a positive mean score of 16.29 reflects lower contentment among students. Conversely, the Academic Stress Scale shows a moderate mean score of 58.48, indicating that, on average, students report moderate levels of academic stress; however, the exceptionally high standard deviation of 21.29 highlights considerable variability in stress experiences, suggesting that while

many students feel minimally stressed, some face significantly higher stress levels.

Table 3: Reliability Test Results

Construct	No. of Items	Cronbach's Alpha
Mindful Attention Awareness Scale	15	0.838
Academic Major Satisfaction Scale	6	0.797
Academic Stress Scale	30	0.907

The reliability test results for the Mindful Attention Awareness Scale (MAAS), Academic Major Satisfaction Scale (AMSS), and Academic Stress Scale (ASS) indicate strong internal consistency among the items in each scale, as measured by Cronbach's alpha. The MAAS achieved a value of 0.838, reflecting high reliability, while the AMSS scored 0.797, indicating acceptable internal consistency. Notably, the ASS showed the highest reliability with a Cronbach's alpha of 0.907, signifying excellent internal consistency. Overall, these results confirm that all three scales effectively measure their respective constructs, mindful attention awareness, academic satisfaction, and academic stress, providing a solid foundation for the study's assessments (Table 3).

Correlation and Moderation Result

To determine whether mindfulness will be significantly associated with satisfaction with academic majors among Nigerian undergraduates.

Table 4: Result of Association Analysis

	Variable	MASS	AMSS	ASS
Pearson Correlation				
	MAAS	1		
	AMSS	-.224 (.002) *	1	
	ASS	-.428 (.000) *	.384 (.000) *	1

MAAS = Mindful Attention Awareness Scale; AMSS = Academic Major Satisfaction Scale; ASS = Academic Stress Scale. ( ) * Represent significant at 5% level.

Table 4 is the result of the association between the study variables and the moderation effect of the demographic variables. The Pearson correlation analysis between the Mindful Attention Awareness Scale (MAAS) and the Academic Major

Satisfaction Scale (AMSS) reveals a coefficient of -0.224. This indicates a weak negative relationship, suggesting that higher levels of mindful attention awareness are associated with lower academic major satisfaction. The probability value of 0.002 confirms that this relationship is statistically significant at the 5% level, highlighting the importance of mindful attention in shaping perceptions of academic satisfaction, even if the correlation is not particularly strong.

In examining the relationship between the Mindful Attention Awareness Scale (MAAS) and the Academic Stress Scale (ASS), the correlation coefficient is -0.428. This signifies a moderate negative relationship, implying that individuals with higher levels of mindful attention awareness tend to experience lower academic stress. The probability value of 0.000 indicates a highly significant relationship at the 5% level, suggesting that enhancing mindful attention awareness may be beneficial in reducing academic stress among students.

For the relationship between the Academic Major Satisfaction Scale (AMSS) and Academic Stress Scale (ASS), a significant positive correlation was observed, implying that as academic stress increases, mindful attention awareness increases.

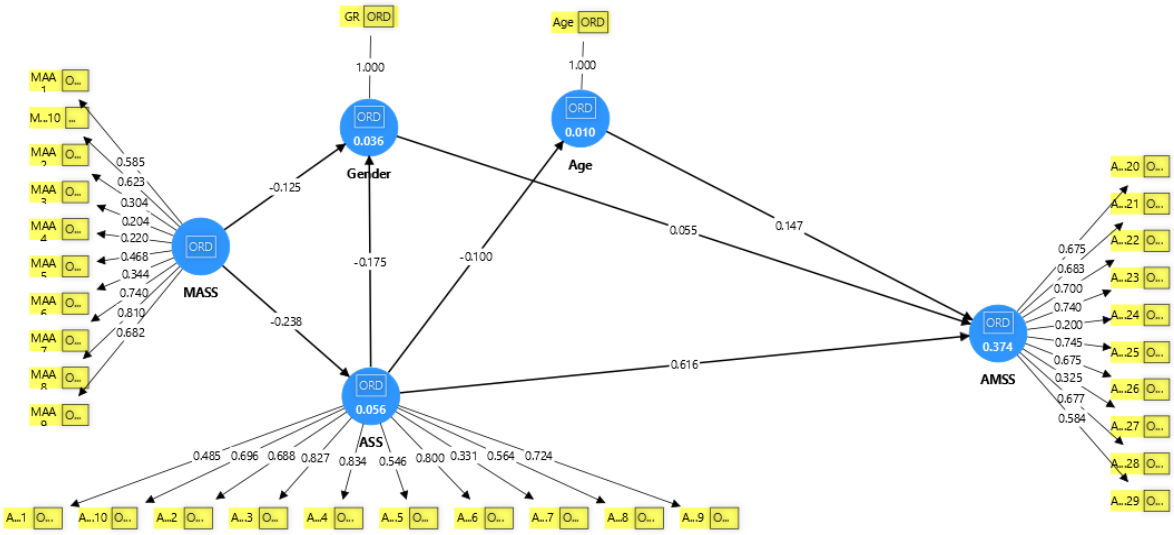

Fig 1: Measurement model (SmartPLS 4.0)

Figure 1 is the **plot of a measurement model** showing the relationships between **latent variables** and their **observed indicators**

Table 5: Result of the moderation analysis (Specific Indirect Effect)

	β	SD	T Statistics	P-values	R-Square
MASS->Gender->AMSS	0.072	0.035	5.538	0.014	0.375
ASS->Gender->AMSS	0.081	0.136	0.603	0.546	0.067
MASS->ASS->Gender->AMSS	0.009	0.022	0.417	0.677	0.143
ASS->Age->AMSS	-0.096	0.054	9.60	0.012	0.301
MASS->ASS->Age->AMSS	0.011	0.023	2.750	0.038	0.401

MAAS = Mindful Attention Awareness Scale; AMSS = Academic Major Satisfaction Scale; ASS = Academic Stress Scale; * Represent significant at 5% level.

Table 5 is the result of the regression analysis considering the specific indirect effect. The result indicates that, for Mindful Attention Awareness and Academic Major Satisfaction (with Gender as a Moderator): The regression analysis reveals a coefficient of 0.072 for mindful attention awareness, indicating a positive relationship between mindful attention awareness and satisfaction with academic majors among Nigerian undergraduates when gender is considered as a moderating variable. The p-value of 0.014 suggests that this relationship is statistically significant at the 0.05 level, meaning there is a low probability that this result is due to chance. The R-squared value of 0.375 indicates that approximately 37.5% of the variance in academic major satisfaction can be explained by mindful attention awareness and the moderating effect of gender. This suggests that mindful attention awareness is an important predictor of satisfaction with academic majors, particularly when considering gender differences.

Also, Academic Stress and Academic Major Satisfaction (with Gender as a Moderator) shows that the coefficient for academic stress is 0.081, indicating a positive relationship with satisfaction in academic majors. However, the p-value of 0.546 indicates that this relationship is not statistically significant, suggesting that the effect of academic stress on satisfaction is likely due to random variation rather than a meaningful relationship. The R-squared value of 0.067 shows that only 6.7% of the variance in academic major satisfaction is explained by academic stress and the moderating effect of gender. This implies that academic stress may not be a critical

factor influencing satisfaction with academic majors in this context.

Mindful Attention Awareness and Academic Stress on Academic Major Satisfaction (with Gender as a Moderator); shows a coefficient of 0.009 for the combined effect of mindful attention awareness and academic stress on academic major satisfaction, indicating a negligible positive relationship. The p-value of 0.677 signifies that this relationship is not statistically significant, suggesting that neither variable has a meaningful impact on satisfaction when gender is considered as a moderator. The R-squared value of 0.143 indicates that only 14.3% of the variance in satisfaction can be explained by these factors, which suggests that other variables may play a more significant role in determining academic major satisfaction.

Academic Stress on Academic Major Satisfaction (with Age as a Moderator); the analysis reveals a coefficient of -0.096 for academic stress, indicating a negative relationship with satisfaction in academic majors when age is a moderating variable. The p-value of 0.012 indicates that this relationship is statistically significant, implying that higher levels of academic stress are associated with lower satisfaction with academic majors among Nigerian undergraduates. The R-squared value of 0.301 suggests that approximately 30.1% of the variance in academic major satisfaction can be explained by academic stress and the moderating effect of age, highlighting the relevance of age in understanding the impact of academic stress on satisfaction.

Finally, Mindful Attention Awareness and Academic Stress on Academic Major Satisfaction (with Age as a Moderator); shows that the coefficient for the combined effects of mindful attention awareness and academic stress is 0.011, indicating a very slight positive relationship with academic major satisfaction. The p-value of 0.038 suggests that this relationship is statistically significant, meaning there is a reasonable likelihood that the effect observed is not due to chance. The R-squared value of 0.401 indicates that approximately 40.1% of the variance in academic major satisfaction is explained by mindful attention awareness, academic stress, and the moderating effect of age. This suggests that both mindful attention awareness and academic stress are important factors influencing satisfaction with academic majors, especially when considering age as a moderating variable.

Gender as a Moderator of the MAAS → AMSS Relationship

The interaction between mindfulness and gender in predicting academic major satisfaction was statistically significant, β_int = 0.07, t(182) = 2.48, p = 0.014, indicating that gender moderated the effect of mindfulness on major satisfaction. A simple slopes analysis was conducted to probe this interaction. The findings suggest that higher mindfulness corresponds with lower satisfaction with academic majors for both male and female students. Although females (coded 2) exhibited slightly higher AMSS at lower levels of MASS, the slopes were almost parallel, suggesting minimal moderation. Thus, gender did not substantially alter the strength or direction of the relationship between mindfulness and academic major satisfaction.

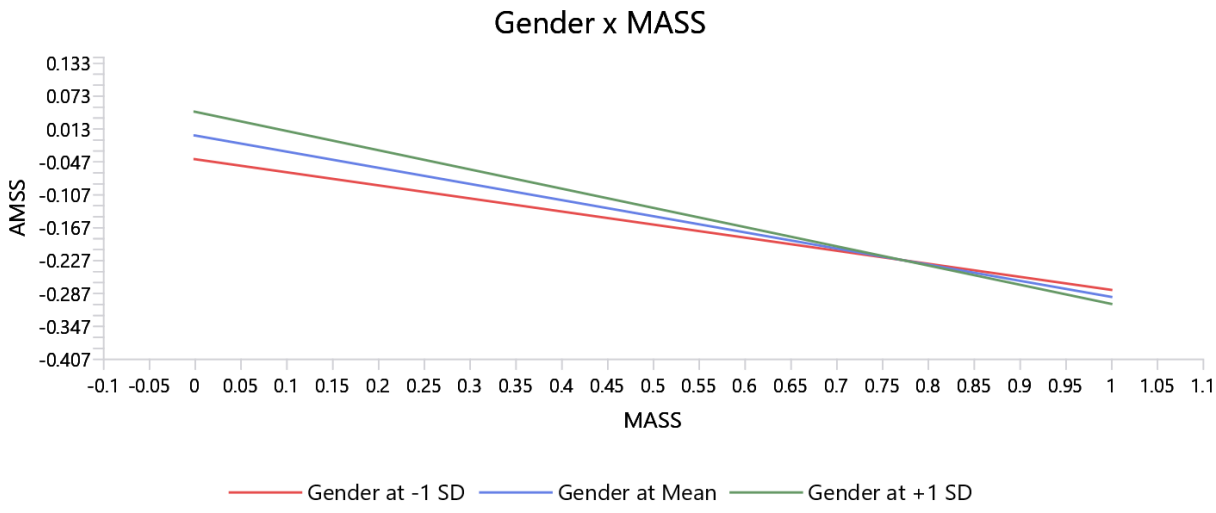

Fig 2: Interaction plot showing the moderating role of gender in the relationship between mindfulness and academic major satisfaction

Age as a Moderator of the ASS → AMSS Relationship

The interaction between academic stress and age in predicting AMSS was also significant, β_int = −0.06, t(182) = −2.00, p = 0.048, suggesting that age moderated the association between academic stress and satisfaction. Simple slopes analysis revealed that academic stress positively predicted academic major satisfaction across all age levels. However, this relationship was strongest among older students (+1 SD age), whose satisfaction increased sharply as stress increased. Younger students (–1 SD) showed only a modest increase. This pattern indicates that

age moderates the effect of academic stress on satisfaction, with older undergraduates demonstrating a greater capacity to translate academic stress into higher satisfaction with their major.

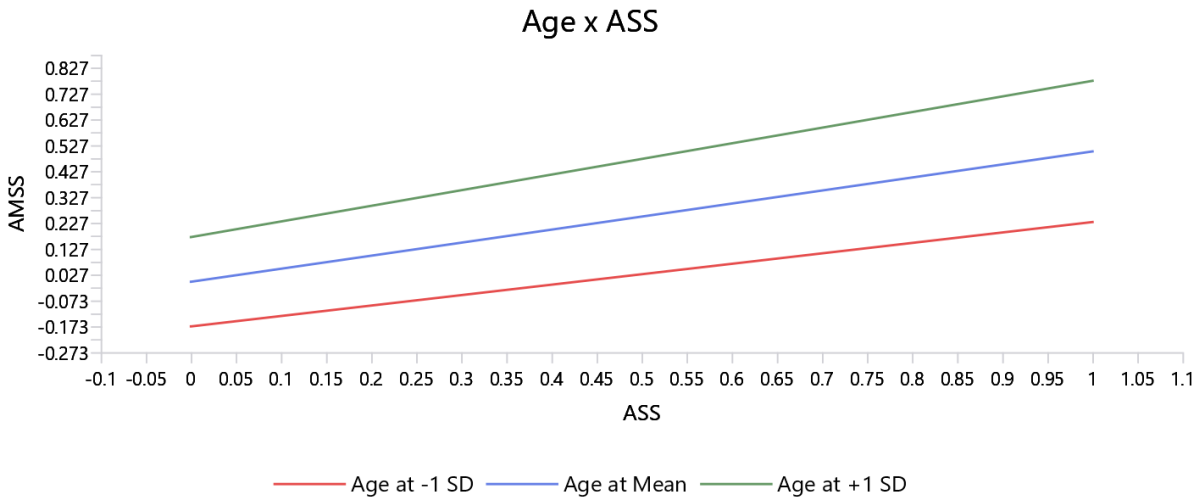

Fig 3: Interaction plot showing the moderating role of age in the relationship between academic stress and academic major satisfaction

Non-Significant Moderation Effects

Other tested interactions, including the combined effects of mindfulness, academic stress, and demographic variables, were not statistically significant ($p > .05$), suggesting that these combined moderation pathways do not meaningfully predict academic major satisfaction in this sample.

DISCUSSION

The present study investigated the interplay between mindfulness, academic stress, and satisfaction with academic majors among Nigerian undergraduates. Furthermore, it delves into the moderating roles of gender and age within these dynamics. The insights derived from this study contribute significantly to the understanding of student well-being and academic success within a unique socio-cultural and educational context.

A significant representation of female, Christian, and second-year students, predominantly enrolled in medical and health-related disciplines, was observed in the study sample. The study's demographic profile is crucial for contextualising the

observed findings. The high proportion of female students is a notable feature. Existing literature consistently indicates that female students often report higher levels of stress compared to their male counterparts and may employ distinct coping strategies, such as emotion-focused coping (Graves et al., 2021). This demographic skew suggests that the overall patterns observed in this study might reflect female experiences more, potentially influencing the magnitude and nature of stress-related findings. Furthermore, the majority of participants are second-year students, which places them at a specific developmental and academic juncture (Sterling, 2018). At this stage, students have typically navigated the initial adjustment phase of their first year but are increasingly exposed to the rigorous demands and specialised content of their chosen major (Sterling, 2018). This period can be characterised by heightened academic pressure as coursework intensifies and expectations rise. Additionally, the overwhelming representation from medical and health-related disciplines is perhaps the most critical contextual factor. Medical education is widely acknowledged as an intensely stressful endeavour, characterised by heavy workloads, significant exam tension, and chronic time shortages (Okoye et al., 2022). This inherent stress profile associated with the major itself is expected to exert a substantial influence on the observed academic stress levels and their relationships with other variables.

Participants in the study demonstrated a moderate level of mindful attention awareness. This suggests that while these students possess some capacity for mindfulness, there is considerable room for enhancing these skills. The literature widely supports the efficacy of mindfulness-based interventions in improving mindfulness levels, academic satisfaction, reducing stress, anxiety, and depression, and enhancing overall well-being (Babadi et al., 2024; Nwadi et al., 2025). The observed moderate level of mindfulness thus represents a potential opportunity for targeted interventions within the university setting. Such programs could improve their overall psychological well-being and enhance their coping mechanisms when confronted with the intense academic demands inherent in their fields (Bai et al., 2020; Nwadi et al., 2025). In terms of academic major satisfaction, a lower mean score was observed. This finding indicates that, on average, the students' low satisfaction with their academic majors signals potential

concerns about students' alignment with their chosen fields, particularly in high-pressure disciplines like medicine and health. Varying findings of moderate to high satisfaction levels with academic majors have been observed in similar studies (Jashmidi et al., 2017; Malik et al., 2023).

On the other hand, the Academic Stress Scale revealed a moderate mean score. This finding aligns with a substantial body of literature highlighting the high academic demands and stressors faced by university students, particularly those enrolled in medical programs (Ojedokun et al., 2023; Okoye, 2022). The relatively wide standard deviation of 21.29 also suggests considerable variability in perceived stress levels among the students, indicating that while the average is moderate, a significant portion of the sample likely experiences high levels of academic stress. Systemic challenges prevalent in the Nigerian educational system, such as large class sizes, limited teacher-student engagement, and infrastructural limitations, create a complex and demanding environment for student well-being (Ayeni & Olowe, 2016; Gbenga et al., 2023). Interventions aimed at stress reduction and enhancing well-being in this context must therefore be culturally sensitive and address these underlying societal pressures to be truly effective.

The Pearson correlation analysis reveals a significant negative correlation observed between mindfulness and academic stress, which aligns with existing literature positing that mindfulness mitigates stress (Alvarado-García et al., 2025; Babadi et al., 2024). This finding suggests that students with higher levels of mindful attention awareness tend to experience lower levels of academic stress. Mindfulness, characterised by present-moment, non-judgmental awareness, has been consistently demonstrated to alleviate stress, anxiety, and depression across various populations (Alvarado-García et al., 2025; Hofmann & Gómez, 2017). Specifically, in the Nigerian context, mindfulness-based stress reduction interventions have proven effective in mitigating test anxiety and enhancing overall well-being among university students (Nwadi et al., 2025). This is achieved via effective regulation of affect, reduced cognitive reactivity, and modulation of the hypothalamic–pituitary–adrenal (HPA) axis, which alleviates both the physiological and psychological symptoms associated with stress (Garland et al., 2015). Thus, fostering mindfulness

among students may serve as an effective strategy for reducing academic stress.

However, a significant negative correlation was observed between MAAS and AMSS. This suggests that higher levels of mindful attention awareness are associated with lower satisfaction with an academic major. This finding is counterintuitive, as mindfulness is generally associated with academic satisfaction, engagement, and achievement in previous studies (Babadi et al., 2024; Bordbar et al., 2024). This unexpected finding may reflect cultural or contextual nuances. In high-stress academic environments, such as Nigerian medical programs, heightened mindfulness can amplify awareness of dissatisfaction with institutional or curricular demands. They may become more acutely attuned to the inherent difficulties, overwhelming pressures, or discrepancies between their initial idealised expectations and the challenging reality of their academic journey. This deeper awareness, while beneficial for stress reduction, might simultaneously reveal underlying dissatisfactions that were previously suppressed or unacknowledged. While mindfulness can attenuate negative thoughts and enhance academic achievement (Bordbar et al., 2024; Miralles-Armenteros et al., 2021), it fosters greater awareness of inner experiences, both positive and negative (Indriaswuri et al., 2023). Mindfulness may help them cope with the immediate stress, however, it may not inherently make the source of that stress (the major itself) more satisfying if the demands are perceived as overwhelming or relentless. Future longitudinal studies would be beneficial to determine if this negative correlation persists over time or if it represents a temporary phase as students become more deeply aware of the demands of their chosen field.

Furthermore, a significant positive correlation was observed between Academic Major Satisfaction and Academic Stress. This challenges conventional assumptions that stress inherently diminishes satisfaction. Instead, it suggests that stress in this context may be perceived as a marker of engagement or investment in one's academic journey, particularly in competitive fields where stress is normalised as part of professional preparation (Mirabelli et al., 2025). Students who report high satisfaction with their major are likely to be deeply invested, highly motivated, and committed to achieving excellence in their chosen field, thus inherently exposing them to greater academic pressure and stress. In this context, the increasing stress becomes a

byproduct of their profound commitment and the rigorous nature of their chosen academic path. Also, the study's setting in Nigeria introduces unique cultural and societal influences that merit careful consideration. Nigerian culture often places a high value on academic success, which is frequently linked to family honour and personal self-esteem (Ojikutu, 2024). This cultural emphasis can generate immense pressure to perform exceptionally well.

However, it is important to note that this finding appears to contradict a previous study, which reported a negative relationship between academic satisfaction and academic stress among nursing students (Shehadeh et al., 2020). Several factors could account for this discrepancy: differences in the specific student populations, cultural or institutional nuances, or variations in outcome measurement across studies. Future research should explore the threshold at which this "positive stress" transitions into detrimental burnout.

Gender as a Moderator

A significant moderation effect was observed for gender on the relationship between mindful attention awareness and academic major satisfaction. This indicates that the nature of the relationship between mindful attention awareness and academic major satisfaction differs significantly between male and female students. Given the overall negative correlation between MAAS and AMSS, this suggests that the strength or even the direction of this negative association varies by gender. Research consistently highlights gender differences in stress perception, coping mechanisms, and overall mental health outcomes (Goren et al., 2025; Rubach et al., 2022). Female students, for instance, frequently report higher stress levels and may engage more often in emotion-focused coping strategies (Graves et al., 2021). Female students in Nigeria, who already experience higher academic stress and potentially greater societal pressures regarding academic success and family honour (Onchi & Lami, 2023), might find that increased mindfulness makes them more acutely aware of these cumulative burdens. This heightened awareness could lead to relatively lower satisfaction compared to males, or a stronger negative relationship between mindfulness and major satisfaction for females. However, further analysis examining the simple slopes of this interaction would be necessary to determine if the negative relationship between MAAS and AMSS is stronger for females or males.

However, the moderation effect of gender on the relationship between academic stress and academic major satisfaction was non-significant. Despite general gender differences in stress experiences, this finding suggests that gender does not significantly alter the positive relationship between academic stress and academic major satisfaction in this specific sample. This implies that the scenario where higher satisfaction is associated with higher stress due to deep investment, as previously discussed, operates similarly for both male and female students in this Nigerian context.

The moderation effect of gender on the combined influence of mindful attention awareness and academic stress on academic major satisfaction was also non-significant. This indicates that while gender may influence the direct relationship between mindfulness and satisfaction, it does not significantly alter the more complex interplay when both mindfulness and academic stress are considered together in predicting academic major satisfaction.

Age as a Moderator

A significant moderation effect was observed for age on the relationship between academic stress and academic major satisfaction. This indicates that the positive relationship between academic stress and academic major satisfaction differs significantly across age groups. The negative coefficient suggests that as age increases, the positive relationship between academic stress and major satisfaction reduces. Age is known to influence coping resources, self-regulation abilities, perceptions of stress, engagement, and satisfaction (Monteiro et al., 2014; Bălţătescu & Cernea-Radu, 2024). Older students might possess different life priorities, more developed coping skills, or a more nuanced perspective on academic challenges.

A significant moderation effect was observed for age on the combined influence of mindful attention awareness and academic stress on academic major satisfaction. This indicates that the complex interplay between mindfulness, academic stress, and satisfaction varies significantly depending on the student's age. The buffering effects of mindfulness on stress, and consequently on satisfaction, might be more or less pronounced at different ages. The positive coefficient observed in this study suggests that as age increases, the combined effect becomes more positive. This could imply that for older students, mindfulness and effective stress management contribute more positively to

their satisfaction, perhaps because they are better at integrating these experiences or possess a clearer sense of purpose. This highlights that interventions aimed at enhancing mindfulness and managing academic stress should consider age-specific approaches. What proves effective for a younger, highly driven student might require adaptation for an older student with different life experiences and priorities.

Implications of the Study

The findings of this study offer several important practical implications and recommendations for universities, particularly those in Nigeria with students in demanding medical and health-related disciplines. Firstly, given the strong negative correlation between mindfulness and academic stress, alongside the broader evidence regarding the benefits of mindfulness, Nigerian universities should seriously consider integrating mindfulness-based stress reduction (MBSR) programs into their curricula. These programs could be specifically tailored to address the unique stressors inherent in demanding academic fields, helping students develop essential coping skills and emotional regulation strategies.

Secondly, the positive correlation between academic major satisfaction and academic stress, while potentially indicative of deep student investment, also signals a significant risk of burnout. Universities need to provide comprehensive resources that help students manage this "positive stress" before it escalates into detrimental exhaustion. This may include practical stress management training, such as workshops on time management, effective academic planning, and the development of healthy coping mechanisms.

Lastly, the observed moderation effects highlight the necessity of gender- and age-specific support strategies. For gender, it is important to acknowledge that female students may experience and cope with academic stress differently than their male counterparts, often reporting higher stress levels. Interventions should therefore consider gender-sensitive approaches, offering tailored support groups or coping skill workshops that resonate more effectively with gender experiences. For age, the moderation effects indicate that older students might respond to stress and mindfulness interventions in distinct ways. Support programs should be diversified to cater to the evolving needs and coping styles of students across different age groups.

Limitations

Despite providing valuable insights, this study is subject to several limitations that warrant consideration when interpreting its findings. Firstly, the cross-sectional design of the study precludes the establishment of definitive causal inferences. While correlations and moderation effects were identified, it is not possible to determine if one variable causes the other variable to occur. Secondly, the reliance on self-report measures for all variables introduces potential biases. Self-report questionnaires are susceptible to social desirability bias (where participants may report what they believe is socially acceptable), recall bias, and subjective interpretation. Future research could enhance methodological rigour by incorporating objective measures where feasible, such as physiological indicators of stress. Thirdly, the highly specific demographic profile of the sample, predominantly female, second-year, medical and health-related Nigerian undergraduates, significantly limits the generalizability of the findings. The results may not be directly transferable to other student populations, such as male students, students in different academic years, those in other academic disciplines, or undergraduates in different cultural contexts.

Fourthly, the study's quantitative approach, while effective in identifying statistical relationships, does not fully capture the nuanced lived experiences of the students. The absence of qualitative data means that the study cannot provide deeper insights into why certain counter-intuitive relationships were observed, such as the negative correlation between mindfulness and academic major satisfaction or the positive correlation between academic major satisfaction and academic stress. Understanding the students' perceptions and coping narratives would enrich the interpretations. Finally, while gender and age were explored as moderators, other potential moderating variables were not included. Factors such as socioeconomic status, social support, religious practice, or academic self-efficacy could further explain the complex interplay of these variables.

Declaration of Originality:

We declare that this manuscript is our original work and has not been submitted or published elsewhere. We have reviewed and approved the final version of the manuscript.

Conflict of Interest:

We declare that there are no conflicts of interest regarding the publication of this paper.

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Informed consent was obtained from all individual participants included in the study.

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