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DETERMINANTS OF ACADEMIC STRESS AMONG STUDENTS: EVIDENCE FROM STRUCTURAL EQUATION MODELING

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ABSTRACT

Purpose- *The objective is to identify the root causes of academic stress among students and contribute substantially to targeted interventions, support systems, and policies for a healthier learning environment.*

Design/methodology/approach-*The study incorporates a robust methodology with a synthesized 'Hypothesized Research Model,' derived from a comprehensive literature review. Through a meticulously structured questionnaire and a sample of 272 students from various departments at Sambalpur University, Odisha, the research examines the relationship between overall academic stress and its determinants.*

Findings-*The structural model analysis, utilizing SeminR and advanced bootstrapping, rigorously assessed five hypotheses on direct relationships between pivotal constructs. All hypotheses were validated, revealing significant findings. Notably, the research identifies the impact of the learning environment, interpersonal relationships, teaching approaches, and student apathy on academic stress. The positive relationship between overall academic stress and academic performance strain underscores the interconnectedness of these factors.*

Originality/Value-*These insights contribute to a nuanced understanding of academic stress in higher education, offering guidance for institutions, especially in the context of the challenges posed by the COVID-19 pandemic and the shift to online learning.*

Keywords- *Academic stress, Higher education, Learning environment, Teaching approaches, Stress management.*

1. INTRODUCTION

Academic stress has emerged as a pervasive and critical concern in higher education, affecting the mental well-being and academic performance of students (Prasad et al., 2020). Again, The adverse impact of academic stress on students' mental well-being is notably pronounced, especially among adolescents (Reddy & Lalitha, 2019). Moreover, academic stress is a primary factor contributing to the overall stress burden on Generation Y and Z students, manifesting in detrimental physical and psychological repercussions (Ramachandiran & Dhanapal, 2017). The profound issue of academic stress in higher education, exacerbated by the COVID-19 pandemic and the shift to online learning, has introduced a spectrum of challenges for university students, resulting in diverse degrees of stress (Fayda-Kınık, 2020).The transition to higher education represents a pivotal phase in an individual's life, marked by increased academic demands, heightened expectations, and a complex socio-environment (Harahap et al., 2020; Mayya et al., 2020; Tibus & Ledesma, 2019). As students navigate through rigorous coursework, challenging examinations, and diverse social interactions, the amalgamation of these factors often gives rise to academic stress.

Understanding and evaluating the constructs responsible for academic stress in higher education is imperative for several reasons. First and foremost, the mental health of students is a paramount consideration, as excessive stress can lead to anxiety, depression, and other psychological challenges (Liaw & Olowolayemo, 2020; Shaffique et al., 2020; Qazi, 2020; Stormon et al., 2019). Moreover, academic stress has a direct correlation with academic outcomes, impacting students' abilities to learn, retain information, and perform well in their studies (Omar, 2020). Identifying and assessing the key constructs contributing to academic stress is a crucial step in developing

effective interventions, support systems, and policies aimed at promoting a healthier and more conducive learning environment (Pradana & Tentama, 2020).

This exploration involves delving into multifaceted factors, including but not limited to, the perceived importance of subjects, teaching methodologies, communication dynamics between students and educators, facility inadequacies, and examination-related pressures. A comprehensive evaluation of these constructs provides valuable insights into the root causes of academic stress, enabling educational institutions to tailor interventions that address specific challenges faced by students. Through this lens, educators, administrators, and policymakers can collaboratively work towards fostering an educational milieu that nurtures not only academic excellence but also the holistic well-being of students in higher education.

2. REVIEW OF LITERATURE

2.1. Academic Stress in Higher Education

Academic stress, a pervasive issue in higher education institutions (HEIs), poses a significant threat to the mental well-being of both academic staff and students. While research highlights the prevalence of academic stress among higher secondary school students (Singh et al., 2020), there is a noticeable research gap concerning stress management and mental health among academic staff within HEIs (Ohadomere et al., 2020). Urging proactive measures, it is imperative for university management to prioritize staff welfare and implement targeted interventions aimed at enhancing mental well-being (Cárdenas et al., 2020). Contrary to assumptions, a study uncovered no direct link between stress and academic performance in mathematics students, challenging the notion that academic stress inherently determines performance outcomes (Fahri et al., 2020). Emphasizing the need for a more comprehensive understanding, further research is essential to gauge the effectiveness of management-led mental well-being strategies in HEIs (Fernández-Mojica et al., 2019). In addressing this intricate and multifaceted issue, it is crucial for higher education institutions to invest in tailored intervention strategies that support the holistic well-being of both students and academic staff.

2.2. Learning Environment and Academic Stress

The relationship between learning environment and academic stress has been examined in several studies. Consistent research findings highlight a strong correlation, revealing that students with a positive perception of their learning environment consistently exhibit lower stress levels (Resti et al., 2019). Moreover, the integration of dynamic audio-visual content into the learning environment has proven to be an effective strategy for not only diminishing general learning stress but also enhancing overall well-being (Nikolai et al., 2017). This underscores the importance of incorporating multimedia elements to create a more engaging and supportive learning atmosphere. In the specific context of senior nursing students engaged in clinical practice, the prevalence of high stress levels has been identified. Notably, there exists a positive correlation between these students' perception of their learning environment and their responses to stress (Cheng et al., 2020). This emphasizes the critical role of the learning environment in influencing the stress levels of students, particularly in demanding and practical settings. Furthermore, A diversified learning environment emerges as a key factor in enhancing learning abilities and mitigating the challenges posed by stressful contexts (Radka et al., 2018). This highlights the need for educational institutions to implement varied and adaptable approaches to cater to the diverse needs of students, fostering a more inclusive and stress-reducing educational experience. Additionally, research indicates that appropriate levels of stress can significantly influence brain activity (Iurea & Safta, 2017). This underscores the delicate balance required in educational settings, where managing stress is crucial for both individual mental health and the overall functioning of the learning environment.

2.3. Interpersonal relationship and Academic Stress

Interpersonal relationships have been found to have a significant impact on students' academic stress. Studies have shown that there is a negative correlation between interpersonal relationships and academic stress, indicating that better interpersonal relationships can help reduce academic stress (Kim, 2020; Li et al., 2020; Jung, 2019). Specifically, it has been found that stress in interpersonal relationships can lead to addictive behaviors, such as

excessive use of social networking sites like WeChat (Ramirez-Perez, 2018). Additionally, factors such as self-management skills and emotional regulation have been identified as potential ways to reduce academic stress and improve students' academic persistence (Zhenhua & Nan, 2020). Therefore, fostering positive interpersonal relationships and providing support programs to enhance students' self-management skills can be effective strategies to reduce academic stress and improve students' academic outcomes.

2.4. Teaching Approach and Academic Stress

The impact of teaching approaches on students' stress levels is underscored by various research. Öhrstedt and Lindfors (2018) revealed a positive association between a surface approach to learning and heightened perceived stress, while deep and strategic approaches exhibited more nuanced relationships with stress. Sotardi's (2018) exploration of elementary school teachers' perspectives identified high-stakes testing and peer conflict as significant stressors for students. Moreover, the university students illuminated the adverse effects of self-limiting mindsets, including stress mindsets, on academic success and overall well-being, yet highlighted the effectiveness of classroom mindset interventions in mitigating these limitations (Gold, 2018). Furthermore, Deasy et al. (2015) identified workload, assessment, exams, financial pressure, and teaching practicum as primary stressors for initial teacher education students, emphasizing the multifaceted nature of stress in educational settings and the need for targeted interventions across various levels of education.

2.5. Stress And Academic Performance

Stress has emerged as a critical factor significantly impacting the academic performance of students within higher education institutions (Abdullah et al., 2020). This comprehensive study identified a myriad of stressors, including challenges associated with campus life, financial constraints, and interpersonal relationships, all of which contributed to a discernible negative influence on students' scholastic achievements (Logan, 2020). A pivotal finding of this research was the inverse relationship between stress levels and academic performance, underscoring that increased stress levels correlated with diminished academic success (Fahri et al., 2020). This highlights the urgency of addressing stress as a central concern in higher education. To ameliorate this issue, proactive measures are imperative. The study suggests that universities should proactively cultivate a supportive learning environment. This involves implementing initiatives that foster resilience, coping mechanisms, and overall well-being among students. Establishing dedicated counseling centers within academic institutions is a strategic move to provide accessible and professional assistance to students grappling with stressors (Rajak et al., 2019). Moreover, extending the focus beyond students, the research also sheds light on the impact of stress on educators in higher education. Teacher performance was identified as being susceptible to stress, with emotional regulation emerging as a critical factor. Recognizing and addressing the stressors faced by faculty members is vital to ensuring the overall efficacy of higher education institutions (Tungdamnernsawad, 2019).

3. OBJECTIVES AND HYPOTHESES

The primary objective of this research is to comprehensively investigate and understand the diverse constructs contributing to academic stress in higher education. By delving into the perceived importance of subjects, teaching methodologies, communication dynamics, facility inadequacies, and examination-related pressures, the study aims to provide valuable insights into the root causes of academic stress among students.

Hypotheses 1($H1_a$ & $H1_b$): Perceptions of the learning environment (LE) will be inversely correlated with Academic performance-related (AP) and Overall academic stress (OAS) levels among students.

Hypotheses 2($H2_a$ & $H2_b$): Better interpersonal relationships (IR) have will be negatively correlated with academic performance-related stress and Overall academic stress levels.

Hypotheses 3($H3_a$ & $H3_b$): Expect a positive correlation between stress induced by Teaching approaches (TA) and both academic performance-related stress and an overall heightened perception of academic stress among students.

Hypotheses 4($H4_a$ & $H4_b$): Students' Apathy (A) has positive influence on academic performance-related stress and heightened Overall academic stress.

Hypothesis 5(H5): Overall academic stress levels are anticipated to have an inverse relationship with academic performance strain.

Ultimately, this research embarks on a comprehensive exploration of the multifaceted dimensions of academic stress in higher education, aiming to provide a nuanced understanding beyond the surface. By unraveling intricacies such as the perceived importance of subjects, diverse teaching methodologies, communication dynamics, facility inadequacies, and examination pressures, the study seeks to identify the root causes of academic stress among students. The overarching objective is to contribute substantially to the development of targeted interventions, support systems, and policies that foster a healthier and more conducive learning environment. Additionally, the insights derived from this research are poised to offer invaluable guidance for educational institutions grappling with the evolving challenges precipitated by the COVID-19 pandemic and the shift to online learning, thereby addressing the pressing need for adaptable and informed approaches in the contemporary higher education landscape.

4. METHODOLOGY

Our research methodology incorporates a robust model derived from a synthesis of both primary and secondary data sources. The development of the 'Hypothesized Research Model' is grounded in a comprehensive review of existing literature, extracting pertinent factors to guide our investigation. To empirically examine the relationship of overall academic stress with the determinants of stress and we designed a meticulously structured questionnaire with relevant variables. Employing a five-point Likert scale, we systematically gathered responses from 272 students. The selection of university initially utilized convenience sampling, followed by a refined stage of simple random sampling to identify individual respondents from various departments viz, MBA, Physics, Economics, English (Literature). This meticulous sampling approach ensures the robustness and representativeness of our findings, contributing to a nuanced understanding of the relationship between overall academic stress and the stressors within the unique context of higher education in Sambalpur University, Odisha.

5. RESEARCH FINDINGS AND ANALYSIS

5.1 Reliability analysis

Structural Equation Modeling (SEM) served as the analytical framework, facilitated by the Advance R(Lavan & Psyche Packages) software, to meticulously construct the model and substantiate hypotheses. The assessment of validity and model fitness involved a meticulous examination of both the measurement and structural models. Utilizing Psyche, Exploratory Factor Analysis (EFA) was conducted to validate the questionnaire through a factor reduction methodology. The suitability of EFA was affirmed through statistical measures, including the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test (Table-1). Reliability, assessed via Cronbach's alpha, surpassed the threshold of 0.70 across all items, ensuring the robustness of the instrument (Table 2). Extracting six distinct factors (Factors with Eigein value more than 1 in depicted in Scree plot, Figure- 2) from the PCA Varimax rotation (Figure-1) matrix, each with factor loadings surpassing 0.5, underscored the questionnaire's robust validation, collectively elucidating 68% of the total variations. Subsequent scrutiny involved the validation of fitness indexes and rigorous testing of hypotheses. Confirmatory Factor Analysis (CFA) was executed to gauge the fidelity of well-defined variables in representing distinct factors, contributing to the methodological precision of the study.

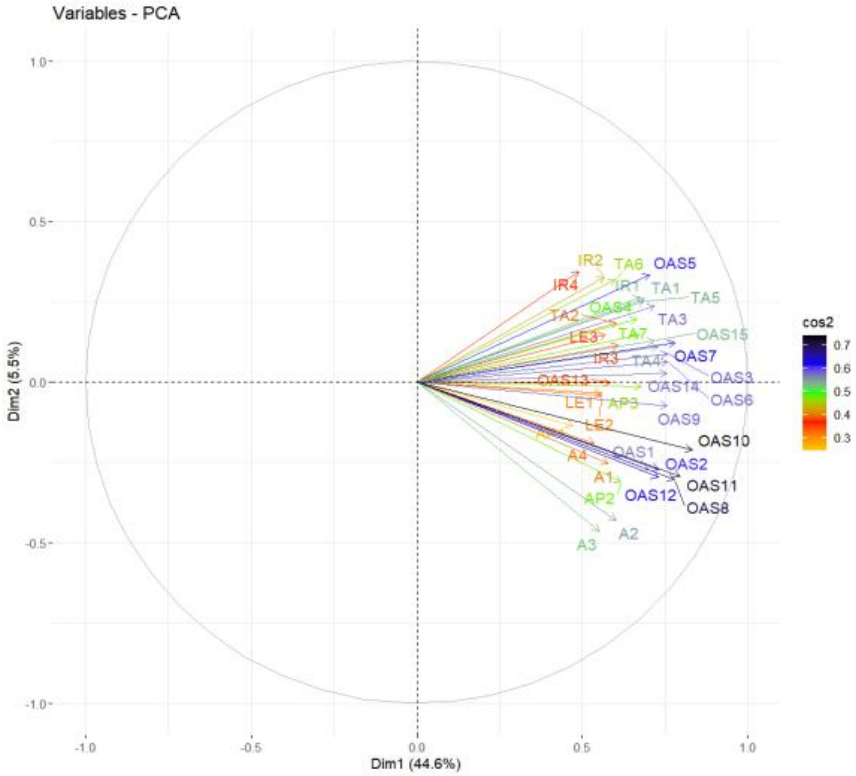

Figure-1

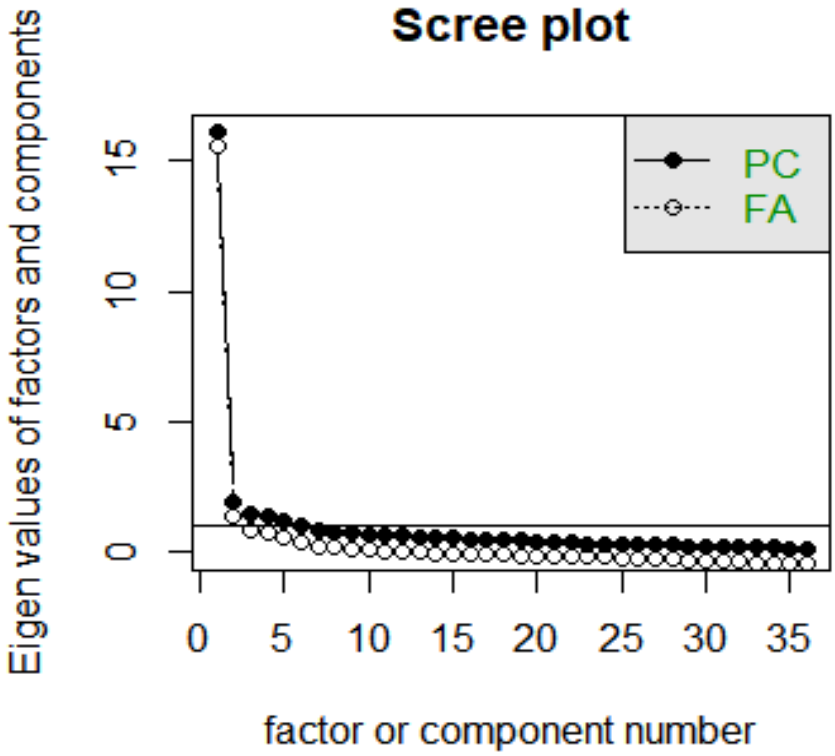

Figure-2

Table-1 (Goodness of Fit)

Statistics	Guidline	Observed Value
Chi-sqaure	P<0.05	χ^2=674.547, df = 311, p = 0.00
GFI	0.90 Traditional >0.95 Great	0.940
RMSEA	0.05 Good 0.05-0.10 moderate >0.10 Bad	0.066
SRMR	<0.09 Good	0.054
KMO	>0.7 Good	0.92
CFI	0.90 Traditional >0.95 Great	0.91
TLI	>0.90 Good	0.90

Table-2

Reliability:						
Constructs	Items	Factor Loadings	alpha	rhoC	AVE	rhoA
Learning Environment	LE1	0.86	0.77	0.87	0.69	0.77
	LE2	0.81				
	LE3	0.81				
Interpersonal Relationship	IR1	0.82	0.79	0.86	0.61	0.81
	IR2	0.80				
	IR3	0.82				
	IR4	0.69				
Teaching Approach	TA1	0.79	0.88	0.91	0.59	0.89
	TA2	0.69				
	TA3	0.80				
	TA4	0.79				
	TA5	0.79				
	TA6	0.71				
	TA7	0.80				
Apathy	A1	0.80	0.78	0.86	0.61	0.79
	A2	0.81				
	A3	0.78				
	A4	0.72				
Academic Performance	AP1	0.73	0.72	0.84	0.64	0.74
	AP2	0.83				
	AP3	0.83				
Overall Academic Stress	OAS1	0.73	0.95	0.95	0.58	0.95
	OAS2	0.75				
	OAS3	0.76				
	OAS4	0.70				
	OAS5	0.71				
	OAS6	0.78				
	OAS7	0.80				
	OAS8	0.82				
	OAS9	0.76				

	OAS10	0.86				
	OAS11	0.85				
	OAS12	0.78				
	OAS13	0.62				
	OAS14	0.79				
	OAS15	0.72				

5.2 Validity Analysis

To evaluate convergent validity, factors such as factor loadings, average variance extracted (AVE), and composite reliability (CR) were considered (Hair et al., 2022). The AVE consistently exceeded the recommended 0.50 threshold, and CR values surpassed the 0.70 threshold (Table-2) for all constructs (Chin, 2010). Factor loadings were above 0.5 (Table-2), confirming convergent validity (Chin, 1998; Hair et al., 2014). For discriminant validity, the heterotrait–monotrait ratio (HTMT) with bootstrap confidence intervals, as proposed by Henseler et al. (2015), was employed. The model, bootstrapped through SeminR, demonstrated discriminant validity with HTMT below 1.0 (Table-3) at a 95% confidence interval (Henseler et al., 2015; Franke and Sarstedt, 2019).

Table-3

Bootstrapped HTMT:					
Correlation	**Original Est.**	**Bootstrap Mean**	**Bootstrap SD**	**2.5 % CI**	**97.5 % CI**
Learning Environment -> Interpersonal Relationship	0.61	0.61	0.07	0.48	0.74
Learning Environment -> Teaching Approach	0.69	0.69	0.07	0.54	0.83
Learning Environment -> Apathy	0.60	0.60	0.08	0.43	0.75
Learning Environment -> Academic Performance	0.68	0.68	0.06	0.55	0.80
Learning Environment -> Overall Academic Stress	0.70	0.70	0.07	0.56	0.83
Interpersonal Relationship -> Teaching Approach	0.77	0.77	0.05	0.66	0.85
Interpersonal Relationship -> Apathy	0.63	0.63	0.06	0.52	0.73
Interpersonal Relationship -> Academic Performance	0.70	0.71	0.06	0.58	0.82
Interpersonal Relationship -> Overall Academic Stress	0.76	0.76	0.05	0.66	0.84
Teaching Approach -> Apathy	0.66	0.66	0.05	0.55	0.75
Teaching Approach -> Academic Performance	0.73	0.73	0.05	0.63	0.82
Teaching Approach -> Overall Academic Stress	0.86	0.86	0.02	0.82	0.90
Apathy -> Academic Performance	0.73	0.73	0.06	0.61	0.85
Apathy -> Overall Academic Stress	0.77	0.77	0.05	0.66	0.86
Academic Performance -> Overall Academic Stress	0.80	0.80	0.04	0.72	0.88

5.1. Structural Model Analysis And Discussion

In the thorough examination of our research model, we leveraged SeminR for precise latent variable score estimation and employed advanced bootstrapping for model scrutiny. Within this intricate framework, we subjected five hypotheses, positing direct relationships between pivotal constructs, to thorough assessment. Our analytical journey involved meticulous t-statistics comparison against critical t-table values (1.96) to discern the nuanced significance of these relationships. Our endeavor yielded a rich tapestry of outcomes, with all hypotheses validated, documented below in Tables 4 and 5, & Figure-3.

Hypotheses $H1_a$ & $H1_b$

our comprehensive examination of the research model, we delved into hypotheses offering unique insights into the intricate dynamics of Overall Academic Stress (OAS) and its determinant factors in higher education. Hypotheses $H1_a$ and $H1_b$ posited an inverse correlation between students' academic stress levels, academic

performance strain, and perceptions of the learning environment. $H1_a$ had a statistically significant path coefficient (β=0.13; t=2.25), supporting previous research on the significant impact of the learning environment on academic performance (Iurea & Safta, 2017; Usman & Mududili, 2019). $H1_b$ was also accepted despite lower values (β=0.10; t=1.98), indicating a lesser impact on students' overall academic stress, in line with the observation that students typically possess the capability to navigate the academic environment and manage stress effectively (Hasibuan, 2019).

Hypotheses $H2_a$ & $H2_b$

The second set of hypotheses ($H2_a$ and $H2_b$) proposed a negative correlation between better interpersonal relationships (IR) and academic performance stress, and overall academic stress levels. Both hypotheses were affirmed with statistical significance (β=0.19; t=2.60) and (β=0.13; t=2.74), aligning with previous research on stress factors in Sino-foreign cooperative higher education, states that academic stress is caused by factors such as academic competition, interpersonal relationships, and financial burden (Yin, 2020).

Hypotheses $H3_a$ & $H3_b$

The third hypotheses ($H3_a$ and $H3_b$) suggested a positive correlation between stress induced by Teaching Approaches (TA) and both academic performance-related stress and an overall perception of academic stress. Statistical support was found for both $H3_a$ (β=0.26; t=3.29) and $H3_b$ (β=0.42; t=8.61), consistent with earlier research stating academic stressors such as teacher evaluations and the type of work requested by teachers can also cause stress (Cooper & Fry, 2020).

Hypotheses $H4_a$ & $H4_b$

Hypotheses $H4_a$ and $H4_b$ predicted that Students' Apathy (A) has a positive influence on academic performance-related stress and overall academic stress. Results supported both hypotheses (β=0.26; t=4.19) and (β=0.22; t=4.62), aligning with research indicating that motivation enhances performance (Nauzeer & Jaunky, 2019), while apathy results from a heavy course load leading to chronic academic stress (Naderi et al., 2018).

Hypothesis 5 (H5)

Lastly, Hypothesis 5 (H5) yielded positive results (β = 0.19; t = 4.19), affirming the existence of positive relationship of Overall academic stress levels with academic performance strain. As, there exists a covariant relationship where heightened academic stress aligns with a decline in course grades or academic performance (Struthers et al., 2000), This clearly indicates that as academic performance stress increases, overall academic stress also rises.

Table-4

Path Coefficients:		
	Academic Performance	**Overall Academic Stress**
R^2	0.47	0.76
AdjR^2	0.46	0.75
Learning Environment	0.13	0.10
Interpersonal Relationship	0.19	0.13
Teaching Approach	0.26	0.42
Apathy	0.26	0.22
Academic Performance	.	0.19

Table-5

Structural Paths	Original Est.	Bootstrap Mean	Bootstrap SD	T Stat.	P Value	Decision
Learning Environment -> Academic Performance	0.13	0.13	0.06	2.25	0.02	Supported

Learning Environment -> Overall Academic Stress	0.10	0.10	0.05	1.98	0.04	Supported
Interpersonal Relationship -> Academic Performance	0.19	0.19	0.07	2.60	0.00	Supported
Interpersonal Relationship -> Overall Academic Stress	0.13	0.14	0.05	2.74	0.00	Supported
Teaching Approach -> Academic Performance	0.26	0.26	0.08	3.29	0.00	Supported
Teaching Approach -> Overall Academic Stress	0.42	0.42	0.05	8.61	0.00	Supported
Apathy -> Academic Performance	0.26	0.26	0.06	4.19	0.00	Supported
Apathy -> Overall Academic Stress	0.22	0.22	0.05	4.62	0.00	Supported
Academic Performance -> Overall Academic Stress	0.19	0.18	0.05	4.19	0.00	Supported

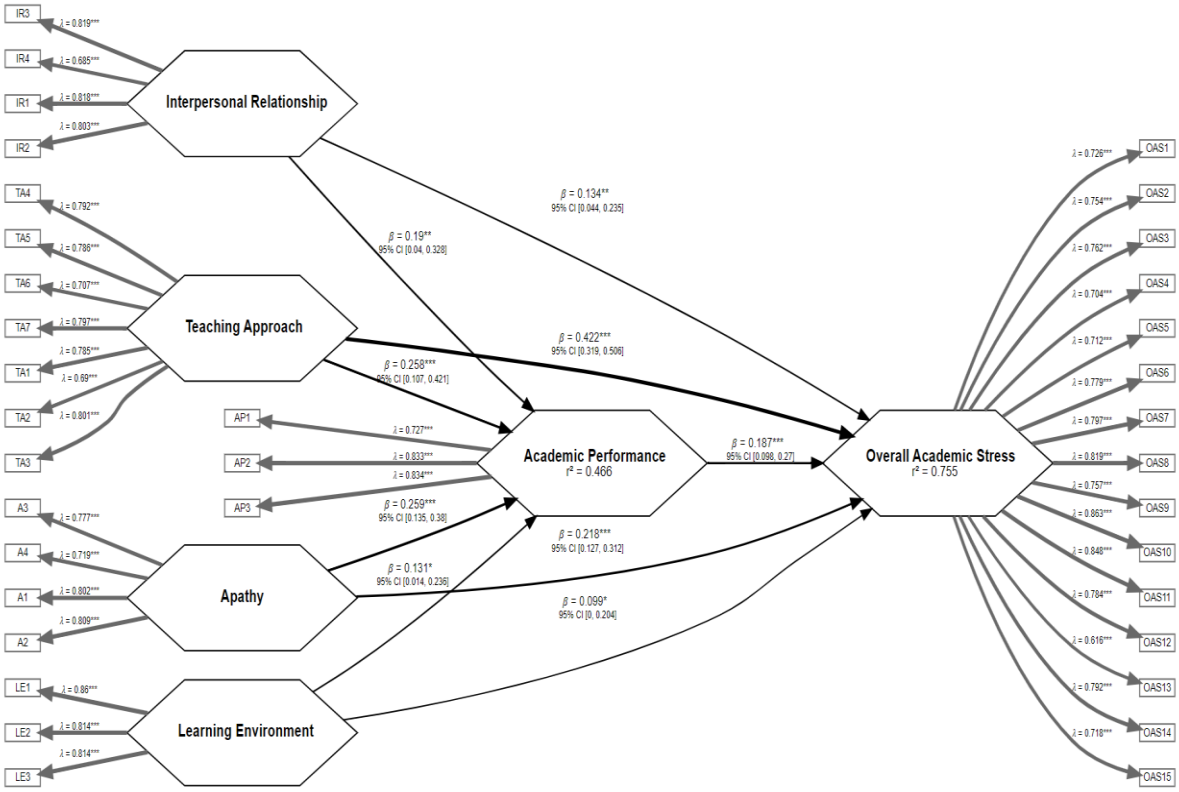

Figure-3

5.2. Implications

5.2.1. Academic Implications

The research findings highlight critical considerations for academic enhancement. Firstly, the pivotal role of the learning environment in shaping students' academic experiences underscores the importance of prioritizing supportive and conducive educational settings. This involves recognizing the significant impact of the learning environment on academic performance. Additionally, the positive correlation between interpersonal relationships

and reduced academic stress emphasizes the need for fostering supportive social networks within the academic community. To achieve this, institutions should actively promote and cultivate strong interpersonal connections among students. Moreover, the positive correlation between teaching approaches and academic stress emphasizes the influential role of pedagogy in student well-being. It calls for a strategic focus on equipping educators with effective and stress-reducing teaching methodologies through comprehensive teacher training programs. These programs should enhance the overall learning experience by incorporating pedagogical approaches that foster a positive and engaging educational environment. Furthermore, the study draws attention to the impact of student apathy on academic stress, suggesting the need for institutions to implement strategies that go beyond traditional teaching methods. This includes supplementing teaching approaches with appropriate pedagogy and emphasizing positive teacher-student interactions. Implementing such strategies can contribute to boosting student motivation and engagement, creating a more dynamic and enriching educational experience.

5.2.2. Administrative Implications

From an administrative perspective, the research findings provide valuable insights for shaping policies and support systems. Addressing the multifaceted nature of academic stress requires a comprehensive approach. Academic institutions should consider implementing stress management programs that holistically address various stressors, including those related to learning environments, interpersonal dynamics, teaching approaches, and student motivation. The study also underscores the importance of monitoring and supporting students, especially during challenging periods, to mitigate the positive relationship between overall academic stress levels and academic performance strain. Moreover, the acknowledgment of the impact of the COVID-19 pandemic on academic stress emphasizes the need for institutions to continually adapt and refine approaches to address evolving challenges. Administrators should prioritize ongoing research and evaluation to stay informed about factors influencing academic stress, enabling continuous improvement of support systems and interventions.

6. CONCLUSION & FUTURE RESEARCH DIRECTIONS

In conclusion, this research delves into the intricate dimensions of academic stress in higher education, shedding light on the crucial role of the learning environment, interpersonal relationships, teaching approaches, and Apathy. The findings underscore the significance of creating supportive learning environments, fostering positive interpersonal connections, and equipping educators with effective teaching methodologies. Additionally, the study highlights the need to address student apathy and implement strategies to enhance motivation and engagement. Looking ahead, future research endeavors should explore the long-term impacts of interventions aimed at improving the learning environment, investigating the sustained effects on academic stress management and overall student well-being. Further investigations into the evolving challenges posed by the COVID-19 pandemic on academic stress and the effectiveness of online learning adaptations would also provide valuable insights. Additionally, understanding the interplay between various stressors and the development of targeted, holistic interventions remains an essential avenue for future research, contributing to the ongoing efforts to cultivate healthier and more conducive learning environments in higher education.

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