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Academic Stress as a Factor Influencing the Relationship Between Perceived Campus Climate and Academic Achievement of Students

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Many students often view higher education settings as unwelcoming or emotionally cold, which can make their academic journey more challenging. Despite growing interest in how students experience their campus environment, there's still very little research that looks closely at how academic stress might explain the link between how students feel about their campus climate and how well they perform academically. Therefore, the present study aimed at investigating the intervening role of perceived academic stress in relationship between students' perceived campus climate and academic achievement by taking the Study-Demand-Resources (SD-R) model as a theoretical framework. The study participants were 360 regular undergraduate students of Debre Markos University, Ethiopia. A cross-sectional research design was employed. Consequently, students generally had a positive perception of the campus climate. Students experienced high levels of academic stress, since lower scores on the scale represent higher stress. The study also revealed a positive campus climate perceptions are linked to less stress and better academic performance. However, academic stress has a negative impact on academic achievement. Finally in the present study, academic stress acted as an intervening factor between perceived campus climate and academic achievement. This result validates the SD-R model's premise that stress plays a significant role in linking the interaction between resources (like campus atmosphere) and outcomes (like academic achievement). The research also adds to the theory and literature by shedding light on how students view the campus environment, academic stress, and academic success within the Ethiopian setting.

Introduction

The ultimate goal of education is to provide graduates a crucial and flexible skill set for an ever-evolving marketplace. Higher education accomplishes this goal by providing

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specialized information, demanding coursework, and professional training and cultivates competence in selected disciplines (Kassaw et al., 2024; Morris, 2019).

Higher education influences both individual and community advancement by promoting intellectual development, professional preparedness, and engaged participation in society. Higher education's critical role in influencing a country's intellectual, social, and economic growth has made academic accomplishment a major priority on international educational agendas. (Robinson et al., 2019). This implies that learning, especially in higher education, is a complex process meant to create well-rounded, flexible individuals who are capable of evolving as individuals and as society. Only 3.3% of the more than 900,000 Ethiopian students who applied for higher education in 2022 were granted admission. The social sciences had a 1.3% pass rate, while the natural sciences had a 3.6% pass rate. Remarkably, no pupils passed the national test in 39.2% of schools (Addis standard, 2023). This decline has necessitated conducting this research to examine the underlying factors affecting students' academic achievement, guided by the Study Demands–Resources (SD-R) model. By doing so, it contributes both theoretically and empirically to the existed literature on higher institution education.

In addition, on research gaps in previous studies, students' perceived campus atmosphere has a big impact on how stressed out they are academically in Ethiopian higher education, but little is known about this link locally. While much Ethiopian research has been on academic stresses such financial strains and severe workloads (Tsegay et al., 2022), few studies specifically look at how institutional atmosphere influences these stressors (Gedefaw et al., 2023), but broader comparative analyses across other variables are lacking. Moreover, the association between students' perceived campus atmosphere, academic success, and perceived academic stress are shown by the combined findings of Berhanu and Sewagegn (2024), Masendi (2021), McQueen et al. (2023) and Nodooshan et al. (2017). Few, if any, research combine the three variables—perceived campus climate, academic achievement, and academic stress—into a single, complete model. Most studies examine correlations pairwise, such as stress and performance or campus climate and stress. Similarly, Lipson et al. (2018) showed that organizational climate elements are closely associated to students' wellbeing, which affects academic functioning. Although these studies focused on vital direct associations, they largely investigate campus climate, stress, and achievement in isolation. There is still a lack of a comprehensive framework that examines how these factors interact and exert mediating effects.

Students' academic achievement is supposed to be influenced the perception they have towards the university (Berhanu & Sabanci, 2020); religious practice and lifestyle (Berhanu & Shiferaw, 2023); school-parent communication (Berhanu & Naidoo, 2024); Depression and substance abuse (Mengistie & Berhanu, 2025) and leadership style (Emiru & Berhanu, 2025). University students are open to several situations and behaviors due to the nature of their campus life. "Campus climate" has been broadly described as how people and groups feel like they belong to the campus community (Rankin et al., 2010). Most scholars believe that the dimensions of campus climate are multifaceted (Krebs, 2015; Loukas, 2007; Mehmood & Khalily, 2021). For example, Loukas (2007) postulated a three-dimensional campus climate framework based on academic, social, and physical factors. Zullig et al. (2010) identified positive student-teacher associations, school linkage, academic support, order and discipline, physical environment, social environment, perceived prohibiting/privilege, and academic gratification as the eight components of school climate. The current study was adapted from Berhanu and Sewagegn's (2024) dimensions of campus climate (e.g. university connectedness, and general climate, physical environment or structure, and ethnic and religious climate).

Research has repeatedly shown that students' psychological well-being and academic achievement are strongly influenced by an unpleasant rather than a friendly and inclusive atmosphere in academic settings (Amodeo et al., 2023; Berhanu & Sewagegn, 2024). This result is in line with the ecological paradigm developed by Bronfenbrenner (Bronfenbrenner, 1979), which holds that people make meaning of the world around them via their interactions with various surroundings. In general, students who are involved with the university—are more possible to reason positively of their time on campus and to stick with it (Berhanu & Sewagegn, 2024; McQueen et al., 2023; Masendi, 2021; Nodooshan et al., 2017).

Students' perceptions of the university climate also influence the academic achievement of students (Ma, & Wei, 2022; Saputra et al., 2020). A research displayed that campus climate has influenced student achievement, that is good academic performance can come from a supportive classroom environment, which is defined by elements like constructive teacher-student relationships, precise expectations, and efficient instructional methods (Gebreslasie et al., 2020; Kassaw & Demareva, 2024; Sabiha & Engin, 2017). By contrary, other scholars also displayed that there is no reasonable relationship (Bahçetepe, & Giorgetti, 2015). This requires further studies on relations between university climate and students' academic achievement.

The reciprocal link between university populations' symptoms of academic stress and their perceptions of the campus climate has been a growing area of study within the modern psychological research on education and institutional studies literature. According to Karadağ et al. (2016), this nexus is a crucial juncture where educational, environmental, and psychological elements come together to influence the student experience. Campus climate, either act as a stressor amplifier or as a protective factor (Lipson et al., 2018; Mayo, & Le, 2023). Addis Ababa University's higher education system in Ethiopia shows notable stressor gradients between departments with bureaucratic rigidity and those with strong mentoring cultures (Gogsido et al., 2024**).** Additionally, comparative analyses show that multidisciplinary learning environments seem to mitigate these effects (Lipson et al., 2018), but language hegemony in anglophone teaching exacerbates stress signals among non-native English speakers (Tsegay et al., 2022).

Another challenge on academic achievement of students is intense of academic stress. Optimal level of stress and anxiety is good academic and physical performance that helps being, confidence, industrious and fruitful (Naranjo-Pereira, 2009). When students start university life, there are important emotional, behavioral and mental changes such as adaptation, making new friends, being away from family, and confusion in new life. Psychological symptoms such as anxiety and stress appear in places where changes are experienced so intensely. Since being a university student and there are stressful situations in university life, university students often face stress throughout their university life. For this reason, some factors play a role in their confrontation with stress. At the university level, previous empirical researchers have reported a high prevalence of academic stress in students (Uyanne, 2021). In addition, level of stress among university students varied in terms of gender and healthy lifestyle behaviors. For instance, female students, students who sleep few hours and drink high alcohol were experienced high level stress (Uyanne, 2021). Students' test anxiety and academic stress as a whole prevalence has been up to 60%, from this, 25% of students experience at devastating level (Thomas et al., 2018). Putwain and Daly (2014) also found that 22% of female student experienced high level of academic stress. A study in South Africa University students, particularly on medical students showed that 78% of respondents experienced stress during the study. From these, the majority were female students (Naidoo et al., 2014).

Academic stress occurred when academic loads exceed the adaptive possessions available to students such as high workloads; lack of time between lesson work and social events; difficult course content, and lack of relevant education resources *(*Uyanne, 2021). In South Africa, various studies have found various causes of academic stress, for instance, Naidoo et al. (2014) identified academic and personal problems as prominent causes of stress in university students while Sikhwari et al.(2014) found students' perceived teachers' conduct and attitude, language barrier, poor time management are main causes for stress that yields poor academic achievement. McQueen et al. (2023) also explored the effects of campus climate perceptions on anxiety and academic competence among college women. The study found that a negative campus climate increases anxiety levels, which in turn diminishes students' self-perceived academic competence. This underscores the importance of a positive campus environment in supporting students' mental health and academic self-efficacy (McQueen et al., 2023).

Academic stress is also associated with worse academic results (Simonelli-Muñoz et al., 2018). Academic stress at the time of the exam, that source harm to their health (including suicidal ideation) (Uyanne, 2021). By considering all consequences academic stress, educators and educational leaders have focused on investigating the antecedents of academic stress and anxiety and its associations with students' academic achievement (Simonelli-Muñoz et al., 2018), to offer students with appropriate intervention to reduce the negative consequence produced by academic stress. Therefore, to recommend means to ameliorate devastating levels of academic stress and support student with high test-anxious, a wealth of research has to be done on the antecedents and consequences. In addition, its practical implication, several empirical studies have varied significantly in direction of correlations between religiosity, healthy lifestyle behaviors, perceived campus climate, academic stress and students' academic achievement.

Therefore, we aimed at clarifying the association between students' perceived campus climate and academic achievement by considering the intervening role of perceived academic stress in the case of Debre Markos University from Ethiopia. To achieve this aim, based on these empirical studies, researchers formulated the following specific objectives:

(1) Examine level of students' perceived campus climate, academic stress and academic achievement
(2) Assess students' statistical difference in students' academic stress due to gender, batch and religion affiliation
(3) Investigate the association between students' perceived campus climate, academic stress and academic achievement
(4) Examine the mediation effect of students' perceived academic stress in relationship between perceived campus climate and academic achievement

Theoretical framework

A model that investigates the mediation role of academic stress in the link between academic performance and perceived campus environment was tested using the Study Demands-Resources (SD-R) model. This model provides a robust theoretical foundation for analyzing how the study environment affects students' academic performance, health, and general well-being (Lesener et al., 2020). One way to think of the SD-R model is as a balancing scale. According to SDR model, academic achievement is portrayed as an outcome determined by the balance between student demands and environmental resources. Students' academic stressors including heavy workloads, tight deadlines, and performance pressure are on one side

of the study demands spectrum that can negatively impact well-being and performance when resources are insufficient. On the other hand, campus climate is conceptualized as an environmental resource that can enhance student engagement and buffer academic demands. There are environmental resources or study aids like supportive instructors, a sense of belonging on campus, or even someone to confide in during difficult moments. Lesener et al. (2020) developed the Study Demands–Resources (SD-R) model, which states that environmental resources are essential for improving study-related resources, which in turn lead to better academic results. Only and particularly, this approach has been verified in a university context (Berhanu & Sewagegn, 2024; Li et al., 2021). Perceived campus climate and personal background information are viewed in the current study as environmental resources that could potentially reduce academic stress, a significant study-related factor, and thereby promote higher academic achievement, which is considered a core study outcome. Figure 1 depicts the conceptual framework that supports this connection.

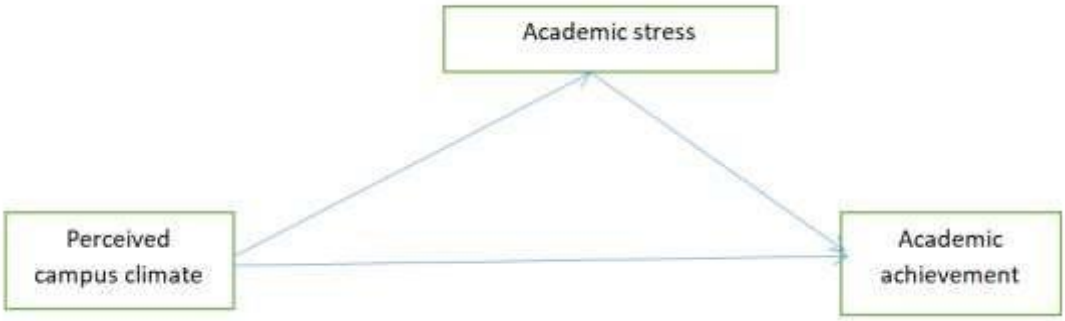

Figure 1: Proposed Conceptual Framework

Guided by SD-R model and empirical evidence that posits that environmental resources and demands jointly influence individual outcomes, this research proposes the following hypotheses:

H1: Perceived campus climate, academic stress and academic achievement are at moderate level

H2: students' academic stress is influenced by sociodemographic characteristics such as gender, batch and religion affiliation

H3: Academic stress is negatively associated with students' perceived campus climate and academic achievement

H4: Academic stress significantly mediates the relationship between perceived campus climate and students' academic achievement.

Methods

Research design and participants

The correlational survey design is preferred over others because it maximizes the potential relationship between different variable. The study was conducted at public university, Debre Markos University in Ethiopia. Undergraduate regular students at the university served as sources of primary data. Debre Markos University has a total of 26,613 students in the

regular, extension, and summer programs. Of these, 6,940 are regular undergraduate students. Using Yemane's formula, the total sample size was determined. A stratified random sampling technique was used in terms of students' batch to ensure representation across academic strata: first to fifth year. Proportional allocation was then used to determine the number of respondents to be selected from each study year.

Within each stratum, a representative samples were selected using simple random sampling techniques from official enrollment lists acquired from the Registrar's Office. The formula is $n= N/ (1+N (e)^2)=6940/(1+6940(0.05)^2 =6940/18.3=379$. However, 19 respondents did not return a complete survey. Therefore, 360 students were participated. Students were selected using simple random sampling from official enrollment lists obtained from the Registrar's Office**.** In terms of batch or length of stay at university, first-year students made up the largest proportion at 41.7% (150 students), with the numbers decreasing in higher years—third year (22.8%), fourth year (16.9%), second year (13.1%), and fifth year (5.6%)**,** yielding a total sample of 360 students.

Measures

After getting ethical approval from the university and a permission letter to conduct the study, data collection was started. Researchers also informed students that their participation was voluntary. This study received ethical approval from the institutional research ethical review committee at University of Johannesburg under reference number SEM 2-2023-095. Consent to participate and consent to publish are also obtained from study participants. They have been given the right to withdraw from filling questionnaire at any time. To ensure confidentiality measures, no individual identifiable information was asked and gathered. The questionnaires were utilized to examine the intervening role of perceived academic stress in the association between perceived campus climate and achievement. The questionnaire contained the following elements.

Students' characteristics- includes: gender, length of the study, religious affiliation, and academic achievement.

Academic achievement- is often assessed using students' self-reported cumulative Grade Point Average (GPA) on a 4.0 scale. To interpret these GPAs more meaningfully, they can be categorized using a 5-point Likert scale that reflects varying levels of academic performance. This approach, supported by prior research (Boone & Boone, 2012; Norman, 2010), simplifies the analysis and enhances interpretability. The GPA range of 2.0 to 4.0 is divided into five equal intervals (0.4 points each). GPAs of 3.6–4.0 are classified as "Outstanding," 3.2–3.59 as "Good or Above Average," 2.8–3.19 as "Average," 2.4–2.79 as "Satisfactory," and 2.0–2.39 as "Acceptable," reflecting descending levels of academic performance. GPA was converted to likert-type categories due to the following reasons. First, these GPA categories align with commonly used academic achievement frameworks in the Ethiopian higher education context, thereby promoting interpretability and contextual relevance. Second, for structural equation modeling, continuous GPA scores were transformed into ordered Likert-type categories corresponding to distinct educational achievement levels. Finally, in keeping with other Likert-type indicators that were part of the measurement model of the current study, the ordered categories made it possible to treat academic achievement as an ordinal observed variable and preserved the use of estimation procedures appropriate for ordinal data. This categorization offers a clearer, more human-centered interpretation of academic performance, helping educators and researchers better understand and support students' educational experiences in

Ethiopia context.

Perceived campus climate scale- This study adopted perceived campus climate scale from Krebs (2015) and Berhanu and Sewagegn (2024). Scale adaptation and validation involve multiple steps, including translation, cultural adaptation, and psychometric evaluation, to ensure consistency and validity (Lamm et al., 2020). The approach included six critical phases: The first step in the process of adaptation and validation of the campus climate scale was determining an appropriate self-efficacy scale from existing literature (Berhanu & Sewagegn, 2024; Krebs, 2015). Second**,** following the determination of an appropriate campus climate scale, translation and cultural adaptation were started. Hence, the original questionnaires were translated into Amharic (the local language) by fluent psychologist and translators.

Third, the content validity of the 38 questions was examined to verify that they could measure what they were intended to assess (coverage and relevance) in accordance with the available literature (Collier, 2020). Four items fell below the 0.5, with CVR values ranging from 0.2 to 0.40, and were eliminated from further analysis due to insufficient expert consensus on their significance (Lawshe, 1975).

Fourth, a pilot test was conducted on 210 students from Debre Markos University, but it was not incorporated in the final adaptation and verification study. This data was used for EFA, which is a prominent approach for assessing construct validity and identifying scale dimensions (Carpenter, 2018). EFA demonstrated the following constructs: general University connectedness, general perceptions of campus police/security, general perceptions of teachers, general perceptions of leadership staff, perceived ethnic and religious diversity, and perception of the physical environment. Initially, 33 items were maintained based on expert assessment. Due to overlapping concerns, five elements were removed from the final EFA study. The final EFA of the main component yielded a sixdimensional scale accounting for 60% of the variance among the 28 items. In this study, the Bartlett Sphericity test was (X2) =3304.8; p<.01, and the KMO value was.867. For every item, the EFA revealed more than 0.5 factor load levels. Finally, the model's fit was confirmed using CFA. The model fits the data well, as indicated by the CFA's chi-square (CMIN/DF)=2.263 value, which is above the threshold. Researchers did not remove anything from CFA. A satisfactory fit to the data and meeting the cut-off conditions were indicated by the model PCC scale's CFA findings, which showed threshold fit indices of $\chi 2/df=2.263$, CFI=0.92, TLI=0.93, RMSEA=0.06 [90% CI = [0.055, 0.07], and SRMR=.045 (Kline, 2023). The perceived campus climate scale has an overall reliability of 0.9 for 28 items. Additionally, each measure has a Cronbach alpha range of 0.8 to 0.92, which is appropriate for educational research. Sample two items include: I feel safe when I am on this campus/ university, and the campus security is genuinely concerned about students' well-being.

Academic stress- Academic stress scale was adapted from Bedewy and Gabriel's (2018) Academic Stress Scale which was validated in university students. In same vein with perceived campus climate scale, the validation of academic stress scale involved multiple steps, including translation, cultural adaptation, and psychometric evaluation, to ensure consistency and validity (Lamm et al., 2020). To capture students' responses, a five-point Likert scale was employed. Example of items: I fear failing courses this year and the examination questions are usually difficult. EFA using principal component analyses were conducted on the scale consisting of eighteen items. With the Kaiser rule (eigenvalues > 1.0), the ratio of variation that was explained, and students' experiences of academic stress's four factors explained 51% of the variance, and the varimax rotation converged after four iterations. The factor loadings (more than 0.5), the internal consistency reliability analysis. Based on Rotated component matrix for

the Perception of Academic Stress (PAS) showed four dimensions: pressures to perform; perceptions of workload; academic self-perceptions; time restraints. The total Cronbach's alpha for the perceived academic stress scale was 0.70, indicating that the scale's internal consistency is satisfactory. Reliability ratings for the subscales ranged from 0.70 to 0.85, which is within the widely accepted range for educational research instruments (Sheposh, 2024). This supports the tool's suitability for academic and educational research. The perceived academic stress scale's acceptable fit indices from the CFA results show that the model indices fit the data well and satisfy the cut-off criteria. The borderline $\chi^2/df = 2.8$ further illustrated the chi-square test's sensitivity to large sample sizes (Kline, 2023). The RMSEA score of 0.063 is still considered adequate in terms of model fit in general, especially in studies related to education. RMSEA values between 0.05 and 0.08 suggest a manageable error of approximation and a reasonable model fit. (2)

Data analysis

The information provided by the measurement tools in operation were analyzed statistically within the framework of the instructions. The data obtained from the scales applied to the participants was transferred to the computer environment called SPSS 25 application and processed with statistical methods. One-Sample test statistics was used to examine students' perceived campus climate, academic stress and academic achievement. MANOVA was employed to examine statistical difference in academic stress of students due to personal information. In addition, Lisrel 8.7 was utilized to perform SEM to address the last objective.

Results

Of the 379 surveys that were distributed to students, 360 were filled out and sent back, while 19 were either not returned at all or were left unfinished. This results in about 95% response rate, which is regarded as quite high. This high degree of participation demonstrates how interested the students were in the survey. Such high response rates contribute to the reliability of the results and guarantee that they accurately represent students' opinions and experiences. This high level of involvement makes the study's conclusions both representative.

Table 1. Personal information of students

Variables		Frequency	Percent
Gender	Male	259	71.9
	Female	101	28.1
Religion	Orthodox	278	77.2
	Islam	28	7.8
	Protestant	38	10.6
	Others	16	4.4
Batch/study year	First year	150	41.7
	Second	47	13.1
	Third	82	22.8
	Fourth	61	16.9
	Fifth year	20	5.6
	Total	360	100.0

As shown in Table 1, the study population comprised 360 participants: 71.9% were male (259 students) and only 28.1% female (101 students). This disproportion may reflect male students are more dominant in the academic environment. Religious affiliation was also notably skewed, with the majority identifying as Orthodox Christians (77.2%), followed by Protestants (10.6%), Muslims (7.8%), and other faiths (4.4%). In terms of batch or length of stay at university, first-year students made up the largest proportion at 41.7% (150 students), with the numbers decreasing in higher years—third year (22.8%), fourth year (16.9%), second year (13.1%), and fifth year (5.6%). This trend might suggest easier accessibility to newer students or higher willingness among first-year students to participate in research.

The Status of Students' Perceived Campus Climate, Academic Stress and Academic Achievement

Table 2. One-Sample Test Statistics of Students' Perceived Campus Climate, Academic Stress and Academic Achievement (T value=3)

Study variables	M	SD	t	df	p	Mean Differ	Effect size
Perceived Campus Climate	3.66	.78	16.21	359	.00	.66	0.86
Academic Stress	2.20	.30	-49.34	359	.00	-.79	-2.60
Academic Achievement (CGPA)	3.30	1.02	5.59	359	.00	.30	0.30

As indicated in Table 2, students reported significantly different levels of perceived campus climate, academic stress, and academic achievement compared to an expected test value of 3. Students' perceived campus climate had a mean score of 3.66, which was significantly higher than the expected test value ($t=16.21$, $p < .001$). This suggests that students generally had a positive perception of the campus climate. The effect size ($d = 0.86$) indicates a large difference.

Academic stress, on the other hand, had a mean score of 2.20, which was significantly lower than the test value of 3 ($t =-49.34$, $p < .001$). This implies that students experienced high levels of academic stress, since lower scores on the scale represent higher stress. The effect size is very large ($d = -2.60$), indicating that stress levels are substantially more intense than what might be considered typical or expected.

Academic achievement (measured by CGPA) showed a mean score of 3.30, which was slightly above the test value ($t=5.59$, $p < .001$). Although this difference is statistically significant, the effect size is small ($d=0.30$), suggesting that while students' academic performance is slightly above average, the difference is not very substantial in practical terms.

In summary, students in the study perceive their campus environment positively and are achieving slightly above average academically. However, they also report experiencing high levels of academic stress, which could be a concern for student well-being and might warrant further attention from educators and university support systems.

Students' Academic Stress Difference Due to Socio-demographic information

Table 3: Multivariate Analysis of Students' Academic Stress

Effect		Value	F	Hypothesis df	Error df	p	(η2)
Gender	Wilks' Lambda	.99	.27	4.00	324.00	.89	.003
Religon	Wilks' Lambda	.97	.76	12.00	857.51	.69	.009
Batch	Wilks' Lambda	.97	.45	16.00	990.47	.96	.00

Gender * Religion	Wilks' Lambda	.96	1.06	12.00	857.51	.39	.01
Gender * Batch	Wilks' Lambda	.96	.63	16.00	990.47	.85	.00
Religion * Batch	Wilks' Lambda	.92	.60	44.00	1241.49	.98	.02
Gender * Religion * Batch	Wilks' Lambda	.95	.67	24.00	1131.51	.87	.01

As shown in Table 3, the multivariate analysis explored whether students' academic stress levels differed based on gender, religious affiliation, academic batch (year group), or combinations of these factors. The results showed no statistically significant differences in stress levels across any of these categories. In other words, whether a student was male or female, came from a particular religious background, or belonged to a specific academic year, none of these factors had a meaningful impact on how much academic stress they experienced. Even when these variables were combined—for example, looking at gender and religion together, or all three factors at once—there were still no significant effects. The effect sizes were all very small, indicating that these personal and demographic characteristics do not explain much of the variation in academic stress. This suggests that other elements such as workload, support systems, or personal coping mechanisms may play a more important role in shaping students' experiences of academic stress.

Relationships between students' perceived campus climate, academic stress, and academic achievement

Table 4: Relationships between students' perceived campus climate, stress, and academic achievement

Study variables	M	**1**	**2**	**3**
1. Perceived Campus Climate	3.66	1		
2. Academic Stress	2.20	-.10*	1	*
3.Academic Achievement (CGPA)	3.30	.27**	-.34**	1

A statistically significant correlation is observed at the 0.05 level (two-tailed), indicated by an asterisk () and A statistically significant correlation is observed at the 0.01 level (twotailed), indicated by a double asterisk (**).

The Table 4 showed that how three key aspects of student life—perceived campus climate, academic stress, and academic achievement (CGPA) are related to one another. Students' perceived campus climate had an average score of 3.67, suggesting that; overall, students had a positive view of their campus environment. When we look at how campus climate relates to other factors: first, it had a small negative relationship with academic stress ($r = -0.10$, $p < .05$). This means that students who felt more positively about the campus tended to report slightly less stress, though the connection isn't very strong. Second, it had a moderate positive relationship with academic achievement ($r = 0.27$, $p < .01$). In other words, students who felt good about their campus were also more likely to have higher grades. Academic stress (average= 2.21) had a moderate negative relationship with academic achievement ($r = -0.34$, $p < .01$). This means that students who reported feeling more stressed generally had lower academic performance, and this relationship is relatively stronger compared to the others.

The intervening role of academic stress in relationship between students' perceived campus climate, stress, and academic achievement

The model showed a good fit to the data, indicating a well-specified relationship among the variables. Therefore, the model is saturated, the fit is acceptable.

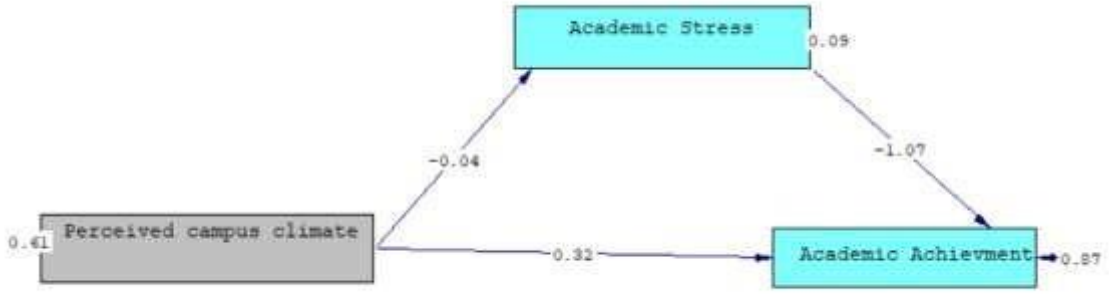

Figure 2: Verified Conceptual Framework

The results of the mediation analysis in figure 2 and Table 5, revealed that perceived campus climate plays a significant role in shaping students' academic achievement, both directly and indirectly through academic stress. In current SEM, the data and the model fit each other well ($\chi 2/df = 2.03$). The result of the chi-square ($\chi 2$) statistic was significant. CFI=.93, TLI=.92, RMSEA=.040, and RMR=.041 demonstrated that the data fit the model well. Specifically, the direct effect of perceived campus climate on academic achievement was moderate and positive (β=0.32), suggesting that students who perceive their campus environment as more supportive and inclusive tend to perform better academically. Additionally, there was a small but meaningful indirect effect (β= 0.04) mediated by academic stress, indicating that a better campus climate slightly reduces stress levels (β=-0.04), which in turn positively influences academic outcomes, as high academic stress is negatively associated with achievement (β=-1.07). This finding is consistent with the stress-buffering hypothesis

(Cohen & Wills, 1985), which suggests that a supportive environment can mitigate the negative impact of stress on performance. The total effect of campus climate on academic achievement ($\beta \approx 0.36$) highlights the importance of fostering positive educational settings—not only to directly support students' learning but also to buffer the harmful effects of stress. It appears that the indirect and direct effect of perceived campus climate (total effect=0.36, 95% CI [0.12, 0.62]) on academic achievement is greater than the direct influence (0.32, 95% CI [0.1, 0.45) at P=0.006. The indirect effect was significant (B = 0.043, 95% CI [0.012, 0.081]), demonstrating partial mediation. These results indicate that students' academic stress played aparital mediating role in the effect of perceived campus climate on academic achievement.

Table 5: Direct and Indirect Effects Analysis with Full Mediation

Effects	Direct effect	Indirect effect	Total effect	P	95% CI LL	95% CI UL
Perceived campus climate → Academic achievement	0.32	-	0.32	.008*	0.1	0.45
Perceived campus climate →Academic stress	-0.04	-	-0.04	.040*	-0.08	-0.002
Academic stress → Academic achievement	-1.07	-	-1.07	.001*	-1.64	-0.47

Perceived campus climate → Academic stress → Academic achievement	0.32	.04	0.36	.006*	0.12	0.62

Note: * Indicates P<.05

Discussion

This research examined the role of academic stress in the association between campus climate and academic achievement. The present study is aligned with the SD-R model. The research draws on the SD-R model, which highlights how both personal and environmental factors work together to affect students' experiences and outcomes (Almarzouki, 2024). This study looks at how students' stress levels play a key role in linking how they *feel* about their campus environment with how well they perform academically. The simultaneous nature of some personal characteristics (such as gender, religious affiliations, and batch) and the perceived campus climate (one of the environmental resources) is supported by the SD-R model. These factors may lessen academic stress (one of the student demands) and result in positive academic achievement as one of the study outcomes. This was further supported by Almarzouki (2024), who asserted that social, contextual, and personal characteristics—such as demands and resources—were preventing academic stress and promoting successful academic performance.

First, a mean score of 3.66 was found in the data when looking at how students felt about the campus atmosphere. This score was much higher than the test value, which is usually set at the neutral middle of 3.0 on a 5-point Likert scale. This suggests that students generally had a good perception on campus. Generally speaking, students who are actively involved with the university—whether through involvement in student organizations, good relationships with faculty, or classroom cooperative learning projects—are more likely to remember and value their time on campus (Berhanu & Sewagegn, 2024; McQueen et al., 2023; Masendi, 2021;Nodooshan et al., 2017). According to the statistical significance of this variation students perceive their surroundings as moderately to highly supportive rather than neutral, which is important to understand how it could operate as a stress reliever and promote accomplishment. In congruent with the present study, according to Çelik et al. (2017), Ma and Wei (2022), and Riggers-Piehl et al. (2018), students' perceptions of the school atmosphere are moderate.

The results of the present survey also showed that students were under a lot of academic stress. In line with the present study, up to 60% of students feel academic stress, with 25% of those students experiencing it to a debilitating degree (Thomas et al., 2018). According to research conducted on South African university students, namely medical students, 78% of participants reported feeling stressed out during the study (Naidoo et al., 2014).

According to the multivariate analysis, stress levels of students did not differ statistically significantly by gender, batch, or religious affiliation. However, prior research revealed that university students' stress levels differed according to their gender and healthy lifestyle choices. Students who drank a lot of alcohol, slept little, or were female, for example, reported significant levels of stress (Uyanne, 2021). Furthermore, 22% of female students reported significant levels of academic stress, according to Putwain and Daly (2014). Stress affected most female students (Naidoo et al., 2014). According to the multivariate analysis, stress levels of students did not differ statistically significantly by gender, batch, or religious affiliation. However, prior research revealed that university students' stress levels differed according to their gender and healthy lifestyle choices. Students who drank a lot of alcohol, slept little, or were female, for example, reported significant levels of stress (Naidoo et al., 2014; Uyanne,

2021). Furthermore, 22% of female students reported significant levels of academic stress compared to male students, according to Putwain and Daly (2014).

The present investigation indicates that supporting institutional climate considerably buffer stress. This was corroborating with a well-established inverse association between academic stress and a positive campus climate (Lipson et al., 2018; Karadağ et al., 2016). This conclusion is made more complex by additional information, which shows threshold effects, in which stress reduction from climatic changes occurs only after the establishment of fundamental mechanisms for support (Dachew et al., 2015; Mayo, & Le, 2023). This discrepancy has been especially evident in Ethiopia, where language and infrastructure constraints continuing to perpetuate excessive levels of stress notwithstanding the face of favorable interpersonal dynamics (Asmare & Dagnaw, 2023; Tsegay et al., 2022). According to these findings, campus climate improvement requires multifaceted, culturally sensitive strategies that tackle the structural and interpersonal factors that contribute to student stress.

The results of the current correlation analysis also demonstrated a favorable and substantial relationship between academic success and the perceived campus atmosphere. Mayhew et al. (2016), Konold et al. (2018), Ma & Wei (2022), Gutierrez & Tomas (2019), Hemer et al. (2019), Sabiha & Engin (2017), Saputra et al. (2020) and Karadağ et al (2016) all provided backing for this result. According to a meta-analysis of 90 researches, the campus atmosphere has a moderately beneficial impact on student success (Sabiha & Engin, 2017).The findings of this study were consistent with research conducted at Dilla University (Kassaw & Demareva, 2024), Jimma University (Tadesse et al., 2022), Gondar University (Gebreslasie et al., 2020), and Debre Tabor and Mekelle Universities (Tadesse et al., 2022). In contrast, students who have a negative view of the campus atmosphere typically perform worse academically. In contrast to the current research, the findings also indicated that academic success, peer communication, and the perceived physical environment do not reasonably correlate (Bahcetepe & Giorgetti, 2015). As a theoretical basis, in line with the SD-R theory, the present study verified that a positive perceived environment positively influences academic outcomes. This finding was consistent with the SD-R model's assumption that a supportive and comprehensive campus climate can serve as a contextual resource that fosters learners' sense of belonging and academic perseverance, thereby benefiting better-quality academic achievement. Within the SD-R standpoint, such environmental resources benefit counterbalance speculative and psychosocial demands through encouraging emotional protection and assisting access to formal and informal support links.

Therefore, this result underpins the SD-R model's proposition that institutional resources are fundamental factors of student overall functioning. In current study area, Ethiopian higher institution situations, where organizational resources may limited and vary, the perceived value of the campus climate may play role in influencing how learners organize existing resources and reply to academic pressures.

According to the current findings, which are substantiated by other recent research, students' academic stress serves as a partial intervening factor between their academic achievements and the perceived campus environment. Better grades are typically the result of students feeling less stressed when they are satisfied with the school atmosphere (Almarzouki, 2024). Students who thought their institution was inclusive reported being less anxious, and more effective in average grade points (Li et al., 2023). Students' stress levels decreased and their academic performance increased when they had access to strong support networks like counseling and mentorship, according to a different study by San and Guo (2023). While prior research showed

campus climate's direct impacts on both stress and performance (Karadağ et al., 2016), subsequent studies suggest this mediation path accounts just under five percent of variation in achievement results (Chen & Park, 2022). Even after controlling for the characteristics of students and resources at the institution, this barely noticeable mediation effect exists (Mayo & Le, 2023). Given the constrained intervening role of stress, perceived campus climate may affect academic achievement through multiple channels, such as social network formation (Lipson et al., 2018), intellectual retention of resources (Almarzouki, 2024), and direct motivational enhancement (Baker et al., 2021). The perceived associations recommends that eminent academic and psychosocial demands may weaken learners' academic achievement when not well-adjusted by adequate and established organizational and personal resources. On the contrary, the presence of helpful influences looks to buffer the undesirable influence of stressors, strengthening the SD-R model's vital suggestion that resources play a protective and motivational role. These findings, therefore, not only support the main postulation of the SD-R model but also emphasize the significance of circumstantial resource accessibility in shaping students' academic achievement.

Even if the topic is not addressed in the Ethiopian context, notably, the mediation effect is even less prominent and partial in environments with resources constrains, emerging organizational system, such as Ethiopia, where campus climate has a more direct impact on academic performance (Dachew et al., 2015; Gedefaw et al., 2023). By indicating that main SD-R associations are apparent within this educational environment—while also demonstrating context-specific patterns in Ethiopia—the results add value to a more comprehensive and thoughtful understanding of the model. This circumstantial standpoint highlights the necessity for socially and institutionally profound applications of SD-R model and emphasis the contribution of study carried out beyond repeatedly considered Western academic surroundings. Since performance gains seem more closely linked to environmental quality than to stress mediation, the body of research points to the need for institutional interventions that prioritize climate improvements beyond reducing stress in general.

Conclusion and implications

The study revealed a favorable correlation between academic accomplishment (CGPA) and students' perceptions of the campus climate. This finding supports the SDR paradigm, which views campus climate as a valuable tool for improving student performance and stress management in educational settings. Additionally, the present findings revealed that there was no significant difference in the level of academic stress experienced by students based on their gender, their religious background, or the academic year. This research suggests that other elements, such as the facilities made apparent by the campus, may be more important for stress management than certain demographic characteristics. The SD-R model states that a key metric for assessing how well students receive assistance in handling educational requirements is the degree of correlation between resources (campus environment) along with outcomes (stress reduction, academic achievement). Finally, in the present study, academic stress acted as a intervening factor between perceived campus climate and academic achievement. This result validates the SD-R model's premise that stress plays a significant role in linking the interaction between resources (like campus atmosphere) and outcomes (like academic achievement). To put it another way, a positive campus climate has a direct effect on success by lowering stress, which helps students perform better.

This study has both theoretical and practical implications. This research also advances theory and literature by shedding light on the nature of students' perceived campus atmosphere,

academic stress, and academic accomplishment within the Ethiopian setting. The study's findings also have practical implications. First, the findings of the study showed a significant correlation between higher stress levels and lower academic achievement. This indicated the demand for directed stress-reduction program on campus, such as guidance and counselling provision, peer mentoring, and organized time-management programs. These may also take the form of stress management seminars and mindfulness exercises. The present study also showed that students experienced high levels of academic stress, since lower scores on the scale represent higher stress. Thus, stress reduction is a necessity since it has a direct impact on the ability of students to concentrate, get involved with their education, and accomplish academic success. Second, from an empirical standpoint, this study additionally serves as vital for comprehending the elements influencing Ethiopian university students' academic performance. It will provide guidance to academics in their pursuit of a supportive campus environment that lowers stress and improves academic performance. Improving how people view the campus environment can help university students do better academically.

Limitations

While this study offers valuable insights, it's important to keep a few limitations in mind. First, the data were gathered from a relatively small group of students, and all from a single higher education institution in Ethiopia. Although this focus brings muchneeded attention to campus climate within the Ethiopian context—an area that hasn't been widely explored—it does mean the results may not fully represent students across the country. To draw broader conclusions, a larger study involving multiple institutions nationwide would be beneficial. Second, because this study used a cross-sectional design (capturing data at one point in time), we can't draw firm conclusions about cause and effect between the variables. Future research that follows participants over time— using a longitudinal approach—would help uncover how these relationships develop and change. Third, students' GPA was measured through self-report, which may be subject to planned overstating. Fourth, to conform to socially desired standards, students may have overreported their perceptions of campus climate and stress, potentially leading to social desirability bias due to reliance on self-reporting. Future scholars might use various anonymous surveys to mitigate social desirability bias.

Declarations

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Ethics Statements*: The authors state that the research conducted with human participants was carried out in accordance with ethical principles and that the necessary ethical approvals were obtained.*
Conflict of Interest: *No potential conflicts of interest have been reported by the authors.*
Informed Consent: *The authors confirm that informed consent was obtained from all individuals included in this study involving human subjects.*
Data availability*: Upon request to the corresponding author, the dataset associated with the research can be accessed.*

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