THE WEIGHT OF SUCCESS: PSYCHOMETRIC VALIDATION AND DIFFERENCES IN PERCEIVED ACADEMIC STRESS IN BUSINESS STUDENTS

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SUMMARY

This study aimed to examine differences in academic stressors according to the demographic and academic characteristics of business students in Chile. A quantitative cross-sectional study was conducted using a non-probability sample. The Academic Stressors Scale (ECEA) was administered, and its psychometric properties were assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM), including indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and a supplementary assessment of model fit. Differences between groups were subsequently examined using the Mann–Whitney U and Kruskal–Wallis H tests, followed by Dunn's post hoc comparisons with Bonferroni correction. The findings confirmed the sound psychometric performance of the ECEA and revealed higher levels of academic stress among students without children, third-year students, those from rural areas, women, full-time students, and single students. These findings provide evidence to inform targeted institutional strategies for promoting student well-being and improving student retention.

Introduction

University students' psychological well-being has become one of the major challenges facing higher education institutions (HEIs), given the growing prevalence of stress-related problems during professional training (Muse *et al*., 2019; Romero-Argueta *et al*., 2024). Academic, personal, and social demands may compromise students' physical and emotional well-being, reducing their ability to cope with university requirements and successfully fulfill their academic responsibilities (Nagy and Hokstok, 2025). Within this context, stress has been associated with anxiety, depression, irritability, emotional exhaustion, and sleep disturbances (Zhang *et al*., 2025). Moreover, prolonged exposure to stress has been linked to adverse physiological outcomes, including hypertension, muscle tension, and

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cardiovascular disease (Vaccarino and Bremner, 2024; Pérez-Jorge *et al*., 2025).

The university years represent a particularly demanding stage of life, characterized by the transition to adulthood and the simultaneous need to cope with new academic, family, and social responsibilities (Hang and Guo, 2025; Silver, 2025). These conditions contribute to the emergence of academic stressors, defined as educational demands that students perceive as exceeding their available coping resources (Cabanach *et al*., 2016; Ruiz-Camacho and Gozalo, 2025). The literature identifies academic workload, examinations, public speaking, methodological deficiencies in teaching, beliefs about academic performance, the university social climate, and difficulties in participating in learning activities as the most common academic stressors experienced by university students (Blanco *et al*., 2025; Castillo-Navarrete *et al*., 2026).

Academic stress can be understood as a state of physiological and psychological tension that arises when situational demands exceed an individual's adaptive capacity (Selye, 2013). According to the Transactional Model of Stress, this experience depends on students' cognitive appraisal of academic demands in relation to their own coping resources (Lazarus and Folkman, 1984). In a complementary perspective, Conservation of Resources Theory posits that stress emerges when there is a real or potential threat to valued resources, such as time, energy, or social support (Hobfoll, 1989). To cope with these demands, students rely on problem-focused or emotion-focused strategies to regulate the impact of academic stress on their well-being (Carver *et al*., 1989).

Current evidence indicates that these stressors negatively affect academic performance, motivation, quality of life, and student retention in higher education (Chongjin *et al*., 2025; Valencia-Arias *et al*., 2026). Furthermore, academic stress has been associated with negative thoughts, frustration, impaired concentration, disordered eating behaviors, and emotional responses that compromise students' overall functioning (Chai *et al*., 2024; Alexatou *et al*., 2025). Consequently, academic stress has been recognized as a critical concern for both university management and public health due to its detrimental effects on mental health, student well-being, and academic achievement (Barbayannis *et al*., 2022; Chen *et al*., 2024; Severino-González *et al*., 2026).

Previous research has extensively documented the magnitude, consequences, and challenges of academic stress for various stakeholders in higher education communities (Bali *et al*., 2024; Mingoia *et al*., 2025). In Mexico, burnout has been examined in relation to anxiety, stress, and depression, revealing associations with sleep disturbances, reduced autonomy, and difficulties coping with university demands (Llanes-Castillo *et al*., 2022). In Peru, growing concern about student mental health has led to the implementation of institutional psychological support and psychosocial assistance programs across universities (Cassaretto *et al*., 2024). Similarly, in Chile, scholars have emphasized the need to strengthen institutional strategies that integrate psychological and emotional well-being into university education (Beroíza-Valenzuela, 2024; Leal-Soto *et al*., 2023).

Scientific evidence also indicates that academic stressors vary according to sex, year of study, geographical background, the balance between study and employment, family responsibilities, and socioeconomic conditions (Bernardo *et al*., 2025; Ruiz-Camacho and Gozalo, 2025). Likewise, relocation from rural to urban areas, reduced social support networks, and limited financial resources have been identified as factors that may heighten vulnerability to academic stress (Arntz *et al*., 2022; Cabrera-Díaz *et al*., 2023). In response, many higher education institutions have implemented interventions aimed at mitigating the impact of academic stressors through psychosocial support services, the development of socio-emotional skills, and resilience- and coping-based programs (Guerra-Báez, 2019; Worsley *et al*., 2022; Amanvermez *et al*., 2023).

Research on academic stress has primarily focused on students enrolled in health-related disciplines, particularly nursing, where academic and clinical demands are consistently associated with higher levels of stress (Mohamed *et al*., 2024). By contrast, studies involving business students remain comparatively scarce, although recent evidence indicates that this population also experiences stressors related to academic workload, teaching practices, time constraints, and the challenge of balancing academic, professional, and personal responsibilities (Singh *et al*., 2023; Piscalkiene *et al*., 2024). Consequently, an important research gap remains in identifying student groups that experience higher levels of academic stressors, limiting the development of evidence-based institutional strategies aimed at strengthening resilience, motivation, and academic success (Rožman *et al*., 2025).

Against this background, the following research question was addressed: What differences in academic stressors exist according to the personal, academic, and family characteristics of business students in Chile? Accordingly, the study aimed to examine differences in academic stressors according to the sociodemographic characteristics of business students in Chile. The null hypothesis (H_0) states that no statistically significant differences exist in the dimensions of academic stressors across business student groups. Conversely, the alternative hypothesis (H_1) posits that statistically significant differences exist in the dimensions of academic stressors across business student groups, with specific groups exhibiting higher levels of academic stress.

The remainder of the manuscript is organized as follows. The Methods section describes the study design, participants, instrument, and analytical strategy. The Results section presents the psychometric evaluation of the ECEA and the differences in academic stressors across student groups. The Discussion examines the main findings in light of previous research and considers their practical implications. Finally, the Conclusions summarize the main contributions and limitations of the study and outline directions for future research.

Methods

Study design

This research employed a quantitative, non-experimental, cross-sectional, and comparative design. Data were collected during the second academic term of 2025 using a self-administered questionnaire applied to a non-probability convenience sample (Canales, 2006). The analytical procedure comprised two stages. First, the psychometric properties of the Academic Stressors Scale (ECEA) were examined by assessing its reflective measurement model using Partial Least Squares Structural Equation Modeling (PLS-SEM). Second, differences in the dimensions of academic stressors were examined according to participants' sociodemographic characteristics using non-parametric statistical tests to identify groups reporting higher levels of academic stress.

Participants

The study sample comprised 147 undergraduate business students. As summarized in Table I, women represented a slight majority of the participants (54.4%). Most students were from urban areas (59.9%), aged between 18 and 23 years (71.4%), enrolled full-time

TABLE I
SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Characteristic	Category	n (%)
Sex	Male	67 (45.6)
	Female	80 (54.4)
Place of residence	Urban	88 (59.9)
	Rural	59 (40.1)
Age (years)	18–23	105 (71.4)
	24–29	25 (17.0)
	30–35	7 (4.8)
	36–40	3 (2.0)
	≥ 40	7 (4.8)
Employment status	Full-time student	86 (58.5)
	Working student	61 (41.5)
Year of study	First year	56 (38.1)
	Second year	26 (17.7)
	Third year	27 (18.4)
	Fourth year	20 (13.6)
	Fifth year	18 (12.2)
Marital status	Single	140 (95.2)
	Married	5 (3.4)
	Cohabiting	2 (1.4)
Number of children	None	120 (81.6)
	One	13 (8.8)
	Two	10 (6.8)
	Three or more	4 (2.7)
Monthly household income (CLP)	< 300,000	19 (12.9)
	301,000–600,000	65 (44.2)
	601,000–900,000	27 (18.4)
	901,000–1,500,000	26 (17.7)
	1,501,000–2,500,000	9 (6.1)
	> 2,501,000	1 (0.7)
Stress management training	No	143 (97.3)
	Yes	4 (2.7)

(58.5%), single (95.2%), and had no children (81.6%). The largest proportion of participants were first-year students (38.1%), and nearly half reported a monthly household income of CLP 301,000 to 600,000 (44.2%). Only 2.7% of the participants had previously received stress management training.

Instrument

Data were collected using a structured questionnaire comprising three sections. The first included a screening question to verify participants' enrollment in the undergraduate business programs included in the study. The second collected personal, academic, and family information, which was subsequently used to examine differences across student groups. The third section assessed academic stressors using the Academic Stressors Scale (ECEA) developed by Cabanach *et al*. (2016). The instrument comprises 54 items organized into eight dimensions: Methodological Deficiencies of Teaching (12 items), Academic Overload (10 items), Beliefs about Academic Performance (10 items), Public Speaking (5 items), Negative Social Climate (6 items), Examinations (4 items), Lack of Value of Course Content (4 items), and Participation Difficulties (3 items) (Table II). Responses were recorded on a five-point Likert scale ranging from 1 (Never) to 5 (Always).

The Academic Stressors Scale (ECEA) has been validated and its psychometric properties have been reassessed across different university settings. Beyond the original validation conducted by Cabanach *et al*. (2016), subsequent research involving Peruvian university

TABLE II
ACADEMIC STRESSORS SCALE (ECEA)

Dimension	Variable	Item
Public speaking (INTPUB)	ECEA1	When I am asked questions in class.
	ECEA2	If I have to speak aloud in class.
	ECEA3	When I have to go to the board.
	ECEA4	When I have to give a presentation or speak in public for a period of time.
	ECEA9	If I have to express an opinion in public.
Examinations (EXAM)	ECEA5	When talking about examinations.
	ECEA6	When I have examinations.
	ECEA7	While preparing for examinations.
	ECEA8	When examination dates are approaching.
Methodological deficiencies of teaching (DEFMET)	ECEA10	When the lecturer teaches the class in a particular way but then examines us in a manner that is inconsistent with the way the class was taught.
	ECEA11	When lecturers do not agree with one another (they show clear disagreements on academic issues).
	ECEA12	When it is not clear to me how I should study a subject.
	ECEA13	When I am not sure what is expected of me in the different subjects.
	ECEA14	When lecturers assign projects, activities, or tasks that are not closely related to one another.
	ECEA15	When the lecturer does not clearly explain what we are expected to do.
	ECEA16	When the lecturer assigns projects, activities, or tasks that contradict one another.
	ECEA17	When different lecturers expect different things from us.
	ECEA18	When the lecturer expects us to know things that have not been taught.
	ECEA19	When the lecturer assumes that we have knowledge that we do not actually possess.
	ECEA20	When the lecturer sets examinations that are clearly inconsistent with what has been studied or taught.
	ECEA21	When there is a clear lack of coherence among the contents of different subjects.
Lack of value of course content (CARVAL)	ECEA22	The courses I am taking have little to do with my expectations.
	ECEA23	The courses I am taking are of little interest.
	ECEA24	What I am studying has little usefulness for my future.
	ECEA25	The classes I attend are not very practical.
Beliefs about academic performance (CREREN)	ECEA26	Because I do not know whether my learning pace is appropriate.
	ECEA28	Because the results I obtain in examinations do not reflect the effort I have made.
	ECEA30	Because I perform well below my actual knowledge.
	ECEA35	Because I do not believe I can cope with the demands of my degree program.
	ECEA37	Because I do not believe I can achieve the proposed goals.
	ECEA41	Because I do not know whether my academic progress is adequate.
	ECEA42	Because I do not know how to do things well.
	ECEA43	Because I do not know what to do to have my effort and work recognized.
	ECEA44	Because I am not sure how to have my mastery of the subjects recognized.
	ECEA46	Because I do not know what to do to have my personal worth recognized.
Academic Overload (SOBACA)	ECEA27	Because of the excessive number of courses included in my degree curriculum.
	ECEA29	Because of the excessive and varied demands placed on me.
	ECEA31	Because I have too little time to study the different subjects properly.
	ECEA32	Because of having to meet the deadlines established for academic activities.
	ECEA33	Because of the excessive amount of information provided in class.
	ECEA34	Because of the excessive amount of time I must devote to academic activities.
	ECEA36	Because I do not have enough time to devote to my courses.
	ECEA38	Because of the excessive workload I have to deal with.
	ECEA39	Because of the excessive number of class hours each day.
	ECEA40	Because of the pace of work or study that is required of us.

TABLE II (*Cont.*)
ACADEMIC STRESSORS SCALE (ECEA)

Dimension	Variable	Item
Participation Difficulties (DIFPAR)	ECEA45	Because I have little or no opportunity to express my opinion about the teaching methodology.
	ECEA47	Because there is little or no opportunity to express my opinion about the assessment procedure.
	ECEA48	Because I have no control over how projects or activities are designed, even though I would prefer them to be organized differently.
Negative Social Climate (CLINEG)	ECEA49	Because of conflicts in my relationships with lecturers or classmates.
	ECEA50	Because of the excessive competitiveness in class.
	ECEA51	Because of the lack of support from lecturers.
	ECEA52	Because of the lack of support from classmates.
	ECEA53	Because of the absence of a positive classroom environment.
	ECEA54	Because of the existence of favoritism in class.

students confirmed the instrument's factorial structure, internal consistency, and construct validity (Serpa-Barrientos *et al*., 2022). More recently, a cross-cultural measurement invariance study involving Peruvian and Ecuadorian university students demonstrated the stability of the factorial structure and the equivalence of the measurement model across both cultural contexts (Tito-Huamaní *et al*., 2023). Collectively, these findings support the robustness of the ECEA as a valid instrument for assessing academic stressors in higher education, although psychometric evidence remains limited for business students and in the Chilean context.

Procedure and data analysis

Data were collected using an online questionnaire developed in Google Forms® and distributed through institutional email to business students enrolled at a Chilean university. Before completing the survey, participants received detailed information about the study objectives and were informed that participation was voluntary, anonymous, and confidential. After data collection, the dataset was exported to Microsoft Excel® for cleaning and coding.

The psychometric properties of the Academic Stressors Scale (ECEA) were examined by assessing its reflective measurement model using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was selected because it provides a suitable approach for evaluating theoretically established reflective measurement models under less restrictive distributional assumptions (Hair *et al*., 2014; Hair *et al*., 2022). Given the non-probability convenience sampling strategy and the absence of a defined population frame, sample adequacy was considered in relation to the requirements of PLS-SEM model estimation rather than population-based sampling criteria (Hair *et al*., 2022). In PLS-SEM, sample-size requirements are determined by model complexity and estimation requirements rather than by applying a fixed participant-to-indicator ratio; therefore, the 54 indicators were not considered a standalone criterion for determining sample adequacy (Hair *et al*., 2022; Kock and Hadaya, 2018).

Following established recommendations for PLS-SEM, the measurement model was evaluated in terms of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity (Hair *et al*., 2014; Hair *et al*., 2022). Accordingly, standardized outer loadings, Cronbach's alpha, Dijkstra–Henseler's rho_A, composite reliability (rho_C), and average variance extracted (AVE) were examined. Discriminant validity was primarily assessed using the Heterotrait–Monotrait ratio (HTMT), while the Fornell–Larcker criterion provided complementary evidence (Fornell and Larcker, 1981; Henseler *et al*., 2015).

Variance Inflation Factor (VIF) values were also examined as a supplementary diagnostic of indicator redundancy and potential collinearity (Hair *et al*., 2010; Hair *et al*., 2022). Although some indicators exceeded conservative VIF reference values, they were retained because the measurement model was reflectively specified and the indicators exhibited high outer loadings, adequate internal consistency reliability, and satisfactory convergent validity (Hair *et al*., 2022). Overall model fit was assessed using the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI), while the discrepancy measures d_ULS and d_G were evaluated against their corresponding bootstrap-based 95% upper bounds (Henseler *et al*., 2016). All PLS-SEM analyses were performed using SmartPLS version 4.1.

Inferential analyses were subsequently conducted to examine differences in academic stressors according to participants' personal, academic, and family characteristics. For this purpose, dimension scores calculated as the mean of the observed indicators within each dimension were used for group comparisons. Normality was assessed using the Shapiro–Wilk test. Because the assumption of normality was not met, non-parametric statistical procedures were employed. Comparisons between two independent groups were conducted using the Mann–Whitney U test, whereas variables comprising three or more categories were analyzed using the Kruskal–Wallis H test. When statistically significant differences were identified, Dunn's post hoc pairwise comparisons with Bonferroni correction were performed to determine which groups differed significantly. Effect sizes were calculated using the r coefficient for Mann–Whitney U tests and eta-squared based on the Kruskal–Wallis H statistic (η^2_H) for Kruskal–Wallis tests, with their magnitude interpreted according to conventional criteria (Tomczak and Tomczak, 2014). All analyses were conducted using IBM SPSS Statistics version 29, with statistical significance set at 5% ($p < 0.05$).

Results

Assessment of the Reflective Measurement Model

To evaluate the factorial structure of the Academic Stressors Scale (ECEA), the reflective measurement model was assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The model retained the original theoretical structure comprising eight latent constructs and 54 indicators: Methodological Deficiencies of Teaching (DEFMET), Academic Overload (SOBACA), Beliefs About Academic Performance (CREREN), Public Speaking (INTPUB), Negative Social Climate (CLINEG), Examinations (EXAM), Lack of Value of Course Content (CARVAL), and Participation Difficulties (DIFPAR).

As shown in Table III, descriptive statistics revealed differences across the eight dimensions. Methodological Deficiencies of Teaching showed the highest mean score (M = 2.917, SD = 1.046), followed by Academic Overload (M = 2.824, SD = 1.084) and Examinations (M = 2.740, SD = 1.136), indicating that these dimensions represented the most prominent academic stressors perceived by the participants. Conversely, Negative Social Climate exhibited the lowest mean score (M = 1.950, SD = 0.938), followed by Participation Difficulties (M = 2.063, SD = 1.184) and Lack of Value of Course Content (M = 2.092, SD = 1.087). Median values ranged from 1.67 to 2.75, while standard deviations varied between 0.938 and 1.211, reflecting moderate variability in participants' responses.

TABLE III
ASSESSMENT OF THE REFLECTIVE MEASUREMENT MODEL: OUTER LOADINGS, VARIANCE INFLATION FACTOR, RELIABILITY, AND CONVERGENT VALIDITY

Dimension	Variable	Outer loading	VIF	Mean	SD	Median	α	rho_A	rho_C	AVE
Methodological deficiencies of teaching (DEFMET)	ECEA10	0.719	2.328	2.917	1.046	2.75	0.955	0.957	0.960	0.668
	ECEA11	0.733	2.200							
	ECEA12	0.780	2.758							
	ECEA13	0.841	3.458							
	ECEA14	0.861	3.806							
	ECEA15	0.841	3.406							
	ECEA16	0.844	3.459							
	ECEA17	0.743	2.112							
	ECEA18	0.837	4.029							
	ECEA19	0.838	4.026							
	ECEA20	0.869	5.110							
	ECEA21	0.882	5.148							
Academic overload (SOBACA)	ECEA27	0.737	2.453	2.824	1.084	2.50	0.956	0.959	0.962	0.717
	ECEA29	0.875	4.450							
	ECEA31	0.858	3.326							
	ECEA32	0.876	4.194							
	ECEA33	0.852	3.310							
	ECEA34	0.881	4.581							
	ECEA36	0.879	4.153							
	ECEA38	0.855	3.540							
	ECEA39	0.755	2.497							
	ECEA40	0.885	4.128							
Beliefs about academic Performance (CREREN)	ECEA26	0.785	2.542	2.685	1.121	2.40	0.958	0.961	0.964	0.727
	ECEA28	0.818	3.317							
	ECEA30	0.855	3.708							
	ECEA35	0.870	4.333							
	ECEA37	0.887	5.011							
	ECEA41	0.874	4.408							
	ECEA42	0.873	4.006							
	ECEA43	0.875	4.281							
	ECEA44	0.832	5.305							
	ECEA46	0.854	5.547							

TABLE III (*Cont.*)
ASSESSMENT OF THE REFLECTIVE MEASUREMENT MODEL: OUTER LOADINGS, VARIANCE INFLATION FACTOR, RELIABILITY, AND CONVERGENT VALIDITY

Dimension	Variable	Outer loading	VIF	Mean	SD	Median	α	rho_A	rho_C	AVE
Public speaking (INTPUB)	ECEA1	0.876	3.634	2.649	1.211	2.40	0.942	0.949	0.956	0.813
	ECEA2	0.943	6.147							
	ECEA3	0.902	4.144							
	ECEA4	0.909	5.251							
	ECEA9	0.876	3.897							
Negative social climate (CLINEG)	ECEA49	0.735	1.937	1.950	0.938	1.67	0.920	0.929	0.939	0.720
	ECEA50	0.864	2.888							
	ECEA51	0.920	4.816							
	ECEA52	0.868	3.037							
	ECEA53	0.853	2.861							
	ECEA54	0.838	2.700							
Examinations (EXAM)	ECEA5	0.790	1.818	2.740	1.136	2.50	0.908	0.922	0.936	0.786
	ECEA6	0.918	3.947							
	ECEA7	0.922	3.678							
	ECEA8	0.909	3.661							
Lack of value of Course content (CARVAL)	ECEA22	0.907	3.569	2.092	1.087	2.00	0.923	0.935	0.946	0.815
	ECEA23	0.917	3.815							
	ECEA24	0.888	2.904							
	ECEA25	0.898	3.055							
Participation difficulties (DIFPAR)	ECEA45	0.962	6.100	2.063	1.184	2.00	0.959	0.966	0.974	0.925
	ECEA47	0.966	6.707							
	ECEA48	0.957	5.516							

VIF: Variance inflation factor; SD: Standard deviation; α: Cronbach's alpha; rho_A: Dijkstra–Henseler's rho_A coefficient; rho_C: Composite reliability; AVE: Average variance extracted.

All standardized outer loadings exceeded the recommended threshold of 0.708, ranging from 0.719 to 0.966, thereby confirming a strong association between each indicator and its corresponding latent construct. Consequently, no indicators were removed during the evaluation of the measurement model.

Internal consistency was satisfactory across all eight constructs. Cronbach's alpha ranged from 0.908 to 0.959, Dijkstra–Henseler's rho_A from 0.922 to 0.966, and composite reliability (CR) from 0.936 to 0.974, all exceeding the recommended thresholds for reflective measurement models (Vandenberg and Lance, 2000; Henseler *et al*., 2016). Likewise, convergent validity was supported, as all constructs achieved average variance extracted (AVE) values above the recommended cutoff of 0.50, ranging from 0.668 to 0.925.

Regarding indicator redundancy, most indicators showed variance inflation factor (VIF) values below 5.0. However, several indicators within the Methodological Deficiencies of Teaching, Beliefs About Academic Performance, Public Speaking, and Participation Difficulties dimensions exhibited VIF values ranging from 5.011 to 6.707, exceeding both the conservative threshold of 3.3 and the more liberal cutoff of 5.0 (Hair *et al*., 2010). Because the model was reflectively specified, correlations among indicators were theoretically expected. Given their high outer loadings, satisfactory reliability and convergent validity, and theoretical relevance, these indicators were retained (Hair *et al*., 2022).

Discriminant validity of the measurement model was assessed using the Heterotrait–Monotrait ratio (HTMT) and the Fornell–Larcker criterion, following established recommendations for reflective measurement models in PLS-SEM (Fornell and Larcker, 1981; Henseler *et al*., 2015).

The HTMT analysis yielded coefficients ranging from 0.454 to 0.830, all below the conservative threshold of 0.85, supporting the conceptual distinctiveness of the eight academic stressor dimensions. The strongest associations were observed between Methodological Deficiencies of Teaching and Academic Overload (HTMT = 0.830), and between Negative Social Climate and Participation Difficulties (HTMT = 0.798). Nevertheless, both values remained within the recommended limits, indicating no concerns regarding discriminant validity among the constructs (Table IV).

Discriminant validity was further examined through the Fornell–Larcker criterion. As shown in Table V, the square root of the average variance extracted (AVE) for each construct exceeded its correlations with all other constructs. These findings indicate that each construct shared more variance with its own indicators than with the remaining constructs in the measurement model, further supporting adequate discriminant validity.

Taken together, both criteria support the empirical distinctiveness

TABLE IV
DISCRIMINANT VALIDITY BASED ON THE HETEROTRAIT–MONOTRAIT RATIO (HTMT)

Dimension	DEFMET	SOBACA	CREREN	INTPUB	CLINEG	EXAM	CARVAL	DIFPAR
DEFMET								
SOBACA	0.830							
CREREN	0.679	0.764						
INTPUB	0.492	0.493	0.567					
CLINEG	0.558	0.610	0.658	0.465				
EXAM	0.635	0.704	0.719	0.746	0.582			
CARVAL	0.490	0.558	0.609	0.454	0.743	0.500		
DIFPAR	0.522	0.563	0.606	0.472	0.798	0.528	0.752	

DEFMET: Methodological deficiencies of teaching; SOBACA: Academic overload; CREREN: Beliefs about academic performance; INTPUB: Public speaking; CLINEG: Negative social climate; EXAM: Examinations; CARVAL: Lack of value of course content; DIFPAR: Participation difficulties.

TABLE V
DISCRIMINANT VALIDITY BASED ON THE FORNELL–LARCKER CRITERION

Dimension	DEFMET	SOBACA	CREREN	INTPUB	CLINEG	EXAM	CARVAL	DIFPAR
DEFMET	0.818							
SOBACA	0.794	0.847						
CREREN	0.646	0.730	0.853					
INTPUB	0.462	0.469	0.538	0.902				
CLINEG	0.518	0.571	0.617	0.430	0.848			
EXAM	0.593	0.659	0.665	0.688	0.524	0.887		
CARVAL	0.457	0.524	0.574	0.423	0.688	0.454	0.903	
DIFPAR	0.498	0.538	0.580	0.448	0.753	0.491	0.708	0.962

DEFMET: Methodological deficiencies of teaching; SOBACA: Academic overload; CREREN: Beliefs about academic performance; INTPUB: Public speaking; CLINEG: Negative social climate; EXAM: Examinations; CARVAL: Lack of value of course content; DIFPAR: Participation difficulties.

of the eight constructs comprising the Academic Stressors Scale (ECEA) and confirm the sound psychometric quality of the measurement model.

Overall model fit

The overall fit of the measurement model was evaluated using goodness-of-fit indices recommended for PLS-SEM (Table VI). The standardized root mean square residual (SRMR) was 0.069, remaining below the recommended threshold of 0.08 and indicating acceptable fit. Likewise, the normed fit index (NFI) reached 0.976, exceeding the recommended cutoff of 0.90 and supporting satisfactory overall fit. In addition, the discrepancy measures supported model adequacy, as both d_ULS = 6.907 and d_G = 6.561 were lower than their respective upper bounds of the 95% bootstrap confidence intervals (HI95 d_ULS = 13.798; HI95 d_G = 10.655).

Taken together, these results support the adequate fit of the ECEA measurement model. Evidence from the SRMR, NFI, reliability, convergent validity, discriminant validity, and discrepancy measures collectively supports the adequacy of the eight-dimensional reflective measurement model (Henseler *et al*., 2016).

Inferential analysis

Differences in perceived academic stressors according to participants' sociodemographic characteristics were examined using non-parametric statistical tests. Mann–Whitney U tests were performed for dichotomous variables,

TABLE VI
OVERALL MODEL FIT

Indicator	Value	Recommended Threshold	Interpretation
SRMR	0.069	< 0.08	Adequate
NFI	0.976	> 0.90	Adequate
d_ULS	6.907	< HI95 = 13.798	Adequate
d_G	6.561	< HI95 = 10.655	Adequate

SRMR: Standardized Root Mean Square Residual; NFI: Normed fit index; d_ULS: Squared Euclidean distance; d_G: Geodesic distance.

whereas Kruskal–Wallis H tests were applied to variables with three or more categories. Significant Kruskal–Wallis results were followed by Dunn's post hoc comparisons with Bonferroni correction. Group medians and mean ranks were used to identify groups reporting higher levels of academic stress. Categories with limited sample representation—including participants aged 36–40 years, those living with a partner, monthly household incomes above CLP 2,501,000, participants with three or more children, and those who had participated in stress management workshops—were excluded from the analyses (Table VII).

The analyses revealed significant differences across several dimensions of academic stressors. For Methodological Deficiencies of Teaching (DEFMET), students without children reported higher stress levels than those with two children (adjusted p = 0.029), although the effect size was small (η^2_H = 0.050). Significant overall differences were also observed according to year of study (p = 0.033; η^2_H = 0.046); however, pairwise comparisons were not significant after Bonferroni correction. For Academic Overload (SOBACA), students from rural areas reported higher levels of stress than their urban counterparts (p = 0.030; r = 0.179), suggesting a greater perceived academic workload among students from rural backgrounds.

For Beliefs About Academic Performance (CREREN), higher stress levels were observed among students from rural areas (p = 0.016; r = 0.198) and among third-year students, who scored significantly higher than first-year (adjusted p = 0.001) and fourth-year students (adjusted p = 0.004). This dimension exhibited one of the largest effect sizes in the study (η^2_H = 0.112), indicating that year of study was notably associated with students' beliefs about academic performance. In the Public Speaking

TABLE VII
SIGNIFICANT DIFFERENCES IN ACADEMIC STRESSORS ACROSS SOCIODEMOGRAPHIC CHARACTERISTICS

Dimension	Characteristic	Test	p	Effect size	Group reporting higher stress	Median	Mean rank	Comparison / Post Hoc
Methodological Deficiencies of Teaching (DEFMET)	Number of children	Kruskal–Wallis	0.011	η^2H = 0.050	None	2.83	76.4	None > Two; adjusted p = 0.029
	Year of study	Kruskal–Wallis	0.033	η^2H = 0.046	Second year	3.38	87.9	No significant pairwise differences after Bonferroni correction
Academic Overload (SOBACA)	Place of residence	Mann–Whitney U	0.030	r = 0.179	Rural	2.80	83.3	Rural > Urban
Beliefs About Academic Performance (CREREN)	Place of residence	Mann–Whitney U	0.016	r = 0.198	Rural	2.90	84.3	Rural > Urban
	Year of study	Kruskal–Wallis	< 0.001	η^2H = 0.112	Third year	3.60	100.0	Third year > First year; adjusted p = 0.001. Third year > Fourth year; adjusted p = 0.004
Public Speaking (INTPUB)	Number of children	Kruskal–Wallis	0.003	η^2H = 0.071	None	2.60	76.8	None > Two; adjusted p = 0.005
Negative Social Climate (CLINEG)	Year of study	Kruskal–Wallis	0.002	η^2H = 0.092	Third year	2.50	98.4	Third year > First year; adjusted p = 0.002. Third year > Fourth year; adjusted p = 0.029
Examinations (EXAM)	Sex	Mann–Whitney U	0.029	r = 0.180	Female	2.75	81.0	Female > Male
	Employment status	Mann–Whitney U	0.039	r = 0.170	Full-time student	2.88	80.1	Full-time student > Working student
	Marital status	Mann–Whitney U	0.016	r = 0.200	Single	2.63	74.6	Single > Married
	Number of children	Kruskal–Wallis	< 0.001	η^2H = 0.102	None	2.75	76.9	None > Two; adjusted p < 0.001
Lack of Value of Course Content (CARVAL)	Year of study	Kruskal–Wallis	0.002	η^2H = 0.094	Fifth year	2.13	90.7	Third year > First year; adjusted p = 0.008. Fifth year > First year; adjusted p = 0.025
Participation Difficulties (DIFPAR)	Number of children	Kruskal–Wallis	0.035	η^2H = 0.034	None	2.00	75.0	None > Two; adjusted p = 0.032

Mean Rank corresponds to the average rank obtained in each statistical test. For the Mann–Whitney U test, the group with the highest score was identified by the highest mean rank. For the Kruskal–Wallis H test, the table reports the group with the highest mean rank together with the corresponding Dunn's post hoc comparisons with Bonferroni correction.

(INTPUB) dimension, students without children reported significantly higher stress than those with two children (adjusted p = 0.005), with a moderate effect size (η^2_H = 0.071).

For Negative Social Climate (CLINEG), third-year students reported significantly higher stress levels than first-year students (adjusted p = 0.002) and fourth-year students (adjusted p = 0.029). Examinations (EXAM) was the dimension associated with the greatest number of significant group differences. Higher stress levels were reported by women (p = 0.029; r = 0.180), full-time students (p = 0.039; r = 0.170), single students (p = 0.016; r = 0.200), and students without children, who reported significantly higher stress levels than those with two children (adjusted p < 0.001).

Finally, for Lack of Value of Course Content (CARVAL), third- and fifth-year students reported higher stress levels than first-year students (adjusted p = 0.008 and adjusted p = 0.025, respectively). For Participation Difficulties (DIFPAR), students without children also reported higher stress levels than those with two children (adjusted p = 0.032), although the corresponding effect size was small (η^2_H = 0.034).

Overall, the findings indicate that certain student groups reported higher levels of academic stress across several dimensions. Students without children consistently reported higher stress levels across four dimensions, whereas third-year students reported higher levels of stress associated with Beliefs About Academic Performance and Negative Social Climate. Likewise, students from rural areas reported higher levels of Academic Overload and Beliefs About Academic Performance. Examinations emerged as the dimension showing the greatest number of significant differences across groups, with higher stress levels reported by women, full-time students, and single students.

Discussion

The present study confirmed the sound psychometric performance of the Academic Stressors Scale (ECEA) among Chilean business students, providing further support for the multidimensional structure originally proposed by Cabanach *et al*. (2016). Specifically, all eight dimensions demonstrated satisfactory internal consistency, convergent validity, and discriminant validity. These findings are consistent with previous psychometric evidence obtained among Peruvian university students (Serpa-Barrientos *et al*., 2022) and with findings from the cross-cultural measurement invariance study conducted in Peru and Ecuador (Tito-Huamaní *et al*., 2023). Consequently, the present study extends the available evidence on the applicability of the ECEA in Latin America by providing psychometric evidence on its use among an understudied population of Chilean business students.

Methodological Deficiencies of Teaching, Academic Overload, and Examinations emerged as the academic stressors with the highest mean scores, highlighting teaching practices, academic workload, and assessment processes as prominent sources of stress in this sample. In addition, differences were observed across groups of students without children, third-year students, those from rural areas, women, full-time students, and single students. These findings are consistent with previous research reporting variations in academic stress according to individual and academic characteristics, particularly sex, academic progression, and social and economic support conditions (Barbayannis *et al*., 2022; Arntz *et al*., 2022; Bernardo *et al*., 2025). The higher scores observed among third-year students may reflect a stage in their academic trajectory characterized by increasing curricular complexity and more demanding academic expectations, whereas the differences found among students from rural areas may be related to contextual challenges involving relocation, access to resources, and distance from established support networks.

The finding that students without children reported higher stress levels across several dimensions is less intuitive and should be interpreted cautiously. Rather than suggesting that parenthood itself protects against academic stress, this pattern may reflect differences in age, life experience, role organization, or the management of competing responsibilities between students with and without children. Importantly, several statistically significant differences were accompanied by small effect sizes, indicating that these findings represent differences in the intensity of perceived academic stressors rather than evidence that particular sociodemographic groups are inherently more vulnerable.

From a practical perspective, these findings underscore the importance of implementing targeted institutional strategies to support students reporting higher levels of academic stress. Unlike previous studies that primarily quantified the overall prevalence of academic stress, the present research reveals differences in perceived academic stressors across specific student groups and dimensions. This evidence may assist higher education institutions in designing targeted student well-being initiatives, psychosocial support services, and academic support programs. Ultimately, recognizing which student groups report higher levels of specific academic stressors may contribute to the development of more effective interventions aimed at enhancing student well-being, academic persistence, and academic success among business students.

Conclusions

These results add to the evidence on academic stressors among business students, confirming that the ECEA is a valid and reliable instrument within the Chilean higher education context and revealing significant differences across student groups. Higher levels of academic stress were reported by students without children, third-year students, those from rural areas, women, full-time students, and single students, reinforcing the notion that perceived academic stress varies according to personal, academic, and family circumstances rather than being experienced uniformly across the student population.

From an institutional perspective, these findings extend beyond individual student characteristics. The prominence of stressors related to teaching practices, academic workload, and examinations suggests that institutional practices are also important for understanding academic stress. Monitoring these dimensions over time could help detect difficulties related to workload distribution, assessment scheduling, or teaching practices and inform timely institutional responses.

The differences across student groups are also relevant to the design of preventive strategies. A single, campus-wide intervention is unlikely to address the needs of all students equally; combining institution-wide measures with targeted support according to specific stages or circumstances of students' academic trajectories may provide a more appropriate approach. In this context, the ECEA can serve not only as a research instrument but also as a tool for identifying the stressors most strongly perceived by different student groups, thereby informing the allocation of resources for prevention and support.

Several limitations should be noted. The cross-sectional design does not allow for causal inferences, and the sample was limited to business students from a single Chilean university, restricting the generalizability of the findings. Self-report measures may also have introduced response bias. Future studies should adopt longitudinal designs, include students from multiple institutions and

disciplines, and examine variables such as resilience, academic self-efficacy, and social support to better understand the factors underlying academic stress and strengthen the evidence base for preventive interventions.

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EL PESO DEL ÉXITO: VALIDACIÓN PSICOMÉTRICA Y DIFERENCIAS EN EL ESTRÉS ACADÉMICO PERCIBIDO EN ESTUDIANTES DE NEGOCIOS

Pedro Severino-González, Mónica Sánchez-Limón, Carolina Leiva-Fuentes, Francisco Javier Villar-Olaeta, Francisco Novoa-Muñoz, Edwars Nuñez-Acevedo y Guipsy Rebolledo-Aburto

RESUMEN

El objetivo de este estudio fue examinar las diferencias en los estresores académicos según las características demográficas y académicas de estudiantes de negocios en Chile. Se realizó un estudio cuantitativo de corte transversal utilizando una muestra no probabilística. Se aplicó la Escala de Estresores Académicos (ECEA) y se evaluaron sus propiedades psicométricas mediante el modelado de ecuaciones estructurales por mínimos cuadrados parciales (PLS-SEM), incluyendo la fiabilidad de los indicadores, la fiabilidad de consistencia interna, la validez convergente, la validez discriminante y una evaluación complementaria del ajuste del modelo. Posteriormente, se examinaron las diferencias entre grupos mediante las pruebas U de Mann–Whitney y H de Kruskal–Wallis, seguidas de comparaciones post hoc de Dunn con corrección de Bonferroni. Los resultados confirmaron el sólido desempeño psicométrico de la ECEA y revelaron mayores niveles de estrés académico en estudiantes sin hijos, de tercer año, provenientes de zonas rurales, mujeres, estudiantes a tiempo completo y solteros. Estos hallazgos aportan evidencia para orientar estrategias institucionales específicas destinadas a promover el bienestar estudiantil y mejorar la retención universitaria.

O PESO DO SUCESSO: VALIDAÇÃO PSICOMÉTRICA E DIFERENÇAS NO ESTRESSE ACADÊMICO PERCEBIDO EM ESTUDANTES DE NEGÓCIOS

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RESUMO

Este estudo teve como objetivo examinar as diferenças nos estressores acadêmicos segundo as características demográficas e acadêmicas de estudantes de negócios no Chile. Foi realizado um estudo quantitativo de corte transversal utilizando uma amostra não probabilística. Aplicou-se a Escala de Estressores Acadêmicos (ECEA), e suas propriedades psicométricas foram avaliadas por meio da Modelagem de Equações Estruturais por Mínimos Quadrados Parciais (PLS-SEM), incluindo a confiabilidade dos indicadores, a confiabilidade da consistência interna, a validade convergente, a validade discriminante e uma avaliação complementar do ajuste do modelo. Posteriormente, as diferenças entre os grupos foram examinadas por meio dos testes U de Mann–Whitney e H de Kruskal–Wallis, seguidos de comparações post hoc de Dunn com correção de Bonferroni. Os resultados confirmaram o sólido desempenho psicométrico da ECEA e revelaram níveis mais elevados de estresse acadêmico entre estudantes sem filhos, do terceiro ano, provenientes de áreas rurais, mulheres, estudantes em tempo integral e solteiros. Esses achados fornecem evidências para orientar estratégias institucionais específicas destinadas a promover o bem-estar estudantil e melhorar a retenção universitária.