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Article

Psychometric Properties of the Academic Motivation Scale (AMS) in University Students from Ecuador

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Abstract

Objective: To assess the psychometric properties of the Academic Motivation Scale (AMS) in a sample of university students from Ecuador **Method:** This instrumental research examines the construct validity through confirmatory factor analysis and the reliability of the AMS. Sample: 1007 subjects (n=403 women, 39.9%) from the Salesian Polytechnic University of Ecuador. **Results:** Regarding the construct validity of the AMS, confirmatory factor analysis indicated that the model demonstrated a good fit to the data, with CMIN or $\chi^2(303) = 1171.948$, $p < 0.001$, CFI = 0.987 (robust), RMSEA = 0.053 (confidence interval between 0.050 and 0.057), and SRMR = 0.047. The Cronbach's Alpha (α) and McDonald's Omega (ω) reliability coefficients were ≥ 0.80 . **Conclusion:** Given the psychometric properties presented, the use of the AMS-E is recommended for evaluating factors of academic motivation in the Ecuadorian population.

Keywords: factorial analysis; reliability; academic motivation factors; validity

1. Introduction

Academic motivation represents a significant influence, both directly and indirectly, on learning processes. Humans exhibit an innate tendency toward personal growth, seek to master their environment, and integrate new experiences in a holistic manner. In this context, both intrinsic and extrinsic motivation play crucial roles in learning behavior Tokan and Imakulata (2019). Furthermore, students' attitudes toward learning and their academic motivations have been observed to be positively correlated, with a stronger association between intrinsic and extrinsic motivations Taşgın and Coskun (2018).

Therefore, an essential instrument for measuring this variable, which has been widely used in higher education over recent decades, is the Academic Motivation Scale (AMS), grounded in Self-Determination Theory and originating from the work of Deci and Ryan in 1985. According to this theory, motivation is defined as the energy, direction, persistence, and purpose of behaviors, involving intentions and actions Deci and Ryan (2004). Its motivational hierarchical structure comprises three levels of generalization: a) global, which refers to the individual's overall orientation, stable in nature and related to personality Grouzet et al. (2004); b) contextual, characterized by domains of human activity such as education, recreation, work, and others, influenced by social factors within the context; and c) situational, which assesses specific, non-repetitive moments, such as a work meeting on a particular day and year Vallerand (1997). Building upon contextual motivation, three motivational positions are proposed within the educational domain along a continuum of self-determination: intrinsic (IM), extrinsic (EM), and amotivation (AM), which can be measured Stover et al. (2015).

The Academic Motivation Scale (AMS) measurement instrument varies in its Spanish versions, but the underlying linguistic and cultural differences highlight the need to apply it to each Latin American country [Vallerand et al. \(1989\)](#). Regarding its evaluation, the AMS is a widely used instrument aimed at adolescents and adults in academic settings. Both the original French and English versions of the test contain 28 items distributed across seven subscales, corresponding to dimensions referenced in Self-Determination Theory. The integrated regulation of extrinsic motivation is a subtype that was excluded from the others because it appears later in adult life. According to [Vallerand et al. \(1992\)](#) [Vallerand et al. \(1992\)](#), the seven-factor structure was verified through subsequent confirmatory analyses and demonstrated adequate internal consistency. Previous studies in Spain, the United States, Greece, Paraguay, and Argentina reveal research involving university students, finding a better statistical fit for the seven-factor model compared to data supporting five, three, or a single factor [Barkoukis et al. \(2008\)](#); [Núñez et al. \(2010\)](#). The five factors correspond to Deci and Ryan's original proposal. The three-factor model was added to confirm the possibility of grouping intrinsic and extrinsic motivation dimensions, and as a simpler alternative, unidimensionality was approved.

The AMS allows researchers to relate motivation to academic variables. Its strength lies in the substantial theoretical and psychometric literature supporting it, which enables a valid and reliable assessment of the construct. On the other hand, it is important to consider the cultural differences within each population, as well as educational levels, because they signal the need to review the wording or interpretation of certain items before use. Failure to do so may affect the psychometric functioning in terms of factorial structure and internal consistency [Núñez Alonso \(2006\)](#).

This study is organized as follows. Section 1 provides a description of the AMS for measuring academic motivation factors using statistical and syntactic criteria. Section 2 explains Academic Motivation and its factors. Section 3 reviews related work concerning the AMS. Section 4 presents the formulation of a hypothesis. Section 5 details the participants in the study, the instrument used, and the procedure for testing the hypothesis. Section 6 presents the findings through confirmatory factor analysis and the instrument's reliability. Section 7 discusses the results presented in previous sections along with other empirical studies in the field. Section 8 provides the general conclusion regarding the fulfillment of the study's objective.

2. Background

In 1985, Deci and Ryan highlighted Self-Determination Theory (SDT) as a macrotheory of human motivation, aiming to achieve an understanding of behaviors that is generalizable across all contexts in which individuals may operate and implementable across different cultures. Personality traits, through motivation, explain the varied behaviors of individuals in response to a situation [Ariani \(2013\)](#); [Costa \(1992\)](#). Thus, if these traits do not serve as a source of development, motivation toward learning is influenced by contextual factors and, above all, by personality [Colquitt et al. \(2000\)](#). It is appropriate to consider these differences when exploring individual performance in various areas, including academic and educational contexts. Authors such as Salgado (1997) [Salgado \(1997\)](#) argue that conscientiousness and neuroticism are considered predictors of performance and motivation.

Furthermore, Personality Psychology posits that behavior is shaped by individual development and is composed of basic units that structure personality [Lomeli-Parga et al. \(2016\)](#). These basic units (values, interests, goals, and life projects of each individual) are fundamental determinants of academic motivation [Manosalvas et al. \(2017\)](#); [Riveiro et al. \(2016\)](#).

Motivation is an internal state that drives individuals to undertake goal-directed actions. This motivation influences both the type of strategy employed to achieve the action and the time and persistence invested in its accomplishment. When referring to an internal state, it implies that it is individual, depending on the person and the specific circumstances they are experiencing. Therefore, it can be said that this motivation largely depends on the individual's personality trait [Fuertes et al. \(2020\)](#) and can be expressed through a continuous increase in self-determination with three fundamental positions that reflect the degree of autonomy on which behaviors are based: amotivation, extrinsic

motivation and intrinsic motivation [Stover et al. \(2014\)](#), which are shown below in more detail in Table 1

Table 1. Description of the Factors and Subtypes of Academic Motivation.

Factors of Academic Motivation	Characteristics
Amotivation	This indicates that an individual acts without the intention of achieving a result, as they perceive no connection between their actions and the outcomes thereof. It is characterized by the individual’s perception of a lack of control over events, incompetence, and an absence of purpose Sum et al. (2022) . Demotivated individuals do not respond to environmental influences and exhibit a state of apathy and decline, resulting in an inability to meet certain expectations associated with relatively simple events. Activities that previously inspired them lose their appeal; hence, they feel no impetus or inspiration, accompanied by feelings of frustration Ryan and Deci (2000) .
Extrinsic motivation	This refers to engaging in an activity to achieve a result or attain a reward. The individual performs actions with the aim of achieving an expected outcome or assigning instrumental value, rather than for reasons inherent to the action itself Ryan and Deci (2000) . Extrinsic motivation arises from incentives and environmental consequences. The more self-determined the extrinsic motivation, the closer it approaches intrinsic motivation—associated with greater commitment, persistence, behavioral quality, and well-being. It includes four progressively regulated subtypes: external, introjected, identified, and integrated. <i>External regulation</i> : behaviors reinforced by others to avoid punishments or gain rewards. <i>Introjected regulation</i> : behaviors done to enhance self-esteem or avoid guilt and anxiety. <i>Identified regulation</i> : activities chosen for extrinsic reasons aligned with personal goals or social values (e.g., education). <i>Integrated regulation</i> : appears in adulthood, when internal needs align with socially expected values (Lopez Navarro et al., 2023 López-Navarro et al. (2023) ; Stover et al., 2014 Stover et al. (2014)).
Intrinsic motivation	It occurs when an individual engages in an activity for the pleasure and enjoyment it brings, as the activity itself is inherently satisfying (Deci & Ryan, 2002). It belongs to the pole of autonomous regulation, where actions are driven by personal interest Stover et al. (2012) . This motivation arises from curiosity, competence, and the innate need for growth. It supports the development of skills and deep engagement with one’s environment. Intrinsic motivation is expressed through three orientations: knowledge, achievement, and experience. <i>Knowledge-oriented</i> : pleasure of learning itself. <i>Achievement-oriented</i> : satisfaction from surpassing personal limits and receiving positive competence feedback. <i>Experience-oriented</i> : driven by intellectual or sensory stimulation Stover et al. (2012) .

On the other hand, as an innate phenomenon, motivation is influenced by four factors: a) context (environment and external stimuli), b) temperament (the internal condition of an organism), c) goal (behavioral goal, purpose, and inclination), and d) tools (means to achieve the goal). To achieve their objectives, needs, and instincts, humans acquire sufficient motivation. Particularly concerning students, motivation for academic achievement is of great importance [Stover et al. \(2012\)](#). Through such motivation, individuals are driven to successfully complete tasks, achieve a goal, or attain a level of performance in their fields. Consequently, motivation defines the reasons behind people’s behavior and determines why they act in a particular manner. Motivated behaviors are energetic, goal directed, and persistent. From an educational perspective, motivation has a multidimensional structure that relates to learning and academic motivation [Amrai et al. \(2011\)](#). In the field of education, motivation is a three-dimensional phenomenon consisting of the individual’s beliefs about their ability to perform a specific task, the reasons and goals for undertaking the task, and the emotional response associated with completing the task [Urhahne and Wijnia \(2023\)](#).

Psychologists have indicated that motivation is a predominant factor in education due to its effective relationship with new learning, skills, strategies, and behaviors. In other words, academic achievement motivation is attributed to behaviors that lead to learning and accomplishment [Filgona et al. \(2020\)](#). In recent decades, various research findings have indicated that personality, familial, academic, and social variables are related to this construct [Zhang and Chen \(2021\)](#). For example, personality variables, self-esteem, and motivation for academic achievement have intrinsically affected learning and academic success [Smadi and Raman \(2020\)](#). Other studies have focused on integrating intellectual ability, learning style, personality, and motivation for academic achievement as predictors of academic performance in higher education [Busato et al. \(2000\)](#); [Sikhwari \(2014\)](#).

It is observed that individuals with a high need for achievement generally respond with approach-oriented emotions, such as hope, pride, and anticipated gratification. In contrast, individuals who do not strongly experience this need for achievement tend to respond with avoidance-oriented emotions, such as anxiety, defensiveness, and fear of failure [Ferrari and Scher \(2000\)](#); [Krispenz et al. \(2019\)](#).

Findings have determined that among these factors, high exam anxiety is associated with significant short- and long-term detriments, affecting working memory, academic performance [Burcaş and Creţu \(2021\)](#); [Von der Embse et al. \(2018\)](#), and student well-being. Within the broad spectrum of analyzed variables, some studies have emphasized the role of motivation [Raymo et al. \(2019\)](#). These detrimental consequences have shifted the focus to factors contributing to the development of anxiety related to academic evaluation situations [Putwain and von der Embse \(2021\)](#); [Soares and Woods \(2020\)](#).

3. Related Work on the AMS

Among the studies focused on examining the psychometric properties of the Academic Motivation Scale (AMS) at the university level, the initial study by Vallerand et al. (1992) [Vallerand et al. \(1992\)](#) stands out. They compiled responses from 745 Canadian university students to examine the underlying factorial structure of responses to the items and the reliability of AMS scores. Regarding reliability, the Cronbach's alpha coefficient for the subscales ranged from .83 to .86, with the exception of the identified subscale of extrinsic motivation, which had an internal consistency of .62. Additionally, test-retest reliability over a one-month period ranged from 0.71 to 0.83 for the subscales, highlighting significant areas for further exploration due to various inconsistencies in AMS evaluation.

In the United States, Fairchild et al. (2005) [Fairchild et al. \(2005\)](#) assessed both the existing and new validity of the Academic Motivation Scale in a sample of university students. The study included 915 individuals, with an average age of 18 years; 66% were female and 88% were Caucasian. Data analysis was performed using LISREL 8.53 [Jöreskog and Sörbom \(1993\)](#) and PRELIS 2.53 [Joreskog and Sorbom \(1996\)](#) to explore score distribution. Confirmatory factor analyses revealed that the Comparative Fit Index (CFI) yielded values greater than 0.95, while the Robust Mean Square Error of Approximation (RMSEA) was 0.055, indicating an adequate model fit. Additionally, Cronbach's alpha coefficients (α) were equal to or greater than 0.80, reinforcing the scale's reliability.

In Spain, Núñez Alonso et al. (2005) [Núñez Alonso et al. \(2005\)](#) validated the AMS in Spanish using a sample of university students, comprising 636 individuals with an average age of 21.7 years ($SD = 4.26$). Confirmatory factor analysis was conducted using AMOS 5.0, and other analyses were performed using SPSS 13.0. The model fit was found to be adequate, with the Goodness-of-Fit Index (GFI) = .91, Normed Fit Index (NFI) = .90, Incremental Fit Index (IFI) = .93, Robust Comparative Fit Index (CFI) = .93, Robust Root Mean Square Error of Approximation (RMSEA) = .05, and a Standardized Root Mean Square Residual (SRMR) = .05. However, the chi-square was significant ($\chi^2 = 883.96$, $df = 320$, $p < .001$). Factor loadings for each factor were statistically significant ($p < .01$) with standardized values exceeding .50. Cronbach's alpha coefficients (α) were equal to or greater than 0.80.

In Argentina, Stover et al. (2012) [Stover et al. \(2012\)](#) conducted a study on the adaptation and psychometric analysis of the Academic Motivation Scale for university students. The research included 330 participants, of whom 68.1% were women and 31.9% were men, aged between 17 and 35 years (mean = 23.45, standard deviation = 4.47), from public and private institutions in Buenos Aires. Data analysis was performed using PASW Statistics (v 18.00; SPSS Inc, Chicago, IL) and AMOS (v 18.0; SPSS Inc). Confirmatory factor analyses showed an adequate model fit after model re-specification: the Goodness-of-Fit Index (GFI) reached a value of 0.955, the Adjusted Goodness-of-Fit Index (AGFI) was 0.944, the Normed Fit Index (NFI) was 0.923, the Relative Fit Index (RFI) was 0.911, and the Root Mean Square Residual (RMR) was also 0.911. Additionally, Aiken coefficients of 0.80 or higher were obtained, ensuring the content validity of the scale.

Finally, in Paraguay, Núñez Alonso (2006) [Núñez Alonso \(2006\)](#) conducted the validation of the Academic Motivation Scale (AMS) with a sample of 441 university students, aged between 17 and 40 years, with a mean age of 21.67 years ($SD = 4.67$). Confirmatory factor analysis was performed using

AMOS 5.0 software, while other analyses were conducted using SPSS 13.0. The findings revealed an adequate model fit, with goodness-of-fit indices such as the Goodness-of-Fit Index (GFI) of 0.90, the Incremental Fit Index (IFI) of 0.93, the Robust Comparative Fit Index (CFI) also of 0.93, and the Robust Root Mean Square Error of Approximation (RMSEA) of 0.05. Additionally, the Standardized Root Mean Square Residual (SRMR) was 0.04, and a significant chi-square was obtained ($\chi^2 = 625.727$, degrees of freedom = 325, $p < .01$). Cronbach's alpha coefficients (α) were equal to or greater than 0.80, confirming the scale's reliability.

4. Present Study

The need to expand knowledge on Academic Motivation and ensure the quality in terms of validity and reliability of the Academic Motivation Scale (AMS) in its previous adaptations underscores the importance of its application in Ecuadorian populations, where currently no specific measurements of this construct exist. In this context, the following hypothesis is proposed:

Hypothesis 1. *The Academic Motivation Scale, adapted for the Ecuadorian population, is reliable and valid.*

This hypothesis is formulated with the aim of demonstrating that the adapted model presents a good fit to the data, expecting to obtain values close to or exceeding a Robust Comparative Fit Index (CFI) of 0.95, and internal consistency, measured by Cronbach's alpha or Omega ≥ 0.80 for each factor or dimension, reflecting results observed in previous adaptations. Verification of this hypothesis will advance the understanding and evaluation of factors affecting academic motivation in the Ecuadorian context, thereby contributing to the development of more effective and targeted educational strategies.

5. Materials and Methods

5.1. Participants

This study involved 1007 individuals ($n = 403$ women, 39.9%) from a private university. The average age of the subjects was 21.88 years (standard deviation = 3.69), with the majority grouped between 18 and 20 years old (42.1%), and an age range extending up to 27 years. Participants came from various faculties: Social Sciences and Humanities ($n = 285$, 28.3%), Science and Technology ($n = 399$, 39.6%), Administration and Economics ($n = 158$, 15.7%), Life Sciences ($n = 113$, 11.2%), and Education ($n = 52$, 5.2%). The sample was non-probabilistic and convenience-based, including only those who voluntarily agreed to participate in a consented and anonymous manner. No financial compensation was offered for participation in the study.

5.2. Instrument

5.2.1. Academic Motivation Scale (AMS)

It is grounded in Self-Determination Theory proposed by Ryan and Deci (2000) [Ryan and Deci \(2000\)](#) and was adapted in Argentina [Stover et al. \(2012\)](#). The instrument assesses several dimensions: extrinsic motivation (external, introjected, identified, and integrated), intrinsic motivation (orientation toward knowledge, achievement, and experience), and amotivation.

The instrument, designed for paper-and-pencil completion, consists of 27 items. In its various applications, the scale has demonstrated high internal consistency, with Aiken coefficients equal to or greater than 0.80, thus ensuring its reliability in measuring different types of academic motivation.

5.2.2. Procedure

Initially, a linguistic review of the Academic Motivation Scale, previously adapted in Argentina by Stover et al. (2012) [Stover et al. \(2012\)](#), was conducted. This process was structured into two fundamental stages to ensure the instrument's suitability for the Ecuadorian context: **Step 1:** Linguistic Review by Experts. A panel of judges, consisting of university professors and researchers, evaluated the version of the instrument adapted in Argentina. The contributions of this group were carefully considered before proceeding to the application of the instrument in a real situation, ensuring that

the content and language were appropriate and understandable for the Ecuadorian context. No items or factors were removed, indicating that no additional content validation process was necessary. **Step 2: Evaluation by Students.** Subsequently, the instrument was administered to a small group of ten students, who independently assessed the linguistic clarity of the items. This step was crucial to confirm that the instrument was fully comprehensible to the target audience. Therefore, Table 2 presents the final items, duly adjusted for linguistic and cultural adaptation specific to Ecuador.

Table 2. Linguistic Comprehension of the Items in the Academic Motivation Scale (AMS).

Items from the version adapted by Stover et al. (2012)	Items with linguistic understanding
1. Because I enjoy debating/communicating/writing my ideas to others.	1. For the strong feelings I experience when communicating my own ideas to others.
2. For the satisfaction I experience while surpassing myself in my studies.	2. For the satisfaction I experience while surpassing myself in my studies.
3. Because I enjoy learning new things.	3. Because I enjoy learning new things.
4. Because I believe that without a university education, I will be unprepared to work in the area I like, as it is not the same to do a university degree as a course or a short tertiary program.	4. Because I believe that without a university education, I will be unprepared to work in the area. I like, as it is not the same to undertake a university degree as a course or a technologist program
5. Because when I succeed at college, I feel important.	5. Because when I succeed at university, I feel important.
6. Because something more than a high school diploma is needed to find a well-paying job in the future	6. Because something more than a high school diploma is needed to find a well-paying job in the future.
7. Honestly, I don't know; I really feel that I am wasting my time at college.	7. Honestly, I don't know; I really feel that I am wasting my time at university.
8. For the pleasure I experience when I participate in interesting debates with some professors.	8. For the pleasure I experience when I participate in interesting debates with some professors.
9. For the satisfaction I experience while surpassing myself in my personal goals.	9. For the satisfaction I experience while surpassing myself in my personal goals.
10. Because I like to discover new topics related to my interests that I have never seen before.	10. Because I like to discover new topics related to my interests that I have never seen before.
11. Because it will allow me to enter the job market in the field that I like	11. Because over time it will allow me to enter the job market in a field that I like.
12. Because I like to get good grades and be congratulated for it.	12. Because I like to get good grades and be congratulated for it.
13. To get a more prestigious job in the future.	13. To get a more prestigious job in the future.
14. A while ago I had reasons to go to college; however, now I wonder whether or not to continue.	14. A while ago I had reasons to go to university; however, now I wonder whether I should continue or not.
15. For the pleasure of reading about topics that interest me.	15. For the pleasure of reading about topics that interest me.
16. For the satisfaction I feel when I manage to carry out difficult academic activities.	16. For the satisfaction I feel when I manage to carry out difficult academic activities.
17. Because I enjoy increasing my knowledge about topics that attract me.	17. Because I enjoy increasing my knowledge about topics that attract me.
18. Because in our society it is important to go to college	18. Because in our society it is important to go to university.
19. Because I don't want to be a failure.	19. Because I don't want to be a failure.
20. To have a better salary in the future.	20. To have a better salary in the future.
21. I can't understand why I go to college and, frankly, I care very little.	21. I can't understand why I go to university and, frankly, I care very little.
22. For the satisfaction of doing something I like related to my future profession. (for example, writing a good analysis of a topic/case, making a model, etc.)	22. For the satisfaction of doing something I like related to my future profession (for example, writing a good analysis of a topic/case, making a model, etc.)
23. Because college allows me to experience personal achievement in the pursuit of excellence in my studies.	23. Because university allows me to experience personal achievement in the pursuit of excellence in my studies.
24. Because my studies allow me to continue learning many things that interest me.	24. Because my studies allow me to continue learning many things that interest me.
25. Because I believe that these studies will improve my abilities as a worker.	25. Because I believe that these studies will improve my abilities as a worker.
26. Because I don't want to disappoint my family.	26. Because I don't want to disappoint my family.
27. I don't know; I can't understand what I'm doing in college.	27. I don't know; I can't understand what I do at university.

After completing the necessary linguistic reviews of the assessment instruments, implementation proceeded. A link <https://ee.humanitarianresponse.info/x/ieKH1SuM> containing these instruments was disseminated, accompanied by a formal invitation to participate. This invitation was published in the virtual classrooms of the Cooperative Virtual Learning Environments (AVAC) at the higher education institution. Students from various academic disciplines accessed these instruments voluntarily and responded individually. Additionally, each participant was presented with an informed consent form before beginning the assessment. This document included detailed information about the study, as well as a request for authorization and anonymous, voluntary participation in the research. The duration for completing the instruments was approximately five minutes, estimated based on the number of items to be answered in the psychological evaluation.

5.2.3. Data Analysis

Upon collecting the data through the measurement instrument, the analysis of the inventory's validity and reliability was conducted. A Confirmatory Factor Analysis (CFA) was performed using the Diagonal Weighted Least Squares (DWLS) estimator on the polychoric correlation matrix. This analysis was executed using the R-Studio statistical environment (GNU Free Software, 2024), specifically employing the lavaan package with the same estimator [Rosseel \(2012\)](#). The expected indices were a χ^2 with a significance level ≥ 0.05 , a Robust Comparative Fit Index (CFI) ≥ 0.95 , a Standardized Root Mean Square Residual (SRMR) ≤ 0.08 , and a Root Mean Square Error of Approximation (RMSEA) ≤ 0.07 [90% CI 0.00 to 0.08]. The CFA structure relationships were illustrated with Onyx [von Oertzen et al. \(2015\)](#). Additionally, a reliability analysis was conducted complementarily using Cronbach's Alpha (α) and McDonald's Omega (ω) coefficients [Revelle and Zinbarg \(2009\)](#).

6. Results

6.1. Validity and Reliability of the Academic Motivation Scale (AMS)

6.1.1. Construct Validity of AMS Through CFA

A Confirmatory Factor Analysis (CFA) was performed using the lavaan package in R to assess the validity of the Academic Motivation Scale (EMA-E). The objective was to verify the construct validity of a factorial structure derived from a theoretical model, which posits that the dimensions of the scale explain the intensity, direction, and persistence of an individual's effort towards achieving their goals. The dimensional structure of the model included seven components: identified regulation extrinsic motivation (MERid), introjected regulation extrinsic motivation (MERin), external regulation extrinsic motivation (MERex), knowledge-oriented intrinsic motivation (MIloco), achievement-oriented intrinsic motivation (MIolo), stimulating experience-oriented intrinsic motivation (MIoee), and amotivation (A).

To validate the latent structure of the Academic Motivation Model factors, we checked the properties of the multivariate data distribution and found that the assumption of multivariate normality was not met according to Mardia's test. Thus, a robust model was employed using the lavaan package in R. Three indices were used to evaluate model fit: the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). Values close to or exceeding 0.95 were considered for CFI; values close to or below 0.08 for SRMR; and values below 0.07 for RMSEA, with the upper limit of its confidence interval below 0.08, as indicators of good model fit. The model considers the scale as multidimensional, adhering strictly to the framework proposed by the authors [Stover et al. \(2012\)](#). Furthermore, there is a closer alignment with the expected absolute, incremental, and parsimony indices for validating the construct, as illustrated in the diagram in Figure 1. The CFA results, using Diagonal Weighted Least Squares (DWLS) on a sample of 1007 adults, were as follows: CMIN or χ^2 (303) = 1171.948, $p < 0.001$; robust CFI = 0.987, RMSEA = 0.053 (confidence interval between 0.050 and 0.057), and SRMR = 0.047. Therefore, the model demonstrated a good fit to the data.

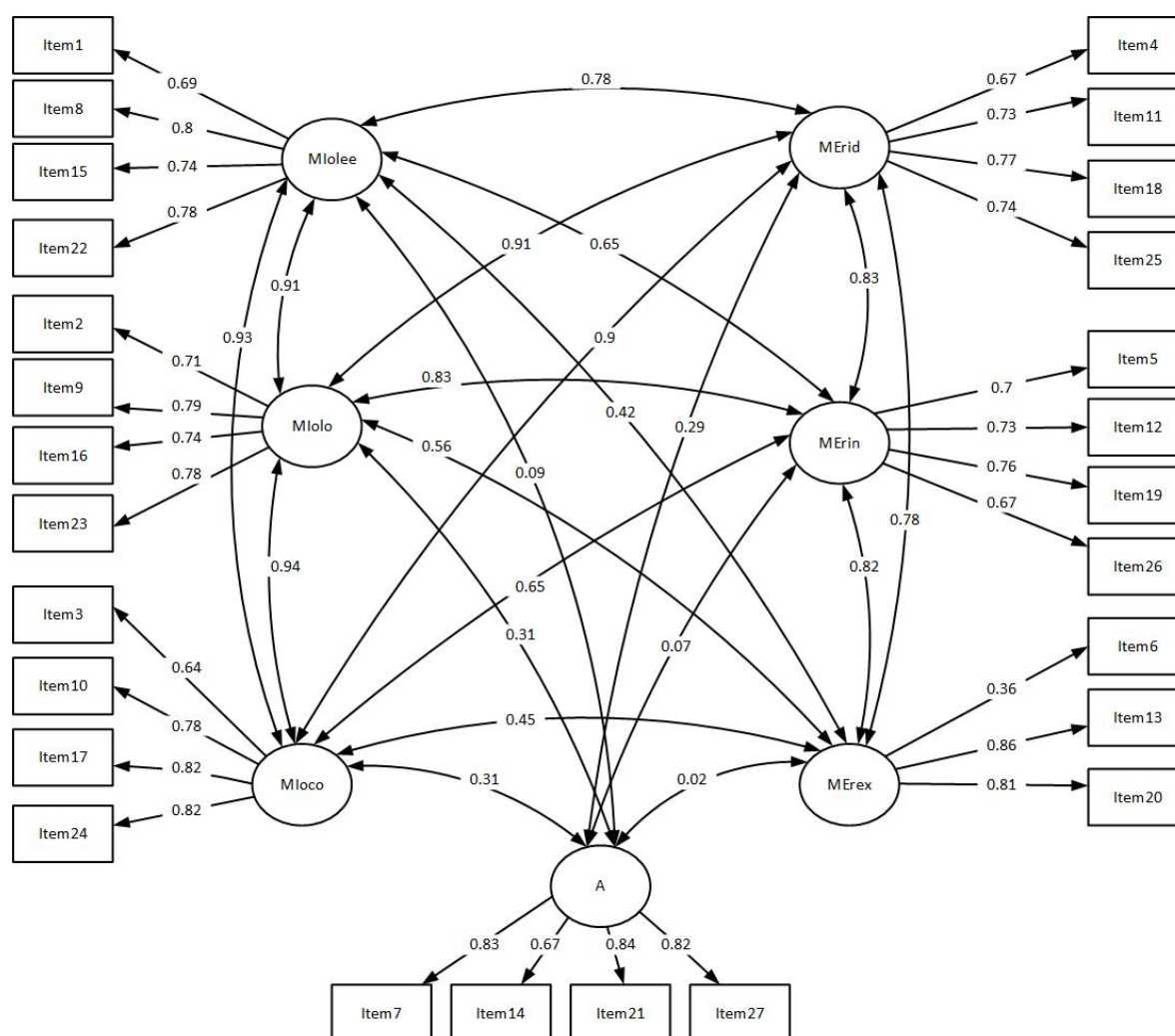


Figure 1. Diagram of the confirmatory factor analysis of the factors of the Academic Motivation Model.

In Table 3, factor loadings are presented both in their unstandardized form (left column) and standardized form (right column). In the standardized column, it is evident that most observed variables exhibit loadings above 0.700, indicating a strong association with their respective factors. However, specific exceptions are noted, such as item 6, "Because something more than a high school diploma is needed to find a well-paying job in the future," which belongs to the dimension of extrinsic motivation with external regulation (MErex). This item displays a relatively low factor loading, with a coefficient of 0.363. Despite this lower value, the item is deemed acceptable and retained in the analysis due to its significant theoretical contribution. This decision is justified by the crucial role the item plays in the conceptual structure of the model and its relevance within the context of the study.

Table 3. Factor Loadings of Observed Variables: Estimated and Standardized for AMS.

Latent variable		Estimate	Std.Err	Z-value	P (> z)	Std.lv	Std.all
(MErid)	=						
	Item 4	1.000				0.547	0.668
	Item 11	1.161	0.058	20.132	0.000	0.635	0.730
	Item 18	1.222	0.061	19.975	0.000	0.668	0.770
	Item 25	1.204	0.061	19.831	0.000	0.658	0.741
(MErin)	=						
	Item 5	1.000				0.698	0.703
	Item 12	1.062	0.048	22.204	0.000	0.741	0.728
	Item 19	0.992	0.050	19.895	0.000	0.693	0.756
	Item 26	0.844	0.049	17.061	0.000	0.590	0.668
(MErex)	=						
	Item 6	1.000				0.383	0.363
	Item 13	2.070	0.227	9.124	0.000	0.793	0.858
	Item 20	1.993	0.214	9.330	0.000	0.763	0.814
(MIoco)	=						
	Item 3	1.000				0.554	0.640
	Item 10	1.309	0.066	19.795	0.000	0.725	0.776
	Item 17	1.258	0.059	21.289	0.000	0.696	0.820
	Item 24	1.263	0.062	20.234	0.000	0.699	0.820
(MIolo)	=						
	Item 2	1.000				0.623	0.707
	Item 9	1.097	0.038	28.520	0.000	0.683	0.785
	Item 16	1.092	0.047	23.269	0.000	0.680	0.738
	Item 23	1.169	0.045	26.099	0.000	0.728	0.784
(MIoee)	=						
	Item 1	1.000				0.621	0.694
	Item 8	1.095	0.053	20.596	0.000	0.680	0.796
	Item 15	1.131	0.053	21.215	0.000	0.702	0.735
	Item 22	1.213	0.055	22.089	0.000	0.753	0.783
(A)	=						
	Item 7	1.000				0.798	0.829
	Item 14	0.936	0.060	15.595	0.000	0.747	0.674
	Item 21	1.006	0.056	18.059	0.000	0.803	0.838
	Item 27	1.008	0.055	18.335	0.000	0.805	0.821

6.1.2. Fiabilidad de la Escala de Motivación Académica (EMA-E)

The internal consistency analysis of the Academic Motivation Scale (EMA-E) was conducted using Cronbach’s Alpha (α) and McDonald’s Omega (ω) reliability coefficients. Overall, the reliability levels are adequate for nearly all indicators, as the calculated coefficients are ≥ 0.80 . However, a discrepancy is observed in the extrinsic motivation with external regulation (MErex) dimension, where Cronbach’s Alpha (α) is 0.700 compared to McDonald’s Omega (ω) of 0.716. The latter value is preferred due to the ordinal nature of the variable, as shown in Table 4. Although removing the first item from this dimension results in a minimal increase in reliability, the item is retained since its value remains acceptable.

Table 4. Internal Consistency Analysis of the Academic Motivation Scale (AMS).

Factors of EMA-E	Cronbach's Alpha	McDonald's Omega
Identified Regulation Extrinsic Motivation (MERid)	0.817	0.819
Introjected Regulation Extrinsic Motivation (MERin)	0.804	0.806
External Regulation Extrinsic Motivation (MERex)	0.700	0.716
Intrinsic Motivation Oriented Towards Knowledge (MIoco)	0.846	0.849
Intrinsic Motivation Oriented Towards Achievement (MI-olo)	0.840	0.840
Intrinsic Motivation Oriented Towards Stimulating Experiences (MIoee)	0.839	0.838
Amotivation (A)	0.865	0.865

7. Discusión

The AMS emerges as the most widely used instrument for assessing academic motivation among university students due to its foundation in Deci and Ryan’s self-determination theory [Vallerand \(1997\)](#). While various versions exist in different languages, cultural and linguistic differences in Latin America have impacted the psychometric strengths of the scale. Consequently, applying the scale to the context of Ecuadorian higher education has prompted the development of a specific version for this country.

To achieve this, a pilot study was conducted, including a linguistic review by expert judges. Their suggestions led to the reformulation of items before the instrument was administered to a group of students, who also performed a linguistic review. As a result, this process produced a scale with local linguistic peculiarities (Table 1). This work was conducted following the recommendations of Núñez Alonso (2006) [Núñez Alonso \(2006\)](#) regarding the review of the EMA components within a Latin American context.

The Ecuadorian adaptation of the measurement instrument demonstrated adequate psychometric properties, both in reliability and validity, as confirmed through Confirmatory Factor Analysis (CFA). The results indicated an optimal model fit, with a robust Comparative Fit Index (CFI) of 0.987, a Root Mean Square Error of Approximation (RMSEA) of 0.053 (confidence interval of 0.050 to 0.057), and a Standardized Root Mean Square Residual (SRMR) of 0.047. These findings align with previous research in university populations, such as studies by Fairchild et al. (2005 [Fairchild et al. \(2005\)](#)),Núñez Alonso et al. (2005) [Núñez Alonso et al. \(2005\)](#),Stover et al. (2012), [Stover et al. \(2012\)](#), and Núñez Alonso (2006) [Núñez Alonso \(2006\)](#), which also reported adequate model fits for similar constructs.

Additionally, the current study reveals outstanding internal consistency, with Cronbach’s alpha and Omega values equal to or exceeding 0.80 for each factor or dimension of the model. This result corroborates findings from the aforementioned studies, which also reported reliability levels for alpha and omega exceeding 0.80 in university contexts.

Based on the observed psychometric properties, the initial hypothesis is confirmed, and the use of the EMA-E instrument for assessing academic motivation factors in the Ecuadorian population is recommended, validating its reliability and effectiveness.

8. Conclusions

The psychometric properties of the adapted and validated Ecuadorian version of the Academic Motivation Scale (EMA) demonstrated acceptable reliability and validity. This appropriately adapted and validated scale, from a linguistic perspective, is advantageous as it is supported by literature on self-determination theory. Thus, having it available in Ecuador is crucial. This empirical work, along with its psychometric results, encourages researchers to have access to relevant material in the academic field.

Each study examining the validity and reliability of the Academic Motivation Scale contributes to its psychometric quality; however, it restricts comparisons between populations. Therefore, achieving comparable versions in content and applicable to university groups would be beneficial. Thus, testing

the factorial structure of the instrument in various Latin American socio-educational contexts is necessary. This aspect represents a limitation of the research, highlighting the need for progress in terms of the construct's operationalization in specific contexts.

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