

Factor validity with robust estimation of the Scale of Perceived Self-efficacy Specific to Academic Situations (Eapesa) in Ecuadorian university students**Validez factorial con estimación robusta de la Escala de Autoeficacia Percibida Específica de Situaciones Académicas (Eapesa) en universitarios ecuatorianos****Validade fatorial com estimativa robusta da Escala de Autoeficácia Percebida Específica para Situações Acadêmicas (Eapesa) em estudantes universitários equatorianos**

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Abstract: Objective: To confirm the unifactorial structure of the Scale of Specific Perceived Self-Efficacy of Academic Situations (Eapesa, by its acronym in Spanish), its reliability and validity in relation to other variables in Ecuadorian university students. **Methodology:** Eapesa's convergence validity, reliability and factorial instrumental study. **Participants:** 466 university students from Ecuador, 35.2% men and 64.8% women, aged between 17 to 39 years ($M= 21.27$; $SD= 2.9$). **Results:** Eapesa's unifactorial model is confirmed with 7 items that presents an adequate adjustment: $\chi^2= 40.01$; $p < .05$; $gI= 14$; $\chi^2/gI= 2.9$; CFI= .966; TLI= .950; SRMR= .034; RMSEA= .063 IC_{95%} [.050 - .076] above the versions of 10 and 9 items. A high reliability of $\omega= .92$ [.90 - .94] and moderate convergence of $r= .685$; $p < .01$. **Conclusions:** The 7-item Eapesa is the version with the best psychometric performance for its applicability in university students in Ecuador.

Keywords: self-efficacy; schooling; factor analysis; reliability

Resumen: Objetivo: Confirmar la estructura unifactorial de la Escala de Autoeficacia Percibida Específica de Situaciones Académicas (Eapesa), su fiabilidad y validez en relación con otras variables en universitarios ecuatorianos. **Metodología:** Estudio instrumental factorial de fiabilidad y validez de convergencia de la Eapesa. **Participantes:** 466 universitarios del Ecuador, 35.2 % hombres y 64.8 % mujeres, con edades entre 17 a 39 años ($M= 21.27$; $DE= 2.9$). **Resultados:** Se confirma el modelo unifactorial de la Eapesa con 7 ítems que presenta un adecuado ajuste: $\chi^2= 40.01$; $p < .05$; $gI= 14$; $\chi^2/gI= 2.9$; CFI= .966; TLI= .950; SRMR= .034; RMSEA= .063 IC_{95%} [.050 - .076] por encima de las versiones de 10 y 9 ítems. Una fiabilidad alta de $\omega= .92$ [.90 - .94] y convergencia moderada de $r= .685$; $p < .01$. **Conclusiones:** La Eapesa de 7 ítems es la versión de mejor rendimiento psicométrico para su aplicabilidad en universitarios del Ecuador.

Palabras clave: autoeficacia; escolaridad; análisis factorial; fiabilidad



Resumo: Objetivo: Confirmar a estrutura unifatorial da Escala de Autoeficácia Específica Percebida de Situações Acadêmicas (Eapesa), sua confiabilidade e validade em relação a outras variáveis em estudantes universitários equatorianos. **Metodologia:** validade de convergência da Eapesa, confiabilidade e estudo fatorial instrumental. **Participantes:** 466 estudantes universitários do Equador, 35,2 % homens e 64,8 % mulheres, com idade entre 17 e 39 anos ($M= 21,27$; $DP= 2,9$). **Resultados:** o modelo unifatorial da Eapesa é confirmado com 7 itens que apresentam um ajuste adequado: $\chi^2= 40,01$; $p < 0,05$; $gl= 14$; $\chi^2/gl= 2,9$; CFI= 0,966; TLI= 0,950; SRMR= 0,034; RMSEA= 0,063 IC_{95%} [0,050 - 0,076] acima das versões de 10 e 9 itens. Uma alta confiabilidade de $\omega= 0,92$ [0,90 - 0,94] e convergência moderada de $r= 0,685$; $p < 0,01$. **Conclusões:** O Eapesa de 7 itens é a versão com melhor desempenho psicométrico para sua aplicabilidade em estudantes universitários em Equador.

Palavras-chave: autoeficácia; escolaridade; análise fatorial; confiabilidade

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In psychology, it is fundamental to understand and persistently create recommendations that permit updates on the assortment of processes that manage and regulate a specific behavior. From the social cognitive model, behavior is clarified by the combination of outside, social, and inner-influence frameworks that modulate and regulate it (Bandura, 2012). In this matter, *self-efficacy* is as important as a self-influence system since it generates positive judgments about the personal resolution capacity to develop processes and achieve established objectives (Bandura, 1992; Suárez, García & Moreno, 2000).

Additionally, self-efficacy allows for the estimation of an individual's ability to master an action based on the self-assessment of the potential to reach a goal. This explains the reason why self-efficacy allows the control and regulation of stress that is initiated by an activity and the process of reaching a proposed goal (Merino Tejedor & Lucas Mangas, 2016). In this way, while people are more aware of their abilities, they are more likely to develop specific, challenging goals and keep them to completion. This perception of self-achievement capacity at different levels allows for feedback to improve or worsen judgments and beliefs about personal efficacy in the face of a proposed aim (Maddux, 2016). Therefore, it influences the execution of behaviors (Mehmood, Adnan, Shahzad, & Shabbir, 2019). Hence, the perception of the difficulty of a task along with personal resolution capacity and one's own psychological response come into play (Pajares, 2002).

It is important to denote that self-efficacy is not a generalized resource of self-influence on all activities and behaviors (Luszczynska, Scholz, & Schwarzer, 2005), but is conditioned by association between the mental scheme 'assessment of own capacity', behavior and the social response. Therefore, it is not certainly effective in every activity. Even so, the current evidence shows the marked relationship that this condition has with different aspects such as: voluntary motivation, decisive social skills, mental health (Lau, Fang, Cheng, & Kwong, 2019), in quality of life, well-being and comorbidity (Buck et al., 2015), sports competitiveness (Jaramillo, Mayorga Lascano, & Moreta-

Herrera, 2020), education (Sagone & Caroli, 2014) among others. Therefore, its study and analysis is important for psychosocial and educational research.

Self-efficacy and education

Already in the field of education and psychology, the study of the university population is necessary due to the fragility, vulnerability (Guassi & Telzer, 2015) and mental health problems associated with performance (Domínguez-Lara, Prada-Chapoñan, & Moreta-Herrera, 2019; Mayorga-Lascano & Moreta-Herrera, 2019) presented. In this matter, the self-evaluation that university students have about themselves is relevant for the understanding of psychoeducational phenomena (Panadero, Jonsson, & Botella, 2017). And that is where (academic) self-efficacy plays an important role; due to the involvement in school life, studies, and academic activities (Høigaard, Kovač, Øverby & Haugen, 2015; Honicke & Broadbent, 2016; Montes De Oca & Moreta Herrera, 2019; Sagone & Caroli, 2014).

Academic self-efficacy is a specific form of general self-efficacy, which includes beliefs and personal achievement judgments about academic goals (Elias & MacDonald, 2007), such as learning objectives, assignments or exceeding academic levels (Bandura, 1992) as a specific aspect of self-assessment of solving skills on educational training. Thus, the development of activities, content, knowledge, interest in learning or educational competencies such as research are carried out by the influence generated by self-efficacy (Cruz, del Rosario & Gutiérrez Arceo, 2015).

In general, academic self-efficacy is an area of interest and analysis in the educational psychology and education section (Sagone & Caroli, 2014). Contemporary findings show evidence that the relationship among self-efficacy and academic performance (Páez, Velásquez, Gómez & Roldán, 2017) for example, or with learning self-regulation (Wang, Shannon & Ross, 2013), school performance (Richardson, Abraham & Bond, 2012), attitudes towards research, academic resilience (Cassidy, 2015), academic well-being (Paciello, Ghezzi, Tramontano, Barbaranelli & Fida, 2016), psychological alterations in the school context (Steca et al., 2014), school stress (Chiu, 2014) among others. Thus, the study of the AEA is a line of research that allows the explanation and intervention in educational dynamics. Especially given the difficulties that students, teachers and the educational system may go through.

Measurement of academic self-efficacy

One of the challenges for psychoeducational exploration is the estimation of the academic self-efficacy construct. On the one hand, there is a lack of diverse and specialized instruments for its measurement. On the other hand, there's a lack of sufficient evidence of validity and suitability (especially in Latin America and Ecuador). In the case of self-efficacy linked to schooling, evaluation is frequent with general tests (Chiu, 2014; Cruz et al., 2015, Moreta-Herrera, Lara-Salazar, Camacho-Bonilla & Sánchez-Guevara, 2019; Suárez et al., 2000). This affects measurement errors and biases that particularly affect the diagnosis due to the lack of details in the academic context.

In the Spanish-speaking world, one of the first tests with a multitude of studies is the Scale of Perceived Self-Efficacy Specific to Academic Situations (Eapesa; Palenzuela, 1983), developed in Spain. Initially, the scale is structured with 10 items, wherein factorial loads are higher than .63 (with the exception of item 9); with high reliability $\alpha = .91$ and temporal stability (10 weeks) $r = .91$.

Several studies show the relevance of academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations together with adequate psychometric properties that validate its use in adolescents and university students and confirm its one-dimensional factorial structure. Thus, the validation in Spain with high school and university students stands out, wherein factorial validity is $\chi^2 = 141.6$; $g1 = 35$; $p < .001$; $GFI = .96$ and $RMSEA = .051$. Besides being reliable with $\alpha = .89$, stable in three-week intervals with $r = .87$; and convergent with tests of Academic Goals, Academic Self-concept and Performance (García-Fernández et al., 2010).

In Chile, with adolescents in school whose adjustment values were $\chi^2 = 542.4$; $gI = 35$; $p < .001$; $GFI = .97$; $CFI = .96$ and $RMSEA = .06$; with high internal consistency of $\alpha = .88$ and that converges with tests of learning strategies (García-Fernández et al., 2016); and in university students with adjustment values of $\chi^2 / gI = 2$; $CFI = .97$; $TLI = .96$ and $RMSEA = .058$ and with high reliability of α (ordinal) = .87 (Del Valle, Díaz, Pérez & Vergara, 2018).

In Peru, it was found both university students, revealing an adequate adjustment with $\chi^2 = 64.7$; $gI = 27$; $p < .001$; $CFI .98$; $GFI = .97$ and $RMSEA = .06$ confirming the model in a nine-item version (eliminating item 9), as well as reliable with $\alpha = .88$ 90% CI [.86 - .90] (Domínguez-Lara, 2014); and adolescents, with an adjustment of $\chi^2 = 30.6$; $gI = 14$; $p < .001$; $CFI = .99$; $TLI = .99$ and $RMSEA = .06$ [.033 - .095] in a reduced version of 7 items (2, 3 and 9 eliminated); with a reliability of $\alpha = .86$ 90% CI [.84 - .90] (Navarro-Loli & Domínguez-Lara, 2019).

All these studies show the suitability of the Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations test in the adolescent and university school population through a unifactorial model (although with a different number of items, as well as the options available within the Likert scale of response among items). In the case of Ecuador, the unifactorial model has not been confirmed in the school population, so it does not have real authenticity for its applicability. This has psychometric implications because it makes it difficult to carry out empirical studies in the future. That is why the development of this type of instrumental research is considered necessary.

Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations methodological considerations

In the academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations studies, there are methodological considerations taken into account for its instrumental development. In the first place, the validation referential studies report a low factor load of item 9 connected to the remaining items. This raises a question about the relevance of the item in the factorial model of the test and whether it is appropriate to test new reduced versions with the elimination of item 9 (Domínguez-Lara, 2014) or in a reduced version of 7 items (Navarro-Loli & Domínguez-Lara, 2019).

The confirmation methodology of the factorial structure in which there are differences among studies should also be considered. García-Fernández et al. (2010) and Domínguez-Lara (2014) do not report the origin method that was used, which in theory hinders the reproducibility of the design in other trials. However, García-Fernández et al. (2010) and Del Valle et al. (2018) report the estimation of Maximum Likelihood (MV) as factoring methodology. Also, this method is not the most appropriate due to the ordinal nature and lack of multivariate normal distribution of the items (Li, 2016). Finally, the study by Navarro-Loli and Domínguez-Lara (2019) uses the method of Weighted Least Squares with Mean and Adjusted Variance (WSLMV), which is the most appropriate estimate given the limitations of the MV (Jin & Cao, 2018), because the Likert response scale has four options even when the original version is 10 and in a reduced version of 7 items (it is therefore necessary to use the Robust Maximum Likelihood estimate). Still, for the differences in the use of the Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations factoring methodology, the number of items applied, and the number of answer options need to be clarified to guarantee the suitability of the test, as well as the confirmation of the model in an Ecuadorian university sample, for which no preliminary data is known for further use.

Objectives and hypotheses

The following are the objectives of the study: a) To verify evidence of the validity of the Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations univariate structure in a sample of Ecuadorian university students. It is hypothesized that the sample fits the proposed unifactorial model; b) To confirm the reliability of the scale, since it is high; c) To estimate the validity of Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations based on the relationship with other variables (Academic Self-efficacy). It is estimated that Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations is correlated with another measure of Academic Self-efficacy.

Method

Design

The current work is an instrumental study (Ato, López, & Benavente, 2013) aimed to confirm the Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations univariate model, its reliability (internal consistency) and its convergence validity in a sample of university students from Ecuador.

Participants

The sample was made up of 466 participants (35.2 % men and 64.8 % women), ranged 17-39 years old ($M = 21.27$; $SD = 2.9$). They define themselves ethnically as mestizos in 93.6 % and the remaining 6.4 % as white, skin of color, and indigenous. 78.8 % live in the urban areas of their cities; while the remaining 11.2 % in rural areas.

The participants are students from five different careers (dentistry, medicine, tourism, gastronomy, and accounting) from a private university in Ambato city, Ecuador. 9.4 % receive scholarships and financial aid and 5.2 % are at academic risk due to poor performance.

The selection of the participants was carried out through a non-probabilistic convenience sampling with inclusion criteria. The criteria was focused on of a) voluntary participation; b) signed consent; c) legal condition of registration; and d) regular school attendance.

Instruments

Scale of Perceived Self-Efficacy Specific to Academic Situations (Eapesa; Palenzuela, 1983) in the Spanish version of García-Fernández et al. (2010). This scale was designed to determine the levels of Academic Self-Efficacy of students through a questionnaire of 10 items on a Likert scale of 10 levels from *strongly disagree* to *strongly agree*. Although there are no specific normative values for the scale, it is considered that the higher the score, the greater the perceived self-efficacy. The referential cut-off point is 50 points. Regarding reliability, internal consistency in the Spanish version is high with $\alpha = .89$ and temporarily stable with $r = .87$.

Scale of Self-efficacy of Academic Behaviors (EACA, by its acronym in Spanish; Vega, Marín, Enríquez, & Cuadras, 2011). It consists of 13 items, the scale seeks to determine self-efficacy in academic behaviors, it was based on three factors (communication, attention and excellence). A Likert scale of five options from 1 (*strongly disagree*) to 5 (*strongly agree*) was created. The psychometric properties of the scale show high reliability in Mexican students ($\alpha = .82$ in communication; $\alpha = .82$ in attention and $\alpha = .81$ in excellence); while the present study had these results $\alpha = .86$; $\alpha = .91$ and $\alpha = .90$ for communication, attention and excellence, respectively.

Procedure

After having got the approval of the educational center, the research project was familiarized with students since their participation was highly necessary. Once the students read and signed the consent letter, the evaluation in groups was carried out in the classrooms, where the supervision of

the researchers was necessary. This process took approximately 15 minutes. Then, the evaluations were filtered (the ones that were not fully filled were excluded) and digitized in databases in order to keep on working with the statistical treatment. The hypotheses were verified, and research reports were written with the results achieved. Finally, this article was disseminated and reviewed by the Pucesa Publications Commission, in order to ensure compliance with research ethical standards.

Data analysis

The statistical results are submitted in three sections. The first part is a preliminary examination of the items, which addresses the behavior of the responses with the arithmetic mean, standard deviation, asymmetry, and kurtosis. Additionally, it is important to verify the assumptions of univariate normality, which is fulfilled when asymmetry and kurtosis are within the range ± 1.5 (Ferrando & Anguiano-Carrasco, 2010); and to multivariate normality, which exists when the Mardia test is not significant ($p > .05$) (Mardia, 1970). The verification of these assumptions is essential for future use of factor structure analyzes. Likewise, strong estimations when multivariate normality is not met.

The second section is the factorial structure through the CFA with MLR estimation (Jin & Cao, 2018; Li, 2016). Here, the academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations unifactorial model is examined with 10 (Palenzuela, 1983), 9 (Domínguez-Lara, 2014) and 7 (Navarro-Loli & Domínguez-Lara, 2019) items through the adjustment indices: a) Absolute, which is the Chi square (χ^2), the normed Chi square (χ^2 / gl) and the Standardized Square Mean Residual (SRMR); b) Relative, with the Comparative Adjustment Index (CFI) and the Tucker-Lewis Index (TLI); and c) The non-based on centrality which is the Mean Square Error of Approximation (RMSEA). It is estimated that the factorial model has a good fit when the χ^2 is not significant ($p > .05$), the χ^2 / gl is less than 4, the CFI and TLI are greater than 0.9 and the SRMR and RMSEA are less than 0.08 (Abad, Olea, Ponsoda, & García, 2011; Brown, 2015; Byrne, 2006). Subsequently, the saturations of the items are analyzed to also know the degree of contribution of the items to the model. The loads are expected to be greater than $\lambda > 0.5$ since they show that the items are consistent and allow an adequate explanation of the variance (Hair, Anderson, Tatham, & Black, 2004).

The third section is the convergence validity analysis to determine the relationship of Academic articles for Specific Perceived Self-Efficacy Scale of Academic Situations with the Academic Self-efficacy construct. Therefore, EACA is correlated to meet the level of relationship. Finally, the reliability of the test is verified through the omega coefficient (ω , McDonald, 1999; Trizano-Hermosilla & Alvarado, 2016; Ventura-León & Caycho-Rodríguez, 2017) with the 95 % of confidence intervals.

The statistical management of the results was carried out with the use of R Language in version 3.6.1. (R Core Team, 2019), assisted by the MVN, Lavaan and Mbess packages.

Results

Preliminary analysis

The initial analysis is showed in Table 1, the methods of the responses to the items are consistent one with the other, except for item 9 ($M = 6.38$; $SD = 2.67$) which differs from the rest of the items. The response trend is presented in a general way on the right end of the scale because it follows the perception of academic self-efficacy conditions which is presented in the analysis sample.

In the verification of univariate and multivariate normality through asymmetry and kurtosis, it is evidenced that not all items (except 2 and 9) present a univariate normal distribution. A similar scenario occurs with multivariate normality that does not meet the expected distribution, because in the Mardia test there is not absence of significant differences ($p > .05$).

Table 1.

Eapesa preliminary descriptive analysis

Items	<i>M</i>	<i>DE</i>	<i>g</i> ₁	<i>g</i> ₂
I consider myself capable enough to successfully face any academic task.	8.57	1.22	-1.10	1.91
I think that I can understand a subject well and quickly.	8.36	1.27	-0.95	1.44
I feel confident in approaching situations that test my academic ability.	8.31	1.21	-1.68	6.65
I am confident that I can take exams remarkably.	8.52	1.18	-0.92	1.59
I put aside the fact that the teachers are demanding and tough, because I trust a lot in my own academic ability.	8.17	1.56	-1.60	3.74
I believe that I am a capable and competent person in my academic life.	8.40	1.24	-1.40	4.08
If I put my mind to it, I think I have enough ability to obtain a good academic record.	8.95	1.13	-2.08	8.49
I think I can pass the courses quite easily, and even get good marks.	8.44	1.16	-0.96	1.80
I am one of those people who do not need to study to pass a subject or pass a full course.	6.38	2.67	-0.62	-0.58
I believe that I am prepared and capable enough to achieve a lot of academic success.	8.50	1.41	-1.35	3.54
	Mardia		4260.6***	113.1***

Note: ****p* < .001. *g*₁: asymmetry. *g*₂: kurtosis.

Confirmatory analysis and Eapesa adjustment models

Table 2 shows the CFA with MLR estimation in three Eapesa single-sector models (with 10, 9 and 7 items). From this analysis it can be inferred that the proposed model of Navarro-Loli & Domínguez-Lara (2019) of 7 items keeps acceptable adjustments in its factorial structure except for χ^2 that contains significance ($p < .05$, which is explained by the sensitivity of the χ^2 at large sample sizes), although they are structurally valid once it is regularized (χ^2 / g_1) and it is less than 4. In addition, the other results of the adjustment indicators such as the absolute ones (χ^2 / g_1 and SRMR), the relative ones (CFI and TLI) and the one not based on centrality (RMSEA), show that it presents a better fit than that of the other models (10 and 9 items respectively).

Table 2.

Eapesa confirmatory factor analysis with MLR estimation

Adjust model	χ^2	<i>g</i> ₁	χ^2/g_1	CFI	TLI	SRMR	RMSEA
1 factor - 10 items	95,93***	27	3.6	.951	.935	.037	.011 [.089 - .138]
1 factor - 9 items	95.93***	27	3.6	.951	.935	.037	.011 [.089 - .138]
1 factor - 7 items	40.01***	14	2.9	.966	.950	.034	.063 [.050 - .076]

Note: *** *p* < .001. χ^2 : Chi-square. χ^2/g_1 : Normed chi-square. CFI: Comparative Fit Index. TLI: Tucker-Lewis index. SRMR: Standardized Mean Square Residual. RMSEA: Mean Square Error of Approximation.

The CFA along with the overloads of the items in the 7-item version (items 2, 3 and withdrawn) are analyzed (see Figure 1). It is observed that the saturations are adequate and homogeneous with each other. Moreover, in all cases, they are higher than $\lambda > 0.5$; therefore, it is not necessary to remove items like the versions of 9 and 10 items since it allows greater consistency of the model and explanation about the variance.

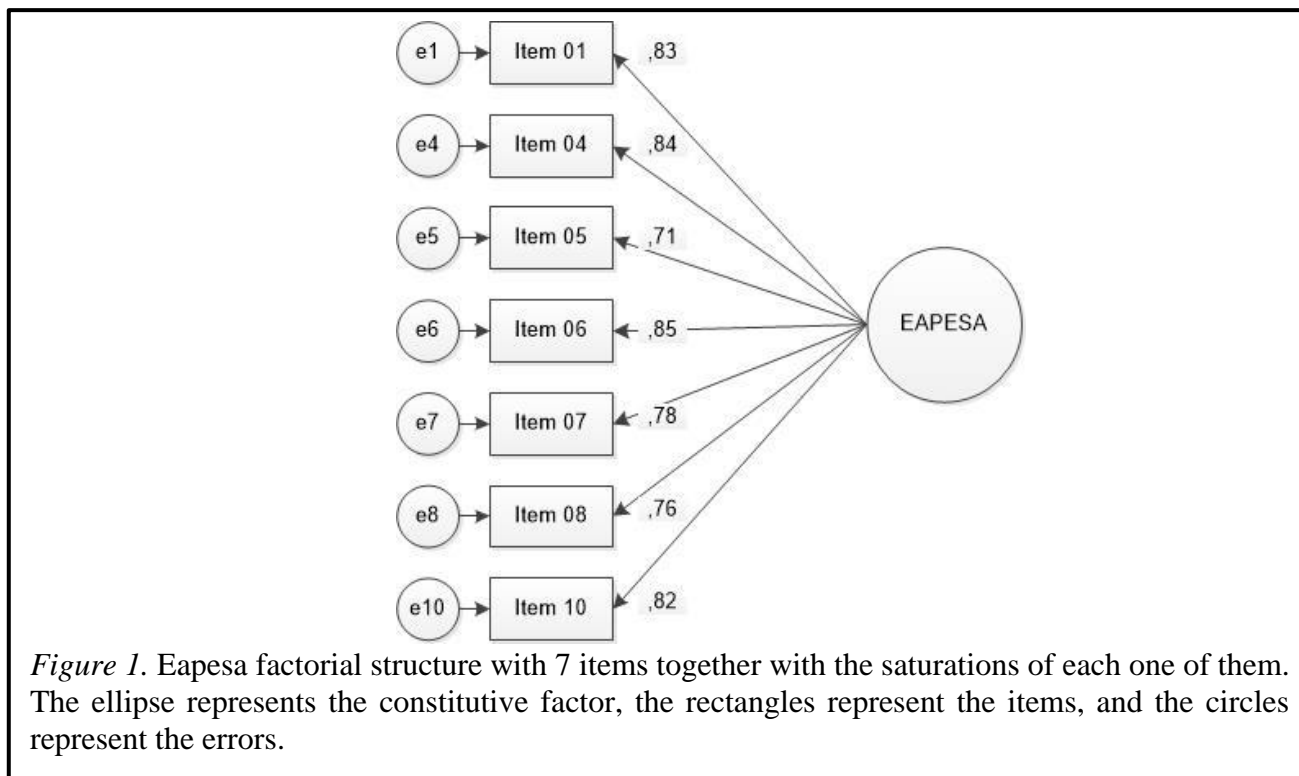


Figure 1. Eapesa factorial structure with 7 items together with the saturations of each one of them. The ellipse represents the constitutive factor, the rectangles represent the items, and the circles represent the errors.

Validity of relationship with other variables and reliability

Table 3 analyzes the relationship that Eapesa has with the Academic Self-efficacy construct. To demonstrate the validity as a function of the relationship with other variables, the 7-item Eapesa data are correlated with a similar test of Academic Self-efficacy, which in this case is the EACA. The mentioned version of Eapesa was found to converge moderately ($r > .40$), significant ($p < .05$) and positively with the EACA.

Something similar happens when the reliability calculation is obtained with the coefficient ω and the confidence intervals. Construct validity based on reliability is high along with its CI.

Table 3.

Convergence validity and reliability analysis of Eapesa in the 7-item version

Factors	Eapesa-7
Communication	.600**
Attention	.604**
Excellence	.573**
EACA	.685**
ω IC _{95%}	.92 [.90 - .94]

Note: ** $p < .01$. ω IC_{95%}: McDonald's coefficient. IC_{95%}: 95 % Confidence Intervals.

Discussion

The aim of the study was to confirm the Eapesa one-factor model, as well as its reliability and validity of convergence in a sample of university students from Ecuador.

First, the CFA with MLR estimation confirms the one-factor structure of Eapesa proposed by Palenzuela (1983). The proposed 7-item version shows an adequate fit (considering solid estimation) in the absolute (χ^2 , χ^2 / gl and SRMR), relative (CFI and TLI) and not based on centrality (RMSEA) indices (Abad et al., 2011; Brown, 2015; Byrne, 2006). In addition, the analysis of the saturations of the items shows factorial loads greater than $\lambda > 0.5$ and homogeneously with each other. This allows for estimation that the items contribute consistently to the construct under analysis and let a more consistent explanation of the variance happen. The adjustment of the Eapesa-7 in the Ecuadorian sample, as it is adequate, resembles the findings of factorial structuring proposed by Navarro-Loli and Domínguez-Lara (2014) in the Peruvian sample and differs from the versions of 10 (García-Fernández et al., 2010) and 9 items (Domínguez-Lara, 2014) respectively.

Second, it should be considered that in the 7-item versions between the current analysis in Ecuadorians and that of Navarro-Loli and Domínguez-Lara (2019) in Peru, they differ in the response option scales, since 10 were used in the first options according to the original version and 4 options in the second one. Apparently, the number of response options between 10 and 4 options does not differ in the final factorial structuring because the same conclusion is achieved. However, this should be taken with caution and considered for future instrumental investigations to verify or do not verify discrepancy.

Regarding the reliability and validity of convergence, high reliability is evidenced with coefficient ω . This matches similar findings in preliminary studies (Del Valle et al., 2018; Domínguez-Lara, 2014; García-Fernández et al., 2010; García-Fernández et al., 2016; Navarro-Loli & Domínguez-Lara, 2019). There is also moderate ($r > .40$) and significant ($p < .05$) convergence with the EACA (Vega et al., 2011). There are no previous data points that corroborate these results found with similar instruments.

To conclude, it is established that the Eapesa in the 7-item version is one that adequates to univariate structure, homogeneous capacities, high reliability and moderate convergence valid for its application in Ecuadorian university students. Notice that the factorization calculation methodology was carried out by through estimations (MLR), which turns out to be more suitable for validating tests with a discrete scale and without multivariate normality. This allows for greater objectivity in the results and less bias in the interpretation of the factorial structure (Li, 2016).

Among the practical implications, the inclusion of the Ecuadorian population in the instrumental analyzes of Eapesa that confirms its factorial structure is observed. Furthermore, there is a specialized scale for measuring Academic Self-efficacy adapted to the Ecuadorian context, which will allow the improvement of the evaluation and diagnosis processes, as well as proposals for future intervention. Finally, it allows progress in the conformation of a more exact and precise test by proposing a reduced version of 7 items with more accurate validation calculations that can be replicated in the future at a national and international level.

Limitations and future recommendations

It should be mentioned that the study has limitations regarding the diversification of the sample, since the participants come from a private university in Ecuador. For future research, it is necessary to extend the samples to students from both public and private universities in different cities of Ecuador to grant it a greater national range. It could be possible to extend this study to the adolescent population in high school, as well as at the postgraduate level to know the dynamics of factorial structuring of Eapesa.

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