

Psychometric properties of the Spanish-language version of the Agentic Engagement Scale (AES): a preliminary study

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Abstract

In 2011, Reeve and Tseng operationalized the measurement of the 'agentic engagement' construct in five statements. Later, the preliminary scale was empirically validated (Reeve, 2013) to assess the students' active contribution during the education process. This work presents a preliminary study of the psychometric properties of the Spanish version of the Agentic Engagement Scale (AES). Using a sample of 194 participants, we analyzed item responses distribution, factor structure, internal consistency, and evidence based on the relationship between the AES and other measures of engagement and personality traits. The results confirmed its one-factor structure and its reliability in terms of internal consistency. In conclusion, the Spanish version of the AES seems to be a promising scale to assess agentic engagement in Spanish-speaking students.

Keywords: *Agentic Engagement Scale; measurement; unidimensional; Spanish.*

1. Introduction

Academic engagement is a multidimensional construct formed by behavioral, emotional, cognitive, and agentic aspects (Reeve & Tseng, 2011; Morcillo-Martínez, Infantes-Paniagua, García-Notario, & Contreras-Jordán, 2021). Its importance in education has grown due to its potential to promote learning and prevent school failure and dropout (Rodríguez-Fernández, Ramos-Díaz, Madariaga, Arrivillaga, & Galende, 2016).

Reeve and Tseng (2011) defined the concept of *agentic engagement* as the edifying students' input to the process of receiving instructions. In this way, agentic engagement is a unique and proactive type of engagement that generates continuous dialectical transactions between teacher and student (Reeve, 2013). In other words, it involves "the most frequent ways students proactively and constructively engaged themselves in the flow of the day's instruction" such as by asking questions, expressing preferences, and providing suggestions (Reeve & Tseng, 2011). In 2013, Reeve developed the Agentic Engagement Scale (AES) to measure these interactions through five items that showed a unifactorial structure ($\alpha = .84$).

Recent studies have already administered the AES in Spanish-speaking samples, but they were limited to sample populations of secondary (Cuevas, Sánchez-Oliva, & Fernández-Bustos, 2016) and primary school students (Morcillo-Martínez et al., 2021), which prevents generalizing the findings to university students. Our investigation fills this gap in the literature. Reeve and Tseng (2011) have found moderate correlations between the agentic engagement construct and other types of engagement (e.g., behavioral engagement, emotional engagement, and cognitive engagement). In addition, some personality traits such as extraversion, agreeableness, and conscientiousness have shown a positive correlation with general engagement (Qureshi, Wall, Humphries, & Bahrami, 2016). Finally, several researchers have focused on the contribution of engagement to student outcomes such as academic achievement (e.g., Kimbark, Peters, & Richardson, 2017; Lardy, Bressoux, & De Clercq, 2022). Notably, Reeve (2013) has found the potential of agentic engagement to explain independent variance in student achievement.

The aim of this study is to conduct a preliminary assessment of the psychometric properties of the Spanish version of the AES in a sample of university students. Specifically, we analyze item responses distribution, factor structure, internal consistency, and evidence based on the relationship between the AES and other measures of engagement and personality traits.

2. Method

2.1. Participants

The sample consisted of 194 students (154 women [79.4%], 38 men [19.6%], and 2 non-binaries [1.0%]). Their age ranged from 17 to 48 years ($M = 20.6$; $SD = 3.83$). At the time of

the study, 95.4% were enrolled in bachelor's degrees, 3.6% were postgraduate students (Master's degrees/Postgraduate courses), and 1.0% were enrolled in doctorate programs.

2.2. Measures

The original English-language version of the AES (Reeve, 2013) includes five items measuring students' dialectical and transactional participation in class (e.g., "During class, I express my preferences and opinions"). Item responses are presented on a 7-point Likert scale, ranging from 1 (*completely disagree*) to 7 (*completely agree*). Items were translated and adapted into Spanish by means of parallel translation and reconciliation procedures.

The Spanish version of the Utrecht Work Engagement Scale for Students (UWES-9S; Schaufeli & Bakker, 2004) was administered. This nine-item scale is the standard tool for assessing work engagement characterized by vigor, dedication, and absorption (e.g., "When I'm doing my work as a student, I feel bursting with energy"). Items are scored on a 7-point Likert-type scale, ranging from 0 (*never*) to 6 (*always*). The UWES-9S has been shown to be internally reliable ($\alpha = .84$) and have a three-factorial structure that seems invariant across gender and educational levels.

The Spanish version of the Mini International Personality Item Pool-Five-Factor Model-Positively Worded (Mini-IPIP-PW; Martínez-Molina & Arias, 2018; original version by Donnellan, Oswald, Baird, & Lucas, 2006) was applied. This instrument includes 20 items to measure the Big Five domains: extraversion (e.g., "I am the life of the party"), agreeableness (e.g., "I sympathize with others' feelings"), conscientiousness (e.g., "I get chores done right away."), emotional stability (e.g., "I am relaxed most of the time."), and openness to experience (e.g., "I have a vivid imagination"). Items are rated on a 5-point Likert scale, ranging from how well each statement described them from 1 (*not at all*) to 5 (*completely*) to evaluate each personality trait. There is sufficient support for the Spanish Mini-IPIP-PW's factorial validity and composite reliability ($\geq .90$). Its associations with engagement suggest convincing correlations (Qureshi et al., 2016).

A sociodemographic questionnaire was included to get participants' information about gender, age, current studies, and the admission grade point average (GPA). Even though average grades seem biased (De Clercq, Galand, Dupont, & Frenay, 2013), they are the most common institutional information about student academic performance (Lardy et al., 2022).

2.3. Procedure

The data were collected between October and November 2022 using a convenience sample. Undergraduate university students received the invitation to participate in the study on their virtual campus. They received a link to an online questionnaire (hosted on the Qualtrics software platform: <https://www.qualtrics.com>) that included the instruments listed above and were asked to share the link with others on their social media (e.g., Twitter, Instagram). The

inclusion criteria were (1) being a university student at the time of responding to the questionnaire, and (2) having a proficient level of Spanish. Before starting the questionnaire, all participants were informed about voluntary participation, anonymity, and confidentiality in the study, and gave online informed consent.

The study followed the Declaration of Helsinki (World Medical Association, 2001) and was approved by the bioethics commission of the University of Barcelona.

2.4. Analysis Strategy

The statistical data analysis programs Jamovi 2.3.21 and the lavaan package (Rosseel, 2012) were used to analyze the psychometric properties of the AES.

Descriptive statistics of the AES were obtained at the item level, including mean, standard deviation, and percentage of item endorsement, skewness, and kurtosis coefficients, as well as corrected item-total correlations. We assessed the dimensionality of the AES through confirmatory factor analysis (CFA). We used the weighted least squares means and variance adjusted (WLSMV), which is suitable for ordinal items. The goodness of fit was assessed by means of the Comparative Fit Index (CFI; $\geq .90/95$ reflecting acceptable-to-excellent model fit), and the Standardized Root Mean Square Residual (SRMR; $\leq .06$ suggesting good model fit) (Hu & Bentler, 1999).

We calculated the scale-level descriptive statistics (i.e., mean, standard deviation, skewness, and kurtosis values) for the EAS, the UWES-9S, and the Mini-IPIP-PW. Furthermore, the internal consistency of these scales was examined using Cronbach's alpha (α) and McDonald's omega (ω) coefficients.

Validity evidence based on relationships between the AES and other measures was calculated using Pearson correlations relating the AES total score with the UWES-S9, the admission GPA and the Mini-IPIP-PW trait scores.

3. Results

3.1. Item-level Descriptive Statistics

Table 1 informs about the distribution of the AES item scores. All the items spanned the entire range of the scale (i.e., 1-7), but participants less frequently responded to the "completely agree (7)" option. Skewness and kurtosis coefficients suggested non-significant departures from normality, even though items have a moderate positive asymmetry. All corrected item-total correlations were high.

Table 1. Item-Level Descriptive Statistics of the SP-AES.

Item	M	SD	PIE (%)							SK	K	r _{ix}
			1	2	3	4	5	6	7			
I1	2.97	1.76	23.7	29.4	11.9	10.3	12.4	10.3	2.1	0.60	-0.90	.70
I2	3.01	1.83	21.1	33.5	12.9	8.2	9.8	9.3	5.2	0.77	-0.62	.70
I3	3.29	1.84	22.2	20.6	13.9	10.8	17.5	11.9	3.1	0.29	-1.21	.57
I4	3.27	1.90	23.2	20.1	14.9	11.9	16.0	6.2	7.7	0.45	-0.95	.61
I5	2.77	1.72	29.4	28.4	10.3	10.3	12.9	6.7	2.1	0.72	-0.67	.67

Note. I = Item; M = Mean; SD = Standard deviation. PIE (%) = Percentage of Item Endorsement; each statement is rated on a 7-point Likert-type scale. SK = Skewness; K = Kurtosis. r_{ix} = Corrected item-total correlation.

3.2. Factor Structure

The one-factor model fits the data well (CFI = .972, SRMR = .048). Figure 1 shows the path diagram of the one-factor model of the AES. All factor loadings were high and statistically significant.

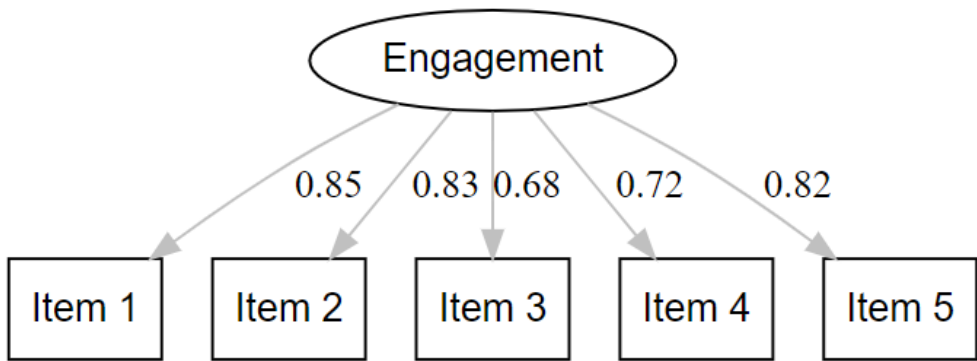


Figure 1. Path diagram of the one-factor model of the AES.

3.3. Scale-Level Descriptive Statistics and Internal Consistency

Table 2 shows the scale-level descriptive statistics (i.e., mean, standard deviation, skewness, and kurtosis values) and the internal consistency of the AES total score. The internal consistency was evaluated using Cronbach’s alpha (α) and McDonald’s omega (ω) coefficients, both suggesting that scores provided by the AES are reliable.

Table 2. Descriptive statistics, internal consistency coefficients, and correlations of the AES with engagement, academic achievement, and personality traits.

	M	SD	SK	K	α	ω	r
AES	15.3	7.11	0.51	-0.27	.84	.86	-
UWES-9S	31.7	10.8	-0.11	-0.64	.92	.92	.39**
Admission GPA	8.02	1.00	-0.23	0.16	-	-	.02
Mini-IPIP-PW							
Extraversion	10.3	3.63	0.21	-0.69	.76	.76	.22*
Agreeableness	15.8	3.15	-0.73	0.16	.83	.83	.11
Conscientiousness	12.5	3.62	-0.20	-0.53	.82	.83	.10
Emotional stability	9.65	3.42	0.26	-0.69	.74	.75	.12
Openness to experience	13.4	3.80	-0.21	-0.40	.83	.83	.25**

Note. M = Mean; SD = Standard Deviation; SK = Skewness; K = Kurtosis; α = Cronbach's Alpha; ω = McDonalds' Omega; r = Pearson Correlation. * $p < .01$; ** $p < .001$ (two-tailed).

3.4. Validity based on relations with other variables

Descriptive statistics and internal consistency coefficients of the other measures of engagement, academic achievement, and personality traits are shown in Table 2, also their bivariate correlations with the AES. The total score of the AES was moderately associated with students' work engagement ($r = .39$). Contrary to what we expected, the AES was not related to the admission GPA. According to the relation of AES with personality traits, the extraversion and openness to experience factors were significantly related to AES.

4. Discussion

This study shows the initial psychometric evidence of the AES in a Spanish university students sample. The item-level descriptive statistics scores of the Spanish version of the AES yielded similar distributional properties to those observed in the original scale (Reeve, 2013). Furthermore, the internal consistency in our results aligns with the original scale and the Spanish versions of the AES for secondary school students (Cuevas et al., 2016) and primary school students (Morcillo-Martínez et al., 2021).

Moreover, our investigation revealed that the one-factor structure of the AES (Reeve, 2013) showed a good model fit and high factor loadings of the five items. These results are similar

to other validity studies of the AES (Cuevas et al., 2016; Morcillo-Martínez et al., 2021) that reinforce our confidence in the future replication of this structure in larger sample sizes.

Our findings support the correlation between the AES and students' work engagement in line with the study of Reeve and Tseng (2011), which highlighted the correlation between the AES and other engagement types. On the other hand, we observe a positive relationship between AES and extraversion similar to Qureshi et al. (2016). However, we found low correlations between AES and agreeableness or conscientiousness. In the future, more research may be performed to identify early predisposition to engagement.

Finally, the absence of a correlation between the AES total score and academic achievement, as measured by admission GPA, may be attributed to the possibility of grade average bias, as suggested by De Clercq et al., (2013). Additionally, it is worth noting that the admission GPA represents past information, specifically the mark used for university admission, rather than current academic performance. As other authors have found (Lardy et al., 2022), it would be expected that the relationship between engagement and current academic achievement would be higher.

5. Conclusion

The Spanish version of the AES appears to be a promising instrument for measuring agentic engagement. It corroborates good psychometric properties: adequate factor structure, convincing internal consistency, and validity evidence based on relations with students' work engagement and extraversion personality traits. These findings have theoretical and applied implications in education to promote programs and interventions in this field.

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