Research Article

Received: 18 August 2022 / Accepted: 19 October 2022 / Published: 5 November 2022

Psychometric Evidences of the Entrepreneurial Behavior Scale in University Students from Northern Peru

Mabel Isabel Otiniano León[1]

Velia Graciela Vera Calmet[1]

Haydee Mercedes Aguilar Armas[1]

Lucy Angélica Yglesias Alva[2]

Susana Edita Paredes Díaz[1]

Monica Elisa Meneses La Riva[1]

[1]*Universidad Cesar Vallejo,*
Av. Larco 1770, Trujillo 13001,
Peru
[2]*Universidad Nacional de Trujillo,*
Av. Juan Pablo II, Trujillo 13011,
Peru

DOI: https://doi.org/10.36941/ajis-2022-0147

Abstract

The study establishes the psychometric evidences of the Entrepreneurial Behavior Scale (EBS) in a sample of university students (N = 865) where 526 (60.8%) were women and 339 (39.2%) were men. Evidences of Aiken's content validity (p<.01 or p<.05) were found, indicating that the items are clear, coherent and relevant; as well as of internal structure, verifying the three-dimensional model, with adequate fit indices (RMR = .05, AGFI = .94, NFI = .92, RFI = .91, PNFI = .84). Finally, reliability by internal consistency was found with the Omega coefficient (ω > .70). It is concluded that the Entrepreneurial Behavior Scale (EBS) presents adequate evidences of validity and reliability.

Keywords: *Entrepreneurial behavior, psychometric evidences, validity and reliability*

1. Introduction

At a global level, changes and transformations in the social, cultural, economic and other contexts have emerged, especially in developing countries (Lugo and Ithurburu, 2019). These changes have a significant impact on the growth of small businesses, which sustain the development of a country's economy, generating jobs for thousands of people and boosting the welfare of societies (Lanero et al., 2011). Generating entrepreneurship allows the creation of an optional development model for society, so it is important to have an entrepreneurial profile characterized by innovating and taking risks in

the establishment of new companies. Entrepreneurship is linked to activities that generate economic profits or not, where those involved come from both state and private institutions (Aldana- Rivera et al., 2019).

Entrepreneurship generates the union of several relevant areas such as economic growth, fairness, innovation and productive development. Motivating entrepreneurship allows growth that leads to economic and social development, as it contributes to the implementation of jobs, as well as to the diversification of production, innovation, consolidation of MYPES (small and medium-sized enterprises), leading to better levels of competition and fairness in economic management. Entrepreneurship is a topic frequently dealt with from various theoretical proposals due to the fact that there are multiple disciplines that encourage it, working together to explain entrepreneurial behavior, and leaving aside the hypothesis of unreflective entrepreneurial activity. Generating entrepreneurship allows the confluence of motivations, beliefs and context (Acosta et al.,2017).

Thus, entrepreneurship is related to flexible thinking, as well as to the ability to compete in a globalized economy. For this reason, as entrepreneurship in traditional commerce has decreased, it has sought to adapt to new virtual sales channels, seeking to increase efforts in relation to marketing and allow its permanence in the market. The quarantine forced a global analysis of the situation of entrepreneurship, valuing the resources to challenge the limitations of this new way of life, so the use of virtuality as a marketing strategy was implemented (Sumba-Bustamante et al., 2020).

International studies, such as that of Echeverri-Sánchez & Valencia-Arias (2018), maintain that entrepreneurship starts from personal needs that will cover their life expectations, goals, and their desires for improvement, growth and achievement (Farashah, 2015). It should be noted that the situations surrounding the individual are fundamental to start a new business; they are influenced by the social, professional and personal context (Torres et al., 2017). Therefore, there are different motivations that mobilize people to form new enterprises, taking into account the environment in which they operate.

The academic training of the entrepreneur is a preponderant factor in the generation of an entrepreneurship (Laguía et al., 2017) taking into account that the higher the degree of studies, the higher the rate of entrepreneurship. University institutions are committed to training entrepreneurs by reinforcing competencies in the use of technology and training in strategies to meet the needs of customers, which is constantly evolving (González-García et al., 2019). These transformations have an impact on and challenge university education, which is responsible for training prepared and suitable professionals for the new demands of the labor market. The university pedagogical practice must be made up of scientific and technical inputs that guide the development of personal and professional competences that guide the student towards an entrepreneurial attitude (Durán-Aponte and Elvira-Valdés, 2015).

In the university context, entrepreneurship is promoted in order to provide solutions to the high rate of young people who are unemployed. For this reason, migration to industrialized cities is constant, trade is high but damage to the environment is increasing (Vélez et al., 2020). The university students clarify their vision towards the professional future, devising various strategies that allow them to face the demands of the environment, responding according to their personality, social and cultural characteristics (Torres et al., 2017). Likewise, the entrepreneur is distinguished by possessing an innovative and unique attitude, capable of seeking solutions against challenges, facing risk prudently and planning his or her actions (Cabrera- Nova et al., 2016).

In this sense, entrepreneurial behavior has a theoretical foundation based on the planned behavior (TPB) of Ajzen (1991), which values the impressions of the context that explains behavior based on effort and perseverance regarding entrepreneurship (Querejazu-Vidovic, 2021). For Ajzen (1991), behavior is guided by personal and contextual intentions that motivate the creation of work projects related to entrepreneurial attitude, subjective norms and perceived behavioral control. This entrepreneurial behavior is composed of various components such as the culture from which the norms that guide social behavior are governed; the ability to perform a certain activity, the conviction to be able to start a business; the uptake, and thoughts and behaviors based on previous experiences

that may arise over time. If all these aspects combine in an appropriate way, the motivation for entrepreneurship will give way to a new business idea (Regalado-Pezúa et al.,2017).

In this regard, Patiño et al. (2018) report that more than 70% of the adult population evaluates generating an entrepreneurship as a growth option. However, there are few instruments that help to identify the entrepreneur's profile. Some measure the entrepreneur's personality, others the attempts to carry out ventures, and the phases to develop a venture, among others. Current approaches show that entrepreneurship is changeable and that it is linked to the intention and perception that individuals have of their environment, making it possible to observe entrepreneurial behavior. In view of this, there is a need for a scale that identifies the characteristics of entrepreneurial behavior, which is conceived through three factors: attitudes, subjective norm and perceived social control. Taking into account these areas, Alfaro et al., (2019) elaborated the instrument aimed at measuring the variable under study, having a number of items determined for each dimension.

On the other hand, entrepreneurial attitudes are actions aimed at fostering an entrepreneurial culture as a mechanism to generate jobs and thus enable young people to enter the labor market. For this objective, it is necessary to have certain guidelines that enable change, among which we have the benefits subject to self-employment aimed at the transition of mentality at the labor level (Rodriguez and Ramos, 2016; Rodriguez and Verd, 2018). The fact that young people do not have a permanent job helps to link two primary objectives for social entrepreneurship: the creation of social value and favoring their employability (Díaz and Lejarriaga, 2018).

The subjective norm is related to the predominance of the immediate context: family, friends, close people and referents, in the incentive and interest to acquire certain consumer products (Carpi et al., 2005; Chiou, 1998). Customers assume a pattern of behavior that allows them to meet their expectations, among which are the motivations that consumers must meet according to their needs, lifestyles, stage of life and their family priorities. Likewise, social control viewed through the perception of control is related to the potentialities and abilities that the client uses to confront internal and external difficulties that prevent him/her from acting (Lee et al., 2007; Ajzen, 2002). This factor takes indirectly the importance of the environment to make or not the purchase (Xu & Zhao, 2020); therefore, universities seek to adapt to the new demands of the market, so that their students manage to develop skills that allow them to perform efficiently (Martínez- Garcés et al. 2021).

In view of the above, the present study has the following objectives: to establish the evidence on the psychometric scale of entrepreneurial behavior in university students, to identify the evidence of content validity, structural validity and internal consistency reliability. These results will make it possible to have a scale with adequate psychometric properties to measure and identify entrepreneurial behavior and, based on this, develop profiles and strategies that help to train university students with an entrepreneurial vision.

2. Methodology

The present research, due to its psychometric nature, was carried out with an instrumental type of research plan with a field study, non-experimental and transectional. (Ato et al., 2013; Hurtado de Barrera, 2010). The sample for the study consisted of 865 university students from northern Peru, of whom 526 (60.8%) were women and 339 (39.2%) were men. They were selected by non-probabilistic convenience sampling, including students between 16 and 40 years of age, enrolled in four different careers, within the 2021-I academic semester and who voluntarily accepted to participate in the study. The Entrepreneurial Behavior Scale (EBS), version 1, constructed by Alfaro et al. (2019) was applied. This scale evaluates three subscales: attitude (10 items), subjective norm (6 items) and perceived social control (10 items), making a total of 26 items equivalent to statements on a Likert scale with four response options: always (4 points), almost always (3 points), almost never (2 points) and never (1 point), and it was administered individually and collectively.

The EBS was applied to undergraduate students at a university in El Salvador, showing that the psychometric evaluations of the Scale had been carried out and where the correlation coefficients of

each of the items with the respective subscales are shown. They also show the contribution in the measurement of the construct, reporting values between .54 to .68 in the attitude subscale, between .56 to .73 in the subjective subscale and between .49 to .64 in the perceived social control subscale. These results corroborate the reliability of the instrument as well. Initially, the instrument was reviewed by 9 expert jurors to evaluate the original model of the Scale. Subsequently, authorization was requested to administer the Entrepreneurial Behavior Scale. Once permission was granted, a Google form was prepared and distributed to the students in each classroom. The form contained the informed consent in accordance with the ethical parameters of research. The technique used was the survey and all the information was entered into Excel 2016 software for its statistical processing.

To demonstrate content validity, the Scale was submitted to the criteria of nine experts, whose opinions were evaluated with the Aiken coefficient. Then the univariate and multivariate normality test was performed by means of the asymmetry and kurtosis coefficients (Santana-Rodríguez et al., 2019), and then evaluate the structural validity through confirmatory factor analysis (CFA) with the nonparametric method of least squares of free scale, indicating the good fit of the three-dimensional model to the sample data through indexes, such as chi-square, standardized residual mean square root (RMR) less than or equal to .08. Adjusted Goodness of fit index (AGFI), recommending a value greater than .93 in GFI in samples greater than 100 (Cho et al., 2020), in the case of other incremental indexes such as, Normed fit index (NFI); Relative fit index (RFI), its value should be greater or equal to .90 (Escobedo-Portillo, et al. 2016); Parsimony normed fit index (PNFI), greater or equal to .50 (Torres, 2011); factor loadings greater or equal to .40 (Stevens, 2002). Likewise, the path diagram presented by Cohen (2008) was developed in order to schematize the model.

The evidences of reliability of the Entrepreneurial Behavior Scale were established by means of the point and interval estimation at 95% confidence interval of the Omega coefficient as a measure of internal consistency with a recommended value between .70 and .90 (Campo-Arias & Oviedo, 2008). The IBM SPSS Statistics 28 with its AMOS extension was used to process the data, and the tables were prepared according to the APA seventh edition.

3. Results

3.1 Evidences of content validity

Table 1: Content validity of the Aiken Entrepreneurial Behavior Scale according to the criteria of nine experts

Item	Clearness		Coherence		Relevance	
	V of Aiken	Value p	V of Aiken	Value p	V of Aiken	Value p
Item 01	.96	.009	1.00	.002	1.00	.002
Item 02	.96	.009	1.00	.002	1.00	.002
Item 03	1.00	.002	1.00	.002	0.96	.009
Item 04	1.00	.002	1.00	.002	1.00	.002
Item 05	1.00	.002	1.00	.002	1.00	.002
Item 06	1.00	.002	1.00	.002	1.00	.002
Item 07	1.00	.002	1.00	.002	1.00	.002
Item 08	1.00	.002	0.96	.009	0.96	.009
Item 09	1.00	.002	1.00	.002	1.00	.002
Item 10	1.00	.002	1.00	.002	1.00	.002
Item 11	1.00	.002	1.00	.002	0.96	.009
Item 12	1.00	.002	1.00	.002	1.00	.002
Item 13	1.00	.002	0.96	.009	0.96	.009
Item 14	1.00	.002	0.96	.009	0.96	.009
Item 15	1.00	.002	1.00	.002	1.00	.002
Item 16	1.00	.002	1.00	.002	1.00	.002

Item	Clearness		Coherence		Relevance	
	V of Aiken	Value p	V of Aiken	Value p	V of Aiken	Value p
Item 17	.81	.033	1.00	.002	1.00	.002
Item 18	1.00	.002	1.00	.002	1.00	.002
Item 19	1.00	.002	1.00	.002	1.00	.002
Item 20	1.00	.002	1.00	.002	1.00	.002
Item 21	1.00	.002	1.00	.002	1.00	.002
Item 22	1.00	.002	1.00	.002	1.00	.002
Item 23	1.00	.002	1.00	.002	1.00	.002
Item 24	1.00	.002	1.00	.002	1.00	.002
Item 25	1.00	.002	1.00	.002	0.93	.013
Item 26	.96	.009	1.00	.002	1.00	.002

**p<,01, *p<,05

Table 1, Aiken indexes were found to be highly significant (p<.01) or significant (p<.05), indicating that the twenty-six items are clear, coherent and relevant, regarding the measurement of entrepreneurial behavior in the students of the referred University.

The content validity was certified by nine expert jurors belonging to three university institutions, with training in the area of Psychology, qualified as knowing the subject and focused on research, complying with the recommendations of Valera et al. (2012), who propose that for an optimal analysis there should be between 7 to 30 experts. With respect to the aforementioned experts, they evaluated the original version of the scale considering the clearness, coherence and relevance of the 26 items, and ruled as a better proposal the indicators of clearness and coherence reaching a score of 1, specifying that the aspects of comprehension, syntactic and semantic, as well as the identification of the linguistic terms used in the formation of the items, establish statements in accordance with what is intended to be measured (Merino and Livia, 2009; Pérez, 2013).

It should be noted that the instrument of social entrepreneurship competence in university students validated the content of its items based on the evaluation of expert judgment in the areas of clearness, coherence and relevance, finding theoretical and conceptual support with the theory that supports the construction of this instrument (García-González et al., 2020). In addition, the social entrepreneurship potential assessment test was developed based on literature analysis (Portuguez et al., 2018). For this reason, it is important to highlight that in relation to the complexity of behaviors, it is of utmost importance to perform the content validity of each construct (item) i.e. the theoretical argumentation on which it is supported and which declares it as representative or not of the domain or population of items that would measure the trait to be measured, by experts in the subject of interest, before proceeding to evaluate other aspects of validity, such as construct or criterion (Ventura-León, 2019; Dominguez-Lara & Rodríguez, 2017).

3.2 Evidence based on internal structure

Table 2: Goodness-of-fit indexes of the confirmatory factor analysis model of the Entrepreneurial Behavior Scale

Model fit indexes	Value
RMR	.05
AGFI	.94
NFI	.92
RFI	.91
PNFI	.84

According to the findings, an AFC was found in the testing of the hypothesis concerning the corroboration of the three-dimensional structure of the Entrepreneurial Behavior Scale (Table 2); it

reports indexes that fall within the permissible range indicating good fit: standardized residual mean square root less than or equal to .08; the goodness-of-fit indexes, AGFI, NFI and RFI with values greater than .90, an indicator of good fit; and the parsimony-normed fit index PNFI with a value indicating a good parsimony-fit relationship.

Evidence of validity based on internal structure was estimated. The analysis allowed verifying that the theoretical model established by the author, in this case of three-dimensional structure of the Entrepreneurial Behavior Scale, was adequately adjusted to the data obtained with the application of the EBS in the university students involved in the study (Ríos and Well, 2014); presenting good fit indexes, both the absolute standardized root mean residual root mean square index (RMR =.05), as well as the incremental indexes reporting values above .90 (AGFI = .94, NFI = .92, RFI=.91) and the parsimony normed fit index PNFI which reported an acceptable fit (Escobedo - Portillo et al., 2016; Batista-Fogueta et al., 2004,); the results indicate that the theoretical model was adequately adjusted to the empirical data obtained from the population of university students in northern Peru, due to the evidence of improvement of the model with respect to the base model and very good approximation of the covariance matrices between the empirical model and the theoretical model, as well as the dependence of the items with their respective subscales, thus being able to observe that all the items are based on the same variable (Shi & Maydeu-Olivares, 2019; Ventura-León, 2019; Domínguez-Lara, 2014).

García-González et al. (2020) applied factor analysis for the Social Entrepreneurship Competence Scale in university students, where it is observed that the items do not fit the proposed dimensions. However, in the present study the results show evidence of validity with better fit indexes, thus finding a more refined instrument for the evaluation of entrepreneurial behavior.

Table 3: Factorial loads of the items of the Entrepreneurial Behavior Scale

Item	Attitude	Subjective norm	Perceived social control
Item01	.54		
Item02	.57		
Item03	.45		
Item04	.58		
Item05	.64		
Item06	.53		
Item07	.72		
Item08	.61		
Item09	.66		
Item10	.69		
Item11		.55	
Item12		.68	
Item13		.71	
Item14		.74	
Item15		.73	
Item16		.78	
Item17			.60
Item18			.66
Item19			.71
Item20			.71
Item21			.58
Item22			.65
Item23			.50
Item24			.43
Item25			.41
Item26			.42

The factor loadings of the Entrepreneurial Behavior Scale items, shown in Table 3, take values ranging from .41 to .78, higher than .40 set as the minimum value to ensure the contribution of the item.

As for the factor loadings, they indicate a good fit; ranging in the subscales, between .45 to .72 in Attitude, between .55 to .78 in the factor Subjective Norm and between .41 to .71 in the factor Perceived Social Control, showing that the items within each dimension tend to measure the same construct, evidencing not very high values (greater than .80), indicating that the items are not redundant measures of the construct (Merino-Soto et al., 2017). Likewise, the inter-factor correlations (subscales) range between .55 and .66. Therefore, the correlations among the factors are not high, revealing that the factors are explaining differentiated aspects (Social Control-Subjective norm=.66; Social Control-Attitude=.55 and Subjective Norm-Attitude=.62) or are not substantially redundant (Rodriguez, 2020).

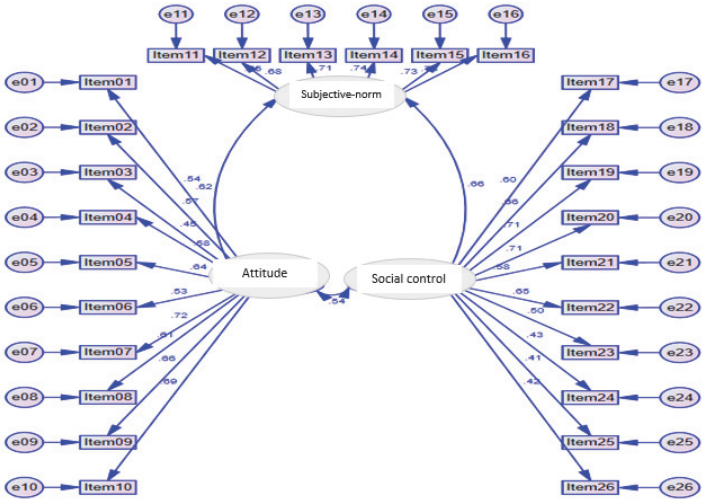

Figure 1: Path diagram of the factorial structure of the Entrepreneurial Behavior Scale.

This path diagram shows the three-dimensional structure of the Entrepreneurial Behavior Scale in Peruvian university students, as well as the items that belong to each of the dimensions, and also shows the factor loadings of all items, with their respective random errors (Figure 1).

3.3 Evidence of reliability by internal consistency

Table 4: Reliability of the Entrepreneurial Behavior Scale in university students

	ω	N° items	IC at 95%[(a)]	
			LI	LS
Entrepreneurial behavior	.94	26	.93	.95
Attitude	.85	10	.82	.88
Subjective norm	.85	6	.82	.88
Perceived social control	.83	10	.80	.86

Note: Omega reliability coefficient; (a): Interval of omega coefficient estimate; LI: Lower limit of the interval; LS: Upper limit of the interval.

Table 4 shows the omega reliability coefficients of the Entrepreneurial Behavior Scale in Peruvian university students, performing a punctual and interval estimation with a confidence level of 95%, showing a high reliability of the scale at a general level with a value of .94; and a very good reliability in its three dimensions: Attitude, Subjective norm and Perceived social control with coefficients ranging from .83 to .85.

In reliability, the omega coefficient referred to by Ventura & Rodriguez (2017) was used as an alternative robust measure of the reliability of an instrument in the face of the possible biases of Cronbach's alpha coefficient, due to its sensitivity to the number of items, or response alternatives in the measurement scale; obtaining results in the proposed model that indicate good internal consistency, both in the general scale and in the dimensions for reaching values within the ranges that indicate adequate reliability (Corral, 2009). Unlike the studies conducted by García-González et al. (2020) and Portuguez et al. (2018), who estimated reliability through Cronbach's Alpha coefficient.

Finally, it is suggested that future research could examine psychometric properties of the Entrepreneurial Behavior Scale in other contexts, in more heterogeneous samples, as well as evaluate the factorial invariance of the multigroup instrument to ensure the accuracy measured by the scale.

4. Conclusions

The validity and reliability of the Entrepreneurial Behavior Scale (EBS) was determined in a final sample of 834 participants aged 16 to 40 years, university students from Northern Peru. The results confirm the content validity, internal structure validity and internal consistency.

The content validity of the Entrepreneurial Behavior Scale, which was certified by nine academic experts, the construct validity in three dimensions, Attitude, Subjective norm and Perceived social control, were determined by means of the AFC, reporting adequate fit indexes in the population of university students in northern Peru. Likewise, it was possible to establish the evidence of reliability by internal consistency of the Entrepreneurial Behavior Scale, since omega coefficients were obtained, which qualify the reliability as high at a general level and as very good in the three subscales in the university students in reference.

Finally, the practical implication of the results of the study allows having an instrument that possesses adequate psychometric properties to be able to identify an entrepreneurial profile in university students and strengthen their entrepreneurial skills through programs that allow shaping their behavior and entrepreneurial intention, becoming successful professionals capable of developing competitively and contribute to the development of MYPES that economically benefit a country, especially in the current COVID-19 situation.

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