

ENTREPRENEURIAL BEHAVIOR SCALE: A VALIDATION STUDY WITH TEACHERS

ESCALA DE COMPORTAMENTO EMPREENDEDOR: UM ESTUDO DE VALIDAÇÃO COM PROFESSORES

ESCALA DE COMPORTAMIENTO EMPREENDEDOR: UN ESTUDIO DE VALIDACIÓN CON MAESTROS

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ABSTRACT

This study has two purposes. First, we assessed the reliability and factor structure of the English-language version of the Entrepreneurial Behavior Scale. Second, we measured its convergent validity. We used two data sets from previous studies exploring entrepreneurial behavior among public school teachers in the United States. Data set #1 consisted of 311 participants and data set #2 had 367. Exploratory and confirmatory factor analysis indicated adequate fit indexes. Results indicated a good Cronbach's alpha score (0.84). Results also showed evidence of convergent validity between Entrepreneurial Behavior and Career Adaptability.

KEYWORDS: CONVERGENT VALIDITY; ENTREPRENEURIAL BEHAVIOR SCALE; SCALE VALIDATION; TEACHERS' ENTREPRENEURIAL BEHAVIOR

RESUMO

Este estudo tem dois propósitos. Primeiro, avaliamos a confiabilidade e a estrutura fatorial da versão em inglês da Entrepreneurial Behavior Scale. Segundo, medimos sua validade convergente. Utilizamos dois conjuntos de dados de estudos anteriores que exploram o comportamento empreendedor entre professores de escolas públicas nos Estados Unidos. O conjunto de dados nº 1 consistiu em 311 participantes e o conjunto de dados nº 2 teve 367. A análise fatorial exploratória e confirmatória indicou índices de ajuste adequados. Os resultados indicaram um bom escore alfa de Cronbach (0,84). Os resultados também mostraram evidências de validade convergente entre o comportamento empreendedor e a adaptabilidade da carreira.

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RESUMEN

Este estudio tiene dos propósitos. Primero, evaluamos la confiabilidad y la estructura de factores de la versión en inglés de la Escala de Comportamiento Empresarial. En segundo lugar, medimos su validez convergente. Utilizamos dos conjuntos de datos de estudios anteriores que exploraron el comportamiento empresarial entre los maestros de escuelas públicas en los Estados Unidos. El conjunto de datos n. ° 1 consistía en 311 participantes y el conjunto de datos n. ° 2 tenía 367. El análisis factorial exploratorio y confirmatorio indicó índices de ajuste adecuados. Los resultados indicaron una buena puntuación alfa de Cronbach (0,84). Los resultados también mostraron evidencia de validez convergente entre el comportamiento empresarial y la adaptabilidad profesional.

PALABRAS CLAVE: VALIDEZ CONVERGENTE; ESCALADE COMPORTAMIENTO EMPREENDEDOR; VALIDACIÓN DE ESCALA; COMPORTAMIENTO EMPREENDEDOR DE LOS PROFESORES

INTRODUCTION

Entrepreneurial behavior is defined by van Dam, Schipper, and Runhaar (2010) as “behavior that involves recognizing opportunities and marshalling the resources to take advantage of and acting upon these opportunities” (p. 966). Research on entrepreneurship has expanded beyond the investigation of stable characteristics of entrepreneurs (Chell, 1985), and advanced a new perspective that allows for the development of competencies through education and experiences (Hayton & Kelley, 2006; Kyndt & Baert, 2015). Research on entrepreneurship has also gone beyond economics and management and reached into areas such as education, with special focus on teachers’ role as entrepreneurs in their classrooms and school buildings (Neto, Rodrigues & Panzer, 2017; Van Dam et al., 2010). This new area of studies on teachers’ entrepreneurial behaviors can be supported by the development of reliable and valid measures that become available to researchers. Van Dam et al. (2010) developed the Entrepreneurial Behavior Scale (EBS), originally used with Dutch teachers, to identify competencies predictive of entrepreneurship. This scale has also been used with English-speaking samples (Neto, Rodrigues, Stewart, Xiao & Snyder, 2018; Neto, Rodrigues, Polega & Persons, 2019; Neto, Rodrigues, Polega, Campbell, Ochsankell, 2020). To fill the gap regarding the reliability and validity of the English-

language version of this scale, our study aims at assessing the reliability and the factor structure of the English-language version of the EBS and measuring its convergent validity.

THEORETICAL BACKGROUND: ENTREPRENEURSHIP

Entrepreneurship has been identified as a driver of economic growth and development (Fritsch & Wyrwich, 2017), which is congruent with the perception of entrepreneurs as agents of change who identify needs and opportunities that impact people's lives (Maranto, 2015; Petersen, 2014), or those who take advantage of innovative technology to develop their ventures (Tülüce & Yurtkur, 2015). While "entrepreneurship" and "entrepreneur" are pervasive and ingrained in our culture by personalities such as Steve Jobs, Cher Wang, and Xavier Niel, these terms have been used since the 18th century to refer to those who take risks in managing ventures, according to Carland, Hoy, and Carland (1988). This claim is supported by Murphy, Liao, and Welsh (2006), who have established that the first systematic investigations of entrepreneurship took place in 18th century Europe. Two centuries later, a body of research on entrepreneurship had begun to accrue, and universities included it as part of their economics and management curricula (Carlsson et al., 2013; Katz, 2003).

Many early studies approached entrepreneurship from a trait-based perspective, as a set of genetic and personality traits innate to individuals (Nicolaou & Shane, 2010; Zhang et al., 2009). Consider, for example, the study conducted in the Flemish region in Belgium by Cools and Broeck (2015). They found that entrepreneurs were more likely to have proactive personalities and a higher tolerance for ambiguity than non-entrepreneurs. Consider also the study exploring personality traits among British entrepreneurs, which showed that social entrepreneurs displayed higher levels of innovativeness and needs for autonomy/independence than traditional entrepreneurs (Smith, Bell, & Watts, 2014). More recently, researchers have investigated entrepreneurship from a competency-based perspective. This relies on competencies that can be developed through experience and education, and more easily recognized and assessed (Hayton & Kelley, 2006; Volery, Mueller, & von Siemens, 2015). This competency-based approach allows employers to promote professional development of entrepreneurial skills through work experience, structured education, and reflection and feedback. While this perspective is recent, a growing body of research has identified different competencies that impact entrepreneurship (e.g., Man, Lau, & Snape, 2008; Robles & Zarraga-Rodriguez, 2015). For example, consider the study conducted in Belgium, in which Kyndt and Baert (2015) assessed the predictive value of a set of

competencies toward entrepreneurship. The results indicated that perseverance and insight into the market predicted entrepreneurship.

In tandem with the development of new approaches to the of study entrepreneurship, the interest for this topic branched out from the domain of business and management to areas such as psychology and education (e.g., Chatterjee & Das, 2015; Peltonen, 2015, van Dam, Schipper, & Runhaar, 2010). In the field of education, there are two types of research on entrepreneurship. The first type is “entrepreneurship education,” defined by Carcamo-Solis, Arroyo-Lopez, Alvarez-Castanon, and Garcia-Lopez (2017) as the “means of promoting the transformation of ordinary people into entrepreneurs who are aware of future opportunities to make a career by creating profitable mini-companies” (p. 293). The second one is entrepreneurship *in* education. At the center of this type are teachers’ abilities to act as entrepreneurs when developing their lessons, incorporating technology to facilitate learning, creating partnerships to foster student success, and securing resources for innovative projects (Neto et al., 2019; van Dam et al., 2010).

While entrepreneurship education, with its focus on the creation of new companies, tends to occur in colleges of business and management or in vocational schools (e.g., Ruskovaara, Pinkala, Seikkula-Leino, & Jarvinen, 2015; Welsh, Tullar, & Nemati, 2016), entrepreneurship *in* education does not depend on grade level or subject taught. When teachers act like entrepreneurs, they are up to date with developments in educational practices, proactive, and willing to take risks to bring about innovation in their classrooms. They teach entrepreneurship through their actions, rather than through a curriculum focused on business creation and management (Peltonen, 2015). When it comes to the area of education, especially in K-12 public schools that still face funding and racial inequalities (Mordechay & Orfield, 2017), teachers’ entrepreneurial behavior is essential.

TEACHERS AS ENTREPRENEURS

The educational demands of our times require teachers to behave as entrepreneurs. They are expected to identify new developments in education, seek funding for innovative projects, incorporate technology in different instruction, and evaluate and manage risks regarding innovative pedagogies (van Dam et al., 2010). Innovation in teaching is essential for student engagement and success (Zhu, Wang, Cai, & Engels, 2013). The role of teachers in bringing change to the next generation is so important that Papendieck and Hughes (2017) call them “critical innovators.” According to them, teachers should be at the forefront of innovation and of the design of change through technology, with high impact on the next generation. However, they

acknowledge that the education offered to teachers and the culture of school systems are both rooted in assessment and risk control, reducing the odds of teachers engaging in entrepreneurial behaviors that involve creativity, risk, and change (Papendieck & Hughes, 2017). Beyond such limitations, Waghid and Oliver (2017) maintain that, by acting as entrepreneurs and promoting equality and inclusion, and thereby social justice, teachers can bring changes not only to schools, but also to society.

This realization of the importance of teachers' entrepreneurial behavior has fostered researchers' interest. While this is still a developing area of research, some studies have laid the groundwork for the construction of a solid body of knowledge. Consider the groundbreaking study by van Dam et al. (2010) identifying competencies that can predict entrepreneurial behavior among Dutch teachers (e.g., entrepreneurial knowledge, creative thinking, teamwork skills). Recent studies with American teachers have confirmed some of van Dam et al.'s (2010) findings on predictive competencies (Neto et al., 2018; Neto et al., 2019; Neto et al., 2020). These studies have also identified an emerging pattern of demographics associated with teachers' entrepreneurial behavior. Age and/or education have been associated with entrepreneurial behavior, giving weight to the importance of teachers' education and so-called "grey entrepreneurship" (Neto et al., 2018; Neto et al., 2019; Neto et al., 2020). These studies did not find any gender differences among American teachers, in contradiction of previous findings in other groups of teachers (Neto et al., 2017) and other professionals (Langowitz & Minniti, 2007), in which males reported higher levels of entrepreneurship. In addition to these demographics and competencies associated with entrepreneurial behavior, a study of Finnish teachers found that collaborative learning and social support can help teachers to exercise entrepreneurship (Peltonen, 2015).

These studies are an indicator of the growing interest and shared knowledge on teachers' entrepreneurial behavior. More research could be developed if reliable and valid instruments are made available. Many of the instruments developed around entrepreneurship are still focused on the business and management areas, with the creation of a business as the main indicator of entrepreneurship (e.g., Hansen, Deitz, Tokman, Marino, & Weaver, 2011; Kraus, Niemand, Halberstadt, Shaw, & Syrjä, 2017; McGee, Peterson, Mueller, & Sequeira, 2009; Mungule & Van Vuuren, 2016). However, these instruments do not reflect the elements of entrepreneurship needed to drive change and innovation in public school classrooms. In helping to fill this gap, van Dam et al. (2010) developed an instrument to measure teachers' entrepreneurial behavior, the object of this study, and presented in the next section.

THE ENTREPRENEURIAL BEHAVIOR SCALE

The EBS was originally developed by van Dam et al. (2010) to measure entrepreneurial behavior among Dutch educators. The EBS assesses three aspects of entrepreneurial behavior: opportunity recognition, risk management, and initiative. Opportunity recognition involves the identification and the active pursuit of opportunities that can lead to success. Risk management refers to a calculated tolerance to risk, as opposed to irresponsible risk behavior, and initiative refers to actions taken toward identified opportunities (van Dam et al., 2010).

While the English-language version of the EBS has been used in previous studies (e.g., Neto et al., 2018; Neto et al., 2020) to the best of our knowledge no study has explored this scale through factor analysis and established its convergent validity. Valid and reliable instruments are important to assess entrepreneurial behaviors and contribute to the expansion of the body of knowledge in this field of research. Therefore, the goals of this study are to examine the reliability and the factor structure of the English-language version of the EBS, and to assess its convergent validity.

METHODS: SAMPLES

Data sets from two previous studies investigating entrepreneurial behavior among public school teachers in the United States were used in this study. Data set #1 comprised 311 participants. The large majority were females (N = 229, 73.6%) and those holding a graduate degree (N = 190, 61.1%). The mean age was 42.3 years (SD = 11.7) and the mean years of teaching was 14.3 (SD = 9.9).

Data set #2 had 367 participants. The mean age was 42.6 years (SD = 11.6) and the mean years of teaching experience was 13.9 years (SD = 9.9). Again, the majority of the participants had a graduate degree (N = 252, 68.7%) and were female (N = 262, 71.4%).

The gender distributions of participants in both data sets are therefore aligned with the teacher population in the United States, where 76% of teachers in the country's public schools in 2015 were women (U.S. Department of Education, National Center for Education Statistics, 2016).

METHODOLOGICAL APPROACH

With a view to validating the EBS proposed by van Dam et al. (2010), a 4-step methodological approach was derived by conducting (i) a Reliability Analysis (RA); (ii) an Exploratory Factor Analysis (EFA), (iii) a Confirmatory Factor Analysis (CFA), and

finally (iv) a Convergent Analysis (CA). Version 24 of SPSS was used in the first two steps of our analyses (RA and EFA), and version 14 of STATA in the CFA.

The original Entrepreneurial Behavior Scale, derived from the work of van Dam et al. (2010) and modified by us, consisted of 17 items. These are presented in Table 1. For each item, study participants were provided with five response options (Likert Scale), rated 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 1: Entrepreneurial Behavior Scale Items

1. I kept a close eye on new developments in the educational field.
 2. I usually waited to see how things worked out. (Reversed)
 3. I successfully evaded rules in order to start an innovative project.
 4. I often was among the first to notice an opportunity to endeavor something new.
 5. I actively addressed problems.
 6. I willingly took risks.
 7. I was mainly occupied with performing my regular tasks. (Reversed)
 8. I actually implemented plans I had made.
 9. I invested time in projects that carried risks.
 10. I looked for potential partners for collaboration.
 11. I sought opportunities to get involved with projects in the educational field.
 12. I made calculated tradeoffs before taking risks.
 13. I usually was the last one to learn about upcoming changes. (Reversed)
 14. I took initiative even when others did not.
 15. I avoided risky situations. (Reversed)
 16. I was aware of opportunities in the educational field that could benefit our school.
 17. I took advantage of opportunities provided to me.
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First, we conducted a RA on the 17-item EBS to explore its internal consistency, based on the data set #1 (N = 311). We calculated (i) Cronbach's alpha, a measure of reliability and internal consistency of the scale, to estimate how well the EBS's 17 items elicit consistent answers from participants, and (ii) measures of linear correlation (r) and prediction (Squared Multiple Correlation - SMC). R measures the strength of the association between a given item in the scale and the remaining items. The SMC measures how well an item is predicted by the remaining items in the scale.

Second, we performed an EFA on this very same sample, and used it as training data—that is, data from which to obtain a factor model. The purpose of conducting an EFA was to reveal the factor (latent construct) structure that underlies the EBS. Based on their review of the literature on Entrepreneurial Behavior, van Dam et al. (2010)

conjectured that the EBS included three dimensions: opportunity recognition, initiative, and risk management. To test this hypothesis, we used *principal axis factoring* for extracting factors, and the *promax oblique rotation*. By using this rotation technique, we assumed that the latent factors present in the scale are correlated. The criterion we used to extract a factor was the software's default—i.e., the eigenvalue associated with a factor must be greater than one. Based on this condition, we obtained a three-factor structure, as described in the pattern matrix displaying the loadings (coefficients) for each of the three factors.

Third, we used the data set #2 to test the model generated from the first (independent) sample using CFA. The purpose of running a CFA was to determine if the factor structure suggested by the EFA represented the data adequately—i.e., we sought to confirm the results of the EFA conducted in the previous step. We used the *maximum likelihood* method to estimate the model. CFA models are assessed using standard structural equation modeling fit indices. For this study, we relied on four fit indices: the root-mean-square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the standardized root-mean-square residual (SRMR). These fit indices compare the covariance structure implied by the model to the covariance structure observed in the data.

Finally, with the N = 311 sample, we evaluated the convergent validity of the EBS. We explored the EBS's convergent validity by examining its correlation with career adaptability. Data on career adaptability were available on data set #1 and were collected using the 11-item instrument developed by Rottinghaus, Day, and Borgen (2005). It was hypothesized that since these two scales measure similar constructs, they should be directly related.

RESULTS

The results of the validation study are presented in this section according to the four steps of the method described in Section 3. The results of the RA, EFA, CFA, and CA are respectively reported.

RELIABILITY ANALYSIS

In the first step of our overall validation analysis, we explored the internal consistency of the items that make up the EBS. Although we obtained a Cronbach's alpha of .84, we also discovered three negative correlations which involved the following four items: 2, 3, 12, and 13 (see Table 1). Items 12 and 13 were involved in two of the three negative correlations, and items 2 and 3 in only one. We decided to

eliminate three of the four items from the scale: 3, 12 and 13. The criteria we used to choose between items 2 and 3 were (a) their impact on Cronbach's alpha when deleted from the scale and (b) their correlation with other items. Cronbach's alpha, when item 2 is excluded from the scale, was .839, and .841 for item 3. The SMC was .230 for item 2 and .215 for item 3. Finally, the correlation between item 2 and the rest of the items was $r = .350$, and $r = .323$ for item 3. While these differences are by no means substantial, we decided to rely on objective measures to make our choice and accordingly excluded item 3 from the scale. After that, we ran the reliability analysis on the EBS, which now comprised 14 items (EBS-14). Cronbach's alpha for this reduced scale remained at .84—essentially the same as the full scale. In addition, all correlations among items were positive, although two were not significantly different from zero: between items 2 and 8 ($r = .065$; $p > .10$) and between items 10 and 15 ($r = .012$; $p > .10$). All other correlations were significant at the conventional level of $p \leq .05$.

EXPLORATORY FACTOR ANALYSIS

Our next step was to conduct an EFA on the sample of the Career Adaptability study ($N = 311$). We conducted this analysis on the reduced 14-item scale (EBS-14). We obtained the following results: the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA), which tells us whether the data, specifically the pattern of correlation among items, is adequate to conduct a factor analysis, was .85. The closer the statistic is to 1, the more confident we can be that the data are adequate for factor analysis. Values at or above .80 are considered very acceptable. All the MSA statistics computed for each item were above the .80 threshold, except for item 10, whose KMO was .78.

Based on the methods and criterion presented in Section 3, we obtained a three-factor solution consistent with what van Dam et al. (2010) suggested. Table 2 presents the results of the Pattern Matrix, which show how strongly the items (sorted in descending order) load onto their respective factors.

Table 2: Pattern Matrix for EBS-14

Item	Factor		
	1	2	3
11	0.68		
16	0.65		
1	0.54		
4	0.48		
14	0.41		
6		0.77	
15		0.64	
7		0.40	
9		0.40	
2		0.31	
8			0.74
10			0.53
5			0.40
17	0.32		0.36

Note: Loadings at or below .30 have been suppressed.

The higher the loadings (coefficients), i.e. the closer to 1, the more the item is a good measure of the latent construct. As a rule of thumb, coefficients equal to or greater than .45 are considered fair or better (Tabachnick & Fidell, 2007). We see that in our case only eight of the 14 items meet that criterion. For Factor 1 (rotated eigenvalue = 3.40), four out of the five loadings have values larger than .45; for Factor 2 (rotated eigenvalue = 2.80), only two out of the five coefficients are above that value; and for Factor 3 (rotated eigenvalue = 2.76), only two of the four. We also note that item 17 loads almost equally well on Factors 1 and 3, its loading value being slightly higher on Factor 3. Following van Dam et al. (2010), we used the same labels for our factors. Thus, we called Factor 1 “opportunity recognition” (Opportunity), Factor 2 “risk management” (Risk), and Factor 3 “taking initiative” (Initiative).

Although, as previously stated, the factor structure obtained is consistent with the one suggested by Van Dam et al. (2010), there are discrepancies between items they believe should belong to each latent construct and our results. For EBS-14, their first factor or dimension (opportunity recognition) is made up of items 1, 4, 7, 10, and 16; ours includes 1, 4, 11, 14, and 16. Thus, there are three items in common, and two that belong to other dimensions (factors). Their second dimension (taking initiative) includes items 2, 5, 8, 11, 14, and 17; ours has only four items: 5, 8, 10, and

17. Both dimensions have three items in common. Finally, their last dimension (risk management) consists of items 6, 9, and 15. Our factor has five items: 2, 6, 7, 9, and 15—hence, three common items. These differences are summarized in Table 3 below.

Table 3: Comparison of Dimension Items

EB-14 Factors	Items	
	Van Dam et al.	Current Study
Opportunity	1	1
	4	4
	7	11
	10	14
	16	16
Risk		2
	6	6
		7
	9	9
	15	15
Initiative	5	5
	8	8
	2	10
	11	17
	14	
	17	

Finally, we present the results of the Factor Correlation Matrix in Table 4. We seek to determine whether it was reasonable to assume that the three factors that characterize the EBS are correlated. The correlations between factors are moderate ($r = .47$ and $r = .49$) to strong ($r = .60$), which indicates that the assumption appears to have been justified.

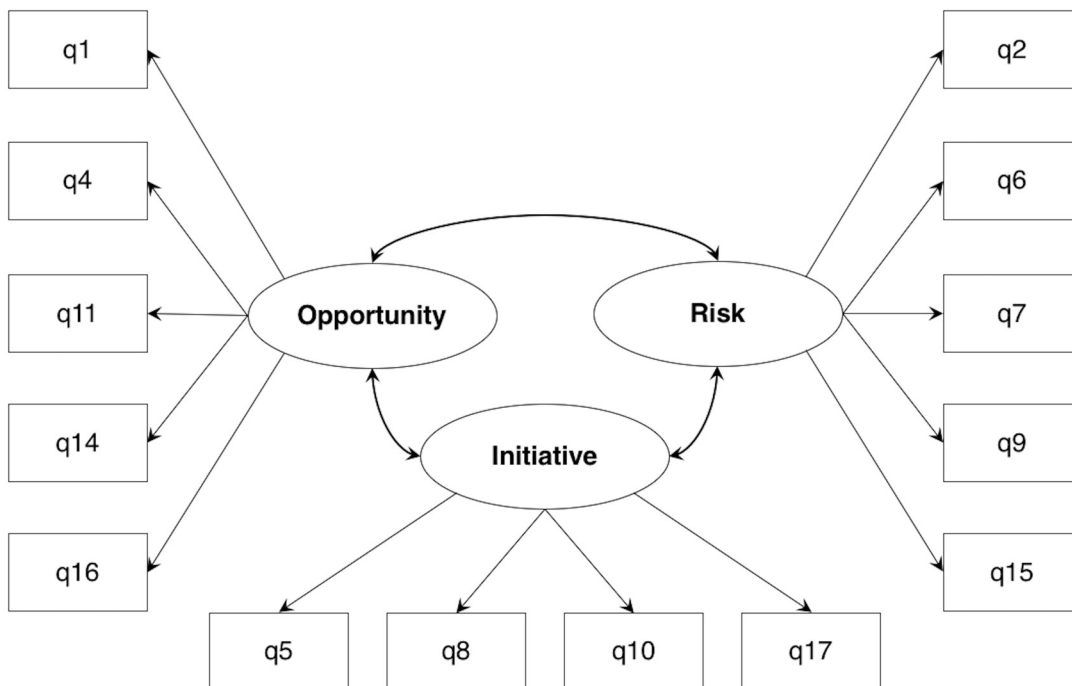
Table 4: Factor Correlation Matrix for EBS-14

Factor	1	2
2	0.49	
3	0.60	0.47

CONFIRMATORY FACTOR ANALYSIS

Figure 1 describes graphically the model suggested by the EFA and tested with a CFA. The rectangles represent the items that load onto the factors (latent constructs) and the ovals are the factors. The double-headed arrows between the dimensions indicate that they are correlated.

Figure 1: Factor Model for EBS-14



As mentioned earlier, the data used for the CFA was based on a different (independent) sample (N = 367) than the one used in the EFA. Conventional rules of thumb for the indices used to assess CFA models (see Section 3) suggest that to conclude the hypothesized model is a *good* fit for the data, RMSEA should be below .06, CFI and TLI should be at least greater than .90, and SRMR should be below .08 (Hu & Bentler, 1999). Table 5 displays such indices for the CFA model developed.

Table 5: Fit Indices of Confirmatory Factor Analyses (Maximum Likelihood Estimation) of EBS

Scale	Model	RMSEA	CFI	TLI	SRMR
EB-14	3-correlated factors	0.073	0.898	0.874	0.049

Note: RMSEA = root-mean-square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root-mean-square residual.

As shown, our results are mixed. The only measure that meets the “good” fit criterion mentioned earlier is the SRMR. However, the remaining measures are sufficiently close to the suggested cutoff values for the fit indices that we feel confident the model is an *adequate* fit for the observed data. The 90% confidence interval for RMSEA was: .062–.084.

CONVERGENT VALIDITY

The results of the Convergent Analysis are presented in Table 6. The significant positive—although moderate—correlation between EBS-14 and career adaptability appears to be consistent with our hypothesis. There is, therefore, some evidence of the EBS’s convergent validity.

Table 6: *Descriptive Statistics and Correlation for EBS-14 and Career Adaptability*

Scale	M	SD	r
EB-14	3.64	0.472	0.46*
Career Adaptability	4.07	0.472	

Note: * Pearson correlation coefficient; $p < .05$. N = 311.

DISCUSSION

This paper has the main aims of (i) assessing the reliability and factor structure of the English-language version of the EBS proposed by van Dam et al. (2010) and (ii) measuring the scale’s convergent validity. In general, the results show that the reduced EBS scale, with 14 items (EBS-14), displays a high level of internal consistency. EBS-14 presented a high Cronbach’s alpha, practically the same value achieved by the original scale. This means that the items in the EBS are closely related to each other and form a reliable representation of entrepreneurial behavior.

The test items removed from the original scale during the course of our analysis were item 3 (*I successfully evaded rules in order to start an innovative project*), item 12 (*I made calculated tradeoffs before taking risks*) and item 13 (*I usually was the last one to learn about upcoming changes*). These three items might be weakly related to the overall concept of teachers’ entrepreneurial behavior for a number of reasons. Regarding item 3, it is possible that the act of evading rules was not perceived by teachers—to some extent—either as connected to entrepreneurially-inclined, proactive actions, or as a beneficial behavior. Therefore, it is possible that respondents either avoided properly addressing the item or were especially skeptical about its use in the educational context.

As for item 12, it could also have been wrongly interpreted or perceived by respondents. The notion of “calculated tradeoffs” may have raised questions or concerns over its meaning, and therefore might not have been properly addressed or understood by teachers answering the survey. In particular, the other three items which clearly address the concept of risk (items 6, 9 and 15) presented high positive correlations and strong consistency. This might reinforce the idea that risk calculations, or risk-related tradeoffs, are not well-established constructs among teachers. Additionally, interpretations of the overall concept of risk might differ significantly across the sample of teachers we extracted data from, and this may have been manifested in the low consistency of item 12.

Regarding item 13, it is also possible to affirm that this aspect is neither a relevant part nor a strong driver of entrepreneurial behavior. In particular, being the last person to learn about changes might be even less influential in environments with low levels of teamwork (Neto et al., 2020), which is also a predictor of entrepreneurial behavior (van Dam et al., 2010). In other words, it might be argued that in settings where teamwork is weak, teachers might display entrepreneurial behavior at a very individual level, whereas in settings where higher levels of teamwork appear, teachers might display collective entrepreneurial behavior and rely more intensely on each other to carry out entrepreneurial projects.

The results of the EFA show that the three-factor construct we obtained is consistent with the one presented by van Dam et al. (2010). Although only eight of the 14 items met the criterion for fair/good loading (0.45 as an accepted threshold), the resulting three factors are consistent with what was expected from the literature: Factor 1 represents opportunity recognition, Factor 2 relates to risk management, and Factor 3 relates to initiative.

In particular, regarding opportunity recognition (Factor 1), the three common items (1, 4, and 16) are clearly related to opportunity-seeking behaviors, such as following new developments in the educational field or staying aware of opportunities that could benefit the school. The two new items in EBS-14 which are part of Factor 1—items 11 and 14—display different levels of alignment with opportunity recognition. While item 11 clearly refers to seeking opportunities to get involved in educational projects, item 14 is more closely related to initiative taking. However, since the line dividing opportunities and initiatives might be relatively blurry, it is possible to assert that the two concepts are strongly related. One could argue that initiatives are taken based on a clear recognition of opportunities. Therefore, it was expected that some items of the scale would potentially fit different dimensions.

As for Factor 2, dealing with risk management, we found the same factors as the ones categorized by van Dam et al. (2010)—items 6, 9, and 15—which are

explicitly and plainly related to the concept of risk. In addition, we found two new items belonging to this particular dimension: 2 and 7. Item 2 relates to the act of waiting to see how things unfold, while item 7 concerns being occupied with performing regular tasks. With that, item 2 brings important elements of risk into play. It is generally possible to affirm that waiting to see results from things in the educational context is related to lower levels of risk-taking. As for item 7, it is also likely that individuals more driven by their regular tasks are less likely to take risks, as these tasks present lower levels of uncertainty or unexpected outcomes. Therefore, in this sense, items 2 and 7 might indeed be closely related to the risk dimension in entrepreneurial behavior.

Regarding Factor 3, initiative, three of the items we found are the same as the original scale: 5, 8, and 17. In the EBS-14, we also found item 10 to be part of the initiative dimension. This item deals with prospecting partners for collaborative interaction. In a way, this behavior tends to display certain levels of initiative, especially because it is a proactive way of establishing potential partnerships and collaborative efforts. It therefore seems that item 10 fits well into the dimension of initiative.

As previously mentioned, the three dimensions—opportunity recognition, risk management, and initiative—are very closely related to each other. The theoretical constructs behind each dimension bear several similarities and synergies. This expectation was confirmed with the results of the Factor Correlation Matrix, which showed a moderate correlation between factors 1 and 2 and between 1 and 3, and a strong correlation between factors 2 and 3.

In the confirmatory step of our analysis, the results from CFA based on the dataset #2 produced either good or sufficiently good measures of fit. The convergent validity analysis—based on the scale measuring career adaptability developed by Rottinghaus et al. (2005)—resulted in positive moderate correlation. This convergence is in line with the literature formulating career adaptability as a predictor of entrepreneurial behavior and other entrepreneurial outcomes (Rudolph, Lavigne, & Zacher, 2017; van Dam et al., 2010).

Despite the encouraging results, the study has some limitations. First, the data used for this study is constrained by the current reality and context of U.S. teachers. Second, in the EFA, the fact that 6 of the 14 items in the EBS-14 did not meet the criterion of having loadings greater or equal to .45 can be considered a limitation. Third, in the CFA, only one measure of goodness-of-fit (SRMR) was clearly *good* according to general rules of thumb, with the other measures (RMSEA, CFI and TLI) sufficiently close to the suggested cutoff values for this type of measurement. To tackle these limitations and develop the field of entrepreneurship in education even further, lines of future research could involve (i) expanding data collection to cover more samples

using the EBS-14, and (ii) performing the reliability and validation analysis in different populations, with distinct geographical and cultural characteristics.

The results of this study contribute to the literature of entrepreneurship in education, and other related fields, by providing rigorous evidence on the reliability and validity of an important measurement instrument to measure teachers' entrepreneurial behavior proposed by van Dam et al. (2010). This novel contribution will potentially support the enhancement of the instrument, as well as provide researchers and practitioners with a form of quality assurance for the instrument to be widely used in different contexts. Furthermore, these results might also shed light into how the instrument can be properly adapted to a wider range of uses and customizations.

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RECEBIDO: 09/04/2020.

APROVADO: 17/04/2020.