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2022

Bernardus, D., Murwani, F. D., Aji, I. D. K., Radianto, W. E. D., Padmawidjaja, L., Jatiperwira, S. Y., Hitipeuw, I. & Jacob, G. H. (2022). Psychometric properties of the Indonesian adaptation of the entrepreneurial mindset scale. Academic Journal of Interdisciplinary Studies, 11(3), 310-334. https://dx.doi.org/10.36941/AJIS-2022-0069

https://hdl.handle.net/10356/164786

https://doi.org/10.36941/AJIS-2022-0069

Research Article

Received: 7 October 2021 / Accepted: 3 March 2022 / Published: 5 May 2022

Psychometric Properties of the Indonesian Adaptation of the Entrepreneurial Mindset Scale

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DOI: https://doi.org/10.36941/ajis-2022-0085

Abstract

The study aims to verify the validity and reliability of the entrepreneurial mindset scale in the Indonesian context (i.e., the adapted EM scale). The respondents were 302 undergraduate students who have already enrolled in the entrepreneurship course. In order to achieve the aim of study, a scale development procedure was conducted, including item generation, exploratory factor analysis, and confirmatory factor analysis. Item generation was successful in generating the preliminary items of the entrepreneurial mindset scale, whereas exploratory factor analysis was also successful in purifying those preliminary items. Furthermore, confirmatory factor analysis was successful in verifying the convergent validity and the composite reliability of the adapted EM scale. The adapted EM scale was a parsimonious measurement model, and therefore it could be useful for measuring the entrepreneurial mindset of undergraduate students in Indonesia. Future studies are recommended to refine the adapted EM scale: (1) by verifying it among students from other universities, (2) by using two different samples, in which one sample is for exploratory factor analysis and the other one is for confirmatory factor analysis, and (3) by testing the measurement invariance across groups (e.g., gender, age, and origin of university).

Keywords: *entrepreneurial mindset, item generation, scale purification, scale validation, Indonesian adaptation scale*

1. Introduction

The essence of entrepreneurship is "discovery, evaluation, and exploitation of opportunities" (Shane & Venkataraman, 2000, p. 218). Entrepreneurial mindset (EM) is in line with the essence of entrepreneurship, in which EM is "the ability to sense, act, and mobilize under uncertain conditions" (McGrath & MacMillan, 2000, p. 32), including the ability to recognize and exploit opportunities (Ireland et al., 2003; Zupan et al., 2018). Entrepreneurship is an attractive career choice for students who want to start a business (Shirokova et al., 2016), while EM is necessary for a successful student career in starting a business (Zupan et al., 2018). In terms of "intention-action relationship", previous studies (e.g., Shirokova et al., 2016; Bogatyreva et al., 2019; Bernardus et al., 2020) found that starting a business (i.e., an entrepreneurial action) was intentional. For example, Bernardus et al. (2020) found "the strong intention-action relationship" among students who enrolled in an entrepreneurship education program, which indicated that entrepreneurship was not only an intention to start a business but also an action for starting a business. Individuals with strong EM might strongly encourage their ability to recognize and exploit opportunities (Ireland et al., 2003; Zupan et al., 2018) as well as to engage in entrepreneurial action upon those opportunities (Shepherd et al., 2010), and therefore the EM is necessary to more strengthen "the strong intention-action relationship".

An entrepreneurship education program requires the outcomes to evaluate its impact, in which EM is one of those outcomes (Yi & Duval-Couetil, 2021). This implies the need to provide a good measurement instrument (or scale) for assessing EM (Yi & Duval-Couetil, 2021), in terms of a valid and reliable EM scale. In Indonesia, the recent studies (e.g., Handayati et al., 2020; Karyaningsih et al., 2020; Saptono et al., 2020; Wardana et al., 2020) report the results of the validation of the adapted EM scale. Based on this, we followed a guideline from Bittencourt et al. (2021) which examined how many dimensions of EM have been validated by such studies. However, such studies validated the adapted EM scale based only on one dimension (i.e., inadequate dimension). Referring to Bittencourt et al. (2021), due to complement the results from such studies, this study is purposed to provide a valid and reliable adapted EM scale (i.e., an Indonesian adaptation) based on the sufficient dimensions.

The structure of this paper proceeds as follows: following the introduction, we start by presenting the literature review; we then continue by discussing our method, which is followed by a presentation of our results; subsequently, we discuss and conclude our findings.

2. Literature Review

2.1 Dweck's implicit theory of intelligence

Dweck's implicit theory of intelligence states that "the underlying belief that intelligence or ability can change or not change in any individual", in which the underlying belief is known as the mindset (Vsetecka, 2018, p. 51). Mindset consists of two forms including growth mindset and fixed mindset (Vsetecka, 2018; Burnette et al., 2020; Lynch & Corbett, 2021). Individuals with a growth mindset have the positive view of failure, in which they view the failure in a positive way and struggle for future success (Vsetecka, 2018). Such persons embrace the challenges as the opportunities to improve their abilities instead of the threats to be avoided (Vsetecka, 2018). Conversely, individuals with a fixed mindset view the failure negatively, in which they are discouraged by it because it reflects their inability (Vsetecka, 2018). In terms of fixed mindset, the challenges are the conditions to be avoided due to "overly-concerned about past failures" (Vsetecka, 2018, p. 18). From the entrepreneurship education perspective, previous studies found that the growth mindset was better than the fixed mindset. For example, Vsetecka (2018) found that students who received the growth mindset intervention have greater outcome variables (i.e., academic achievement, attendance, and attitude toward learning) than the other students in the control group (i.e., the fixed mindset group).

Similarly, Burnette et al. (2020) found that the growth mindset intervention group reached greater entrepreneurial self-efficacy and task persistence than the control group.

The growth mindset has the following characteristics. First, individuals with a growth mindset set the goals (Vsetecka, 2018; Burnette et al., 2020) in which these goals conduct individuals to take the challenging tasks and to increase their persistence at tasks instead of just completing the certain easy tasks (Vsetecka, 2018). Second, a growth mindset is a goal-directed mindset in which individuals will change their strategies if they do not achieve the desired goal (Lynch & Corbett, 2021). Finally, the growth mindset encourages individuals to pursue new opportunities (Lynch & Corbett, 2021) and increase their entrepreneurial ability even when experience is lacking (Burnette et al., 2020). Based on those characteristics, the growth mindset is in line with EM (Lynch & Corbett, 2021), in which individuals with EM can recognize and exploit new opportunities based on their entrepreneurial ability (Ireland et al., 2003; Zupan et al., 2018).

2.2 *Entrepreneurial mindset construct and its dimensions*

Following the previous studies (e.g., Bernal-Guerrero et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021), we reviewed the literature to specify the dimensions of EM. EM is a multi-dimensional scale instead of a one-dimensional scale, including a two-dimensional scale (Mathisen & Arnulf, 2013), a three-dimensional scale (e.g., Mathisen & Arnulf, 2014; Lindberg et al., 2017), and a four-dimensional scale (e.g., Hultén & Tumunbayarova, 2020; Cui et al., 2021). We followed a guideline from Cui et al. (2021) which examined the dimensions of EM based on the relevant components of EM as contained in the definitions of EM. Based on this, Cui et al. (2021) identified the four dimensions of EM including alertness to opportunity, risk propensity, ambiguity tolerance, and dispositional optimism. Cui et al. (2021) argue that those four dimensions of EM are the relevant components of EM, in which EM is defined as "a way of thinking or an ability to capture entrepreneurial opportunities in an uncertain situation" (Cui et al., 2021, p. 3). Therefore, we took the four dimensions of EM from Cui et al. (2021) with the following explanations.

Alertness to opportunity. "Alertness to opportunity is the ability to possess keen insights into identifying entrepreneurial opportunities" (Cui et al., 2021, p. 3). Individuals with strong alertness to opportunity might have the strong "antenna" to scan the environment and discover the opportunities (Tang et al., 2012). Alertness to opportunity involves the human information-processing approach (i.e., information accumulation, information transformation, and information selection) in order to discover the opportunities (Rezvani et al., 2019).

Risk propensity. Risk propensity consists of two forms including the stable and consistent risk propensity in the different situations, and the unstable risk propensity which is reflected as an individual's tendency to take or avoid risk in the different situations (Hung & Tangpong, 2010; Hung et al., 2012). However, unstable risk propensity plays an important role in opportunity discovery (Cui et al., 2021). Individuals with a greater unstable risk propensity might have a greater willingness to identify the opportunities around them (Cui et al., 2021).

Ambiguity tolerance. Ambiguity tolerance is "ability to accept a degree of uncertainty, yet remain motivated to test their ideas and push them forward despite future threats and uncertainty" (Peschl et al., 2021, p. 7). Tolerance for ambiguity becomes relevant as the uncertainty as well as the opportunity increase (Geller et al., 1993). In contrast, an individual with intolerance for ambiguity shows discomfort with ambiguity and avoids thinking about uncertainty (Geller et al., 1993). In terms of tolerance for ambiguity, individuals should be comfortable with uncertain outcomes (Peschl et al., 2021) and ambiguous scenarios (Cui et al., 2021).

Dispositional optimism. Dispositional optimism is "an individual's ability to view various life experiences and circumstances positively" (Lewis et al., 2015, p. 4). Dispositional optimism also refers to "the expectation that one's own outcomes will generally be positive" (Carver & Scheier, 2014, p. 295). Dispositional optimism is a bipolar dimension (Scheier et al., 1994; Räikkönen & Matthews, 2008; Carver & Scheier, 2014), "with 'substance' at each end and a neutral point in the middle" (Carver

& Scheier, 2014, p. 294). Hence, individuals with high scores of the dispositional optimism indicate high optimism, whereas individuals with low scores of the dispositional optimism show high pessimism (Scheier et al., 1994; Räikkönen & Matthews, 2008; Carver & Scheier, 2014). Individuals with a high dispositional optimism might think optimistically toward future and exert the effort (Carver & Scheier, 2014), whereas individuals with a low dispositional optimism might believe about the unrealistic expectations (Lewis et al., 2015) and disengage from the effort (Carver & Scheier, 2014). Referring to Cui et al. (2021), individuals with a high dispositional optimism might strongly seize "entrepreneurial opportunities in uncertain situations" (p. 3).

In addition, the definition of EM by Cui et al. (2021) is in line with the definition of EM by Benedict and Venter (2010), in which Benedict and Venter (2010) define EM as "the ability to spot opportunities, to develop new ideas and discover new ways of looking at problems and opportunities (creativity) and creative ways both of solving those problems (innovation) and using opportunities …" (p. 246). Based on a guideline from Cui et al. (2021) as stated above, we found that creativity-bricolage dimension from Hmieleski and Corbett (2006) is a relevant component of EM as contained in the Benedict-Venter's definition of EM. Therefore, we also took the creativity-bricolage dimension from Hmieleski and Corbett (2006) to be the EM dimension with the following explanation.

Creativity refers to "the production of ideas that are both novel and useful" (An et al., 2018, p. 840). Accordingly, "exploring and exploiting the new opportunities largely depend upon an individual's abilities to recognize and understand connections among the ideas" (Anjum et al., 2021, p. 3). Bricolage is defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson, 2005, p. 333). Bricolage "can provide advantages when resources are constrained" (Wu et al., 2017, p. 128) and plays "as an intermediate process between creativity and innovation performance" (An et al., 2018, p. 840). The sample items of creativity-bricolage dimension from Hmieleski and Corbett (2006) include "I think outside of the box", "I identify opportunities for new services/products", and "I identify ways in which resources can be recombined to produce novel products". Those sample items indicate an individual ability "to develop new ideas and discover new ways of looking at problems and opportunities" as well as "creative ways both of solving those problems" as the Benedict-Venter's definition of EM (Benedict & Venter, 2010, p. 246). Taken together, we recognized five dimensions of EM including alertness to opportunity, risk propensity, ambiguity tolerance, dispositional optimism, and creativity-bricolage.

3. Method

3.1 Respondents and data collection

The respondents were undergraduate students from three universities in East Java province of Indonesia, who have already taken the entrepreneurship course. The questionnaires were then distributed to 400 students via Google Classroom and WhatsApp using the Google Forms (from March to May 2021). There were 356 questionnaires which have been collected, and therefore the response rate was 85 percent. However, of the 356 questionnaires, 54 questionnaires were incomplete, and therefore 302 questionnaires were retained for further analysis. The 302 in magnitude was a sample size, which indicated the acceptable sample size for the scale development (e.g., Schumacker & Lomax, 2016; Hair et al., 2019; Malhotra, 2020).

Table 1 shows the demographic of respondents. One hundred and twenty-three respondents (40.7%) were male, whereas female respondents were 179 (59.3%). The age of respondents ranged from 20 years old and younger (45.4%) to older than 20 years old (54.6%). There were 159 students from a public university (52.6%), while the remaining percent of them came from two private universities.

Table 1: Demographic of respondents (n = 302)

Demographic	**Frequency**	**Percentage**
Gender		
Male	123	40.7
Female	179	59.3
Age (year)*		
equal to 20 and younger than 20	137	45.4
older than 20	165	54.6
Origin of university		
Public university	159	52.6
Private university	143	47.4

*We used the age classification, which was already used by Radianto et al. (2021).

3.2 Translation and back-translation procedure

We used the translation and back-translation procedure (Brislin, 1970; Román et al., 2021a, 2021b) for the Indonesian adaptation of the EM scale (the adapted EM scale). First, the original English version (34 items, see Appendix 1) was translated into Indonesian by the researchers independently, in which they then agreed on the translated version to be the first version of the adapted EM scale (Román et al., 2021a, 2021b). Second, the two professional translators back-translated the first version of the adapted EM scale into English (Román et al., 2021a). Third, the back-translated and the original English versions were compared by the researchers and the two professional translators. Referring to Román et al. (2021a), the comparison of those two versions was conducted to identify the semantic errors as well as to fine-tuning the items. Finally, after comparing the back-translated and the original English versions, the 34-items of the adapted EM scale (see Appendix 1) were agreed by the researchers (Román et al., 2021b).

3.3 Scale development procedure

Referring to previous studies (e.g., Hansen, 2004; Yi & Gong, 2013; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Cacciotti et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021), we conducted the scale development procedure, including item generation, scale purification (i.e., exploratory factor analysis), and scale validation (i.e., confirmatory factor analysis). Item generation was implemented to generate and evaluate the preliminary items of the EM scale (e.g., Hansen, 2004; Yi & Gong, 2013; Robinson, 2018; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Cacciotti et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021). Exploratory factor analysis was used to purify the preliminary items of the EM scale, while confirmatory factor analysis was used to verify the convergent validity and the composite reliability of the EM scale (e.g., Hansen, 2004; Yi & Gong, 2013; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Cacciotti et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021).

4. Results

4.1 Item Generation

The EM scale was proposed to be adapted in Indonesian context. Item generation was first conducted to generate an initial set of items (or observed variables) for measuring the EM, and therefore we then began to conceptualize EM from the literature review (e.g., Hansen, 2004; Yi & Gong, 2013; Robinson, 2018; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021). Based on the literature review in previous section, EM is a construct (e.g., Mathisen

& Arnulf, 2013; Mathisen & Arnulf, 2014; Cui et al., 2021), which is conceptualized as having five dimensions (sub-constructs) including alertness to opportunity, risk propensity, ambiguity tolerance, dispositional optimism (Cui et al., 2021), and creativity-bricolage (Hmieleski & Corbett, 2006). Based on those five dimensions, an initial set of 52 items for five dimensions was captured. Alertness to opportunity is indirectly measured through 15 items (Tang et al., 2012; Cui et al., 2021). Risk propensity is indirectly measured through seven items (Hung & Tangpong, 2010; Hung et al., 2012; Cui et al., 2021). Ambiguity tolerance is indirectly measured through 11 items (Geller et al., 1993; Lewis et al., 2015; Cui et al., 2021). Dispositional optimism is indirectly measured through ten items (Scheier et al., 1994; Lewis et al., 2015; Cui et al., 2021). Creativity-bricolage is indirectly measured through nine items (Hmieleski & Corbett, 2006).

Second, we conducted the content validity to evaluate an initial set of 52 items for measuring the EM (e.g., Yi & Gong, 2013; Robinson, 2018; Bernal-Guerrero et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021). For content validity, those 52 items were reviewed by six experts, two each in the fields of entrepreneurship education, psychology, and business (e.g., Lawshe, 1975; Bernal-Guerrero et al., 2020; Cárdenas-Gutiérrez, 2021). The experts were asked whether or not each item was essential for measuring the EM, and the Lawshe's content validity ratio (Lawshe's CVR) of each item was then calculated, in which the items with the Lawshe's CVR value of greater than 0.99 were retained (e.g., Lawshe, 1975; Bernal-Guerrero et al., 2020; Cárdenas-Gutiérrez, 2021). Of those 52 items, there were 18 items which have the Lawshe's CVR value of less than 0.99, and therefore the remaining 34 items were retained and then purified through the exploratory factor analysis. The 34 items were then called as the preliminary items of the EM scale (see Appendix 1). The 34 items were the self-response items, in which the respondents were asked to respond on a five-point scale (1 = strongly disagree to 5 = strongly agree; or for reversed items, 1 = strongly agree to 5 = strongly disagree).

4.2 Exploratory Factor Analysis (EFA)

EFA was conducted to purify the 34 items which previously be captured by the item generation (e.g., Hansen, 2004; Kobayashi et al., 2013; Yi & Gong, 2013; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Cacciotti et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021). The analytical process of EFA was based on the correlation matrix of 34 items (see Appendix 2), in which those 34 items should be correlated with one another (Hair et al., 2019; Malhotra, 2020). Bartlett's test of sphericity was significant (p-value of chi-square was less than 0.01; see Table 2a), which indicated the sufficient correlations among those 34 items (Hair et al., 2019; Malhotra, 2020). In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.930 (see Table 2a), which exceeded the cut-off value of 0.5 (Hair et al., 2019; Malhotra, 2020). Thus, EFA was suitable for analyzing the correlation matrix of 34 items (Hair et al., 2019; Malhotra, 2020). EFA was then done by using the principal axis factoring (PA2) extraction and the oblimin rotation (with Kaiser normalization). PA2 extracts the factors based on the common variance (or shared variance) instead of the total variance in the items (Hair et al., 2019; Malhotra, 2020). We also used a priori criterion (i.e., a prior knowledge) for the number of factors to be extracted (Hair et al., 2019; Malhotra, 2020). We further determined the five factors as the number of extracted factors based on the previous item generation. In addition, the oblimin rotation produces two matrices, namely factor pattern matrix and factor structure matrix (Hair et al., 2019). Referring to Hair et al. (2019), we next report the factor pattern matrix (see Table 2) instead of the factor structure matrix, as the factor structure matrix was less interpretable in terms of many cross-loadings (see Appendix 3).

Table 2: Factor pattern matrix of the EM scale (PA2 extraction and oblimin rotation, n = 302)

a) **Factor pattern matrix of 34 items (the first EFA)**

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO1	-0.120	-0.005	-0.021	0.165	**-0.689**
EM_AO2	0.063	0.024	0.017	0.022	**-0.764**
EM_AO3	0.043	-0.033	-0.068	0.009	**-0.840**
EM_AO4	0.263	0.054	-0.091	-0.127	**-0.660**
EM_AO5	0.301	0.056	-0.211	-0.053	**-0.596**
EM_AO6	0.296	0.088	0.026	0.091	**-0.470**
EM_AO7	0.184	0.022	0.040	0.182	**-0.546**
EM_AO8	0.150	0.032	-0.061	0.288	**-0.446**
EM_RP1	0.062	0.082	0.027	**0.634**	0.030
EM_RP2	0.269	-0.095	-0.268	**0.591**	-0.007
EM_RP3	0.081	-0.056	-0.125	**0.723**	0.003
EM_RP4	0.064	-0.071	-0.100	**0.716**	-0.140
EM_AT1	0.026	**0.487**	-0.093	-0.076	-0.091
EM_AT2	-0.009	**0.616**	-0.031	0.031	0.019
EM_AT3*	-0.128	0.372	-0.077	0.024	-0.161
EM_AT4	0.139	**0.572**	-0.184	-0.049	0.160
EM_AT5	0.110	**0.440**	0.065	-0.041	-0.144
EM_AT6	0.115	**0.655**	-0.106	-0.055	0.172
EM_AT7	-0.070	**0.601**	0.175	0.100	-0.049
EM_DO1*	-0.188	0.309	0.194	0.350	-0.162
EM_DO2*	-0.120	-0.158	0.339	-0.108	0.052
EM_DO3*	0.093	0.010	0.047	0.298	-0.235
EM_DO4	0.171	-0.026	**0.666**	-0.180	0.060
EM_DO5	0.132	-0.128	**0.692**	0.026	0.096
EM_DO6	-0.182	**0.408**	0.295	0.244	-0.137
EM_CR1	**0.547**	0.056	0.073	0.094	-0.167
EM_CR2	**0.685**	0.083	0.050	0.057	-0.119
EM_CR3	**0.464**	0.077	0.039	0.154	-0.217
EM_CR4	**0.539**	0.043	0.098	0.235	-0.177
EM_CR5	**0.430**	0.046	0.069	0.194	-0.317
EM_CR6	**0.427**	0.069	-0.103	0.068	-0.351
EM_CR7	**0.609**	0.082	0.115	0.229	-0.103
EM_CR8*	**0.462**	-0.059	0.008	**0.483**	-0.082
EM_CR9	**0.443**	0.028	0.065	0.234	-0.301

Note. *Items were removed for the next EFA. Factor loadings greater than 0.4 [in absolute terms] are in bold. The rotation converged in 33 iterations. KMO measure of sampling adequacy was 0.930. Bartlett's test of sphericity was significant (chi-square = 5632.088, df = 561, p = 0.000).

b) **Factor pattern matrix of 29 items (EM_AT3, EM_DO1, EM_DO2, EM_DO3, and EM_CR8 were removed in the second EFA)**

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO1	-0.048	0.009	0.005	0.176	**-0.656**
EM_AO2	0.140	0.034	0.014	0.044	**-0.694**
EM_AO3	0.108	-0.010	-0.080	0.050	**-0.770**
EM_AO4	0.330	0.062	-0.105	-0.088	**-0.544**
EM_AO5	0.356	0.067	-0.215	-0.018	**-0.486**

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO6*	0.383	0.079	0.008	0.095	-0.359
EM_AO7	0.275	0.029	0.024	0.161	**-0.463**
EM_AO8*	0.221	0.045	-0.066	0.279	-0.377
EM_RP1	0.045	0.110	0.069	**0.608**	0.000
EM_RP2	0.252	-0.065	-0.220	**0.606**	0.026
EM_RP3	0.061	-0.035	-0.071	**0.779**	0.022
EM_RP4	0.051	-0.041	-0.046	**0.723**	-0.150
EM_AT1	0.015	**0.504**	-0.108	-0.075	-0.104
EM_AT2	-0.058	**0.643**	-0.015	0.058	-0.021
EM_AT4	0.060	**0.609**	-0.173	-0.008	0.140
EM_AT5	0.101	**0.427**	0.094	-0.021	-0.142
EM_AT6	0.097	**0.642**	-0.123	-0.048	0.168
EM_AT7	-0.030	**0.558**	0.159	0.072	-0.072
EM_DO4	0.105	-0.028	**0.636**	-0.152	0.055
EM_DO5	0.078	-0.122	**0.757**	0.016	0.072
EM_DO6*	-0.096	0.368	0.245	0.168	-0.161
EM_CR1	**0.687**	0.015	0.043	0.018	-0.012
EM_CR2	**0.825**	0.036	0.024	-0.029	0.055
EM_CR3	**0.602**	0.038	0.013	0.066	-0.094
EM_CR4	**0.710**	-0.015	0.079	0.125	-0.025
EM_CR5	**0.599**	-0.007	0.045	0.098	-0.177
EM_CR6	**0.557**	0.035	-0.123	0.016	-0.218
EM_CR7	**0.760**	0.032	0.080	0.118	0.046
EM_CR9	**0.593**	-0.010	0.041	0.154	-0.162

Note. *Items were removed for the next EFA. Factor loadings greater than 0.4 [in absolute terms] are in bold. The rotation converged in ten iterations. KMO measure of sampling adequacy was 0.928. Bartlett's test of sphericity was significant (chi-square = 4884.845, df = 406, p = 0.000).

c) Factor pattern matrix of 26 items (EM_AO6, EM_AO8, EM_AT3, EM_DO1, EM_DO2, EM_DO3, EM_DO6, and EM_CR8 were removed in the third EFA)

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO1	-0.053	0.018	0.008	0.189	**0.663**
EM_AO2	0.142	0.051	0.024	0.058	**0.682**
EM_AO3	0.088	0.014	-0.056	0.074	**0.776**
EM_AO4	0.327	0.070	-0.094	-0.062	**0.521**
EM_AO5	0.345	0.084	-0.187	0.014	**0.451**
EM_AO7*	0.307	0.042	0.023	0.161	0.396
EM_RP1	0.024	0.122	0.085	**0.610**	0.003
EM_RP2	0.210	-0.047	-0.181	**0.627**	-0.024
EM_RP3	0.015	-0.023	-0.043	**0.802**	-0.007
EM_RP4	0.014	-0.025	-0.019	**0.743**	0.154
EM_AT1	-0.018	**0.517**	-0.075	-0.049	0.109
EM_AT2	-0.100	**0.658**	0.022	0.079	0.049
EM_AT4	0.022	**0.632**	-0.124	0.010	-0.129
EM_AT5	0.087	**0.432**	0.105	-0.009	0.146
EM_AT6	0.068	**0.649**	-0.092	-0.031	-0.167
EM_AT7	0.004	**0.503**	0.114	0.053	0.068
EM_DO4	0.054	0.013	**0.662**	-0.113	-0.017
EM_DO5	0.015	-0.075	**0.808**	0.070	-0.034
EM_CR1	**0.712**	-0.001	0.021	-0.003	0.002

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_CR2	**0.849**	0.024	0.008	-0.051	-0.070
EM_CR3	**0.641**	0.021	-0.013	0.039	0.068
EM_CR4	**0.735**	-0.024	0.059	0.106	0.005
EM_CR5	**0.628**	-0.020	0.022	0.077	0.164
EM_CR6	**0.581**	0.026	-0.132	0.002	0.191
EM_CR7	**0.797**	0.018	0.056	0.088	-0.073
EM_CR9	**0.615**	-0.008	0.032	0.142	0.126

Note. *Item was removed for the next EFA. Factor loadings greater than 0.4 are in bold. The rotation converged in seven iterations. KMO measure of sampling adequacy was 0.919. Bartlett's test of sphericity was significant (chi-square = 4236.023, df = 325, p = 0.000).

d) Factor pattern matrix of 25 items (EM_AO6, EM_AO7, EM_AO8, EM_AT3, EM_DO1, EM_DO2, EM_DO3, EM_DO6, and EM_CR8 were removed in the last EFA)

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO1	-0.040	0.019	0.011	0.195	**0.649**
EM_AO2	0.156	0.053	0.027	0.067	**0.661**
EM_AO3	0.088	0.014	-0.049	0.080	**0.785**
EM_AO4	0.331	0.070	-0.090	-0.057	**0.517**
EM_AO5	0.349	0.085	-0.183	0.019	**0.443**
EM_RP1	0.035	0.122	0.080	**0.605**	-0.009
EM_RP2	0.209	-0.048	-0.180	**0.623**	-0.014
EM_RP3	0.012	-0.024	-0.041	**0.801**	0.005
EM_RP4	0.017	-0.025	-0.017	**0.742**	0.157
EM_AT1	-0.013	**0.517**	-0.076	-0.047	0.101
EM_AT2	-0.099	**0.658**	0.023	0.080	0.050
EM_AT4	0.018	**0.631**	-0.124	0.008	-0.123
EM_AT5	0.086	**0.432**	0.107	-0.008	0.148
EM_AT6	0.064	**0.648**	-0.092	-0.033	-0.162
EM_AT7	0.007	**0.503**	0.114	0.054	0.065
EM_DO4	0.050	0.013	**0.668**	-0.112	-0.010
EM_DO5	0.016	-0.076	**0.805**	0.070	-0.037
EM_CR1	**0.710**	-0.002	0.022	-0.005	0.010
EM_CR2	**0.849**	0.024	0.007	-0.052	-0.069
EM_CR3	**0.644**	0.021	-0.014	0.038	0.063
EM_CR4	**0.740**	-0.024	0.057	0.105	-0.003
EM_CR5	**0.627**	-0.022	0.026	0.076	0.177
EM_CR6	**0.578**	0.025	-0.128	0.001	0.204
EM_CR7	**0.798**	0.018	0.054	0.086	-0.076
EM_CR9	**0.623**	-0.008	0.028	0.142	0.110

Note. Factor loadings greater than 0.4 are in bold. The rotation converged in seven iterations. KMO measure of sampling adequacy was 0.912. Bartlett's test of sphericity was significant (chi-square = 3985.840, df = 300, p = 0.000).

Table 2a shows the factor pattern matrix of 34 items. Referring to Thurstone's Guideline (Hair et al., 2019), we intended to find out the simple structure of factors, in terms of which each item has a significant factor loading on one factor only (no cross-loading). As shown in Table 2a, 30 items had significant factor loadings (in bold), which were greater than 0.4 [in absolute terms] (Hair et al., 2019). Four items (i.e., EM_AT3, EM_DO1, EM_DO2, and EM_DO3) had insignificant factor loadings, and therefore they should be removed (Hair et al., 2019). However, EM_CR8 had a cross-loading of 0.462 and 0.483, in which it had two significant factor loadings simultaneously on both factor 1 and factor 4. Referring to Hair et al. (2019), the cross-loading represented the difference in factor loading of 0.021 (= 0.483 – 0.462) as well as the difference in variance of 0.020 (= $0.483^2 - 0.462^2$). Further, the ratio of the larger variance to the smaller one was 1.093 (= $0.483^2 \div 0.462^2$), which indicated the problematic cross-loading (Hair et al., 2019). Hence, EM_CR8 should be removed to achieve the simple structure of factors (Hair et al., 2019).

EFA was re-run (the second EFA), in which five items (i.e., EM_AT3, EM_DO1, EM_DO2, EM_DO3, and EM_CR8) were removed and therefore 29 items were retained. Bartlett's test of sphericity was significant and the KMO was acceptable (see Table 2b), in which EFA was suitable for analyzing the correlation matrix of 29 items (Hair et al., 2019; Malhotra, 2020). As shown in Table 2b, almost all factor loadings were significant (in bold) and no cross-loadings were found, as a consequence the second EFA improved the factor pattern matrix in order to achieve the simple structure of factors. However, three items (i.e., EM_AO6, EM_AO8, and EM_DO6) had insignificant factor loadings, and therefore they should also be removed. EFA was then re-run (the third EFA), in which eight items (i.e., EM_AO6, EM_AO8, EM_AT3, EM_DO1, EM_DO2, EM_DO3, EM_DO6, and EM_CR8) were removed and therefore 26 items were retained. Bartlett's test of sphericity was significant and the KMO was acceptable (see Table 2c), in which EFA was suitable for analyzing the correlation matrix of 26 items (Hair et al., 2019; Malhotra, 2020). As shown in Table 2c, the 25 items had significant factor loadings (in bold) and no cross-loadings were found. However, the only one item (i.e., EM_AO7) had an insignificant factor loading, and therefore it should be removed. Finally, EFA was re-run (the last EFA), in which nine items (i.e., EM_AO6, EM_AO7, EM_AO8, EM_AT3, EM_DO1, EM_DO2, EM_DO3, EM_DO6, and EM_CR8) were removed and therefore 25 items were retained. Bartlett's test of sphericity was significant and the KMO was acceptable (see Table 2d), in which EFA was suitable for analyzing the correlation matrix of 25 items (Hair et al., 2019; Malhotra, 2020). As shown in Table 2d, all items had significant factor loadings (in bold) and no cross-loadings were found. Thus, the simple structure of factors was achieved, in which the 25 purified-items of the EM scale were grouped into five factors.

4.3 Confirmatory Factor Analysis (CFA)

Referring to previous studies (e.g., van Prooijen & van der Kloot, 2001; Milfont & Duckitt, 2004; Hansen, 2004; Oei, et al., 2005; Kobayashi et al., 2013; Yi & Gong, 2013; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020; Cacciotti et al., 2020; Le et al., 2020; Cárdenas-Gutiérrez, 2021; Trager et al., 2021), CFA was performed to confirm the simple structure of five factors which was previously obtained by the EFA. We set up the five-factor measurement model (i.e., the five-dimension EM scale) based on the 25 purified-items to be validated through CFA. Based on the previous studies (e.g., van Prooijen & van der Kloot, 2001; Milfont & Duckitt, 2004; Oei, et al., 2005; Kobayashi et al., 2013; Izquierdo et al., 2014), we also used the same sample which previously used in EFA. Specifically, CFA was first conducted to examine the overall goodness-of-fit of the five-dimension EM scale. Referring to some literatures (e.g., Marsh & Balla, 1994; Sun, 2005; Hair et al., 2019; Malhotra, 2020), the assessment of the overall goodness-of-fit of the five-dimension EM scale was based on the two common fit indices: (1) the absolute fit indices (i.e., chi-square statistic, goodness of fit index [GFI], root mean square error of approximation [RMSEA], root mean square residual [RMR], and standardized root mean square residual [SRMR]), and (2) the relative or incremental fit indices (i.e., normed fit index [NFI], non-normed fit index [NNFI], and comparative fit index [CFI]). As shown in Table 3a, the chi-square statistic was unacceptable, because it was significant ($p = 0.000$). The significant chi-square statistic was then adjusted using the ratio of chi-square to degrees of freedom (e.g., Marsh & Balla, 1994; Sun, 2005; Cheng & Chen, 2009; Hair et al., 2019). The ratio of chi-square to degrees of freedom was 2.324 (= 615.821 ÷ 265), which was acceptable in terms of less than the cut-off value of 3.0 (Sun, 2005; Hair et al., 2019). GFI was unacceptable, but it was close to the cut-off value of 0.9 (Sun, 2005; Hair et al., 2019; Malhotra, 2020). RMSEA, RMR, and SRMR were acceptable because they were less than the cut-off value of 0.08 (Sun, 2005; Hair et al., 2019; Malhotra, 2020). NFI indicated an acceptable fit because it was greater than the cut-off value of 0.90 (Sun, 2005;

Malhotra, 2020), whereas NNFI and CFI indicated the good fits because they were greater than the cut-off value of 0.95 (Sun, 2005). Therefore, the overall goodness-of-fit of the five-dimension EM scale was a good fit.

Table 3: CFA of the five-dimension EM scale (n = 302)

a) Factor loading, average variance extracted, and composite reliability

Dimension and associated items	Factor loading	t-value	Composite reliability	Average variance extracted
Alertness to opportunity (EM_AO)			0.893	0.626
EM_AO1	0.691	13.273		
EM_AO2	0.816	16.792		
EM_AO3	0.867	18.478		
EM_AO4	0.779	15.690		
EM_AO5	0.793	16.086		
Risk propensity (EM_RP)			0.844	0.579
EM_RP1	0.612	11.109		
EM_RP2	0.778	15.284		
EM_RP3	0.791	15.630		
EM_RP4	0.842	17.118		
Ambiguity tolerance (EM_AT)			0.745	0.330
EM_AT1	0.570	9.397		
EM_AT2	0.654	11.033		
EM_AT4	0.615	10.263		
EM_AT5	0.469	7.520		
EM_AT6	0.616	10.280		
EM_AT7	0.502	8.116		
Dispositional optimism (EM_DO)			0.752	0.610
EM_DO4	0.635	6.265		
EM_DO5	0.903	6.850		
Creativity-bricolage (EM_CR)			0.916	0.579
EM_CR1	0.696	13.493		
EM_CR2	0.744	14.771		
EM_CR3	0.728	14.341		
EM_CR4	0.796	16.295		
EM_CR5	0.801	16.455		
EM_CR6	0.730	14.381		
EM_CR7	0.792	16.186		
EM_CR9	0.792	16.175		

Notes: Overall goodness-of-fit: chi-square = 615.821 (p = 0.000, degrees of freedom = 265), GFI = 0.859, RMSEA = 0.066, RMR = 0.056, SRMR = 0.056, NFI = 0.949, NNFI = 0.968, and CFI = 0.972.
All t-values were greater than 2.6, therefore all factor loadings were significant at 0.01 level (see the statistical table of t-distribution).

b) Phi coefficient of inter-dimension correlation

	EM_AO	EM_RP	EM_AT	EM_DO	EM_CR
EM_AO	1.000				
EM_RP	0.676**	1.000			
EM_AT	0.345**	0.214**	1.000		
EM_DO	-0.143*	-0.105	-0.250**	1.000	
EM_CR	0.792**	0.687**	0.278**	-0.022	1.000

Notes: **t-value was greater than 2.6 (the significance was at 0.01 level). *t-value was greater than 1.96 (the significance was at 0.05 level).

CFA was then conducted to examine a type of construct validity, which called as the convergent validity (e.g., Bagozzi, 1981; Fornell & Larcker, 1981; Hasan, 1986; Anderson & Gerbing, 1988; Bagozzi & Yi, 1988; Schumacker & Lomax, 2016; DeVellis, 2017; Hair et al., 2019; Malhotra, 2020). The convergent validity was used to examine the extent to which the items included in the five-dimension EM scale cohere (or converge) with one another (e.g., Bagozzi, 1981; Hasan, 1986; Hair et al., 2019; Malhotra, 2020). In assessing the convergent validity, we firstly examined how each group of items is convergent into any one of the five dimensions (i.e., alertness to opportunity [EM_AO], risk propensity [EM_RP], ambiguity tolerance [EM_AT], dispositional optimism [EM_DO], and creativity-bricolage [EM_CR]) (Bagozzi, 1981; Hasan, 1986; Hair et al., 2019; Malhotra, 2020). The five-dimension EM scale can be considered as achieving the convergent validity if all factor loadings are significant and positive (e.g., Bagozzi, 1981; Hasan, 1986; Anderson & Gerbing, 1988; Yi & Gong, 2013; Hair et al., 2019; Malhotra, 2020). A factor loading (or a lambda) indicates the extent to which an item correlate (or converge) with any one of the five dimensions (i.e., EM_AO, EM_RP, EM_AT, EM_DO, and EM_CR) (e.g., Bagozzi, 1981; Hasan, 1986; Anderson & Gerbing, 1988; Jöreskog & Sörbom, 1996; Schumacker & Lomax, 2016; Hair et al., 2019; Malhotra, 2020). As shown in Table 3a, all factor loadings were significant at 0.01 level and positive, and therefore it provided the evidence of the convergent validity (e.g., Bagozzi, 1981; Hasan, 1986; Anderson & Gerbing, 1988; Yi & Gong, 2013; Hair et al., 2019; Malhotra, 2020).

Since the convergent validity occurs when the two dimensions of the same construct correlate (or converge) with one another (e.g., Bagozzi, 1981; Hasan, 1986; Bookter, 1999; Schumacker & Lomax, 2016; DeVellis, 2017), we secondly examined the convergent validity by using a phi coefficient (e.g., Bagozzi, 1981; Hasan, 1986; Jöreskog & Sörbom, 1996; Schumacker & Lomax, 2016). A phi coefficient is a correlation coefficient between two dimensions, which indicates the extent to which the two dimensions of the EM scale correlate with one another (e.g., Bagozzi, 1981; Hasan, 1986; Jöreskog & Sörbom, 1996; Schumacker & Lomax, 2016). All phi coefficients should be significant and positive (e.g., Bagozzi, 1981; Hasan, 1986; Boivin et al., 1992; Bookter, 1999; Herring et al., 1999; LaNasa et al., 2009; Schumacker & Lomax, 2016; Eriksson & Boman, 2018), and therefore the five-dimension EM scale is considered as achieving the convergent validity. As shown in Table 3b, the phi coefficients among the four dimensions (i.e., EM_AO, EM_RP, EM_AT, and EM_CR) were significant and positive. It meant that those four dimensions validly composed a scale for measuring the EM construct (e.g., Bagozzi, 1981; Hasan, 1986; Herring et al., 1999; LaNasa et al., 2009; Schumacker & Lomax, 2016; Eriksson & Boman, 2018), and therefore it provided the adequate evidence of the convergent validity of the four-dimension EM scale (e.g., Bagozzi, 1981; Hasan, 1986; Bookter, 1999; Schumacker & Lomax, 2016; DeVellis, 2017). Conversely, the phi coefficients between the EM_DO and EM_AO dimensions, and between the EM_DO and EM_AT dimensions were significant and negative, but the phi coefficients between the EM_DO and EM_RP dimensions, and between the EM_DO and EM_CR dimensions were insignificant and negative. Therefore, the inclusion of the EM_DO proved that the five-dimension EM scale did not achieve an adequate convergent validity (e.g., Bagozzi, 1981; Hasan, 1986; Bookter, 1999; Schumacker & Lomax, 2016; DeVellis, 2017). Referring to previous studies (e.g., Nicholls et al., 1998; Hansen, 2004; Li et al., 2005; LaNasa et al., 2009; Bhatti & Ahsan, 2017; Eriksson & Boman, 2018; Vandevelde et al., 2020), the EM_DO should be removed in order to achieve more parsimonious measurement model of the EM scale. Therefore, in the second CFA, we examined the four-dimension EM scale instead of the five-dimension EM scale.

Furthermore, this study also tested the reliability of each dimension by using the composite reliability (CR) (e.g., Bagozzi, 1981; Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Yi & Gong, 2013; Hair et al., 2019; Malhotra, 2020). As shown in Table 3a, the CRs ranged from 0.745 (i.e., EM_AT) to 0.916 (i.e., EM_CR), in which they exceeded the acceptable value of 0.70, and therefore it indicated the satisfactory reliability (i.e., the adequate internal consistency) of each dimension (Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Yi & Gong, 2013; Hair et al., 2019; Malhotra, 2020). As also shown in Table 3a, the average variance extracted (AVE) of each dimension, except the EM_AT, was greater than the acceptable value of 0.50 (Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Yi & Gong, 2013; Hair et al., 2019; Malhotra, 2020). It indicated that each dimension, except the EM_AT, captured more than 50 percent of the variance of its items (Fornell & Larcker, 1981; Hair et al., 2019; Malhotra, 2020), and therefore it indicated the satisfactory convergent validity of each dimension (e.g., Fornell & Larcker, 1981; Hair et al., 2019; Malhotra, 2020). However, the AVE of the EM_AT was 0.33, which indicated that about 67 percent of the variance of the EM_AT's items was due to the measurement error instead of be captured by the EM_AT itself (Fornell & Larcker, 1981). Since the unacceptable AVE of the EM_AT was 0.33, we may conclude that the convergent validity of the EM_AT was adequate based only on its CR of 0.745 (Fornell & Larcker, 1981; Malhotra, 2020; previous studies e.g., Leuteritz et al., 2019; Bittencourt et al., 2021).

CFA was re-run (the second CFA), in which the EM_DO was removed, and therefore the four-dimension EM scale was examined. As shown in Table 4a, the chi-square statistic was significant, but the ratio of chi-square to degrees of freedom was less than 3.0. GFI was close to 0.9. The remaining six indices (i.e., RMSEA, RMR, SRMR, NFI, NNFI, and CFI) were acceptable. Therefore, the overall goodness-of-fit of the four-dimension EM scale was a good fit. All factor loadings and all phi coefficients were significant and positive (see Table 4a, Table 4b, and Appendix 4). All CRs and all AVEs were the same as those previously yielded by the five-dimension EM scale (see Table 3a and Table 4a). In terms of phi coefficients, the convergent validity of the four-dimension EM scale was better than the five-dimension EM scale.

Although, the four-dimension EM scale has been verified to achieve the better model than the five-dimension EM scale, there was a possibility that the second-order four-dimension EM scale might achieve the better model than the four-dimension EM scale (see e.g., Herring et al., 1999; Bhatti & Ahsan, 2017). We then examined the second-order four-dimension EM scale by using the same procedures as the four-dimension EM scale, in which the four-dimension EM scale was identified as the first-order four-dimension EM scale (see Table 4 and Appendix 4). As shown in Table 5, all fit indices were similar to those previously generated by the first-order four-dimension EM scale, and therefore the overall goodness-of-fit of the second-order four-dimension EM scale was also a good fit. In addition, the statistically comparison between the second-order four-dimension EM scale and the first-order four-dimension EM scale yielded an insignificant difference of chi-square (Δ chi-square = 1.071, Δ degrees of freedom = 2; see Table 4a, Table 5, and the statistical table of chi-square distribution), and therefore it indicated that those two EM scales provided the same level of the overall goodness-of-fit (e.g., Schumacker & Lomax, 2016;_Hair et al., 2019; Malhotra, 2020). All factor loadings were also significant and positive (see Table 5 and Appendix 4), whereas all CRs and all AVEs were the same as those previously yielded by the five-dimension EM scale and the four-dimension EM scale (see Table 3a, Table 4a, and Table 5). Taken together, the evidence indicated that the second-order four-dimension EM scale was similar to the first-order four-dimension EM scale.

Table 4: The first-order CFA of the four-dimension EM scale (n = 302)

a) Factor loading, average variance extracted, and composite reliability

Dimension and associated items	Factor loading	t-value	Composite reliability	Average variance extracted
Alertness to opportunity (EM_AO)			0.893	0.626
EM_AO1	0.693	13.311		
EM_AO2	0.817	16.844		
EM_AO3	0.868	18.494		
EM_AO4	0.778	15.661		
EM_AO5	0.790	16.005		
Risk propensity (EM_RP)			0.844	0.579
EM_RP1	0.613	11.131		
EM_RP2	0.776	15.217		
EM_RP3	0.791	15.628		
EM_RP4	0.844	17.163		

Dimension and associated items	Factor loading	t-value	Composite reliability	Average variance extracted
Ambiguity tolerance (EM_AT)			0.745	0.330
EM_AT1	0.569	9.338		
EM_AT2	0.661	11.134		
EM_AT4	0.604	10.022		
EM_AT5	0.477	7.652		
EM_AT6	0.607	10.077		
EM_AT7	0.510	8.246		
Creativity-bricolage (EM_CR)			0.916	0.579
EM_CR1	0.696	13.479		
EM_CR2	0.743	14.756		
EM_CR3	0.729	14.365		
EM_CR4	0.795	16.267		
EM_CR5	0.801	16.449		
EM_CR6	0.732	14.438		
EM_CR7	0.792	16.166		
EM_CR9	0.792	16.166		

Notes: Overall goodness-of-fit: chi-square = 549.766 (p = 0.000, degrees of freedom = 224), GFI = 0.863, RMSEA = 0.0695, RMR = 0.055, SRMR = 0.055, NFI = 0.953, NNFI = 0.969, and CFI = 0.973.
All t-values were greater than 2.6, therefore all factor loadings were significant at 0.01 level.

b) Phi coefficient of inter-dimension correlation

	EM_AO	EM_RP	EM_AT	EM_CR
EM_AO	1.000			
EM_RP	0.676**	1.000		
EM_AT	0.348**	0.216**	1.000	
EM_CR	0.792**	0.687**	0.281**	1.000

Note. **t-value was greater than 2.6 (the significance was at 0.01 level).

Table 5: The second-order CFA of the four-dimension EM scale (n = 302)

Dimension and associated items	First-order factor loading	t-value	Composite reliability	Average variance extracted
Alertness to opportunity (EM_AO)			0.893	0.626
EM_AO1	0.694	na*		
EM_AO2	0.818	13.070		
EM_AO3	0.869	13.779		
EM_AO4	0.777	12.462		
EM_AO5	0.788	12.630		
Risk propensity (EM_RP)			0.844	0.579
EM_RP1	0.614	na*		
EM_RP2	0.775	10.466		
EM_RP3	0.791	10.598		
EM_RP4	0.844	11.000		
Ambiguity tolerance (EM_AT)			0.745	0.330
EM_AT1	0.565	na*		
EM_AT2	0.661	7.643		
EM_AT4	0.606	7.294		
EM_AT5	0.475	6.194		
EM_AT6	0.610	7.321		
EM_AT7	0.510	6.524		

Dimension and associated items	First-order factor loading	t-value	Composite reliability	Average variance extracted
Creativity-bricolage (EM_CR)			0.917	0.579
EM_CR1	0.696	na*		
EM_CR2	0.744	12.132		
EM_CR3	0.730	11.912		
EM_CR4	0.795	12.918		
EM_CR5	0.801	13.012		
EM_CR6	0.732	11.957		
EM_CR7	0.792	12.871		
EM_CR9	0.792	12.869		
Dimension	**Second-order factor loading**	**t-value**		
EM_AO	0.893	11.740		
EM_RP	0.763	9.306		
EM_AT	0.340	4.434		
EM_CR	0.889	11.821		

Notes: Overall goodness-of-fit: chi-square = 550.837 (p = 0.000, degrees of freedom = 226), GFI = 0.863, RMSEA = 0.069, RMR = 0.056, SRMR = 0.056, NFI = 0.953, NNFI = 0.969, and CFI = 0.973.
All t-values were greater than 2.6, therefore all factor loadings were significant at 0.01 level.
*t-values were not available (na), because the first-order factor loadings corresponding to those t-values were fixed in the second-order CFA (e.g., Jöreskog & Sörbom, 1996; Hansen, 2004; Schumacker & Lomax, 2016).

5. Discussion, Limitations, and Contributions

5.1 Discussion

The study aims to verify the validity and reliability of the EM scale in the Indonesian context. A scale development procedure was conducted to achieve it. *First*, item generation was successful in capturing an initial set of 52 items based on the five dimensions of EM. Next, content validity successfully evaluated the initial set of 52 items to generate the preliminary 34 items of the EM scale. *Second*, EFA was performed to purify the preliminary 34 items of the EM scale. EFA was conducted four times. The first EFA, second EFA, third EFA, and last EFA were performed to purify 34 items, 29 items, 26 items, and 25 items, respectively. Overall, EFA was successful in purifying the preliminary 34 items to be the 25 purified-items which were grouped into the simple structure of five factors. *Third*, CFA was performed to confirm the simple structure of five factors (i.e., five dimensions). CFA was conducted three times. The first CFA, second CFA, and last EFA were performed to confirm the five-dimension EM scale, the first-order four-dimension EM scale, and the second-order four-dimension EM scale, respectively. The overall goodness-of-fit of the five-dimension EM scale, the first-order four-dimension EM scale, and the second-order four-dimension EM scale were good fits.

In terms of convergent validity (i.e., phi coefficients), the first-order four-dimension EM scale was better than the five-dimension EM scale. Based on phi coefficients, the dispositional optimism dimension of the five-dimension EM scale was found as an oppositional element (Herring et al., 1999) to the other four dimensions (i.e., alertness to opportunity, risk propensity, ambiguity tolerance, and creativity-bricolage). The dispositional optimism dimension has two items including "I hardly ever expect things to go my way" and "I rarely count on good things happening to me", in which each of those two items has a mean score of 2.844 and 2.868 in magnitude (see Appendix 1). Those two mean scores were less than the neutral score of 3.00 (Carver & Scheier, 2014), which indicate the low scores of the dispositional optimism. Those low scores reflect the dispositional pessimism instead of the dispositional optimism (Scheier et al., 1994; Räikkönen & Matthews, 2008; Carver & Scheier, 2014). Therefore, the inclusion of the dispositional optimism as a dimension of the five-dimension EM scale is conditional, in which the items of the dispositional optimism dimension should have the mean scores above the neutral score. The dispositional optimism dimension was then removed to achieve a more parsimonious EM scale. By removing the dispositional optimism dimension, the four-dimensional EM scale has 23 items instead of 25. In terms of the convergent validity and the composite reliability, the first-order four-dimension EM scale was similar to the second-order four-dimension EM scale. Overall, CFA succeeded in verifying the convergent validity and the composite reliability of the EM scale in both the first-order four-dimension and the second-order four-dimension.

The findings are in line with previous findings (e.g., Opperman et al., 2013; Amri & Akrout, 2020; Bernal-Guerrero et al., 2020), in which the first-order and second-order scales fit the data and achieve the validity and reliability of those scales. The findings are relatively consistent with the proposed model, in which EM has four dimensions including alertness to opportunity, risk propensity, ambiguity tolerance (Cui et al., 2021), and creativity-bricolage (Hmieleski & Corbett, 2006). The four dimensions as the sub-constructs of EM correlate with one another (see phi coefficients in Table 4b). For an example, correlations between alertness to opportunity and risk propensity, between alertness to opportunity and ambiguity tolerance, and between alertness to opportunity and creativity-bricolage were 0.676, 0.348, and 0.792 in magnitude, respectively. It means that individuals with strong "antenna" to discover the opportunities (Tang et al., 2012) might have a greater willingness to identify the opportunities around them (Cui et al., 2021), might be comfortable with uncertain outcomes (Peschl et al., 2021), and might produce useful ideas to combine the constrained resources (An et al., 2018; Baker & Nelson, 2005; Wu et al., 2017). The findings are also consistent with the growth mindset which is a component of Dweck's implicit theory of intelligence (Vsetecka, 2018). For example, individuals with a high growth mindset might pursue new opportunities (Lynch & Corbett, 2021), might accept the challenges as the opportunities, and have a high positive view of failure (Vsetecka, 2018), in which it is in line with the alertness to opportunity (i.e., to be active to scan the environment and find opportunities [Tang et al., 2012]), the risk propensity (i.e., willingness to identify the opportunities around them [Cui et al., 2021]), and the ambiguity tolerance (i.e., to be comfortable with uncertain outcomes [Peschl et al., 2021]), respectively.

5.2 *Theoretical and practical contributions*

This study makes both theoretical and practical contributions. *First*, this study captures the theoretical and empirical dimensions of EM more comprehensively than those captured by the recent published studies in the Indonesian context. We provide a clear conceptualization of EM as a construct, in which EM is reflected validly (i.e., empirically) into four dimensions including alertness to opportunity, risk propensity, ambiguity tolerance, and creativity-bricolage. The four dimensions correlate with one another both theoretically and empirically. In addition, those four dimensions are rooted in one distinctive characteristic of EM, namely pursuing new opportunities based on entrepreneurial abilities (Ireland et al., 2003; Zupan et al., 2018), in which such characteristic is in line with a growth mindset (Lynch & Corbett, 2021). Therefore, our study also contributes to the literature of Dweck's implicit theory of intelligence (Vsetecka, 2018).

Second, in terms of the convergent validity and the composite reliability, we provide the empirical evidence for the four-dimension EM scale instead of the five-dimension EM scale. Accordingly, the four-dimension EM scale was better than the five-dimension EM scale in terms of the convergent validity. It was due to dispositional optimism not supporting the convergent validity of the five-dimension EM scale. However, the dispositional optimism can be included as an EM dimension with one condition, in which the items of the dispositional optimism have the mean scores greater than the neutral score (i.e., greater than the neutral score of 3.00 on a five-point scale). Referring to Hansen (2004), this study therefore provides a stepping stone for the development of an EM scale in order to achieve a better and more complete measure of EM in the future.

Third, this study also provides the four-dimension EM scale both the first-order scale and second-order one. Referring to Hansen (2004), this study therefore provides a practical way for measuring the extent to which an undergraduate student is entrepreneurially minded. The EM scale can be used at level of construct and at level of dimensions. Based on this, for example, it would be possible to compare the mean scores of an undergraduate student on each of the EM dimensions. An undergraduate student may have the highest mean score on one dimension (i.e., alertness to opportunity) and the lowest mean score on the other one (i.e., risk propensity). In addition, the second-order scale is suggested to measure the overall EM (Opperman et al., 2013), in which the second-order scale makes it possible to interpret intercorrelations among dimensions by providing the second-order factor loadings (Meng & Jin, 2017).

Fourth, referring to Bernardus et al. (2020), our study provides a kind of guidance for entrepreneurship educators in developing an entrepreneurship education program. They can arrange the content of that program based on the EM dimensions, for example, how students are alert to opportunities and tolerant for ambiguity.

5.3 Limitations and future research directions

This study has limitations and consequently directions for future studies. *First*, the sample consisted of only the students from three universities in Indonesia. Therefore, the findings need to be verified among students from other universities in Indonesia. *Second*, the same sample of 302 in magnitude was used for both EFA and CFA. Thus, verification of the findings by using two different samples, in which one sample is for EFA and the other one is for CFA, is also required. *Finally*, the CFA did not examine the measurement invariance across groups, therefore verification of the findings by testing the measurement invariance across groups (e.g., gender, age, and origin of university) is also recommended (e.g., Vandenberg & Lance, 2000; Guppy et al., 2004; Schlägel & Sarstedt, 2016; Ammann et al., 2020; Jung & Lee, 2020).

6. Conclusion

The aim of this study was achieved by providing a valid and reliable adapted EM scale. The adapted EM scale is a parsimonious measurement model which is realized as a four-dimensional model consisting of 23 items. The adapted EM scale enhances the validity and reliability of other adapted EM scales in the Indonesian context which have been found in the recent studies. Therefore, we believe that the adapted EM scale is a suitable measurement instrument to measure the degree to which the Indonesian students are entrepreneurially minded.

7. Acknowledgements

We wish to express our gratitude to The Directorate General of Higher Education, The Ministry of Education, Culture, Research and Technology, Republic of Indonesia. The authors also would like to thank the anonymous reviewer and the editor for their constructive comments and suggestions.

8. Funding

This study was fully supported via a Research Grant Program namely "*The Penelitian Dasar Unggulan Perguruan Tinggi*" (The PDUPT) which financed by The Directorate General of Higher Education, The Ministry of Education, Culture, Research and Technology, Republic of Indonesia [022/SP2H/LT-MULTI-PDPK/LL7/2021].

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Appendix 1: Dimension and associated items, Cronbach's alpha, mean, and standard deviation [SD] (n = 302)

Alertness to opportunity [EM_AO] (Tang et al., 2012). Cronbach's alpha: 8 items** = 0.920; 5 items*** = 0.891.		**Mean**	**SD**
EM_AO1	I have frequent interactions with others to acquire new information. [Saya sering berinteraksi dengan orang lain untuk mendapatkan informasi baru.]	4.106	0.852
EM_AO2	I am an avid information seeker. [Saya adalah seorang pencari informasi yang rajin.]	3.861	0.886
EM_AO3	I am always actively looking for new information. [Saya selalu aktif mencari informasi baru.]	3.907	0.869
EM_AO4	I see links between seemingly unrelated pieces of information. [Saya dapat melihat keterkaitan antara potongan-potongan informasi yang tampaknya tidak terhubung.]	3.825	0.881
EM_AO5	I often see connections between previously unconnected domains of information. [Saya sering melihat keterkaitan antara domain-domain (ranah-ranah) informasi yang sebelumnya tidak terhubung.]	3.745	0.881
EM_AO6*	I have a gut feeling for potential opportunities. [Saya memiliki firasat untuk menemukan peluang potensial.]	3.825	0.815
EM_AO7*	I can distinguish between profitable opportunities and not-so-profitable opportunities. [Saya dapat membedakan antara peluang yang menguntungkan dan peluang yang tidak terlalu menguntungkan.]	3.921	0.863
EM_AO8*	When facing multiple opportunities, I am able to select the good ones. [Saat menghadapi banyak peluang, saya bisa memilih satu peluang yang baik.]	3.997	0.829
Risk propensity [EM_RP] (Hung & Tangpong, 2010; Hung et al., 2012). Cronbach's alpha: 4 items*** = 0.841.		**Mean**	**SD**
EM_RP1	I believe that higher risks are worth taking for higher rewards. [Saya percaya bahwa risiko yang lebih tinggi layak diambil untuk mendapatkan imbalan yang lebih tinggi.]	4.113	0.847
EM_RP2	I like to take chances, although I may fail. [Saya suka mengambil risiko, meskipun untuk itu saya mungkin gagal.]	3.639	0.936
EM_RP3	I like to try new things, knowing well that some of them will disappoint me. [Saya suka mencoba hal-hal baru, meskipun saya tahu betul bahwa beberapa di antaranya akan mengecewakan saya.]	3.904	0.875
EM_RP4	I seek new experiences even if their outcomes may be risky. [Saya mencari pengalaman baru walaupun hasilnya mungkin berisiko.]	3.990	0.868
Ambiguity tolerance [EM_AT] (Geller et al., 1993). Cronbach's alpha: 7 items** = 0.745; 6 items*** = 0.740.		**Mean**	**SD**
EM_AT1	It really disturbs me when I am unable to follow another person's train of thought. [Saya benar-benar merasa terganggu, ketika saya tidak dapat mengikuti alur pemikiran orang lain.]	3.702	1.010
EM_AT2	If I am uncertain about the responsibilities involved in a particular task, I get very anxious. [Saya menjadi sangat cemas dalam melaksanakan tugas tertentu, ketika saya tidak yakin mengenai bentuk tanggung jawabnya.]	3.957	0.919
EM_AT3*	Before any important task, I must know how long it will take. [Sebelum melakukan tugas penting, saya harus tahu berapa lama waktu yang dibutuhkan untuk itu.]	3.844	0.892
EM_AT4	I don't like to work on a problem unless there is a possibility of getting a clear-cut and unambiguous answer. [Saya tidak suka bekerja untuk menyelesaikan suatu masalah, kecuali ada kemungkinan solusi yang jelas dan tidak ambigu (tidak membingungkan).]	3.520	1.017
EM_AT5	The best part of working on a jigsaw puzzle is putting in that last piece. [Bagian terbaik dari mengerjakan teka-teki bergambar adalah bisa memasukkan potongan gambar yang terakhir.]	3.960	0.984
EM_AT6	I am often uncomfortable with people unless I feel that I can understand their behavior. [Saya sering merasa tidak nyaman dengan orang-orang lain, kecuali saya bisa memahami perilaku mereka.]	3.765	1.076
EM_AT7	A good task is one in which what is to be done and how it is to be done are always clear. [Tugas yang baik adalah suatu tugas yang senantiasa jelas mengenai apa yang harus dilakukan dan bagaimana melakukannya.]	4.245	0.786
Dispositional optimism [EM_DO] (Scheier et al., 1994). Cronbach's alpha: 6 items** = 0.468; 2 items*** = 0.729.		**Mean**	**SD**
EM_DO1*	In uncertain times, I usually expect the best. [Saya biasanya mengharapkan yang terbaik, walaupun dalam kondisi ketidakpastian.]	4.344	0.720
EM_DO2*	If something can go wrong for me, it will. (reverse) [Jika suatu hal bisa salah, maka hal itu akan menjadi kenyataan.]	2.692	0.795
EM_DO3*	I'm always optimistic about my future. [Saya selalu optimis terhadap masa depan saya.]	4.219	0.850
EM_DO4	I hardly ever expect things to go my way. (reverse) [Saya jarang sekali berharap bahwa segala sesuatu akan berjalan sesuai dengan cara saya.]	2.844	0.967
EM_DO5	I rarely count on good things happening to me. (reverse) [Saya jarang memperhitungkan bahwa hal-hal yang baik akan terjadi pada saya.]	2.868	1.016
EM_DO6*	Overall, I expect more good things to happen to me than bad. [Secara keseluruhan, saya mengharapkan lebih banyak hal-hal yang baik terjadi pada diri saya daripada hal-hal yang buruk.]	4.526	0.680
Creativity-bricolage [EM_CR] (Hmieleski & Corbett, 2006). Cronbach's alpha: 9 items** = 0.924; 8 items*** = 0.916.		**Mean**	**SD**
EM_CR1	I am inventive. [Saya mampu menemukan hal-hal baru.]	3.940	0.796
EM_CR2	I serve as a good role model for creativity. [Saya mampu menjadi panutan untuk kreativitas.]	3.632	0.926
EM_CR3	I demonstrate originality in my work. [Saya menunjukkan orisinalitas dalam kerja saya (misalnya, bukan mengambil karya orang lain).]	3.894	0.824

EM_CR4	I am creative when asked to work with limited resources. [Saya mampu kreatif ketika diminta untuk bekerja dengan sumber daya yang terbatas.]	3.854	0.842
EM_CR5	I identify ways in which resources can be recombined to produce novel products. [Saya mampu mengidentifikasi cara-cara untuk mengombinasikan-ulang sumber daya guna menghasilkan produk baru.]	3.854	0.814
EM_CR6	I find new uses for existing methods or equipment. [Saya mampu menemukan penggunaan yang baru dari metode atau peralatan yang sudah ada.]	3.768	0.798
EM_CR7	I think outside of the box. [Saya mampu melakukan pemikiran yang tidak biasa (misalnya, pemikiran yang kreatif).]	3.805	0.818
EM_CR8*	I take risks in terms of producing new ideas in completing projects. [Saya mengambil risiko untuk menggunakan ide-ide baru dalam menyelesaikan kerja saya.]	3.781	0.838
EM_CR9	I identify opportunities for new services/products. [Saya dapat mengidentifikasi peluang untuk produk/layanan baru.]	3.868	0.796

Note. Sentences in brackets are the items in the Indonesian adaptation. *Item was removed during the EFA. **A set of items was examined in the first EFA. ***A set of items was retained in the last EFA. All Cronbach's alphas, except a Cronbach's alpha of the six-item EM_DO, were acceptable, in which they were greater than a cut-off value of 0.70 (Hair et al., 2019).

Appendix 2: Inter-item correlation (n = 302)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1. EM_AO1	1.000																																	
2. EM_AO2	.614**	1.000																																
3. EM_AO3	.641**	.773**	1.000																															
4. EM_AO4	.503**	.577**	.625**	1.000																														
5. EM_AO5	.461**	.568**	.655**	.786**	1.000																													
6. EM_AO6	.429**	.542**	.578**	.577**	.637**	1.000																												
7. EM_AO7	.527**	.620**	.601**	.550**	.585**	.651**	1.000																											
8. EM_AO8	.475**	.587**	.590**	.477**	.536**	.619**	.710**	1.000																										
9. EM_RP1	.342**	.353**	.334**	.253**	.301**	.375**	.426**	.440**	1.000																									
10. EM_RP2	.361**	.400**	.424**	.447**	.505**	.461**	.429**	.465**	.487**	1.000																								
11. EM_RP3	.388**	.377**	.443**	.323**	.400**	.377**	.399**	.458**	.481**	.623**	1.000																							
12. EM_RP4	.473**	.486**	.540**	.423**	.470**	.486**	.504**	.549**	.512**	.633**	.681**	1.000																						
13. EM_AT1	.168**	.180**	.188**	.206**	.221**	.235**	.186**	.142*	.129*	.086	.046	.080	1.000																					
14. EM_AT2	.209**	.172**	.145*	.224**	.163**	.132*	.151**	.165**	.164**	.094	.144*	.133*	.480**	1.000																				
15. EM_AT3	.231**	.183**	.153**	.138*	.152**	.168**	.122*	.174**	.067	.024	.096	.114*	.151**	.198**	1.000																			
16 EM_AT4	-.006	.106	.104	.143*	.174**	.102	.078	.132*	.113*	.114*	.056	.059	.339**	.362**	.152**	1.000																		
17. EM_AT5	.215**	.249**	.295**	.256**	.280**	.281**	.243**	.248**	.220**	.136*	.123*	.151**	.209**	.299**	.280**	.313**	1.000																	
18. EM_AT6	-.002	.084	.073	.083	.182**	.180**	.073	.089	.036	.084	.039	.044	.336**	.379**	.270**	.446**	.208**	1.000																
19. EM_AT7	.224**	.216**	.194**	.168**	.182**	.197**	.200**	.205**	.193**	.044	.121*	.150**	.168**	.318**	.306**	.285**	.339**	.375**	1.000															
20. EM_DO1	.298**	.289**	.274**	.164**	.155**	.262**	.306**	.252**	.285**	.136*	.253**	.303**	.201**	.223**	.270**	-.005	.155**	.143*	.349**	1.000														
21. EM_DO2	-.231**	-.198**	-.171**	-.205**	-.264**	-.145*	-.162**	-.158**	-.126*	-.230**	-.162**	-.192**	-.144*	-.155**	-.274**	-.138*	-.198**	-.116*	-.107	-.098	1.000													
22. EM_DO3	.390**	.354**	.365**	.309**	.319**	.319**	.413**	.425**	.344**	.292**	.265**	.376**	.111	.046	.128*	.045	.086	.016	.109	.305**	-.151**	1.000												
23. EM_DO4	-.137*	-.025	-.092	-.071	-.164**	-.043	-.087	-.146*	-.072	-.180**	-.132*	-.128*	-.119*	-.086	-.144*	-.134*	.042	-.083	-.033	-.052	.356**	-.136*	1.000											
24. EM_DO5	-.030	-.069	-.112	-.093	-.164**	.016	-.016	-.107	.014	-.138*	-.052	-.028	-.149**	-.106	-.166**	-.219**	-.045	-.202**	-.026	-.019	.266**	.034	.574**	1.000										
25. EM_DO6	.259**	.254**	.201**	.210**	.136*	.173**	.241**	.221**	.231**	.080	.186**	.223**	.176**	.259**	.190**	.107	.240**	.142*	.429**	.469**	-.037	.254**	.039	.068	1.000									
26. EM_CR1	.367**	.421**	.429**	.454**	.485**	.429**	.438**	.397**	.281**	.377**	.354**	.374**	.118*	.096	.066	.067	.200**	.081	.140*	.163**	-.171**	.338**	-.012	.019	.162**	1.000								
27. EM_CR2	.306**	.452**	.444**	.519**	.520**	.469**	.487**	.435**	.294**	.406**	.313**	.392**	.106	.137*	.067	.137*	.221**	.086	.129*	.121*	-.235**	.377**	-.023	.005	.134*	.641**	1.000							
28. EM_CR3	.385**	.485**	.478**	.418**	.466**	.487**	.516**	.481**	.312**	.407**	.336**	.412**	.153**	.178**	.077	.046	.204**	.103	.143*	.235**	-.227**	.280**	-.042	-.056	.195**	.496**	.475**	1.000						
29. EM_CR4	.406**	.538**	.467**	.480**	.478**	.544**	.555**	.494**	.367**	.468**	.423**	.439**	.148*	.116*	.133*	.027	.185**	.065	.165**	.275**	-.246**	.379**	-.028	.039	.163**	.517**	.612**	.638**	1.000					
30. EM_CR5	.487**	.520**	.600**	.487**	.513**	.522**	.499**	.506**	.342**	.436**	.433**	.472**	.129*	.094	.188**	.072	.283**	.040	.191**	.295**	-.223**	.420**	-.054	.005	.205**	.540**	.532**	.620**	.662**	1.000				
31. EM_CR6	.442**	.513**	.553**	.528**	.544**	.540**	.470**	.521**	.250**	.475**	.373**	.433**	.169**	.154**	.145*	.104	.263**	.122*	.170**	.203**	-.275**	.300**	-.124*	-.128*	.146*	.522**	.509**	.548**	.523**	.643**	1.000			
32. EM_CR7	.354**	.467**	.498**	.487**	.493**	.522**	.543**	.523**	.367**	.424**	.410**	.470**	.078	.108	.072	.091	.221**	.118*	.199**	.255**	-.195**	.358**	-.005	.017	.185**	.543**	.659**	.570**	.629**	.605**	.556**	1.000		
33. EM_CR8	.432**	.482**	.506**	.456**	.536**	.498**	.559**	.553**	.479**	.585**	.506**	.636**	.088	.070	.083	.060	.199**	.031	.112	.213**	-.271**	.407**	-.042	.056	.150**	.498**	.542**	.553**	.613**	.605**	.545**	.635**	1.000	
34. EM_CR9	.457**	.563**	.554**	.511**	.511**	.620**	.623**	.593**	.421**	.462**	.435**	.479**	.141*	.115*	.139*	.094	.197**	.041	.201**	.288**	-.212**	.411**	-.053	-.005	.166**	.533**	.592**	.551**	.635**	.611**	.558**	.659**	.614**	1.000

Note. *p < 0.05; **p < 0.01.

Appendix 3: Factor structure matrix of the EM scale (n = 302)

All factor structure matrices are not presented, and therefore it is available on request from the corresponding author.

a) Factor structure matrix of 34 items (the first EFA)

Item	Factor loading				
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
EM_AO1	0.261	0.243	-0.020	**0.525**	**-0.729**
EM_AO2	**0.427**	0.279	-0.007	**0.496**	**-0.813**
EM_AO3	**0.441**	0.251	-0.086	**0.507**	**-0.856**
EM_AO4	**0.540**	0.276	-0.140	0.361	**-0.727**
EM_AO5	**0.588**	0.293	-0.261	**0.411**	**-0.727**
EM_AO6	**0.554**	0.288	-0.023	**0.490**	**-0.689**
EM_AO7	**0.501**	0.253	0.010	**0.572**	**-0.744**
EM_AO8	**0.468**	0.263	-0.085	**0.607**	**-0.695**
EM_RP1	0.277	0.219	0.021	**0.657**	-0.395
EM_RP2	**0.498**	0.101	-0.276	**0.665**	**-0.453**
EM_RP3	0.341	0.129	-0.116	**0.735**	**-0.442**
EM_RP4	0.384	0.154	-0.090	**0.803**	**-0.568**
EM_AT1	0.104	**0.513**	-0.156	0.095	-0.217
EM_AT2	0.063	**0.620**	-0.101	0.155	-0.193

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AT3	0.004	**0.424**	-0.110	0.156	-0.237
EM_AT4	0.129	**0.546**	-0.263	0.033	-0.064
EM_AT5	0.204	**0.482**	-0.002	0.182	-0.312
EM_AT6	0.097	**0.612**	-0.192	0.031	-0.062
EM_AT7	0.035	**0.612**	0.112	0.242	-0.265
EM_DO1	0.024	0.396	0.179	**0.451**	-0.374
EM_DO2	-0.234	-0.252	0.369	-0.210	0.228
EM_DO3	0.304	0.157	0.036	**0.472**	**-0.455**
EM_DO4	0.008	-0.145	**0.649**	-0.150	0.107
EM_DO5	0.011	-0.219	**0.696**	-0.002	0.074
EM_DO6	-0.019	**0.453**	0.267	0.356	-0.320
EM_CR1	**0.656**	0.181	0.008	0.397	**-0.493**
EM_CR2	**0.764**	0.203	-0.032	0.387	**-0.497**
EM_CR3	**0.624**	0.227	-0.020	**0.462**	**-0.547**
EM_CR4	**0.698**	0.200	0.037	**0.539**	**-0.577**
EM_CR5	**0.643**	0.230	0.016	**0.542**	**-0.644**
EM_CR6	**0.633**	0.255	-0.162	**0.437**	**-0.614**
EM_CR7	**0.734**	0.219	0.044	**0.523**	**-0.544**
EM_CR8	**0.663**	0.126	-0.028	**0.681**	**-0.561**
EM_CR9	**0.662**	0.217	0.014	**0.573**	**-0.651**

Note. Factor loadings greater than 0.4 [in absolute terms] are in bold.

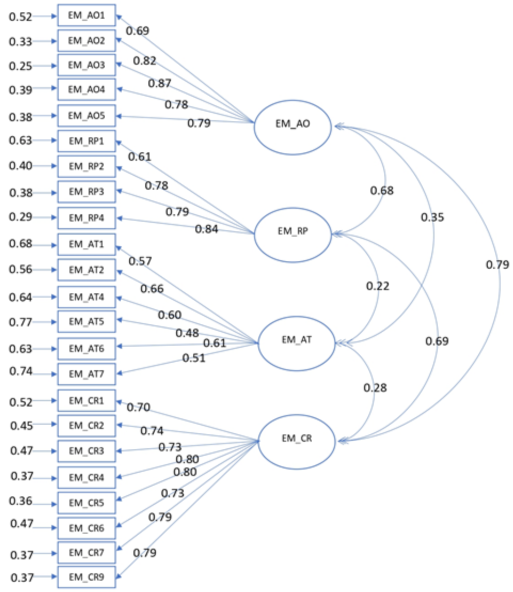
b) Factor structure matrix of 25 items (the last EFA)

Item	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EM_AO1	**0.473**	0.199	-0.050	**0.488**	**0.722**
EM_AO2	**0.612**	0.262	-0.036	**0.482**	**0.801**
EM_AO3	**0.619**	0.251	-0.111	**0.516**	**0.884**
EM_AO4	**0.637**	0.287	-0.141	**0.402**	**0.715**
EM_AO5	**0.660**	0.317	-0.240	**0.463**	**0.699**
EM_RP1	**0.402**	0.218	0.003	**0.634**	0.329
EM_RP2	**0.549**	0.139	-0.236	**0.744**	**0.415**
EM_RP3	**0.466**	0.124	-0.112	**0.810**	0.396
EM_RP4	**0.530**	0.147	-0.092	**0.825**	**0.521**
EM_AT1	0.157	**0.543**	-0.164	0.089	0.202
EM_AT2	0.145	**0.655**	-0.094	0.158	0.189
EM_AT4	0.114	**0.627**	-0.223	0.079	0.055
EM_AT5	0.280	**0.471**	0.023	0.177	0.297
EM_AT6	0.115	**0.634**	-0.190	0.044	0.026
EM_AT7	0.202	**0.511**	0.020	0.165	0.212
EM_DO4	-0.040	-0.107	**0.675**	-0.148	-0.073
EM_DO5	-0.014	-0.204	**0.813**	-0.026	-0.063
EM_CR1	**0.712**	0.178	-0.002	**0.402**	**0.440**
EM_CR2	**0.782**	0.214	-0.018	**0.401**	**0.430**
EM_CR3	**0.710**	0.210	-0.048	**0.440**	**0.482**
EM_CR4	**0.790**	0.173	0.025	**0.516**	**0.492**
EM_CR5	**0.771**	0.191	-0.011	**0.512**	**0.590**
EM_CR6	**0.715**	0.244	-0.165	**0.445**	**0.573**
EM_CR7	**0.804**	0.209	0.020	**0.502**	**0.456**
EM_CR9	**0.769**	0.199	-0.013	**0.546**	**0.557**

Note. Factor loadings greater than 0.4 are in bold.

Appendix 4: The empirical models of the four-dimension EM scale (n = 302)

a) The first-order four-dimension EM scale



b) The second-order four-dimension EM scale