General versus specific personality traits for predicting entrepreneurship

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ABSTRACT

Personality traits play an important role when it comes to predicting people's entrepreneurial behaviour. The objective of this study was to determine whether the specific traits of enterprising personality predicted entrepreneurial behaviour better than general (Big Five type) traits. The sample comprised 1153 working people (33% entrepreneurs). The mean age of the sample was 41.72 years old ($SD = 12.32$). The five general personality traits (Big Five) were evaluated using the *Overall Personality Assessment Scale* and the eight specific traits were measured with the *Battery for the Assessment of the Enterprising Personality (BEPE)*. The differences between entrepreneurs and non-entrepreneurs were greater in the specific personality traits than in the more general traits, with mean effect sizes of 0.54 and 0.21, respectively. The predictive capacity of the specific traits ($R^2 = 0.21$) was greater than that of the general traits ($R^2 = 0.07$). The ROC curves for the specific traits gave higher areas under the curve (0.74) than the general traits (0.56). The canonical correlation between the eight specific BEPE dimensions and the Big Five factors was 0.77. The specific personality traits demonstrated better predictive and discriminative capacity for enterprising behaviour than the more general, Big-Five type traits.

1. Introduction

Enterprising behaviour plays an important role in the modern economy (OECD, 2019) which is characterized by instability and rapid change (Bauman, 2017), obliging people and organizations to be in a process of constant innovation (Global Entrepreneurship Monitor [GEM], 2020; Kuckertz et al., 2020). Enterprising behaviour may occur in various settings, both personal and social. A person may be enterprising at the personal level (personal entrepreneur), characterized by having high levels of control and initiative that give them the ability to manage difficult situations and manage their own life (Frese & Fay, 2001). One might also talk of intra-entrepreneurs, referring to people who produce changes and innovation within their positions in a company, improving projects that are already in progress (Mumford et al., 2021). Finally, and most widely-known as enterprising personality, is the extra-entrepreneur (business-starting behaviour), the person whose goal is developing new external projects linked to business creation (Rauch & Frese, 2007b). In this study, the focus is on the latter type of entrepreneur, also known as a "general entrepreneur" (Salmony & Kanbach, 2021), someone who chooses to work for themselves rather than working for others.

The models proposed to date for studying enterprising behaviour (business-starting behaviour) include three large blocks of variables: behavioural, attitudinal, and personality (Cuesta et al., 2018; Gielnik et al., 2021; Muñiz et al., 2014). In this study we focus on personality variables (Frese & Gielnik, 2014), and in particular, we aim to provide data about the suitability of using specific traits of enterprising personality rather than using Big-Five type general traits.

Personality traits can be measured with different levels of conceptual breadth (Soto & John, 2017). A broad character trait summarizes a large amount of behavioural information and predicts a wide range of important criteria. In contrast, a more specific measured trait has the advantage of fidelity, in other words, it more precisely expresses a specific behavioural description and can predict criteria that are closely linked to that description (John et al., 2008). This idea that the different breadths in personality traits have advantages and disadvantages is known as the bandwidth-fidelity trade-off (John et al., 1991). In research into enterprising personality, various authors have advocated using general personality traits, with the Big Five taxonomic model (Costa & McCrae, 1992) being the most widely used (Brandstätter, 2011). Results from this line of research have been varied. The results of a meta-analysis by Zhao and Seibert (2006) indicated that there were

differences between entrepreneurs and managers in Conscientiousness, Openness, Emotional stability, and Agreeableness (not in Extraversion). Entrepreneurs demonstrated higher scores in Conscientiousness and Openness, whereas managers demonstrated higher scores in Neuroticism and Agreeableness. Zhao et al. (2010) concluded in a meta-analysis that four of the five broad traits (the exception being Agreeableness) were positively related to enterprising behaviour, although the correlations were rather weak: Conscientiousness (0.19), Openness (0.24), Emotional stability (0.22), Extraversion (0.16), and Agreeableness (0.04). Other researchers have noted that attempting to cover such a large amount of behaviour (bandwidth) in only five broad traits may be too reductive (Almeida et al., 2014; Leutner et al., 2014; Muñiz et al., 2014; Postigo, García-Cueto, et al., 2020).

The specific traits of enterprising personality provide a more precise description (fidelity) of how entrepreneurs and non-entrepreneurs differ in specific behavioural dimensions, which allows results to be predicted more accurately (Paunonen & Ashton, 2001; Rauch & Frese, 2007a). One clear example can be seen in the meta-analysis by Zhao and Seibert (2006), who analysed multiple traits, considering facets of the Big Five and codifying them within their respective broad trait. The looked at two facets of Conscientiousness: Achievement motivation and Dependability. While the correlation between Achievement motivation and entrepreneurialism was 0.30, for Dependability it was 0.005. These differences between facets are less obvious when the overall correlation of Conscientiousness with enterprising behaviour is given (0.22). As Brandstätter (2011) clearly noted, "… specific personality constructs may have some merits beyond those of the global personality constructs" (p. 225).

A meta-analysis by Rauch and Frese (2007b) demonstrated that personality traits which were more closely related to the task of managing a business were better predictors of business creation ($r = 0.247$) than general personality traits such as the Big Five ($r = 0.124$). Leutner et al. (2014) found that the specific traits, measured using the Measure of Entrepreneurial Tendencies and Abilities (META; Ahmetoglu et al., 2011), demonstrated greater evidence of predictive validity than the Big Five personality traits measured via the International Personality Item Pool (Goldberg, 1992). Although all of the personality traits (general and specific) were statistically significant in the prediction of entrepreneurialism, only Extraversion and Agreeableness continued to be significant once the META test was included in the prediction model for enterprising activity.

These two approaches continue to be used nowadays in research into enterprising personality, with some authors opting for general traits (Dai et al., 2019; López-Núñez et al., 2020; Stoll et al., 2020), while others choose to use more specific traits (Almeida et al., 2014; Muñiz et al., 2014; Postigo, García-Cueto, et al., 2020; Walter & Heinrichs, 2015).

Given that there have been no conclusive results to date, the objective of our study is to determine whether the specific traits of enterprising personality more accurately predict people's enterprising behaviour than the more general (Big Five type) traits. To evaluate the general (Big Five) personality traits, we will use the Overall Personality Assessment Scale (OPERAS; Vigil-Colet et al., 2013), while to evaluate the specific traits we will use the Battery for the Assessment of the Enterprising Personality (BEPE; Cuesta et al., 2018). This battery evaluates eight specific traits of enterprising personality: Self-efficacy, Autonomy, Innovativeness, Internal locus of control, Achievement motivation, Optimism, Stress tolerance, and Risk-taking (Cuesta et al., 2018; Frese & Gielnik, 2014; Muñiz et al., 2014; Rauch & Frese, 2007b).

2. Material and methods

2.1. Participants

The sample was initially made up of 1301 participants from the general Spanish population, except for 6% who were from other Spanish-speaking countries, including Guatemala, Colombia, Argentina,

and Ecuador. The final sample comprised 1153 participants following the removal of 11.4% of the original sample for incorrectly answering two or more of the attentional control scale items, described in the Measures section. All of the participants were actively working. Out of the 1153 participants, 772 were employed by someone while 381 worked for themselves (33%). Just over half of the samples (57%) were women. The age of the participants ranged from 18 to 83 years old, with a mean of 41.72 and a standard deviation of 12.32.

2.2. Measures

2.2.1. Battery for the assessment of the enterprising personality (BEPE)

The BEPE (Cuesta et al., 2018) is a questionnaire containing 80 items that evaluate the eight dimensions of personality that the literature has identified as most strongly related to enterprising personality (10 items per dimension): Self-efficacy, Autonomy, Innovativeness, Internal locus of control, Achievement motivation, Optimism, Stress tolerance, and Risk-taking (Cuesta et al., 2018; Frese & Gielnik, 2014; Muñiz et al., 2014; Rauch & Frese, 2007b). Responses to the items are given on a Likert-type scale from 1 (completely disagree) to 5 (completely agree). The items are all formulated in a direct manner to minimize response bias (Vigil-Colet et al., 2020). The eight dimensions exhibit high coefficients of reliability, with values for the alpha coefficient between $\alpha = 0.808$ and $\alpha = 0.965$ (Cuesta et al., 2018). The Information Function (Item Response Theory models) also demonstrates adequate values for precision (Postigo et al., 2020a). The BEPE showed measurement invariance according to be self-employed or not (Postigo et al., 2021b). In our study, the reliability coefficients (α) were as follows: Entrepreneurial personality: 0.97; Self-efficacy: 0.90; Autonomy: 0.83: Innovativeness: 0.90; Internal locus of control: 0.87; Achievement motivation: 0.90; Optimism: 0.92; Stress tolerance: 0.84; and Risk-taking: 0.90.

2.2.2. Overall personality assessment scale (OPERAS)

OPERAS (Vigil-Colet et al., 2013) is an instrument that evaluates the five broad personality traits, according to the Big Five model (Extraversion, Emotional stability, Conscientiousness, Agreeableness, and Openness to experience) (Costa & McCrae, 1992). It uses 7 items per dimension, with responses on a Likert-type scale from 1 (completely disagree) to 5 (completely agree). The subscales exhibit reliability coefficients (α) between 0.71 and 0.86 and the instrument has adequate evidence of convergent validity with the Big Five Inventory (BFI; Benet-Martínez & John, 1998). In our study, the reliability coefficients (α) were as follows: Extraversion: 0.82; Emotional stability: 0.80; Conscientiousness: 0.70; Agreeableness: 0.67; Openness to experience: 0.69.

2.2.3. Working status

This variable was evaluated dichotomously. We asked the participants whether they were employed by someone or worked for themselves. Those who were not working at the time of the evaluation were removed from the study. Participants who were working for themselves, in other words, who had started a business in the past and still continued with it, were considered entrepreneurs (Gielnik et al., 2021; Rauch & Frese, 2007b). Based on the differentiation of the types of entrepreneurs (Salmony & Kanbach, 2021), the working participants in the present study were classed as entrepreneurs if they reported self-employment as their primary activity.

2.2.4. Attentional control scale

This is a scale with 10 items with 5 Likert-type response alternatives. The aim of the scale is to detect participants who respond carelessly to the questionnaires. The items are obvious in nature, for example "In this question, select option 4". If participants are paying attention, they should answer all of the items in this scale correctly, errors mean a lack of attention. We eliminated participants who answered two or more items in this scale incorrectly. The items in this scale were interspersed randomly among the items of the different measuring instruments we

used.

2.3. Procedure

We used a snowball procedure to obtain the sample. Initially, we contacted potential participants who met the inclusion criteria (18 years old or above, actively working). We asked them to respond to the questionnaire online, and to provide email contact details of other potential participants. We contacted those new potential participants and asked them to do the same. We also contacted various anonymous organizations to identify entrepreneurs. The participants received no compensation for taking part and the questionnaire items were randomized together with the attentional control scale items. Data collection lasted 2 months (March and April 2020). The anonymity of each participant was carefully maintained, subject to professional confidentiality and strict compliance with data protection laws (Organic Law 3/2018, 5 December, on Protection of Personal Data and Assurance of Digital Rights).

2.4. Data analysis

Firstly, we used the *t*-test to compare the mean scores between entrepreneurs and non-entrepreneurs in both OPERAS, measuring the general personality traits, and the BEPE, measuring the eight specific traits of enterprising personality. Given that we performed 13 comparisons on the same groups, we corrected for Type I error using Bonferroni's correction, through which, using a bilateral hypothesis approach, the value above which differences are considered statistically significant is $p < .002$ (0.025/13). We used Cohen's *d* as an estimator of effect size, with values between 0.2 and 0.4 indicating a small effect, between 0.4 and 0.7 indicating a medium effect, and greater than 0.7 indicating a large effect size (Cohen, 1988).

We carried out a binary logistic regression for both the general OPERAS traits and the eight specific BEPE traits to examine the predictive capacity of the two instruments for enterprising behaviour. We estimated predictive capacity via Nagelkerke's R^2.

We produced a Pearson correlations matrix between the eight dimensions of the BEPE and the Big Five personality factors, together with the canonical correlation between the two sets of variables. In addition, to estimate the common variance between the two groups of variables we calculated the redundancy coefficient.

Lastly, we produced *Receiver Operating Characteristic curves* (ROC) to examine the instruments' ability to discriminate between entrepreneurs and non-entrepreneurs. This discriminatory ability was evaluated via the area under the curves (AUC).

We used SPSS24 software (IBM Corp, 2016) to perform the statistical analysis.

3. Results

Table 1 shows the different mean scores in the general and specific traits between entrepreneurs and non-entrepreneurs. We only found statistically significant differences in the general traits Emotional Stability and Extraversion, albeit with small effect sizes. There were statistically significant differences between entrepreneurs and non-entrepreneurs in all of the specific traits, with entrepreneurs scoring higher. The differences were most notable in Autonomy, Risk-taking, and Innovativeness, with large effect sizes.

Binary logistic regression showed that the general traits explained 7% of the variance in the variable being an entrepreneur ($R^2 = 0.065$), whereas the eight specific traits in the BEPE explained 21% ($R^2 = 0.207$).

Table 2 shows the Pearson correlations between the eight specific dimensions of the BEPE and the OPERAS subscales. The highest correlations were found between Emotional stability and Stress tolerance ($r = 0.676$), Emotional Stability and Optimism ($r = 0.649$), and

Table 1
Mean scores in general and specific personality traits for entrepreneurs and non-entrepreneurs.

	M entrepreneurs (SD)	M non-entrepreneurs (SD)	t (p)	d
Big Five				
Emotional stability	27.30 (4.70)	25.61 (5.03)	5.51 (<0.001)	0.34
Conscientiousness	27.90 (4.09)	27.52 (4.25)	1.45 (0.147)	0.09
Agreeableness	27.74 (3.61)	27.17 (3.62)	2.54 (0.011)	0.16
Openness to experience	29.18 (4.22)	28.81 (4.14)	1.42 (0.156)	0.09
Extraversion	25.07 (5.02)	23.11 (5.05)	6.21 (<0.001)	0.39
Specific traits				
Self-efficacy	43.00 (5.37)	39.98 (5.49)	8.83 (<0.001)	0.55
Autonomy	43.58 (4.94)	39.95 (5.28)	11.22 (<0.001)	0.70
Innovativeness	45.34 (4.55)	42.11 (5.21)	10.79 (<0.001)	0.65
Internal locus of control	43.61 (5.33)	42.22 (5.18)	4.24 (<0.001)	0.27
Achievement motivation	44.81 (4.65)	42.55 (5.28)	7.41 (<0.001)	0.45
Optimism	43.00 (5.84)	39.81 (6.80)	8.25 (<0.001)	0.49
Stress tolerance	36.71 (6.62)	33.77 (6.49)	7.20 (<0.001)	0.45
Risk-taking	43.72 (5.45)	39.45 (6.04)	11.66 (<0.001)	0.73

Note. *M* = mean; *SD* = standard deviation; *p* = *p* value; *d* = effect size.

Conscientiousness and Achievement motivation ($r = 0.551$). The canonical correlation between the eight dimensions of the BEPE and the Big Five factors was 0.770. The redundancy coefficient (% of explained variance) for the first set of variables was 26.2%.

We calculated the ROC curves for the BEPE and OPERAS instruments, with being an entrepreneur or not as the criterion. The AUC is given in Table 3. It shows that the AUCs for the different specific traits measured by the BEPE are close to 0.70, and are almost all higher than any of the general traits measured by OPERAS. The exception is Internal locus of control, which has an AUC that is slightly lower than the AUCs for Extraversion and Emotional Stability.

4. Discussion

The identification of personal characteristics that encourage enterprising activity is important both for the modern economy (Global Entrepreneurship Monitor [GEM], 2020; OECD, 2019) and for the possible social and psychological consequences (Chell, 2008; Kuckertz et al., 2020; Zhao et al., 2010). The objective of our study was to determine the best way to evaluate enterprising personality, via general Big Five type traits, or via more specific traits. Firstly, we examined the differences in personality traits between entrepreneurs (people who had started businesses in the past and continued with them into the present; Rauch & Frese, 2007b) and non-entrepreneurs (people who were employed by someone other than themselves). With regard to the Big Five model of personality traits (Costa & McCrae, 1992), entrepreneurs had higher scores than non-entrepreneurs only in Emotional Stability and Extraversion, albeit with small differences. In contrast, when we looked at the differences in the specific personality traits, the results were more consistent. One aspect that needs to be mentioned is that the correlations of the BEPE variables with the Big Five model were higher than expected (e.g., between Conscientiousness and Risk-taking and Innovativeness). Using a sample with a large number of entrepreneurs in

Table 2

Correlations between the eight specific dimensions of entrepreneurial personality (BEPE) and the Big Five personality factors (OPERAS).

OPERAS					
BEPE	Openness	Extraversion	Agreeableness	Emotional stability	Conscientiousness
Self-efficacy	0.157	0.386	0.233	0.521	0.437
Autonomy	0.137	0.234	0.090	0.281	0.269
Innovativeness	0.264	0.351	0.284	0.348	0.314
Internal locus of control	0.039	0.217	0.195	0.225	0.332
Achievement motivation	0.150	0.295	0.219	0.375	0.551
Optimism	0.097	0.352	0.345	0.649	0.286
Stress tolerance	0.090	0.289	0.330	0.676	0.322
Risk-taking	0.167	0.370	0.172	0.393	0.326

Note. BEPE = Battery for the Assessment of the Enterprising Personality; OPERAS = Overall Personality Assessment Scale.

Table 3

The area under the curve (AUC) of the eight specific traits of entrepreneurial personality (BEPE) and the Big Five personality factors (OPERAS).

Broad traits (Big Five)		Specific traits	
Emotional stability	0.598	Self-efficacy	0.658
Conscientiousness	0.522	Autonomy	0.697
Agreeableness	0.548	Innovativeness	0.687
Openness to experience	0.530	Internal locus of control	0.587
		Achievement motivation	0.629
		Optimism	0.643
Extraversion	0.619	Stress tolerance	0.625
		Risk-taking	0.708
		Enterprising personality (global score)	0.693

the validation of the BEPE (Cuesta et al., 2018) may be a variable that influenced these results.

In terms of the specific personality traits, we found differences between entrepreneurs and non-entrepreneurs in Self-efficacy, Achievement motivation, Optimism, and Stress tolerance had medium effect sizes, and the differences for Internal locus of control were small. The traits which exhibited more notable differences were Innovativeness, Autonomy, and Risk-taking, with large effect sizes. It is not by chance that Risk-taking was the most controversial when it came to adding it to the five broad traits (Paunonen & Ashton, 2001; Zhao et al., 2010). It is also the trait which has demonstrated the strongest associations with the act of starting a business (Postigo et al., 2021b; Stewart & Roth, 2001). The broad traits of the Big Five model explained less variance of being an entrepreneur or not, compared to the eight specific traits in the BEPE.

These differences were confirmed by the ROC curves, where all of the specific traits, with the exception of Internal locus of control, were better than the general traits in predicting enterprising behaviour. In fact, Conscientiousness, Agreeableness, and Openness *discriminated* between enterprising behaviour and non-enterprising behaviour only slightly better than random chance. These results confirm that the BEPE instrument of specific traits of enterprising personality is satisfactorily able to discriminate between subjects who start businesses and those who opt to work for someone else, whereas the OPERAS instrument (Big Five) has lower discriminatory power. Our results are in line with those from Leutner et al. (2014), who found that specific personality traits improved on the predictive validity of the general Big Five model. The most plausible explanation for these results is that enterprising activity comprises various specific behaviours that the general Big-Five type personality traits have more difficulty in capturing than the specific personality traits (Rauch & Frese, 2007a, 2007b). These and other similar results have led to research into the different specific facets that make up the general traits (Serrano et al., 2020; Soto & John, 2017; Zhao et al., 2010). These results suggest that the BEPE is evaluating certain dimensions that the Big Five model does not cover, such as ambition (Jones et al., 2017). The construct of ambition shares many aspects with grit (Jones et al., 2017), which is closely related to the BEPE for predicting enterprising activity (Postigo et al., 2021a). In fact, some of the

BEPE dimensions, particularly *Achievement motivation*, include clear common aspects with ambition, a key factor in the prediction of success (Judge & Kammeyer-Mueller, 2012).

4.1. Limitations and future research

Our results must be interpreted in the light of certain limitations. In the first place, the complexity of entrepreneurship means having to consider moderating variables that our study did not address, such as contextual and attitudinal aspects, or business characteristics (e.g. Gilberto et al., 2020). A further limitation is that the results cannot be automatically extrapolated to other countries and cultures. It would also be useful for future studies to have more precise measures of *working status*, in an attempt to have additional indicators for the definition of entrepreneurs. For example, future studies should consider and differentiate between different types of entrepreneurs, as someone who starts a business because they want to is not the same as someone who does so out of necessity, or someone who continues a family business (Global Entrepreneurship Monitor [GEM], 2020; Henrekson & Sanandaji, 2014). Another limitation is that OPERAS (used to assess the Big Five) uses fewer items to assess the five general traits, which means that we cannot firmly conclude that the BEPE is clearly superior to the Big Five model for predicting entrepreneurship. In this regard, future studies should use more comprehensive measures for the Big Five such as NEO-PI-R or HEXACO-PI (Costa & McCrae, 1992; Lee & Ashton, 2004). Finally, it is important to note that all of the data about the enterprising personality was collected via self-reports. It would be advisable for future research to use other complementary methods.

5. Conclusions

Our results lead us to draw some general conclusions. In the general traits, entrepreneurs were more extrovert and emotionally stable than non-entrepreneurs, although not to a great extent. In the specific traits, entrepreneurs scored significantly higher in the eight specific traits measured by the BEPE, particularly demonstrating greater capacity to assume risks, along with greater autonomy and innovation. Lastly, and most importantly, the specific traits were better at predicting and discerning enterprising activity than the general traits, providing a clearer, more accurate and more complete picture of the behaviours that lead to enterprising activity.

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Declaration of competing interest

The authors declare that there are no conflicts of interest.

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