

A gender-based approach to the influence of personality traits on entrepreneurial intention

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The “Big Five” Personality Traits and Entrepreneurial Intention: A Gender Based Configuration Approach

Abstract

While previous studies demonstrate the importance of personality traits in the decision to pursue entrepreneurship, more empirical evidence is needed to explain the mechanism through which entrepreneurial intention is strengthened. Accordingly, through a gender-based perspective, the current paper identifies characteristics that positively affect EI in a sample of 531 students in France. A fuzzy-set qualitative comparative analysis is performed from which two distinct combinations arise that are likely to lead to high EI in males and females respectively. In addition, a negation analysis is undertaken which, likewise, yielded different trait combinations for males and females. The inherent findings advance previous studies by offering educators and policymakers a new understanding of entrepreneurial intention from a gender point of view. By the same token, the results offer first-hand evidence to inform university students’ career choices.

Key words: *Gender; Entrepreneurial Intentions; Career Choice; Big Five Personality Traits; Fuzzy-set.*

1. Introduction

There is a time-honored awareness of the utility of entrepreneurship as a catalyst for development in vital social, economic and environmental frontiers. From the outset, Smith (1776) noted the protagonist role of entrepreneurs as enhancers of living standards, while Schumpeter (1934) asserted that entrepreneurs stimulate economic development through the introduction of new products and processes that displace old ones. More recently, Gennaioli et al. (2013), Amoroso & Link (2018), and Stuetzer et al. (2018) have stressed the function of human capital invested in entrepreneurship as a catalyst for economic and regional growth. On the whole, the creation of social value represents the delivery of ‘societal enhancements’ through wealth, knowledge and opportunity creation (Hitt et al., 2011:60). Thus, to expand entrepreneurs’ capacity to meet social expectation, there is a current need to optimise empirical understanding of their [entrepreneurs’] personal characteristics.

Following from the above, gathering and examining evidence from France is both urgent and imperative. Even though France experienced a 12.59% year-on-year average growth in total early-stage entrepreneurial activity between 2001 to 2017 (World Bank, 2020), it is still one of the lowest in this dimension among OECD countries; lagging behind the United States and other developed nations (Estay, 2004; Paul et al., 2017). Partly, this is explained by France’s highly centralised innovation system which is public rather than private sector driven (Okamuro et al., 2019). Equally, Kickert (2005) and Barzelay & Gallego (2010) attest to France’s ‘policy innovation’ being consistent with wider European public policies that inadvertently reinforce public management while attempting to stimulate entrepreneurship. There is also evidence that French universities and civic bodies have not promoted entrepreneurship with the same intensity as counterpart nations (Fayolle, 2000; Carayannis et al., 2003). It has also been mentioned that a greater proportion of French students indicate a desire to gain employment in large organisations rather than create their own ventures (Klapper & Léger-Jarniou, 2006).

Following from the above, in the entrepreneurship field, there is a long-held assumption that entrepreneurial intention is predicted by individuals' unique personalities. *Ab initio*, this postulation was advanced by the findings of researchers in psychology (Caliendo et al., 2014). For example, resulting from psychometric analysis, Holland (1997) demonstrated that personality is a fundamental determinant of occupational choice. Equally, Zhao & Seibert (2006) showed that a distinction in the personality structures of entrepreneurs and managers explains people's pursuit of self versus paid employment. Consequently, scholars have routinely explained the mechanism by which personality traits drive entrepreneurial intention through the big five construct (Zhao & Seibert, 2006; Zhao et al., 2010; Caliendo et al., 2014; Espiritu-Olmos & Sastre-Castillo, 2015).

However, notwithstanding the validity of the big five in explaining personality traits disposed to entrepreneurship and vice-versa, the robustness of the construct is limited by more complex personality profiles. To explain, Chollet et al. (2016) assert that the big five model (which comprises openness, conscientiousness, extraversion, agreeableness, and emotional stability) does not harness trait interdependency. Other cited limitations of the big five constructs include not capturing all personality traits (John & Srivastava, 1999), the independence of the inherent dimensions (Eysenck, 1992; Block, 1995; Digman, 1997), a weak theoretical underpinning (McAdams, 1992; Loevinger, 1994) and a rather static account of personality (Terracciano et al., 2006). Therefore, when predicated on the big five construct, extant entrepreneurship studies are prone to inconclusive findings owing to the complex nature of the personality-entrepreneurial behavior nexus (Elanain, 2008; Ong & Ismail, 2008). Yet, by the same token, these limitations offer opportunities for methodological redress.

Increasingly, scholars have called for the investigation of personality traits using a configurational approach (Woodside, 2017; Kraus et al., 2018; Khedhaouria & Cucchi, 2019). Recognising that entrepreneurial actors have heterogeneous motives, symmetric analyses

potentially fail to capture such heterogeneity within samples and general populations. On the other hand, the value of a configuration or asymmetric technique like fuzzy-set qualitative comparative analysis (fsQCA) is the exploration of data relationships at the case-level to clarify complex and interacting attributes that shape human intention and behavior (Douglas et al., 2020). Krueger (2001) also suggested that the application of fuzzy-set techniques to observe causal relationships can reveal the building blocks of fundamental entrepreneurial processes. Indeed, as a set-theoretic method, fsQCA affords the capturing of complexity entrenched in combinations of attributes (Fiss, 2011). Effectively, it differs from conventional (variable based) approaches by evading the need for regression (Woodside, 2013).

Against this backdrop, the application of fsQCA as a methodological approach in the current study will advance the entrepreneurship literature by shedding new light on causal relationships between the big five personality traits and entrepreneurial intention (EI). Using fsQCA, the interdependencies of openness, conscientiousness, extraversion, agreeableness, and emotional stability and how they increase or reduce entrepreneurial intention can be captured. To be sure, this technique has already been applied in a study by Şahin et al. (2019) in which they demonstrated the attainment of entrepreneurial intention through alternate combinations of the big five dimensions. However, to go further, the current study contends that there are possible gender differences and, on this basis, distinguishes between males and females when exploring the complex relationship between the big 5 traits and entrepreneurial intention. In this regard, previous findings have demonstrated distinctions between men and women in the personality trait - entrepreneurial behavior nexus and solicited more evidence capturing the gender influence (Antoncic et al., 2015; Murugesan & Jayavelu 2017; López-Núñez et al., 2020). In particular, López-Núñez et al., (2020: 4) state “*more research is needed to better understand the relationships amongst sex, traits and entrepreneurial intention to work on specific programmes that reduce this gender gap and increase levels of female*

entrepreneurship". Therefore, the findings from this investigation will offer new theoretical and practical insights on the complex personality profiles of both males and females vis-à-vis entrepreneurship. Capturing the complexity underlying the interactions across the big five elements when shaping entrepreneurial behavior while accounting for gender disparities will help reconcile inconclusive findings in the link between personality traits and entrepreneurial intention.

In the next section, the study proceeds with a theoretical review of the role of personality traits on entrepreneurial intention and rationalises the need for a configurational approach. Subsequently, Sections 3 and 4 explain the data collection protocol and examine the results respectively. Finally, section 5 presents a discussion of the findings, limitations, and perspectives for further research.

2. Literature Review

2.1 EI and Personality Traits: The Big Five lens

Although the role of entrepreneurs' psychological characteristics in the entrepreneurial process has gained scholars' interest (Zhao et al., 2010; Karimi et al., 2015), there is still significant scope for empirical clarity on the holistic nature and interplay of these characteristics (Mitchell et al., 2002; Antoncic et al., 2015; Obschonka & Stuetzer, 2017). While appraising the literature, there is ample evidence of personality characteristics associated with entrepreneurship. For example, the five-factor personality model (Zhao & Seibert, 2006) also known as the *Big Five* (Caliendo et al., 2014; Espíritu-Olmos & Sastre-Castillo, 2015) is frequently cited as an important aspect of character conditioning individuals' pursuit of entrepreneurship (Yeh et al., 2020). Considered a foremost reflection on personality (Kluemper et al., 2015), the Big Five theory covers five key dimensions: emotional stability, extraversion, agreeableness or kindness, openness to experience and conscientiousness. These dimensions are often used to explain human behavior such as engagement with social media (Marshall et

al., 2015), group status hierarchies (Bendersky & Shah, 2013), job performance (Barrick & Mount, 1991) and market knowledge (Chollet et al., 2016). For the understanding of entrepreneurship behavior, Zhao & Seibert's (2006) meta-analysis demonstrates significant differences between entrepreneurs and managers in the Big Five personality dimensions. For instance, entrepreneurs tend to score higher in conscientiousness and openness to experience but lower in neuroticism and agreeableness in comparison to managers. Predicated on this, several empirical studies (e.g. Leutner et al., 2014; Espiritu-Olmos & Sastre-Castillo, 2015; Murugesan & Jayavelu, 2017) have since investigated the relationship between these personality traits and entrepreneurial perception and intention. The next section expands on the findings of extant studies on the Big Five dimensions in entrepreneurship.

Neuroticism/Emotional Stability

Neuroticism represents individual differences in adjustment and emotional stability ranging from calm, relaxed individuals to those with a tendency for anxiety (Zhao & Seibert, 2006; Espiritu-Olmos & Sastre-Castillo, 2015). Highly neurotic individuals tend to experience negative emotions including anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability (Costa & McCrae, 1992; Zhao & Seibert, 2006), while low neurotic individuals are emotionally stable and characterized as self-confident, calm, even-tempered, relaxed, and are able to tolerate stressful situations (e.g. Caliendo et al., 2014; Van Ness & Seifert, 2016). Zhao & Seibert (2006) assert that entrepreneurial careers are fraught with psychological stress due to working in typically unstructured environments, offering longer hours and often lacking a separation between work and personal life in comparison to managers. Also, entrepreneurs have primary responsibility for all aspects of their venture to the extent that job security is less assured than managers who can rely on the going concern of their established enterprise. Consequently, entrepreneurs tend to develop superior levels of self-confidence and

demonstrate a strong belief in their ability to control environmental outcomes as well as higher levels of resilience in the face of stress (Crant, 1996; Chen et al., 1998). Therefore, it can be argued that entrepreneurs are likely to exhibit higher levels of emotional stability and lower levels of neuroticism.

Extraversion/Introversion

The second dimension of the Big Five describes the extent to which individuals are assertive, dominant, ambitious, energetic, and aspire to leadership roles. It also describes the extent to which people are active, talkative and enthusiastic (Costa & McCrae, 1992; Zhao & Seibert, 2006). Extraverted individuals tend to be sociable and positive, thus enabling them to develop social networks easier (Caliendo et al., 2014; Espiritu-Olmos & Sastre-Castillo, 2015). Highly Extravert people tend to be cheerful, admire people and large groups, and seek excitement and stimulation; while low extravert people are introverted; preferring to spend more time alone and are characterised as reserved, quiet, and independent (Zhao & Seibert, 2006). Intrinsically, an entrepreneurial career requires specific personality traits that enable direct interaction with diverse constituents including venture capitalists, partners, employees, and customers (Zhao & Seibert, 2006). Thus, Antoncic et al. (2015) affirm that individuals with a low extraversion score are unlikely to become entrepreneurs. This is because entrepreneurs must constantly build and maintain a network of suppliers, customers, employees, and other stakeholders. Hence, one can argue that extraversion is a key trait for entrepreneurs.

Agreeableness

Agreeableness is also known as friendliness and kindness. It describes a forgiving and trusting nature demonstrated by altruism and flexibility (Caliendo et al., 2014). Espiritu-Olmos & Sastre-Castillo (2015) define kindness as the tendency to be cooperative, attentive, friendly, well-meaning and modest. The aforementioned traits could be crucial when building external business networks as individuals high on agreeableness are perceived as trusting, forgiving and

caring in comparison to those with low agreeableness thought to be manipulative, self-centered, suspicious and ruthless (Costa & McCrae, 1992; Zhao & Seibert, 2006). In effect, Antoncic et al. (2015) found that sympathetic, warm, kind and cooperative individuals are less likely to become entrepreneurs. Practically, entrepreneurs are characteristically less agreeable due to slimmer margins for error and show a strong bias to get the job done over winning consensus. Furthermore, Antoncic et al. (2015) add that agreeable individuals are not inspired to leave their existing environment to found new ventures owing to a high ability to adjust to the norms, policies, systems, and culture of the status quo. On this premise, agreeableness can be seen as a deterrent to entrepreneurship.

Openness to Experience/Imagination

Openness to experience, also known imagination, is described as individuals' intellectual curiosity and the tendency to seek new experiences and explore novel ideas (Zhao & Seibert, 2006). An openness to experience, generally manifested in innovation, change, creativity and a strong desire to explore new or novel ideas is at the core of recent definitions of entrepreneurship (Shane & Venkataraman, 2000; Zhao & Seibert, 2006). Moreover, openness to experience is an important psychological factor and predictor of EI as creative, imaginative, philosophical, intellectual, complex and deep-thinking individuals demonstrate a greater entrepreneurial propensity (Caliendo et al., 2014; Antoncic et al., 2015). Hence, openness to experience can increase the prospect of entrepreneurship.

Conscientiousness

Conscientiousness indicates volition or the ability to work hard. It also indicates individuals' degree of organization, persistence, and motivation in the pursuit of goal accomplishment (Zhao & Seibert, 2006). Scholars assert that there are facets of conscientiousness as Zhao & Seibert (2006) specify two dimensions of *achievement motivation* and *dependability*. Equally, Van Ness & Seifert (2016) affirm that conscientiousness

encompasses two components: the need for achievement and being hard-working. The *need for achievement* underscores individuals' motivation to seek optimal solutions to improve the current environment (Caliendo et al., 2014). It also underlies people's tendency to persevere with certain activities in the face of opposition (Espíritu- Olmos & Sastre-Castillo, 2015). Being dutiful or a hard worker reflects the extent to which an individual is organized, deliberate and methodical, and can be relied on to fulfil own duties and bear responsibilities (Zhao & Seibert, 2006). As it pertains to entrepreneurship, Zhao & Seibert (2006) argue that conscientiousness is more important for entrepreneurs who operate in self-directed environments than for managers in established organisations with structured responsibilities, goals and monitoring systems. Ferreira et al. (2012) show that individuals with a greater *need for achievement* are more likely to demonstrate higher EI due to a preference for situations in which performance is rewarded by own efforts rather than extrinsic factors. However, contrastingly, Antoncic et al. (2015) find a non-significant relationship between conscientiousness and EI. A possible explanation of this finding is the distinction between entrepreneurial and administrative-managerial behavior; where planning and organising routines may be more important for administrators and managers than entrepreneurs. Hence, despite contrasting findings, it could still be argued that conscientiousness is likely to foster entrepreneurial behavior.

2.2. EI and Personality Traits: A configuration Approach

Based on the preceding dialogue, it is deduced that an entrepreneurial personality comprises of higher levels of extraversion, conscientiousness and openness, and to lower levels of agreeableness and neuroticism (Obschonka et al., 2014). However, notwithstanding the insights from prior studies, the vast majority have considered the influence of each Big Five trait in isolation often through regression-based (net effect) techniques without assessing the interplay of the behaviors. This is empirically problematic as the intention to perform a given behavior

is complex and likely to be influenced by other psychological factors (Krueger & Kickul, 2006). Besides, in the decision-making process, it is normal for individuals to be simultaneously influenced by a diversity of psyches (Stroe et al., 2018). It is the combined influence of psychological factors that generate intention and not the unique influence of isolated elements (Nowiński & Haddoud, 2019). Therefore, as Stroe et al. (2018) argue that net effect approaches may not be optimal for studying decision-making behavior, Mezei & Nikou (2018) also express the limitations of such approaches in investigating entrepreneurial intention on the premise that configuration-based and explanation-oriented approaches would better interrogate and advance the literature. Likewise, in a systematic review, Kraus et al. (2018) stress the usefulness of a fuzzy-set approach in measuring entrepreneurial intention to reveal the combined influence of personal attributes that generate entrepreneurial intention. It is anticipated that a configuration approach will also address inconsistent findings that are common in the empirical entrepreneurship literature (Stroe et al., 2018; Haddoud et al., 2021).

By and large, there is a surge in the volume of fuzzy-set analysis in empirical entrepreneurship studies. Based on an empirical study conducted in different universities in 10 European countries, Rippa et al. (2020) confirm that entrepreneurial intention and propensity do not depend only on a single driver but on the interplay of multiple factors, such as entrepreneurship education intention, university atmosphere, locus of control, attitudes toward entrepreneurship, and entrepreneur's family background. Likewise, using a Turkish sample, Şahin et al. (2019) determined distinct combinations of personality traits in students' entrepreneurial intention involving openness to experience, conscientiousness, and the absence of extraversion alongside other factors. They [Şahin et al. (2019)] also confirmed that higher levels of EI warrant the analysis of complex patterns of the big five personality traits.

In summary, based on the aforementioned evidence in relation to (1) the influence of each big five traits on entrepreneurial intentions, and (2) the complex associations underlying the personality traits-EI nexus, a first proposition is raised:

P1. Discrete combinations of at least two of the following traits, low neuroticism, high extraversion, low agreeableness, high openness to experience and high conscientiousness, are associated with high entrepreneurial intention.

2.3 Gender Differences in the Big Five Personality Traits

Extant literature has devoted substantial attention to the Big Five personality traits in the analysis of gender differences and behavioral performance. Indeed, there is evidence of significant differences between males and females. For instance, Schmitt (2007) found that women exude lower levels of emotional stability and self-efficacy, and the connection between these two traits also appears to be more essential for women than men. Likewise, in a complementary comparative and multi-country study, Schmitt et al. (2008) gathered that women express higher levels of neuroticism, extraversion, agreeableness, and conscientiousness compared to men in most countries. To corroborate, Weisberg et al. (2011) found that women score higher in neuroticism, agreeableness, and extraversion, while Cobb-Clark & Schurer (2011) and Marsh et al. (2013) assert that women score higher than men in all traits but openness to experience. In other studies, Vecchione et al. (2012) contended that females score significantly higher in agreeableness, conscientiousness, and openness while males score higher in emotional stability. Obschonka et al. (2014) reached a similar conclusion in their study as female respondents reported higher scores in neuroticism and agreeableness and lower scores in openness to experience compared to their male counterparts. This argument is challenged by Caliendo et al. (2015) who reported that women scored higher in openness to experience and extraversion than men. Furthermore, Chiorri et al. (2016) confirmed that women

score higher in neuroticism, agreeableness, extraversion, and conscientiousness while Ock et al. (2019) argued that males are more conscientious and extraverted, and less neurotic than females. More recently, in their examination of network compositions, Powazny & Kauffeld (2021) found that low agreeableness and low extraversion were significant predictors of the formation of ties by females, whereas high conscientiousness was a significant predictor of the same for males. In one more study, Shchebetenko et al. (2019) found that women scored much higher in negative emotionality and moderately higher in agreeableness, whereas men scored slightly higher in extraversion.

Taking stock of the above findings, several patterns seem to emerge to the extent that gender differences in personality traits can be explained from a variety of biological and sociocultural perspectives (Schmitt et al., 2008). First, females are often found to be more neurotic than and more expressive of emotions than males. From a psychological perspective, this could be due to a lower ability to manage manifestations of fear, sadness, discomfort and anger (Else-Quest et al., 2006). Else-Quest et al. (2006) also state that females are lower in positive affect, which increases vulnerability to depression. In the same vein, Weisberg et al. (2011) attribute the high level of neuroticism among females to the higher levels of anxiety, depression, self-consciousness and vulnerability. Moreover, Costa et al. (2001) confirm that females tend to be higher in negative affect, and more concerned with feelings than ideas. Soto et al. (2011) argue that high neuroticism, anxiety and depression among females is the result of the significant social and psychological difficulties faced during adolescence, including their awareness of negative gender expectations, stereotypes, body image concerns, and negative self-perceptions.

Furthermore, it is also shown that females score higher in agreeableness and conscientiousness. For the former, Weisberg et al. (2011) explain that females tend to develop more agreeable traits than males because of their higher compassion, politeness and enthusiasm which reflects sociability and positive emotionality to the extent that they are more trusting and compliant than men. Vecchione et al. (2012) also suggest that females develop a tendency for agreeableness because of high positive interpersonal ability, empathy and friendliness (Vecchione et al., 2012). Alternatively, from a cultural perspective, the masculine gender is inversely related to agreeableness as this trait reflects cooperativeness, nurturance and tender-mindedness, whereas masculinity is associated with high power, competition, restrictive emotionality and restrictive affectionate behavior (Tokar et al., 2000). Regarding conscientiousness, Tokar et al. (2000) assert that high conscientiousness among males would restrict their success and incur more conflict and stress. Females were also found to score higher than males in conscientiousness which is linked to effortful control and suggests attention focusing, purposeful shifting, perceptual sensitivity, persistence, inhibitory control and achievement motivation (Else-Quest et al., 2006). As for openness to experience, there is mixed evidence although several studies report that males score higher in this dimension (Marsh et al., 2013; Obschonka et al., 2014). Weisberg et al. (2011) provide evidence that while females scored higher than males in openness to experience in the areas of aesthetics and feelings, males have more confidence in their intellectual ability. For entrepreneurship, one could argue that the latter (intellect) is more relevant.

This discourse can be summarised in two sense. First, to develop entrepreneurial intentions, females need a configuration of traits encompassing higher levels of openness to experience and lower levels of agreeableness and neuroticism to compensate for a shortage of such traits since the literature suggest that high openness, low agreeableness and low neuroticism are key predictors for entrepreneurial behavior. Second, it is presumed that males'

entrepreneurial traits will involve combinations of higher levels of extraversion and conscientiousness as these two were found to be drivers of entrepreneurship. Hence, the following propositions are contemplated:

P2. Female combinations associated with high entrepreneurial intention are more likely to involve high openness to experience, low agreeableness and low neuroticism, alongside other traits.

P3. Male combinations associated with high entrepreneurial intention are more likely to involve high extraversion and high conscientiousness, alongside other traits.

3. Data and Methodology

3.1 Sample and data collection

This study investigates the complex relationship between personality traits and EI among students. Student samples are particularly suitable for examining EI since they [students] face an immediate career choice (Krueger et al., 2000; Fitzsimmons & Douglas, 2011). They are also a major force and talent pool for entrepreneurship (Uslay et al., 2002). The current investigation observed business students in one business school in the south of France following previous studies (e.g. Jonson et al., 2015; Pfeifer et al., 2016) using an online survey translated from English to French. The translation was rigorously checked by the research team for consistency, and a pre-test was conducted with 20 students to ensure clarity of the questions and their appropriateness to address the research objectives. This afforded the opportunity to develop and distribute a clearer and well-structured questionnaire (Aydiner et al., 2019). A link inviting students to complete the online survey was e-mailed to students and they were assured of confidentiality. They were also informed of the strictly scientific purpose of the study and that participation was both voluntary and anonymous. Data collection was undertaken in September 2017 at the start of the academic year.

In terms of sampling, the study adopted a non-probability sampling technique. It is widely agreed that this method allows researchers to ensure the appropriateness of participants (Carland et al., 2001) and yield quality data when sufficient respondents are obtained (Coviello & Jones, 2004). Therefore, in this study, mitigating action was taken to achieve a sample size of 531 students which sufficiently compensates for the generalisability limitation (Haddoud et al., 2020). The sample was composed of both undergraduate (48.4%) and postgraduate (51.6%) students. In terms of gender, the sample included 285 females (53.7%) and 246 males (46.3%). This corresponds to the gender distribution in university education in France (OECD indicators, 2018) and similar studies such as Peterson & Merunka (2014). The age of students varied between 18 and 27 with the majority (39%) being between 21 and 22 years. Pertaining relevant tuition, 161 students (30.32%) had been exposed to entrepreneurship education courses during their enrolment.

3.2 Measurement scale

To avert measurement errors, all scales were adopted from previous studies. Respondents were asked to rate their agreement or disagreement to a set of statements using a 5-point Likert scale ranging from 1 ‘strongly disagree’ to 5 ‘strongly agree’. The outcome variable, *EI*, was measured using the scale developed and validated by Liñán & Chen (2009). It has been extensively used in previous studies (e.g. Karimi et al., 2015; Karimi et al., 2016; Miralles et al., 2016) with the aid of six items ($\alpha = 0.96$) including “my professional goal is to become an entrepreneur”. The independent variables were personality traits, measured using the brief Big Five personality scale (Donnellan et al., 2006) that is routinely adopted in the psychology and management fields (e.g., Methot et al., 2016; Kim et al., 2017). Four items were utilised for each psychological dimension including several reversed statements as shown in appendix 1: *extraversion* (e.g., “am the life of the party”), *agreeableness* (e.g., “sympathise with others’ feelings”), *conscientiousness* (e.g., “get chores done right away”), *neuroticism* (e.g., “have

frequent mood swings”), and *openness to experience* (e.g., “have a vivid imagination”). Additionally, to check for measurement bias, a post-hoc Harman’s one-factor test was employed (Lings et al., 2014). The single factor accounted for 20.67% of the total variance, suggesting no major risk of common method bias.

4. Results

4.1 Scales' Reliability and Validity

Prior to conducting fsQCA analysis, it is necessary to assess measurement quality through constructs’ reliability and validity. In this study, a structural equation modelling protocol is applied using the WarpPLS 6.0 software (Kock, 2017). Table 1 depicts the scores for Composite Reliability (CR), Cronbach’s Alpha (α) and Average Extracted Variance (AVE). While some scores are slightly below the threshold, the overall levels are acceptable and confirm no major reliability and convergent validity issues. Furthermore, the square roots of AVE were also assessed and have shown good discriminant validity. Nonetheless, the neuroticism item in the construct had to be dropped due to its low factor loading.

Table 1

4.2 Configurational Analysis (fsQCA)

Developed by Ragin (2000), fsQCA is a technique based on a Boolean algebra system that captures the set of conditions [usually in combinations] sufficient to predict an outcome (Fiss et al., 2013; Ordanini et al., 2014). This process involves the inclusion of contrarian cases that deviate from a general trend in a data set (Woodside, 2014), and, by so doing, the technique minimises issues of unobserved heterogeneity (Schneider & Wagemann, 2010). The software used here was fsQCA.3.0 (Ragin & Davey, 2016).

The first step in fsQCA analysis is the so-called ‘calibration’ where all variables in the study are “fuzzified”. In other words, this means the conversion of Likert scales into fuzzy scores. To do this, three qualitative thresholds representing fuzzy-set scores are represented through the identification of three corresponding values in the data (Ragin, 2009). The three set thresholds are (1) for full membership, (0.5) for cross over point and (0) for full non-membership (Ragin, 2009). In this study, scores 1 (strongly disagree), 3 (neutral) and 5 (strongly agree) were selected to represent non-membership, cross over point and full membership respectively. Nevertheless, since Likert scales can potentially generate a large number of cross-over points (0.5), which will be excluded from the truth table, such values can be increased or decreased by 0.01 to fit in or out of the categories (Kent, 2015). Thus, in the current study, based on the scores’ distribution, which tended to be skewed toward higher values, the cross-over points were considered to be out and therefore assigned a value 0.49.

4.2.1 Necessity Analysis for High EI

The next step after calibration in fsQCA is the necessity analysis. This analysis identifies the conditions (variables) that are deemed necessary for the respondents to express high EI. However, these conditions may be necessary but not sufficient to exhibit the observed behavior (Kent, 2015). For a condition to be necessary, the behavior needs to exhibit a consistency score of at least 0.9 and a coverage exceeding 0.75 (Legewie, 2013). In this study, discrete analyses were undertaken for both genders to capture potential differences. Table 2 shown the results and, as can be seen, none of the big five traits is a necessary condition for high entrepreneurial intention in either group. This means that no single big five personality trait in the current study individually necessary for exhibiting high EI among females or males.

Table 2

4.2.2 Sufficiency Analysis for High EI

Table 3 presents the intermediate solution¹ with key combinations associated with high EI for both sub-groups. To generate these combinations, frequency and consistency thresholds need to be determined. The frequency threshold refers to the minimum case number combinations for inclusion worth investigating. In this study, the aim was to set a threshold of 15 cases, or the closest value to this, as per Ragin's (2008) suggestion to use higher thresholds for large samples. For the consistency threshold, a cut-off value of at least 0.85 was used. According to Ragin (2008), consistency scores should be at least 0.75 for the combination to be consistent.

In table 3, the solutions associated with high EI are presented, alongside measures for both consistency and coverage for each solution. Equivalent to the significant value in multivariate techniques, consistency reflects "*the degree to which the cases sharing a given combination of conditions . . . agree in displaying the outcome in question*". On the other hand, coverage captures "*the degree to which a cause or causal combination 'accounts for' instances of an outcome*" (Ragin, 2008:44). Coverage, which reflects the empirical importance of sufficient configurations (Ordanini et al., 2014), could be raw or unique. Raw coverage is a combination that could overlap with other combinations, while unique coverage is exclusive to a combination (Beynon et al., 2016). Overall solution coverage is also presented to indicate the extent to which outcomes can be determined by a set of configurations [similar to the R-squared value in multivariate methods] (Woodside, 2014). Additionally, the core versus complementary (peripheral) conditions are also highlighted. Core conditions exhibit a strong causal association with the outcome, whereas peripheral elements are those with a weaker association (Fiss, 2011).

¹ Three solutions are typically provided by fsQCA, namely: parsimonious, complex, and intermediate. Kent (2015) recommends interpreting the intermediate solution as it is a midpoint between the parsimonious and the complex solutions.

Core conditions are highlighted in bold. As per table 3, two configurations associated with high EI emerge for both sub-groups.

Starting with females, while both paths share high emotional stability (low neuroticism) and agreeableness, the first also involves high conscientiousness and low extraversion (as core), while the second adds high openness to experience, low conscientiousness (as core) and high extraversion. Both solutions have consistency scores of 0.83 and 0.87 and raw coverage of 0.39 and 0.35 respectively, which means the empirical relevance of both configurations are relatively similar. The overall solution coverage is 0.49, reflecting the proportion of entrepreneurial intention covered by the two solutions. As for males, two profiles also emerged showing high emotional stability (low neuroticism), agreeableness and conscientiousness (as core). Yet, the first adds extraversion, while the second includes high openness to experience instead. Both solutions have consistency scores of 0.89 and raw coverage of 0.56 and 0.59 respectively, reflecting a relatively similar empirical relevance. The overall solution coverage is 0.62, reflecting the proportion of entrepreneurial intention covered by the two solutions.

To sum up, it is determined that a combination of emotional stability (low neuroticism) and agreeableness is needed for both genders to develop a successful path to entrepreneurial intention. However, in addition to this, females need to be either conscientious or imaginative and extraverted to develop entrepreneurial intention. In contrast, males need to be conscientious and extraverted or conscientious and imaginative to develop entrepreneurial intent. Therefore, it seems that conscientiousness is more critical for males as this turned out to be a core condition for them, while females are able to compensate the lack of this virtue with extraversion and openness to experience. Likewise, when females are introverted and less imaginative, they can offset this with conscientiousness. Also, for males, it appears that extraversion can replace openness to experience and vice versa.

Table 3

4.2.3 *Negation Analysis*

Increasingly, the “absence” of a given outcome is of considerable interest in configurational analyses (Kent, 2015; Woodside & Zhang, 2013; Nowiński & Haddoud, 2019). In fsQCA, a negation analysis can also be performed to explore combinations of low EI as depicted in table 4. Here, there is a frequency threshold of 17 for females (closest to 15) and 5 for males (the highest number with at least a consistent combination). As for the consistency threshold, the latter is set at 0.79 and 0.76 for females and males (the highest value beyond the threshold 0.75). From table 4, two profiles associated with low entrepreneurial intention emerge. It is determined that for males, even when emotional stability, extraversion and conscientiousness are present, low openness to experience and low agreeableness will altogether prevent the formation of entrepreneurial intent as these two are core conditions for low intention. As for females, the combination of low openness to experience and low emotional stability will yield low entrepreneurial intention, despite the presence of conscientiousness, agreeableness and extraversion. Here, neuroticism and lack of openness to experience were both core to low intention. Hence, it is deduced that lack of openness to experience is particularly detrimental to EI, especially when it is associated with low agreeableness for males, and a lack of emotional stability in females.

Table 4

5. Discussion

This study advances previous research on the cognitive drivers of EI by uncovering the effect of combined personality traits as opposed to their single influence across genders. In fact, while the present findings support the idea that individuals are attracted to careers that match their personality traits (e.g. Zhao & Seibert, 2006), it goes one step further by capturing the complex associations explaining this nexus using a gender-based approach. Precisely, the study

shows that entrepreneurial behavior is associated with multiple combinations of personality traits stemming from gender, and that in neither of the two groups is a single trait necessary for exhibiting entrepreneurial behavior.

On the one hand, this result corroborates early claims that the heterogeneous nature of entrepreneurs makes it difficult to identify a personality profile. Similarly, it proves the complex nature of EI in general as highlighted in previous works (Nowiński & Haddoud, 2019; Douglas et al., 2020) and echoes findings on the complexity underlying the personality trait-EI nexus. In particular, Şahin et al. (2019) indicated that (1) no single trait is necessary for entrepreneurial intention and (2) multiple configurations of such traits are associated with this behavior. The lack of necessary conditions was also confirmed vis-à-vis entrepreneurial behavior in general by previous works exploring the determinants of EI (e.g. Beynon et al., 2020; Xie et al., 2021).

On the other hand, the study extends its contribution by capturing the role of gender in shaping this link. Based on gender differences underlying the link between personality traits and entrepreneurial behavior (Antoncic et al., 2015; Murugesan & Jayavelu, 2017; López-Núñez et al., 2020), the findings discern two discrete profiles for each gender, that are likely to be associated with high EI. In short, while emotional stability and agreeableness is key to both genders, males require more conscientiousness with either extraversion or openness to experience. For females, this group needs either conscientiousness or extraversion and openness to experience together. As for low EI, a distinct profile for each gender emerged and, despite the presence of other attributes, the lack of openness to experience would lead to low EI when associated with low agreeableness in males, and low emotional stability in females.

These findings support proposition 1 that suggests a complex relationships underlying the Big Five – EI nexus. Yet the proposition is only partially supported when it comes to the traits observed. Specifically, while low neuroticism was confirmed as a driver of EI (and its high level a driver of low EI), contrary to prediction, high agreeableness constitutes a successful

combination leading to EI regardless of gender. Moreover, proposition 2 was not supported in relation to the higher need of females for low neuroticism and high openness to experience since both genders needed these traits in the same way. As for proposition 3, the latter was partially supported since males needed conscientiousness more than females. Extraversion on the other hand was equally relevant for both genders. We argue that such partial support is due to the novel complexity approach adopted in the present study. To the authors' best knowledge, this is one of the first investigations highlighting such gender disparities in the Big Five - EI nexus using fsQCA. These findings are next discussed.

5.1. Drivers of High Entrepreneurial Intention

Common Traits

For both genders, the combination of high emotional stability (low neuroticism) and high agreeableness is important, as it was present in all solutions associated with high entrepreneurial intention. The findings on emotional stability concur with previous research and are evident due to self-confidence and the ability to tolerate stressful situations characterising low neurotic individuals, leading them to deal with stressful situations associated with an entrepreneurial career (Caliendo et al., 2014; Van Ness & Seifert, 2016). Consequently, neuroticism reflects a more changeable and impulsive nature, and generally results from a lack of impulse control, planning, nor a sense of entitlement (Jakobwitz & Egan, 2006; Jonason et al., 2013). Emotional instability, reflecting hostility and anger, is more likely to lead to interpersonal conflicts, frustration, and therefore decrease the likelihood of business success (Viinikainen et al., 2017).

Contrastingly, the association of high agreeableness with high entrepreneurial intention is inconsistent with previous studies arguing that this trait decreases entrepreneurial prospect (Zhao et al., 2010; Antoncic et al., 2015). Such a contrast could be explained through the combined influence captured in the present case and the negative effects of agreeableness can be regulated when emotional stability is high. In fact, it is thought that the sympathetic, warm,

kind and cooperative side of agreeable people would prevent them from developing an entrepreneurial mindset as they will prioritise agreement over task completion. In contrast, entrepreneurs need a strong bias to get the job done over winning consensus (Antoncic et al., 2015). Yet, in this study we posit that the “dark side” of agreeableness is regulated with a better control of emotions; i.e. stable emotions will hinder the agreeable nature from jeopardising task completion. Not only that, emotionally stable people can exploit the positive aspects of their agreeableness such as friendliness and cooperation (Espíritu-Olmos & Sastre-Castillo, 2015) to build external business networks, hence justifying its positive association with EI. Having said that, the pair of agreeableness and emotional stability is still not sufficient to achieve EI. The present findings suggest the need for further traits which have turned out to differ on the basis of gender. These differences are next described.

Male Respondents

To complement agreeableness and emotional stability, men need high conscientiousness (as core) with *either* extraversion *or* openness to experience. In this regard, high conscientiousness appears to be more critical for males compared to their female counterparts as it was needed in both solutions associated with EI. Conscientiousness represents the ability to work hard and reflects individuals’ degree of organisation, persistence and motivation in the pursuit of goal accomplishment (Zhao & Seibert, 2006). In this regard, previous works showed that, among other traits, men score lower in conscientiousness compared to females (Swami et al., 2011; Antoncic et al., 2015; Abdollahi et al., 2017; Murugesan & Jayavelu, 2017; Iimura & Taku, 2018). Such predisposition [towards lower conscientiousness] potentially explains male respondents’ reluctance to engage in entrepreneurial activity, hence raising the need for acquiring this trait. Those who manage to develop it (alongside the pair of agreeableness and emotional stability) are more likely to become entrepreneurs. This will not be the case with

females since this trait [conscientiousness] is more common and therefore may not be a decisive determinant of EI.

As for extraversion and openness to experience, the findings suggest that these two traits are substitutable for men. Extraverted people tend to be sociable and thus have access to a wide network (Caliendo et al., 2014; Espiritu-Olmos & Sastre-Castillo, 2015). This network is likely to support them in the development of new ideas and hence offset their lack of openness to experience. Alternatively, introverted people lacking such support network and social interactions. They can only rely on individual imagination to develop ideas for an entrepreneurial career.

Female Respondents

For females, to complement agreeableness and emotional stability, either high conscientiousness and low extraversion (as core) *or* high openness to experience, low conscientiousness (as core) and high extraversion are needed. As evident, although high conscientiousness can trigger entrepreneurial intention, the lack of this trait is not detrimental unlike in males. It can therefore be argued that conscientiousness and “extraversion-openness to experience” are substitutable for female respondents. In this regard, Iimura & Taku (2018) explain that conscientiousness is important to maintain positive interpersonal relationships. Likewise, Antoncic et al. (2015) explain that extraversion is also key for building and maintaining relationships with various stakeholders, since extraverts are more socially active and central in discussion networks. Furthermore, openness, curiosity, creativity, and the tendency to seek new experiences and explore novel ideas are at the core of entrepreneurship (Shane & Venkataraman, 2000; Zhao & Seibert, 2006). Hence, it is arguable that when females lack of conscientiousness, it can be replaced with input from social interactions and networks stemming from being extraverted. This also confers imagination and creativity. Yet, such a scenario may not apply to males because females tend to score higher in extraversion (Weisberg

et al., 2011; Murugesan & Jayavelu, 2017) to the extent that it can substitute the need for conscientiousness.

5.2. Drivers of Low Entrepreneurial Intention

The negation analysis showed that the lack of openness would lead to low EI when associated with low agreeableness for males, and low emotional stability in females, regardless of the presence of other attributes. For females' EI, neuroticism seems to be particularly damaging when openness is lacking. In fact, there have been evidence that women score higher in neuroticism than men (Wiesbeg et al., 2011; Murugesan & Jayavelu, 2017). This could suggest that when women exhibit such a trait, its intensity would be higher compared to their male counterparts, and hence, would hold a stronger negative influence on EI. The lower neuroticism among men was attributed by their high ability to manage the expression of sadness, discomfort and negative emotions (Else-Quest et al., 2006; Vecchione et al., 2012). Likewise, in a study linking Big five model to resilience, Imura & Taku (2018) confirmed that the influence of neuroticism holds a stronger negative influence on resilience compared to males. Although resilience and EI are different, we can argue that resilience is a predisposition to EI. As for males, a lack of agreeableness was detrimental for EI when openness was lacking. Again, this could be due to the fact that men were found to be less agreeable than women (Weisberg et al., 2011; Murugesan & Jayavelu, 2017). Consequently, a lack of such trait would have greater implications.

6. Conclusion

Understanding the psychology of the individual entrepreneur is at the core of contemporary entrepreneurship research, and this study explains the influence of personality traits on EI. By applying fsQCA, it can be concluded from the inherent findings that EI is underlined by a

complex combination of personality traits rather than independent behaviours. The study suggests that psychological characteristics are all key to promoting EI, but it is their interplay that is likely to be most effective. Thus, this paper corroborates previous evidence (Beynon et al., 2016; Kraus et al., 2018; Rey-Martí et al., 2016; Şahin et al., 2019) on the efficacy of fsQCA in entrepreneurship research. It also promotes the recognition of fsQCA as an analytical tool that is rapidly evolving in the entrepreneurship field (Kraus et al., 2018; Douglas et al., 2020).

More importantly, this study reveals the need to capture gender differences when assessing the complex influence of personality traits on EI. In fact, the fsQCA analysis has revealed considerable differences across the two genders. In the grand scheme, the insights arising from this study poses important implications for both aspiring entrepreneurs and entrepreneurship educators as the assessment of personality traits at the individual level would help determine the desirability and viability of career choices. Indeed, an objective personality assessment based on the big five personality dimensions yields ample insights to make more informed occupational and professional choices. Notably, an assessment taking into account gender differences when assessing big five personality dimensions will lead to more suitable choices, which will help in closing the extant “large unexplained gender gap in entrepreneurship” (Caliendo et al., 2015: 226).

This study suggests that entrepreneurship educators and professional coaches should consider participants’ personality traits in parallel when designing their programmes. While several studies confirm that entrepreneurship education and training programmes aim to increase respondents’ intention to establish their own businesses, it is evident that in addition to pedagogies, personality assessments also play a key complex role in promoting entrepreneurial intention (Aronsson, 2004; Şahin et al., 2019). More importantly, the study indicates that such a role is shaped by gender differences. Therefore, we recommend that entrepreneurship educators and coaches adapt their delivery according to the findings of this

study. For instance, while general delivery should focus on regulating neuroticism and fostering agreeableness among learners, more attention should be given to improving the conscientiousness of male learners, with a focus on improving either extraversion or openness to experience. Contrastingly, for female learners lacking conscientiousness, both [extraversion and openness to experience] should be prioritized or conscientiousness will otherwise suffice.

Finally, as with all empirical investigations, the current research has its limitations. Firstly, the study measures the conditions of high EI using a self-reported measures of both personality traits and entrepreneurial intention, and such measures are susceptible to several biases (Podsakoff et al., 2003). In this regard, future research can address this measurement shortcoming by employing more objective measurement instruments for the conditions and outcomes. Secondly, while the big five personality traits are used as causal conditions to achieve a high level of entrepreneurial intention, other possible causal conditions that predict this outcome were not tested. Future research could focus on testing causation though conditions that are unique to their settings. Moreover, it is acknowledged that the influence of the big five traits on entrepreneurial intention can also be moderated by other personal characteristics. While gender has been accounted for in this inquiry, the effect of other factors such as age, race, ethnic background and work experience is not ruled out. Future studies are invited to consider and examine such antecedents. Lastly, given the cross-sectional nature of the data in this study, causal inferences should be made with caution. New studies can take a longitudinal approach to confirm causality.

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Table 1: CR, Cronbach's α and AVE of the study constructs

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness	EI
CR	0.817	0.800	0.823	0.785	0.786	0.966
Cronbach's α	0.699	0.665	0.712	0.587	0.638	0.957
AVE	0.531	0.502	0.537	0.553	0.481	0.824

Table 2: Necessity Analysis for High EI

	Females		Males	
	Consistency	Coverage	Consistency	Coverage
Extraversion	0.806222	0.699029	0.773285	0.813619
~Extraversion	0.482986	0.779518	0.445680	0.844472
Agreeableness	0.911291	0.649652	0.853203	0.802339
~Agreeableness	0.316516	0.854982	0.361255	0.870925
Conscientiousness	0.827435	0.674972	0.760486	0.824549
~Conscientiousness	0.428305	0.782920	0.468153	0.842179
Neuroticism	0.580218	0.730270	0.398991	0.831872
~Neuroticism	0.717574	0.733405	0.804952	0.806114
Openness	0.810141	0.747890	0.836438	0.808926
~Openness	0.493997	0.716244	0.385110	0.867018

Table 3: Intermediate Solutions for High EI.

Solutions	Raw Coverage	Unique Coverage	Consistency
Females			
~ extra *agree* consc *~neuro	0.395272	0.138911	0.836493
extra *agree*~ consc *~neuro*open	0.353842	0.0974807	0.872393
<i>Solution Coverage</i>	0.492753		
<i>Solution Consistency</i>	0.824761		
Males			
extra *agree* consc *~neuro	0.567721	0.0227137	0.893428
agree* consc *~neuro*open	0.599328	0.0543205	0.892608
<i>Solution Coverage</i>	0.622041		
<i>Solution Consistency</i>	0.886377		

Females: Frequency Cut-off: 12, Consistency Cut-off: 0.85; Males: Frequency Cut-off: 12, Consistency Cut-off: 0.90

Boldface conditions means core conditions

Table 4: Intermediate solutions for Low EI.

Solutions	Raw Coverage	Unique Coverage	Consistency
Females			
extra *agree* consc * neuro *~open	0.465834	0.465834	0.798675
<i>Solution Coverage</i>	0.465834		
<i>Solution Consistency</i>	0.798675		
Males			

extra*~agree*consc*~neuro*~open	0.415933	0.415933	0.76022
<i>Solution Coverage</i>	0.415933		
<i>Solution Consistency</i>	0.76022		

Females: Frequency Cut-off: 17, Consistency Cut-off: 0.79; Males: Frequency Cut-off: 5, Consistency Cut-off: 0.76

Boldface conditions means core conditions

Appendix:

Variable	Dimensions	Items	Mean	S.D.	Factor loadings
Big Five personality traits	Extraversion	Am the life of the party.	3.608	0.942	0.568
		Don't talk a lot. (R)	3.646	1.132	0.786
		Talk to a lot of different people at parties.	3.456	1.127	0.762
		Keep in the background. (R)	3.350	1.096	0.775
	Agreeableness	Sympathize with others' feelings	3.942	0.935	0.802
		Am not interested in other people's problems. (R)	3.949	1.000	0.739
		Feel others' emotions.	3.687	0.944	0.618
		Am not really interested in others. (R)	4.049	0.978	0.661
	Conscientiousness	Get chores done right away.	3.254	1.073	0.697
		Often forget to put things back in their proper place. (R)	3.556	1.242	0.729
		Like order.	3.557	1.145	0.767
		Make a mess of things /Mess up. (R)	3.898	1.104	0.737
	Neuroticism	Have frequent mood swings.	2.642	1.153	0.832
		Am relaxed most of the time. (R)	2.606	1.110	0.595
		Get upset easily.	2.620	1.137	0.595
		Seldom feel blue. (R)	-	-	-
Openness/Imagination	Have a vivid imagination.	3.620	1.058	0.732	
	Am not interested in abstract ideas. (R)	3.298	1.127	0.612	
	Have difficulty understanding abstract ideas. (R)	3.354	1.024	0.647	
	Do not have a good imagination. (R)	3.810	1.121	0.771	
Entrepreneurial Intention	I am ready to do anything to be an entrepreneur	3.382	1.233	0.904	
	My professional goal is to become an entrepreneur	3.273	1.366	0.936	
	I will make every effort to start and run my own firm	3.273	1.287	0.865	
	I am determined to create a firm in the future	3.612	1.333	0.941	
	I have very seriously thought of starting a firm	3.531	1.394	0.878	
	I have the firm intention to start a firm someday	3.392	1.384	0.920	