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The Big Five Personality–Entrepreneurship Relationship: Evidence from Slovenia

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Entrepreneurs and entrepreneurship are important for new wealth creation and economic development. Yet insufficient attention has been paid in entrepreneurship research to psychological characteristics such as the big five personality characteristics. In this study, we address this issue by investigating the psychological determinants of real-life entrepreneurial start-up decisions and intentions by contrasting entrepreneurs and non-entrepreneurs as regards the big five personality factors (openness, conscientiousness, extraversion, agreeableness, and neuroticism). Using data collected via face-to-face structured interviews with 546 individuals from Slovenia, we tested hypotheses using multi-nominal logistic regression (supplemented by MANOVA).

Introduction

Entrepreneurs are people who start up new businesses and are important for new wealth creation and economic development. People (more specifically, entrepreneurs) are central to entrepreneurship. It is no surprise that entrepreneurship researchers have begun to examine the psychological characteristics of an entrepreneur. Brockhaus (1982) presented an overview of the psychology of the entrepreneur by discussing the following psychological characteristics: need for achievement, locus-of-control, risk-taking propensity, and personal values (e.g., need for independence and effective leadership). Efforts to uncover

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differences in personal traits and other personality aspects between entrepreneurs and others (non-entrepreneurs) have only been modestly successful (Baron 1998) and the role of psychological factors in entrepreneurship remains unclear (Stewart et al. 1998). Past research on entrepreneurial personality represents a gap in entrepreneurship literature because it failed to clearly distinguish the unique contributions of entrepreneurs as persons to the entrepreneurial process (Mitchell et al. 2002). The trait approach was evaluated as being unable to identify reliably a trait that would characterize entrepreneurs and distinguish them from other business people (Chell 1985). Shaver and Scott (1991) related only one trait (achievement motivation) to new venture creation. Hatten (1997) also claimed that personality characteristics cannot help predict entrepreneurship success. Some have argued that the theories and methods used in entrepreneurship personality research may be the causes of the lack of progress seen in this research area (Robinson et al. 1991; Sexton and Bowman 1986; Shaver and Scott 1991; Stewart et al. 1998).

The big five personality approach (Goldberg 1981, 1990) represents a promising foundation for research aiming to discover personality differences between entrepreneurs and non-entrepreneurs. The big five personality factors (OCEAN: openness, conscientiousness, extraversion, agreeableness, and neuroticism) as universal personality characteristics have received extensive research attention in psychology, which led to the development of valid measurement instruments (e.g., NEO-PI—the NEO Personality Inventory, Costa and McCrae 1985). In entrepreneurship research, insufficient attention has been paid to the big five personality characteristics. Rare attempts have pinpointed the fruitfulness of the big five approach for entrepreneurship research. For example, Singh and De Noble (2003) investigated the relationship between the big five personality characteristics and student views of self-employment, and Zhao and Seibert (2006) compared entrepreneurs and managers in a meta-analytical review of the big five personality dimensions. Entrepreneurship personality researchers have also tended to neglect the observation of the psychologists Howard and Howard (1995) who identified a pattern based on the big five personality characteristics and labeled it as a sample career of the entrepreneur, who is a person who can be categorized as scoring high on openness, conscientiousness and extraversion, and average on agreeableness. In this study, we address this issue in entrepreneurship personality research by extending the big five personality factors to an investigation of the psychological determinants of real-life entrepreneurial start-up decisions and intentions in Slovenia. The remainder of this paper is organized into four sections: (1) literature review and hypotheses; (2) methods; (3) findings; (4) discussion; (5) contributions and implications; and (6) limitations, future research opportunities, and conclusion.

Literature Review and Hypotheses

The Big Five Personality Factors and Entrepreneurship

The initial taxonomy-building efforts regarding personality traits are evidenced in the research undertaken by Allport and Odbert (1936). They identified about 4,500 dictionary words that describe personality traits (Ryckman 2000). Cattell (1943) reduced this set of traits to 35 variable categories and later (Cattell 1945) to 12 factors. Norman (1967) identified five basic factors. Goldberg (1981, 1990) found and labeled the big five factors: surgency, agreeableness, conscientiousness, emotional stability, and intellect. The big five factors (relabeled so that the first letters of the five factors are OCEAN, see Costa and McCrae 1985) can be described as follows (John 1990, in Carducci 1998, p. 239):

(1) Factor O refers to openness, originality, open-mindedness; defined by traits that refer to, for example, artistic (+), insightful (+), intelligent (+), commonplace (–), narrow interests (–), shallow (–).
(2) Factor C refers to conscientiousness, control, constraint; defined by traits that refer to, for example, deliberate (+), efficient (+), precise (+), careless (–), frivolous (–), irresponsible (–).
(3) Factor E refers to extraversion, energy, enthusiasm; defined by traits that refer to, for example, adventurous (+), assertive (+), dominant (+), sociable (+), quiet (–), reserved (–), retiring (–), shy (–).
(4) Factor A refers to agreeableness, altruism, affection; defined by traits that refer to, for example, cooperative (+), generous (+), sympathetic (+), cruel (–), quarrelsome (–), unfriendly (–).

(5) Factor N refers to neuroticism, negative affectivity, nervousness; defined by traits that refer to, for example, anxious (+), self–pitying (+), temperamental (+), calm (–), contented (–), stable (–).

Openness

Schumpeter (1934) described entrepreneurs as innovative and creative people. Entrepreneurship includes the creation of value through innovation and seizing of opportunities (Churchill 1992) and the creation of something new (Hisrich, Peters, and Shepherd 2005). Newness and originality lie at the heart of entrepreneurship, which can be considered a behavioral phenomenon or a process of emergence (Gartner, Bird, and Starr 1992). McClelland (1961) found that entrepreneurs, when compared with the population, can be characterized by disliking repetitive and routine work, which can be considered by its content as a trait of the openness factor. Several studies exploring the relationship between entrepreneurship and personality have found openness to be a significant factor (Howard and Howard 1995; Singh and De Noble 2003). Openness can be considered such an important factor for entrepreneurs because it plays a crucial role in the process of recognizing an entrepreneurial opportunity. The tendency toward action is a crucial element of entrepreneurship. Entrepreneurs pursue opportunities and transform ideas into profitable businesses. Recognizing business opportunities can be considered one of the essential tasks in which entrepreneurs are engaged in the entrepreneurial process, and also the most fundamental task at the beginning of new venture creation. Therefore, opportunity recognition represents the starting point of the entrepreneurial process (Baron 2007). Opportunity recognition research (e.g., Alvarez and Barney 2007; Ardichvili, Cardozo, and Ray 2003; Baron 2007; Lumpkin, Hills, and Shrader 2004; Pech and Cameron 2006) has stressed the importance of someone being open to new ideas and ready and receptive to the signals in order to perceive an opportunity. Entrepreneurs tend to be alert to new opportunities (Kirzner 1982). Insight as a facet of the openness factor includes the following traits: foresighted, insightful, and perceptivity (Goldberg 1990; Ryckman 2000). Perceptivity as a personality trait may be compared by the content to alertness, which is recognized as a fundamental condition for opportunity recognition (Ardichvili, Cardozo, and Ray 2003). The question is now posed as to how does opportunity recognition occur and why do some people identify opportunities while others do not. The answer involves understanding different behavioral and cognitive factors (Baron 2007). Some people are more insightful when it comes to recognizing business opportunities and therefore have more possibilities to succeed. The discovery theory of entrepreneurial action presumes that entrepreneurs differ from non-entrepreneurs in their ability to see and exploit opportunities (Alvarez and Barney 2007). Baron (2007) identifies engaging in the active searching for opportunities and alertness to opportunities as two significant behavioral and cognitive factors. Consequently, people who are more alert to opportunities than others have such cognitive frameworks that allow them to recognize opportunities. New ideas or new inventions are integral parts of new opportunities (Sarasvathy et al. 2005). An orientation to seeing opportunities is central to entrepreneurship (Stevenson and Jarillo 1990). The discovery and exploitation of opportunities are integral parts of the entrepreneurial process (Shane and Eckhardt 2005). On the basis of the above research we postulate the following hypothesis:

H1: The openness factor will be positively related to entrepreneurship.

Personal success, and entrepreneurship success, can be associated with the idealized Western society traits: autonomy independence and identity (Guisinger and Blatt 1994); strong, self-reliant, powerful, determined, independent, rational, logical, unemotional, aggressive, and competitive (Ryckman 2000); instrumental, dominant and assertive characteristics (Amancio 1989, 1993; Gerber 2009; Lueptow, Garovich, and Lueptow 1995; Stets and Burke 2000). Many of these traits may be found in or are similar to traits found in the extraversion factor and in the conscientiousness factor.

Conscientiousness

Conscientious people tend to be efficient (Goldberg 1990; John 1990; Saucier 1994), deliberate (John 1990), organized and systematic (Goldberg 1990; Saucier 1994), and practical (Saucier 1994). McClelland (1961) discovered that entrepreneurs (in comparison with the

population) scored high on the need for achievement (the desire to do well). They take personal responsibility for their decisions, prefer decisions involving a moderate degree of risk, dislike repetitive, routine work, and are interested in concrete knowledge of the results of decisions. By comparing the content of these characteristics with the content of the big five factors, the need for achievement can be seen as a trait of conscientiousness (Ryckman (2000) noted that "Will to Achieve" can be used as an alternate label for "Conscientiousness"). Howard and Howard (1995) found that high conscientiousness can be a characteristic of the entrepreneurial-type person. Zhao and Seibert (2006) concluded that conscientiousness can have the strongest relationship to the entrepreneurship status (in comparison with the managerial status) among the big five personality factors. On the basis of the above research we propose the following hypothesis:

H2: The conscientiousness factor will be positively related to entrepreneurship.

Extraversion

Extraverts tend to be assertive and dominant (John 1990), active (Goldberg 1990), bold (Saucier 1994), and energetic (Goldberg 1990; Saucier 1994). Palich and Bagby (1995) found that entrepreneurs tend to be more optimistic than non-entrepreneurs. Extroverts tend to be cheerful, jovial, merry, and optimistic (Goldberg 1990). Extraversion may facilitate the achievement of the goals of a good leader (Zadel 2006). Howard and Howard (1995) found that the entrepreneurial-type person can be categorized as scoring high on conscientiousness and extraversion. On the basis of the above research we propose the following hypothesis:

H3: The extraversion factor will be positively related to entrepreneurship.

Agreeableness

The agreeableness factor includes traits that can be related to entrepreneurship in both directions. If we just use some agreeableness items from Goldberg (1990), then on one hand, entrepreneurs may be cooperative, helpful, patient, cordial, friendly, trustful, and diplomatic, while on the other hand, they may be characterized as combative, harsh, bossy, demanding, domineering, manipulative, rude, and ruthless. Entrepreneurs may have in this respect a bright side and a dark side. Kets de Vries (1985) discussed the dark side of entrepreneurs: The high level of energy and strong willingness to succeed of entrepreneurs can be unexpectedly converted into a destructive tool for both the organization and the entrepreneur. Some entrepreneurs find it difficult to accept or understand the organizational behavior of other companies. Therefore, adaptation is very hard for them. On one hand, they are enthusiastic, charismatic, gamesome, and achievement oriented, but, on the other hand, they often act thoughtlessly and impulsively, which makes it hard for others to work with them. Their obsession with the need for control over everything can negatively affect their relationships with others. Consequently, they may not be as agreeable as one would suppose (Kets de Vries 1985). Psychologists recognize the possible ambiguity in the agreeableness factor because of its duality in meaning: its content is being pleasing and/or agreeing with others (Ryckman 2000). Howard and Howard (1995) viewed the entrepreneur-type as scoring average on agreeableness; hence, no clear association can be expected between agreeableness and entrepreneurship. However, the dark side (Kets de Vries 1985) may prevail; this is evident in the study of Zhao and Seibert (2006), who reported that entrepreneurs scored lower than managers on agreeableness. We propose the following hypothesis:

H4: The agreeableness factor will be negatively related to entrepreneurship.

Neuroticism

Emotional stability may be a trait that is important for personal success (Barrick, Mount, and Judge 2001; Rauch and Frese 2007), which may point to the possibility of a negative relationship between the neuroticism factor (the reverse of emotional stability) and entrepreneurship. Singh and De Noble (2003) found negative relationships between neuroticism and views of self-employment in terms of intent and perceived ability. The findings of Goldberg (1990) support the possible negative relationship between neuroticism and entrepreneurship since emotionally stable people tend to be characterized by autonomy, independence, and individualism. Indeed, autonomy or independence may be related to entrepreneurship serving as an important motivator (Collins and Moore 1964; Licht and Siegel 2006). However,

to the contrary, entrepreneurs may also be somewhat neurotic (Kets de Vries 1977; Lynn 1969). Kets de Vries (1977) claimed that entrepreneurs are often seen as persons out of place, often irritating and rebellious because of their irrational actions and provocative ideas. Besides their inconsistency, they decide impulsively and are under a lot of stress. Therefore, the entrepreneur must be seen as a highly complex individual. It may be that frustrations experienced in early childhood can lead to a recognized pattern of behavior of entrepreneurs. Impulsivity, the feeling of dissatisfaction, rejection, and powerlessness may affect their sense of self-esteem. Such situations may put entrepreneurs in a continuous search mode for situations in which they can assert their control and independence, which impede the integration of their personal needs with those of others (Kets de Vries 1977). Despite this observation, emotional stability may be important for entrepreneurship. Hence, most of the above research points to a negative relationship between neuroticism and entrepreneurship.

H5: The neuroticism factor will be negatively related to entrepreneurship.

Gender Difference

Some gender-related differences may exist in the entrepreneurial personality. Women business owners tend to be more similar to men in both demographic and psychological dimensions (motivations of independence, achievement, job satisfaction). Women, however, tend to score lower than men in risk-taking propensity and energy levels (Brush 1992). Men and women entrepreneurs tend to be similar in three categories: demographics, motivations, and business practices, and different in their representation in various business sectors, entrepreneurial processes, and access to resources (Brush 2006). Despite their similar motivations, some differences in personality characteristics may exist between men and women entrepreneurs. Chaganti (1986, in Birley 1989) reported only one difference between men and women entrepreneurs among a group of personality tests—self-confidence (men scored higher than women with this characteristic, while for others—achievement, autonomy, persistence, aggression, independence, nonconformity, goal-orientation, leadership, locus of control—the results were similar). Sexton and Bowman-Upton (1990) examined a series of psychological characteristics (autonomy, change, energy level, risk-taking propensity, tendency to conform, interpersonal affect level, social adroitness, harm-avoidance, and need for succorance) and found some differences: relative to men, women scored higher on the value they placed on autonomy and change and lower on energy level and risk-taking propensity. Hisrich (1986) reported some similarities and differences between male and female entrepreneurs. In terms of personality characteristics, both female and male entrepreneurs tend to be energetic, goal-oriented, and independent, whereas women tend to be less confident and more tolerant and flexible than men. Hisrich (1986) summarized six key personality characteristics for male entrepreneurs (opinionated and persuasive, goal oriented, innovative and idealistic, high level of self-confidence, enthusiastic and energetic, must be own boss) and female entrepreneurs (flexible and tolerant, goal oriented, creative and realistic, medium level of self-confidence, enthusiastic and energetic, ability to deal with the social and economic environment). A woman's identity can be seen as delineated in the web-like context of relationships (family, work, and community relationships—connections) in which decisions tend to be more situational, whereas men may be more separate and autonomous in making logical and rule-based decisions (Gilligan 1982, in Brush 1992). This finding may somewhat contradict the findings of Sexton and Bowman-Upton (1990) regarding autonomy.

The studies described above have only found a few personality-related differences between men and women entrepreneurs. These results may indicate that entrepreneurs share some personality characteristics regardless of their gender. In the overall population, however, gender-related personality differences may be larger, meaning that gender may also play a role in differences between the personalities of entrepreneurs and non-entrepreneurs. In the radical feminism approach, gender differences are regarded as innate, emotional and psychological (Greer and Greene 2003). Males and females may differ in their interpretations of experiences (males would emphasize separation from others and individualization, while females would emphasize relationships and connections to others, Gilligan 1982, in Ryckman 2000). In a cultural philosophy that is predominantly characterized by individualism and personal success, achievement was claimed

to be associated with the "ideal masculine" traits (strong, self-reliant, powerful, determined, independent, rational, logical, unemotional, aggressive, competitive) much more than with the "ideal feminine" traits (warm, dependent, deferent, passive, emotional, sensitive, caring, nurturant) (Ryckman 2000). The argument on "ideal masculine and feminine" traits implicitly stereotypes men and women and does not recognize the power of contexts and situations to affect behavior. Carland and Carland (1991) found stronger personality traits (preference for innovation, propensity for risk taking and need for achievement) for both male and female entrepreneurs in comparison with managers and no significant differences between entrepreneurs by gender with regard to the personality characteristics. This result demonstrated that the specific entrepreneurial personality traits may apply equally to male and female entrepreneurs. However, in the big five personality factors research, women may tend to score higher on agreeableness and neuroticism than men (Caplan 2003). Singh and De Noble (2003) found significant interactions between personality, gender, and having a close self-employed relative with respect to views on self-employment (intent, perceived ability, and personal investment). The differences between entrepreneurs and non-entrepreneurs may be found at different levels depending on gender. On the basis of the above research, we postulate the following exploratory hypothesis:

H6: Gender will influence the relationship between the big five personality factors and entrepreneurship in terms of (a) levels and (b) moderation.

Methods

Data Collection and Sample Characteristics

This research is based on interview data collected about the personality traits of people in employment in Slovenia. On one hand, Slovenia can be considered an appropriate and interesting research context since it is one of the middle-income countries (including transition economies from Central and Eastern Europe), which have a high level of potential opportunities for the development of entrepreneurial activities (see the Global Entrepreneurship Monitor study, Minniti, Bygrave, and Autio 2006); in particular, Slovenia lags behind high-income countries in terms of entrepreneurship values and support systems. On the other hand, findings based on Slovenian samples can be considered comparable with other countries as shown in past cross-nationally comparative studies in intrapreneurship (Antoncic and Hisrich 2000, 2001), business ethics (Bucar, Glas, and Hisrich 2003), entrepreneurship education (Antoncic, Scarlat, and Hvalic Erzetic 2005), and technological innovativeness (Antoncic et al. 2007b). With regard to the definition of the Statistical Office of the Republic of Slovenia, the category of persons in employment includes self-employed persons, persons in paid employment and unpaid family workers. The sample was in part purposeful and in part random. Working people were identified among participants of undergraduate and graduate education at three Slovenian schools (at seven different locations in six towns), who were asked to participate. Since entrepreneurs tend to enroll in degree education less than other working people in Slovenia, in order to increase the number of entrepreneurs in the sample, and to test the data with a random sample of entrepreneurs, additional interviewees were randomly selected from small firms from a financial reports database and contacted by phone and then interviewed in person. The response rate was 67.2 percent (563 total responses out of 838; 72.3 percent for the nonrandom group and 42.8 percent for the random group). Cross tabulation chi-square tests indicated no differences between the random sample and the nonrandom sample of entrepreneurs in terms of gender and age of persons.

The data collection involved a structured questionnaire (see Appendix A). In addition to questions pertaining to personality characteristics, each participant was asked to provide some information about himself or herself (mostly demographic data), and about the firm (age, size, industry, growth) in which he or she is employed. All 62 interviews of the random sample took place in a face-to-face manner in firms and were conducted by two assistants who were previously trained by the principal researcher. The remaining 501 questionnaires were filled out in groups in classes at the education institutions under the supervision of the principal researcher and one trained assistant. Seventeen questionnaires were incomplete and were excluded. These efforts yielded a total of 546 usable responses (51.3 percent male and 48.7 percent female). The average person in the sample was between 20 and 30 years of age

(41.2 percent); married (50.2 percent); had a university degree (62.2 percent); and between 10 and 20 years of work experience (33 percent).

The majority of people (46.7 percent) in the sample were classified as maybe-entrepreneurs, which means they may establish their own firm sometime in the future, while 30.2 percent of them already own a firm (entrepreneurs), 9.9 percent intend to establish their own firm in the following three years (potential entrepreneurs), and 13.2 percent do not intend to set up their own firm (non-entrepreneurs). The average firm in the sample was small (less than 50 employees—full-time equivalent, 51.1 percent), was 11–20 years old (34 percent), had EUR 400,000 or less in sales (27.2 percent) and operated in the service industry (44.1 percent).

The distribution of the sample was found similar to the population of persons in employment in Slovenia (the sample distribution was compared with the distribution of all persons in employment provided by the Statistical Office of the Republic of Slovenia). Regarding gender, men (sample 51.3 percent, population 54.8 percent) and women (sample 48.7 percent, population 45.2 percent) are well represented. In terms of gender no significant difference was found between the sample and the database population (chi-square 2.713, 1 *df*, sig. .10). Further, there was a similarity between the group of entrepreneurs in the sample and the population of Slovenian entrepreneurs; regarding gender the sample is representative (women entrepreneurs: sample 29.6 percent, population 33.6 percent). On the other hand, there was a significant difference for the main industry (chi-square 19.2, 2 *df*, sig. .00). The difference is mainly due to a higher number of responses received from persons employed in manufacturing firms. However, the sample can be considered adequately representative of the population of persons in employment in Slovenia. The main sample characteristics are presented in Table 1.

Measures

The Big Five Personality Factors were taken from Singh and De Noble (2003) who used Saucier's (1994) Mini-Markers Inventory, which includes eight adjectives per each personality factor: (1) Openness adjectives: creative, imaginative, philosophical, intellectual, complex, deep, uncreative (r), unintellectual (r); (2) Conscientiousness adjectives: organized, efficient, systematic, practical, disorganized (r), sloppy (r), inefficient (r), careless (r); (3) Extraversion adjectives: talkative, extraverted, bold, energetic, shy (r), quiet (r), bashful (r), withdrawn (r); (4) Agreeableness adjectives: sympathetic, warm, kind, cooperative, cold (r), unsympathetic (r), rude (r), harsh (r); (5) Neuroticism adjectives: unenvious (r), relaxed (r), moody, jealous, temperamental, envious, touchy, fretful. Respondents reported the accuracy of the 40 adjectives with respect to themselves on a Likert-type scale whereby 1 = very untrue and 5 = very true. The five-point scale used in our study is narrower than the seven-point scale used by Saucier (1994) and Singh and De Noble (2003), but it is simple and captures sufficient information and is very comparable in terms of internal consistency—reliability—with the seven-point scale results administered in this country-specific context (see the Cronbach's alpha reliability coefficients in Table 2). The only difference is the unenvious item that needed to be deleted from the neuroticism factor due to a low communality in the factor analysis. This may be due to a poor understanding of the translated item into Slovenian from English (it seems that the negation of envy as a negative personal evaluation may not be well understood by Slovenians). The adjectives from Saucier's instrument were translated by a translation and a back-translation by the principal researcher who is experienced in cross-cultural research including the Slovenian and English languages. The instrument was pilot tested on a group of five entrepreneurs. The five factors as independent variables were calculated as an average of retained and properly reversed items.

Respondents marked appropriate boxes for the moderator variable (gender: 1-male, 2-female) and some other demographic variables from which the respondent's age (years: 1–20 or less, 2-over 20 to 30, 3-over 30 to 40, 4-over 40 to 50, 5-over 50) was used as a control variable.

The dependent variable—entrepreneurship (activity and propensity)—was measured by an item which asked respondents to check one of twelve answers to the question about how many years they have had their own firm ranging from "I do not intend to found my own firm" to "more than thirty years" (Antoncic et al. 2007a). The answers were categorized in four groups: (1) practicing entrepreneurs—people who have their own firms (including seven answers from

Table 1
Sample Characteristics

Characteristics	Sample		Database Population		Difference
	Number	Percent	Number	Percent	Chi-Square Test
Classification					
Non-entrepreneur	72	13.19			
Maybe-Entrepreneur	255	46.70			
Potential-Entrepreneur	54	9.89			
Practicing-Entrepreneur	165	30.22			
Total	546	100.00			
Age					
20 years or less	2	0.37			
More than 20 to 30	225	41.21			
More than 30 to 40	195	35.71			
More than 40 to 50	111	20.33			
More than 50	13	2.38			
Total	546	100.00			
Gender					
Male	280	51.28	551,000	54.77	$\chi^2 = 2.713$
Female	266	48.72	455,000	45.23	$df = 1$
Total	546	100.00	1,006,000	100.00	$p = 0.10$
Main industry					
Services	318	67.95	22,970	71.94	$\chi^2 = 19.2$
Manufacturing	114	24.36	5,509	17.26	$df = 2$
Construction	36	7.69	3,449	10.80	$p = 0.00$
Total	468	100.00	31,928	100.00	

Table 2
Scale Reliability (Cronbach's Alpha)

Personality Dimension	Cronbach's Alpha	Number of Items	Singh and De Noble (2003)	Saucier (1994)
Openness	0.71	8	0.78	0.62
Conscientiousness	0.77	8	0.86	0.79
Extraversion	0.81	8	0.85	0.86
Agreeableness	0.76	8	0.85	0.80
Neuroticism[a]	0.61	7	0.76	0.74

[a]Item V0125r (unenvious) deleted due to a low communality (.11); Cronbach's alpha with all eight items .483; the neuroticism scale used by Saucier (1994) and Singh and De Noble (2003) includes eight items.

"one year or less" to "more than thirty years"); (2) potential entrepreneurs—people who are planning to start their own business (including three answers ranging from "do not have my own firm yet, but will found one in two to three years" to "do not have my own firm yet, but will found one in less than a year"); (3) undecided entrepreneurs (maybe-entrepreneurs)—people

who will "maybe sometime found own firm"; and (4) non-entrepreneurs—people who do not intend to found their own firm. These four groups were formed in order to better detect differences between entrepreneurs and non-entrepreneurs than by using two groups (people with own firms and people without own firms) because potential entrepreneurs tend to be more like practicing entrepreneurs and may differ from less entrepreneurial groups (Antoncic et al. 2007a). While there is some concern about common method variance since both dependent and independent measures are collected from the same sample, we feel that the impact on our results would be minimal since "practicing entrepreneurs" versus others is really a non-subjective difference. In this study, we attempted to refine our sample by adding two other dimensions of potential and undecided entrepreneurs (which are more subjectively measured). The other moderating variable, gender, is also non-subjective. Thus, even though this variable is captured in the same instrument, it does not involve a subjective response. Common method bias is not a concern since dependent and independent variables come from the same instrument but are not measured on the same scale (1–5).

Methods of Analysis

Exploratory factor analysis (Principal component analysis with a Varimax rotation) of the overall sample was undertaken to test the dimensional structure of the five personality factors, which is reported above in Table 2. Confirmatory factor analysis was not conducted given that this measure is already established in the field. In order to test the directionality in the hypotheses (explaining entrepreneurship by independent variables) a multi-nominal logistic regression was run with entrepreneurship as a dependent variable and personality factors as independent variables, to which the gender variable and interaction terms were added in a subsequent analysis. An additional test of moderation was undertaken by estimating the main effects of the personality-entrepreneurship relationship on the male group (n = 280) and the female group (n = 266) separately. In addition, MANOVA (GLS in SPSS) was used to test the associations (not directionality) between variables in hypotheses. The 4-by-2 factorial research design for MANOVA with eight groups was used. In the sample, the split resulted in groups from 21 observations in the "potential entrepreneur-female group", to 141 observations in the "maybe entrepreneur-female group" (see Table B1 in Appendix B). The number of observations in each group is greater than the number of variables included (5) and greater than 20. However, only the largest group sizes might assure the identification of medium effect sizes with sufficient power (0.80 or above) at a significance level of .05; for other groups that are much smaller this test can only be expected to detect large to very large effect sizes. The use of MANOVA can be considered justified since the variables (personality factors) tend to be correlated; the Bartlett test of sphericity (statistic 331.4, 14 *df*, sig. .000) showed that the hypothesis of the no correlation of variables should be rejected at a .000 significance level. MANOVA may not be the appropriate technique to test the directionality in the hypotheses but it is useful for detecting differences of the means in personality for the four entrepreneurial groups and gender. With MANOVA we do not directly explain entrepreneurship but just detect to what extent the personality factors differ among gender and entrepreneurs. Hence, with MANOVA the hypotheses were tested indirectly. An additional analysis was conducted: a one-way ANOVA was run between entrepreneurship (four groups) and personality and a multiple range test (Duncan) was used to look at the difference in the means; ANOVA was also repeated for gender and personality.

Findings

Group descriptive statistics are depicted in Figures 1 to 5 and shown in Appendix B (Table B1). At the univariate level, openness and extraversion significantly differ (at the .05 level of significance) in the means between entrepreneurship groups, while agreeableness may be slightly different (at the .10 level of significance) and conscientiousness and neuroticism were not found to significantly differ between entrepreneurship groups. Multivariate effects of entrepreneurship were found significant by all four multivariate tests (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, Roy's Largest Root—F tests significant, Power levels very high: very close to 1.0).

When the gender variable was considered at the univariate level, four personality factors were found to be significantly different between men and women (openness—higher for men, conscientiousness—higher for women,

Figure 1
Openness

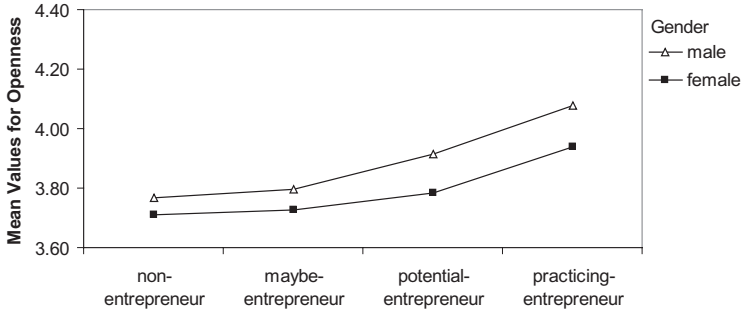
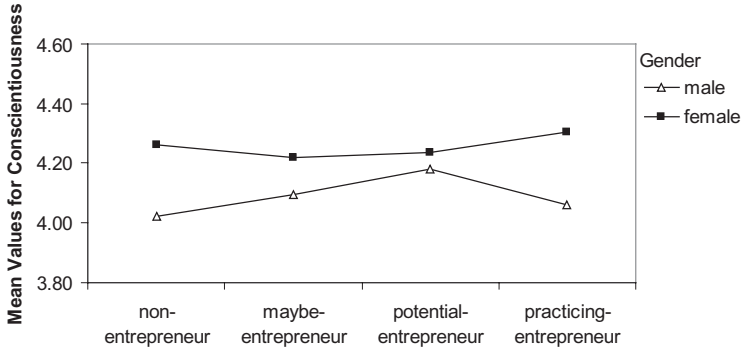


Figure 2
Conscientiousness



extraversion—higher for women, agreeableness—higher for women) while one was not found to be significantly different (neuroticism). These findings indicate that the relationship between four personality factors and entrepreneurship may operate at different levels depending on gender. Similar findings were detected by MANOVA.

The overall multivariate tests of equality of mean vectors across the personality variables seem to show that differences exist (Wilks' lambda and other measures significant at .05 and with sufficient observed power over .8 for effects of the intercept, entrepreneurship, and gender, but not for the interaction term). The *F* tests of the model (see Table 3) also indicate significant effects for four out of five personality variables (openness, conscientiousness, extraversion, and agreeableness).

Main Effects

Results of the multi-nominal logistic regression are reported in Table 3. Both chi-square and likelihood ratio show a significant relationship between entrepreneurship and personality as a whole. Specifically, the differences between the four entrepreneurship groups (practicing, potential, maybe-, and non-entrepreneurs) were found dissimilar depending on the personality factor. In support of H1, therefore, the main effect related to openness was found highly significant at the .000 level. Therefore, differences between the four entrepreneurship groups tend to exist for the openness personality factor. As depicted in Figure 1, the differences in openness across the four groups are in the direction which supports H1 (practicing entrepreneurs tend to have higher levels of openness than other groups).

Figure 3
Extraversion

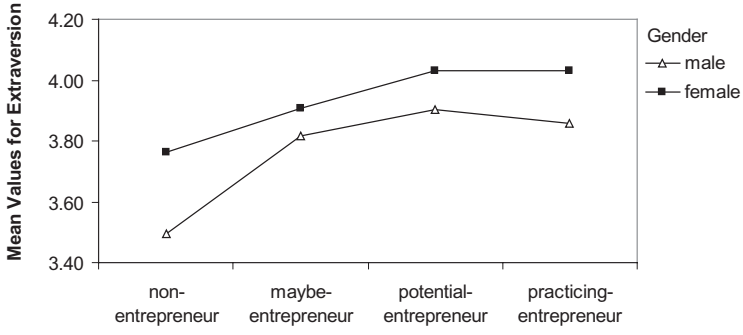
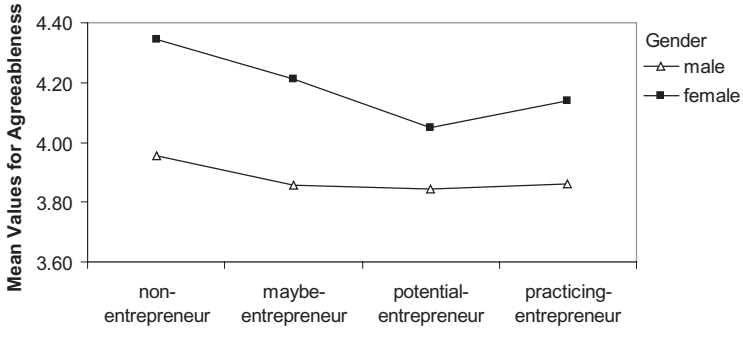


Figure 4
Agreeableness



H2 predicted a positive association between conscientiousness and entrepreneurship. Contrary to the expectations, no significant effect was detected (*sig*. .89). H3 received support since a positive association between extraversion and entrepreneurship was detected (*sig*. .002). H4 stipulated a negative association between agreeableness and entrepreneurship received enough support (*sig*. .016) and indicated that entrepreneurs may be less agreeable than non-entrepreneurs. H5 concerning the negative association between neuroticism and entrepreneurship did not receive support (*sig*. .725). The differences for these four factors are depicted in Figures 2, 3, 4 and 5.

Results of the multi-nominal logistic regression were found in support for the majority of hypotheses (−2 Log Likelihood was found significant in predicting entrepreneurship for personality factors (openness, extraversion and agreeableness) and gender separately; however, the results of the analysis with interaction terms were unstable due to the high number of cells with zero frequencies). When the main effects of the personality-entrepreneurship relationship were estimated on the male group and the female group separately, the −2 Log Likelihood was not found significant in predicting entrepreneurship for agreeableness which may to a large extent be gender-related.

Table B2 in Appendix B contains the MANOVA results for the main effects of entrepreneurship association with the personality factors. The differences between the four entrepreneurship groups (practicing, potential, maybe-, and non-entrepreneurs) were found dissimilar depending on the personality factor

Figure 5
Neuroticism

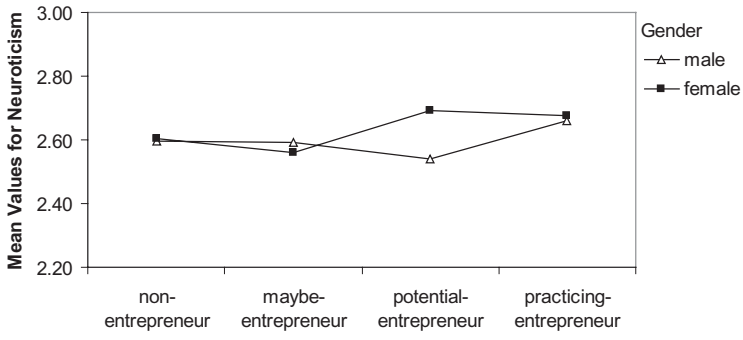


Table 3
Results of Multi-Nominal Logistic Regression (Likelihood Ratio Tests)

Model/Effect	-2 Log Likelihood	Chi-Square	*df*	Sig.
Model				
Intercept Only	615.38			
Final	520.48	94.90	45	0.000
Effect				
Intercept	520.48	0.00	0	
Openness	557.68	37.20	9	0.000
Conscientiousness	522.75	2.28	6	0.892
Extraversion	546.55	26.07	9	0.002
Agreeableness	540.74	20.26	9	0.016
Neuroticism	529.22	8.74	12	0.725

Goodness-of-fit: Pearson chi-square 366.89, 360 *df*, sig. .390, Deviance chi-square 319.35, 360 *df*, sig. .940.
Pseudo R-square: Cox and Snell .16, Nagelkerke .17, McFadden .07.

(the main effects: openness significant at the .001; conscientiousness not significant at the .85; extraversion significant at .003; agreeableness not significant at .05 (0.096), but indicated that when considering the .10 level entrepreneurs may be slightly less agreeable than non-entrepreneurs; neuroticism not significant at .414).

Gender differences (see Table 3) were detected for four personality factors (openness, *sig*. .041; conscientiousness, *sig*. .001; extraversion, *sig*. .009; agreeableness, sig. .000); the only non-significant difference was found for neuroticism. These findings partly support H6a—the effects of gender on the levels of personality factors: relative to women, men tend to score higher in openness, lower on conscientiousness, lower on extraversion, and lower on agreeableness.

Interaction Effects

Table B2 in Appendix B also contains the MANOVA results for testing the interaction effects (entrepreneurship-by-gender). All four multivariate tests indicated that the interaction effect is not significant at the .05 level. This means that the differences in means between the four entrepreneurship groups tend to be

roughly equal across the two gender groups for all personality factors collectively. All *F* tests were also found non-significant for each of the personality factors. These findings do not support H6b—the moderation effects of gender on the entrepreneurship-personality factors relationships.

Additional Findings Related to Entrepreneurship Groups

Some additional insights were gained by the analysis of homogenous subsets in which homogeneous subsets were formed at the .05 significance level and means for each of the five personality factors for groups in homogeneous subsets based on entrepreneurship groups were calculated. Graphical representations are shown in Figures 1, 2, 3, 4 and 5.

For the openness factor two main subsets emerged: (1) practicing entrepreneurs; and (2) other entrepreneurship groups (potential, maybe-, and non-entrepreneurs). It seems that openness can differentiate real-life entrepreneurs from other people. For the conscientiousness factor no differences were found (only one subset including all entrepreneurship groups). For the extraversion factor two main subsets emerged: (1) non-entrepreneurs; and (2) other entrepreneurship groups (maybe-, potential, and practicing entrepreneurs). It seems that non-entrepreneurs (those persons who will not set up their own firms in the future) tend to differ from other people on extraversion. Non-entrepreneurs tend to have lower levels of extraversion than other people. For the agreeableness factor two similar key subsets emerged: (1) non-entrepreneurs; and (2) other entrepreneurship groups (maybe-, potential, and practicing entrepreneurs). Hence, also in agreeableness non-entrepreneurs tend to differ from other people (non-entrepreneurs tend to have higher levels of agreeableness than other people). For the neuroticism factor no differences were found (only one subset including all entrepreneurship groups). In sum, these findings indicate that practicing entrepreneurs tend to score higher in openness than other people, non-entrepreneurs tend to score lower in extraversion and higher in agreeableness than other people, and conscientiousness and neuroticism tend not to differentiate between entrepreneurship-based groups.

The results of the one-way ANOVA were very similar and confirmed the multi-nominal regression and MANOVA findings presented above. When the control variable—person age—was used in MANOVA instead of the gender variable, only two significant main effects emerged (people 30 years old and younger were found to score lower in openness and higher in neuroticism than people aged more than 30 years) and no interaction effects were detected.

Discussion

The big five personality factors can be important for the manifestation of entrepreneurship in terms of firm start-up activities and/or intentions. As the findings of this study indicate, the openness personality factor may be the most important of the five factors for differentiating real-life entrepreneurs from other people. People who score higher than other people in personality traits of openness, that is, those who can be described as creative, imaginative, philosophical, intellectual, complex and deep, may tend to have a greater probability of becoming entrepreneurs than other people. We need to note that the analysis only showed a relationship (not predictability)—entrepreneurs tend to score higher on the openness dimension than other people. An explanation may be that being in a mental state of readiness to perceive and act on opportunity signals from the environment can differentiate entrepreneurs from other people. Also, the creative aspect of openness might influence someone to want to do things their own way (i.e., start their own business rather than conform to the norms, policies, procedures and culture which are predefined in established organizations).

Two personality factors—extraversion and to some extent agreeableness—may also be important for entrepreneurship. People who have no intention of starting up their own firms—non-entrepreneurs—tend to score lower in extraversion and somewhat higher in agreeableness than other people. People scoring lower on extraversion traits (i.e., talkative, bold, and energetic) may be highly unlikely to become entrepreneurs in comparison to other people who score higher on extraversion. An explanation of the relationship between extraversion and entrepreneurship may be related to the fact that, as an entrepreneur, one must wear many hats. As an entrepreneur, one must constantly build and maintain a network of relationships with suppliers, customers, employees and other stakeholders. Extraverted individuals tend to be more social and can use such a

personality characteristic to forge relationships which will be critical for business survival and growth.

This study found some evidence of the impact of the agreeableness factor on entrepreneurship. People who possess agreeableness traits, who are sympathetic, warm, kind and cooperative, will be less likely to become entrepreneurs or have an intention to become entrepreneurs in comparison to other people who score lower on agreeableness. It seems that the bright side of the agreeableness-related personality characteristics may be an important impediment to entrepreneurship intentions and behaviors; sympathy and kindness may be essential detrimental traits in new firm start-up decisions and activities. Also, it may be that start-up entrepreneurs may be less agreeable due to slimmer margins for error. With a lack of slack resources, start-up entrepreneurs may tend to be more focused and less concerned about agreeableness matters and more concerned with getting the job done. We would think that agreeable individuals might be more able to adjust to the norms, policies, procedures and culture of existing organizations. Thus, there might not be such a driving need to leave their existing environments in order to form their own organizations.

Two personality factors—conscientiousness and neuroticism—were found not to be very relevant for entrepreneurship. It may be striking and somewhat counterintuitive that organized, efficient, systematic and practical people may not be more likely to engage in entrepreneurship than other people. However, it seems that even if business planning can be important for firm start-ups (e.g., Hisrich, Peters, and Shepherd 2005) and for the growth of small firms (e.g., Skrt and Antoncic 2004), most entrepreneurs tend not to write business plans (Bhide 1994) and, as the findings of this study indicate, may not have planning-related personality traits. This finding may be consistent with the distinction between entrepreneurial and administrative-managerial behavior (Stevenson and Sahlman 1986) where planning and organization activities may be more within the realm of administrative managers than promoters (entrepreneurs). Strategy variables including conscious strategy making may be important for growth of small firms, but despite this fact many small firm entrepreneurs consciously refuse to grow (Storey 2000). High growth small and medium-sized enterprises can be distinguished more by the strategies and actions of managers than by their profile characteristics (firm size, age, and industry) (Smallbone, Leig, and North 1995). Management and marketing strategies can be crucial for competitiveness (Gomezelj Omerzel and Mihalic 2008). Entrepreneurs tend to be important for their firm performance (Storey 1994), in particular, in business planning and growth of a small firm it is also very important the entrepreneur's knowledge including the entrepreneur's know-how (Chrisman, Bauerschmidt, and Hofer 1998; Storey 1994), work experience, functional skills, formal education and self-confidence (Gomezelj Omerzel and Antoncic 2008). A conclusion may be that planning may be important in entrepreneurship as a choice and a skill and not as a predisposition in terms of the conscientiousness personality traits.

Contrary to the expectations, gender was not found to be a moderator in the personality-entrepreneurship relationship. However, the findings of this study indicated some important effects of gender on the levels of personality factors: men (relative to women) can be seen as scoring high on openness, low on conscientiousness, low on extraversion, and low on agreeableness. This would suggest that gender should be used in entrepreneurship personality studies at least as a control variable.

Contributions and Implications

The key contribution of this study relates to the finding that the big five personality traits can potentially be used for predicting entrepreneurial start-ups (openness) and entrepreneurial intentions (extraversion and agreeableness). We have contributed new evidence on the existence of entrepreneur-related personality characteristics by extending the big five personality research in entrepreneurship to an investigation of the psychological determinants of real-life entrepreneurship start-up decisions and intentions. In methodological terms, we contrasted the big five personality factors with four groups of people on the basis of their entrepreneurial activity or intentions (practicing entrepreneurs, potential entrepreneurs, maybe-entrepreneurs, and non-entrepreneurs). We have discovered that this division into four groups may be much more insightful than a more traditional classification into two groups (entrepreneurs versus non-entrepreneurs) since

in some instances non-entrepreneurs may be more like maybe-entrepreneurs and prospective entrepreneurs (the openness factor), while in some other personality elements practicing-entrepreneurs may be more like prospective entrepreneurs and maybe-entrepreneurs (the extraversion and agreeableness factors). The key difference in personality between practicing entrepreneurs versus "potential" and "undecided" entrepreneurs was found in the levels of the openness factor (practicing entrepreneurs tend to be more creative, imaginative, philosophical, intellectual, complex and deep).

The study has implications for research, practice and policy. Entrepreneurship researchers may like to consider putting the entrepreneur, including his or her personality, back among the crucial elements of new firm formation. In particular, the big five personality factors should be given more emphasis. When studying the determinants of entrepreneurship, researchers need to carefully pay attention to the level of entrepreneurial activities or intentions since some non-entrepreneurial groups may be more similar to entrepreneurs than others (potential entrepreneurs need to be clearly differentiated from maybe-entrepreneurs and particularly from non-entrepreneurs). When studying personality characteristics, controlling for gender can be considered a must because men and women may differ on some personality factors.

In practice it may be useful for people who are thinking about an entrepreneurial career to do self-testing and to evaluate the fit of their personality with the requirements of their potential career choice. Individuals and institutions making considerations about the equity or debt financing of entrepreneurs-to-be may find it handy to acquire information about their personality-based entrepreneurship potential. Policy-makers might like to consider promoting and enhancing entrepreneurship-predictive personality factors (particularly openness) early on in the education system among children, teens and students who have the potential for the big five personality factor changes.

Limitations, Future Research Opportunities, and Conclusion

While this study was not designed to predict entrepreneurial intentions and activity, the results do show some clear associations between personality characteristics and entrepreneurial behavior. Future studies must be ex-ante and longitudinal in nature in order to establish the predictive capability of the big five personality factors and entrepreneurship.

The study was limited to the big five personality traits and did not include other personality-related elements. For example, this study did not take into consideration the cognitive mechanisms of entrepreneurs (for example, Baron 1998; Wadeson 2006), goals that motivate entrepreneurs (such as, for example, those included in goal-structure factors (Kuratko, Hornsby, and Naffziger 1997): extrinsic rewards, independence/autonomy, intrinsic rewards, family security; except that our study included independence and autonomy as important traits of emotional stability), knowledge and ability-related individual characteristics of entrepreneurs (Gartner, Starr, and Bhat 1999), and entrepreneurial identity (Hoang and Gimeno 2005). We recognize that the big personality traits can be considered distal and aggregated concepts in comparison to proximal traits (such as need for achievement, risk-taking, autonomy, locus of control, self-efficacy), which may be more specific to entrepreneurship, in particular in relationship to specific decisions, which are important for firm-related performance concepts (such as sales growth) (Rauch and Frese 2007). The decision to start a new firm can be considered a personal career choice (Hisrich, Peters, and Shepherd 2005) and, in our opinion, the firm start-up may be considered a broader and a person-based concept in comparison to other firm-specific performance concepts and can be predicted well by broad traits—the big five. The big five personality factors were the focus of our study, because these broad personality traits received a wide-ranging research attention in psychology. The study did not include other general and widely used constructs, such as Myers-Briggs Type Indicator, which includes four scales: 1. Extraversion-Introversion, 2. Sensing-Intuitive, 3. Thinking-Feeling, and 4. Judging-Perceiveing (for the overview of this and other scales, which can be usable in entrepreneurship personality research, see Chell 2008). The data were collected in one country, from small firm entrepreneurs and from people who do not have their own firms. In future research, the study could be replicated with samples of larger sizes; cross-country comparisons and comparisons with medium-size-firm and large-size-firm entrepreneurs and

intrapreneurs may provide some additional insights. We also need more longitudinal studies to establish predictability.

The focus of this study was on the personality of the entrepreneur so other elements that may be important for entrepreneurial start-up decisions were not included. For example, the changes of environment may have impact to personality traits; becoming and acting as an entrepreneur as aspects of the entrepreneur's learning process, as well as changes in the entrepreneur's relations with other people, may affect the entrepreneur's personality characteristics (Littunen 2000). When taking into consideration the gender variable, the study did not take into account specific situations (detailed firm, industry and situation specific characteristics), which may bring a more detailed comparative analysis of males and females in the decisions related to firm formation. Personality characteristics may be combined with other characteristics (for example, environmental, sociological and/or opportunity-related, economic status and life cycle considerations might be important) in future research.

The sample and measurement instruments may represent other limitations. The sample used in this study was at the limit in terms of size for the 4-by-2 MANOVA; a larger sample would be better at detecting smaller effect sizes. Despite this limitation, the study has discovered some important differences which would become even more evident if a larger sample had been used. This study used a short version of the measure of the big five personality factors (Mini-Markers Inventory from Saucier 1994) which is not complete due to the relatively low number of measurement items (40) in comparison to some other more extensive scales, but is easy to administer and has shown internal consistency and cross-cultural comparability, with the exception of one item (un-envious), which may be difficult to translate in terms of meaning. Researchers may like to consider using more detailed measurement scales in future research in order to explore other detailed personality differences between entrepreneurs and less entrepreneurial groups.

Despite these limitations, this study has contributed to the personality-related research in entrepreneurship. The big five personality factors can be important predictors of real-life entrepreneurship and of entrepreneurial intentions.

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Appendix A

Table A1
Questionnaire Items—Personality

The big five personality factors (Saucier 1994; Singh and De Noble 2003):

Rate the accuracy of the following adjectives for you as a person:

		Very Untrue				Very True
1.	Talkative	1	2	3	4	5
2.	Extraverted	1	2	3	4	5
3.	Bold	1	2	3	4	5
4.	Energetic	1	2	3	4	5
5.	Shy	1	2	3	4	5
6.	Quiet	1	2	3	4	5
7.	Bashful	1	2	3	4	5
8.	Withdrawn	1	2	3	4	5
9.	Sympathetic	1	2	3	4	5
10.	Warm	1	2	3	4	5
11.	Kind	1	2	3	4	5
12.	Cooperative	1	2	3	4	5
13.	Cold	1	2	3	4	5
14.	Unsympathetic	1	2	3	4	5
15.	Rude	1	2	3	4	5
16.	Harsh	1	2	3	4	5
17.	Organized	1	2	3	4	5
18.	Efficient	1	2	3	4	5
19.	Systematic	1	2	3	4	5
20.	Practical	1	2	3	4	5
21.	Disorganized	1	2	3	4	5
22.	Sloppy	1	2	3	4	5
23.	Inefficient	1	2	3	4	5
24.	Careless	1	2	3	4	5
25.	Unenvious	1	2	3	4	5
26.	Relaxed	1	2	3	4	5
27.	Moody	1	2	3	4	5
28.	Jealous	1	2	3	4	5
29.	Temperamental	1	2	3	4	5
30.	Envious	1	2	3	4	5
31.	Touchy	1	2	3	4	5
32.	Fretful	1	2	3	4	5
33.	Creative	1	2	3	4	5
34.	Imaginative	1	2	3	4	5
35.	Philosophical	1	2	3	4	5
36.	Intellectual	1	2	3	4	5
37.	Complex	1	2	3	4	5
38.	Deep	1	2	3	4	5
39.	Uncreative	1	2	3	4	5
40.	Unintellectual	1	2	3	4	5

Table A2
Questionnaire Item—Entrepreneurship

Entrepreneurship (Antoncic et al. 2007a):
How many years do you have your own firm?
A. more than 30 years
B. over 20 to 30 years
C. over 10 to 20 years
D. over 5 to 10 years
E. over 2 to 5 years
F. over 1 to 2 years
G. 1 year or less
H. I do not have my own firm yet, but will found one in less than one year
I. I do not have my own firm yet, but will found one in one year
J. I do not have my own firm yet, but will found one in two to three years
K. I maybe will sometime found my own firm
L. I do not intend to found my own firm

Appendix B

Table B1
Descriptive Statistics

Personality Factor	Entrepreneurial Group	Gender	Mean	Standard. Deviation	*N*
Openness	Non-entrepreneur	Male	3.77	0.47	22
		Female	3.71	0.49	50
		Total	3.73	0.48	72
	Maybe-Entrepreneur	Male	3.80	0.47	114
		Female	3.72	0.43	141
		Total	3.76	0.44	255
	Potential-Entrepreneur	Male	3.91	0.37	33
		Female	3.78	0.37	21
		Total	3.86	0.37	54
	Practicing-Entrepreneur	Male	4.08	0.42	111
		Female	3.94	0.53	54
		Total	4.03	0.47	165
	Total	Male	3.92	0.46	280
		Female	3.77	0.46	266
		Total	3.85	0.47	546
Conscientiousness	Non-entrepreneur	Male	4.02	0.59	22
		Female	4.26	0.48	50
		Total	4.19	0.52	72
	Maybe-Entrepreneur	Male	4.09	0.48	114
		Female	4.22	0.46	141
		Total	4.16	0.47	255
	Potential-Entrepreneur	Male	4.18	0.43	33
		Female	4.23	0.46	21
		Total	4.20	0.44	54
	Practicing-Entrepreneur	Male	4.06	0.52	111
		Female	4.30	0.42	54
		Total	4.14	0.50	165
	Total	Male	4.08	0.50	280
		Female	4.25	0.45	266
		Total	4.16	0.48	546

Table B1
Continued

Personality Factor	Entrepreneurial Group	Gender	Mean	Standard. Deviation	*N*
Extraversion	Non-entrepreneur	Male	3.49	0.54	22
		Female	3.76	0.79	50
		Total	3.68	0.73	72
	Maybe-Entrepreneur	Male	3.82	0.53	114
		Female	3.91	0.56	141
		Total	3.87	0.55	255
	Potential-Entrepreneur	Male	3.90	0.55	33
		Female	4.03	0.53	21
		Total	3.95	0.54	54
	Practicing-Entrepreneur	Male	3.86	0.63	111
		Female	4.03	0.51	54
		Total	3.91	0.60	165
	Total	Male	3.82	0.58	280
		Female	3.91	0.60	266
		Total	3.86	0.59	546
Agreeableness	Non-entrepreneur	Male	3.95	0.41	22
		Female	4.34	0.49	50
		Total	4.23	0.50	72
	Maybe-entrepreneur	Male	3.85	0.47	114
		Female	4.21	0.46	141
		Total	4.05	0.49	255
	Potential-Entrepreneur	Male	3.84	0.43	33
		Female	4.05	0.42	21
		Total	3.92	0.44	54
	Practicing-Entrepreneur	Male	3.86	0.47	111
		Female	4.14	0.47	54
		Total	3.95	0.49	165
	Total	Male	3.86	0.46	280
		Female	4.21	0.47	266
		Total	4.03	0.49	546
Neuroticism	Non-entrepreneur	Male	2.60	0.43	22
		Female	2.60	0.56	50
		Total	2.60	0.52	72
	Maybe-Entrepreneur	Male	2.59	0.53	114
		Female	2.56	0.52	141
		Total	2.57	0.52	255
	Potential-Entrepreneur	Male	2.54	0.51	33
		Female	2.69	0.44	21
		Total	2.60	0.49	54
	Practicing-Entrepreneur	Male	2.66	0.53	111
		Female	2.68	0.50	54
		Total	2.66	0.52	165
	Total	Male	2.61	0.52	280
		Female	2.60	0.52	266
		Total	2.60	0.52	546

Table B2
Results of MANOVA (Tests of Between-Subjects Effects)

Source	Personality Variable (Factor)	*F*	Sig.	Observed Power(a)
Corrected Model	Openness[a]	7.09	0.00	1.00
	Conscientiousness[b]	2.70	0.01	0.91
	Extraversion[c]	2.58	0.01	0.89
	Agreeableness[d]	12.03	0.00	1.00
	Neuroticism[e]	0.64	0.72	0.28
Intercept	Openness	25073.33	0.00	1.00
	Conscientiousness	26041.39	0.00	1.00
	Extraversion	14698.66	0.00	1.00
	Agreeableness	25952.34	0.00	1.00
	Neuroticism	8709.28	0.00	1.00
Entrepreneurship	Openness	10.37	0.00	1.00
	Conscientiousness	0.26	0.85	0.10
	Extraversion	4.73	0.00	0.90
	Agreeableness	2.13	0.10	0.54
	Neuroticism	0.95	0.41	0.26
Gender	Openness	4.19	0.04	0.53
	Conscientiousness	10.43	0.00	0.90
	Extraversion	6.82	0.01	0.74
	Agreeableness	37.62	0.00	1.00
	Neuroticism	0.41	0.52	0.10
Interaction Term:	Openness	0.25	0.86	0.10
Entrepreneurship	Conscientiousness	0.81	0.49	0.23
Gender	Extraversion	0.42	0.74	0.13
	Agreeableness	0.61	0.61	0.18
	Neuroticism	0.48	0.69	0.15

[a]R Squared = .08 (Adjusted R Squared = .07).
[b]R Squared = .03 (Adjusted R Squared = .02).
[c]R Squared = .03 (Adjusted R Squared = .02).
[d]R Squared = .14 (Adjusted R Squared = .12).
[e]R Squared = .01 (Adjusted R Squared = −.01).