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The Relationship of Personality to Entrepreneurial Intentions and Performance: A Meta-Analytic Review

Hao Zhao

Rensselaer Polytechnic Institute

Scott E. Seibert

University of Iowa

G. T. Lumpkin

Syracuse University

A set of meta-analyses were conducted to examine the relationship of personality to outcomes associated with two different stages of the entrepreneurial process: entrepreneurial intentions and entrepreneurial performance. A broad range of personality scales were categorized into a parsimonious set of constructs using the Five Factor model of personality. The results show that four of the Big Five personality dimensions were associated with both dependent variables, with agreeableness failing to be associated with either. Multivariate effect sizes were moderate for the full set of Big Five personality variables on entrepreneurial intentions (multiple $R = .36$) and entrepreneurial performance (multiple $R = .31$). Risk propensity, included as a separate dimension of personality, was positively associated with entrepreneurial intentions but was not related to entrepreneurial performance. These effects suggest that personality plays a role in the emergence and success of entrepreneurs.

Keywords: *entrepreneurship; personality; meta-analysis*

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Corresponding author: Hao Zhao, Rensselaer Polytechnic Institute, 110 8th Street Pitts 2120, Troy, NY 12180, USA

E-mail: zhaoh@rpi.edu

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Interest in the role of personality in entrepreneurship has recently seen a reemergence after a hiatus of almost 20 years (e.g., Baum, Locke, & Smith, 2001; Ciavarella, Buchholtz, Riordan, Gatewood, & Stokes, 2004). By the late 1980s, narrative reviews of the literature had concluded that there was no consistent relationship between personality and entrepreneurship and that future research using the trait paradigm should therefore be abandoned (e.g., Brockhaus & Horwitz, 1986; Gartner, 1988). More recently, however, other scholars (e.g., Rauch & Frese, 2007; Shane, Locke, & Collins, 2003) have suggested that the contradictory findings in the earlier literature on personality and entrepreneurship may be because of the lack of theoretically derived hypotheses and various research artifacts. Therefore, meta-analysis is an appropriate technique in this situation because it can correct for artifacts such as sampling error and poor reliability, which could not be accounted for in narrative reviews (Dalton & Dalton, 2005).

Several recent meta-analyses have shown that contrary to the conclusions drawn from earlier narrative reviews, entrepreneurs do differ from other groups (e.g., managers) in terms of a broad range of personality. For example, Stewart and Roth (2001, 2004) found entrepreneurs to be significantly higher in risk propensity than managers, and Collins, Hanges, and Locke (2004) and Stewart and Roth (2007) found entrepreneurs to be significantly higher on achievement motivation. Zhao and Seibert (2006) performed a more comprehensive analysis by using the Five Factor model (FFM) of personality to categorize the diverse range of scales used in previous research on personality and entrepreneurial status. Their meta-analysis showed that entrepreneurs are higher on conscientiousness, emotional stability, and openness to experience and are lower on agreeableness than nonentrepreneur managers. Although these meta-analytic studies provide evidence that entrepreneurs differ from managers in terms of personality, scholars have a very limited theoretical understanding of the processes through which these group differences in personality emerge (Rauch & Frese, 2007).

The purpose of the current study is to extend our understanding of the role of personality in the entrepreneurial process. We use the FFM of personality and meta-analytical methods to integrate previous research on the relationship between personality and two critical intermediate outcomes that enable the attainment of entrepreneurial status: the intention to become an entrepreneur and entrepreneurial firm performance (Baron, 2007; Venkataraman, 1997). The intention to find and manage one's own business is widely recognized as the first critical step in the process of becoming an entrepreneur (e.g., Bird, 1988; Krueger, Reilly, & Carsrud, 2000). The second outcome, entrepreneurial firm performance, underlies the individual's ability to continue as an entrepreneur. Although some successful entrepreneurs may choose to no longer continue as the owner and manager of their own business, virtually all unsuccessful entrepreneurs will eventually be forced to abandon entrepreneurship. Personality effect on these two entrepreneurial outcomes should therefore explain how the personality differences among entrepreneur and nonentrepreneur groups identified in previous meta-analytical studies arises. Entrepreneurial intentions and entrepreneurial performance are also important outcomes in themselves. This study will provide the most comprehensive meta-analytical review of personality and entrepreneurial outcomes to date.

The current study thus makes three important contributions to the literature. First, the study advances our theoretical understanding of the processes that underlie the emergence of personality differences between entrepreneurs and nonentrepreneurial groups. Consistent with recent stage models of entrepreneurship (e.g., Baron, 2007; Venkataraman, 1997), our analyses

promise to provide a much more specific understanding of the role of personality in entrepreneurship by examining specific outcomes at distinct stages of the entrepreneurial process. Second, the study provides the most comprehensive assessment of the effects of personality on entrepreneurial intentions and new venture performance of which we are aware. No previous meta-analytical studies have examined the relationship of personality to entrepreneurial intentions, and only Collins et al. (2004) have used meta-analytical techniques to examine the relationship of one personality trait—achievement motivation—to entrepreneurial performance. This is the only study we are aware of that uses the framework of the FFM to synthesize results from the full set of primary studies on personality and entrepreneurial intentions and performance. Finally, this study uses theories of career choice (e.g., Holland, 1985), person–environment fit (Kristof, 1996), and work performance (Barrick & Mount, 1991) to explain the relationship between personality and entrepreneurial intentions and performance. Because these theories have rarely been applied in the entrepreneurial context, this study will help scholars understand how these processes may function in the context of starting and running one's own business. Understanding the factors and processes related to the formation of entrepreneurial intentions and new venture performance may help promote greater entrepreneurial success with fewer wasted financial and personal resources.

Theory and Hypotheses

The Big Five Personality Model: Plus One

The emergence of the FFM of personality in the 1990s has provided a framework for organizing a vast and often confusing variety of personality variables into a meaningful, parsimonious, and yet relatively comprehensive set of broad personality constructs (Costa & McCrae, 1992; Digman, 1990). Although considerable consensus has emerged that five broad personality dimensions (namely, emotional stability, extraversion, openness to experience, agreeableness, and conscientiousness) capture the basic structure of human personality, some personality constructs cannot be readily assigned to one and only one of the Big Five dimensions. The most important and yet controversial of these constructs for entrepreneurial research is risk propensity (Miner & Raju, 2004; Rauch & Frese, 2007). Some scholars (e.g., Nicholson, Fenton-O'Creevy, Soane, & Willman, 2005) suggest that risk propensity is a compound personality trait reflecting a specific combination of scores on all five dimensions of personality (namely, high extraversion, openness, and emotional stability combined with low agreeableness and low conscientiousness). Others argue that risk propensity forms a separate sixth dimension of personality not captured by the Big Five (Jackson, 1994; Paunonen & Jackson, 1996). Because of the theoretical importance but taxonomical uncertainty of risk propensity as a trait, we include it as an additional personality construct outside of the FFM.

Personality, Entrepreneurial Intentions, and Entrepreneurial Firm Performance

Consistent with previous literature (e.g., Rauch & Frese, 2007; Stewart & Roth, 2001), we define an entrepreneur as the founder, owner, and manager of a small business. For the purpose of this meta-analysis, we define entrepreneurial intention as the expressed

behavioral intention to become an entrepreneur (Bird, 1988). The behavioral intention construct derives from the theory of reasoned action (Fishbein & Ajzen, 1975) and is considered to be the most immediate antecedent of a given behavior. Following Baron (2007), we define firm performance in terms of indicators of firm survival, growth, and profitability.

Career choice theory (e.g., Holland, 1997; Lent, Brown, & Hackett, 1994) and person–environment fit theory (Judge & Kristof-Brown, 2004; Kristof-Brown, Zimmerman, & Johnson, 2005) provide the theoretical basis for the hypotheses of the study. Considerable empirical evidence based on these theories shows that people choose work environments that match their personality, values, needs, and interests. Founding and managing a new business venture requires the entrepreneur to fulfill a number of unique task demands or work roles such as innovator, risk taker and bearer, executive manager, relationship builder, risk reducer, and goal achiever (Chen, Greene, & Crick, 1998). This academic view of entrepreneurial work is widely shared within the general population (e.g., Baron, 1999; Locke, 2000). Consistent with the processes identified by career choice and person–environment fit theory, we expect individuals to be attracted to entrepreneurship based on the self-perceived match between their own personality traits and the task demands of entrepreneurship.

Previous research has also shown that several of the Big Five personality dimensions are related to employee job performance (e.g., Barrick & Mount, 1991). Extending the logic of this research to entrepreneurial firm performance, we expect people who score higher on personality traits related to behaviors associated with the entrepreneurial role to be more successful entrepreneurs. This is because they will be more likely to engage in the type of behaviors called for, will do so with less conscious effort or strain, and will be more satisfied, committed, and motivated in those situations. The task behavior of an entrepreneur is likely to have an important influence on firm performance because of the critical strategic role of the entrepreneur in the success of a new venture (Markman & Baron, 2003; Rauch & Frese, 2007). For example, work by Baum and his colleagues (Baum & Locke, 2004; Baum et al., 2001) demonstrates the indirect effect the traits of entrepreneurs have on new venture performance through constructs such as motivation, strategic choice, growth goals, and vision communication.

In sum, considerable theory and empirical research suggest that personality constructs should be viewed as an important determinant of the intention to become an entrepreneur as well as the subsequent performance of the entrepreneurial firm. Below we generate the specific hypotheses of the study based on the defining elements of each personality dimension and the types of tasks, roles, and behaviors thought to be involved in the entrepreneurial role.

Hypotheses

Conscientiousness. Conscientiousness is a personality dimension that describes an individual's level of achievement, work motivation, organization and planning, self-control and acceptance of traditional norms, and virtue and responsibility toward others (Costa & McCrae, 1992; Roberts, Chernyshenko, Stark, & Goldberg, 2005). According to McClelland's (1961) early work on achievement motivation, individuals who score high on need for achievement are attracted to work situations in which they have personal control over

outcomes, face moderate risk of failure, and experience direct and timely feedback on their performance. McClelland surmised that high-need-for-achievement individuals would be attracted to entrepreneurship because it offers more of these conditions than most traditional forms of employment. Certain other traits under the conscientiousness dimension, such as work goal orientation and perseverance are also likely to be associated with the entrepreneurial role. For example, Markman and Baron (2003) suggest that perseverance is called for by entrepreneurial work, while others have emphasized the importance of motivation, persistence, and hard work (e.g., Chen et al., 1998; Baum & Locke, 2004). Work goal orientation, hard work, and perseverance in the face of daunting obstacles to achieve one's goals are closely associated with entrepreneurship in the popular imagination (Locke, 2000). All these traits can be associated with conscientiousness. Based on the proposition that individuals are attracted to roles that match their personality and interests, we expect conscientious people to be attracted to entrepreneurship.

Hypothesis 1a: Conscientiousness will be positively associated with entrepreneurial intentions.

We also expect conscientiousness to be positively associated with entrepreneurial firm performance. Many scholars regard conscientiousness as the primary work motivation variable (e.g., Costa & McCrae, 1992; Gellatly, 1996). It is the most consistent personality predictor of job performance across all types of work and occupations (e.g., Barrick & Mount, 1991). Baum and Locke (Baum & Locke, 2004; Baum et al., 2001) specifically examined entrepreneurial firm growth and found evidence supporting the role of motivational traits as antecedents of specific entrepreneur behaviors, which were in turn related to new venture growth.

Hypothesis 1b: Conscientiousness will be positively associated with entrepreneurial performance.

Openness to experience. Openness to experience is a personality trait that describes someone who is intellectually curious, imaginative, and creative; someone who seeks out new ideas and alternative values and aesthetic standards. Openness is empirically distinct from mental ability but is correlated with aspects of intelligence related to creativity, such as divergent thinking (McCrae, 1987).

One of the defining characteristic of entrepreneurship is creativity and proclivity to bring about innovative change or, in Schumpeter's (1942/1976) famous phrase, "creative destruction." In the popular imagination, entrepreneurs are regarded as heroes who pursue their creative vision even in the face of overwhelming resistance from more conventional thinkers (e.g., Locke, 2000). Self-employment is a nontraditional mode of employment that is itself more likely to appeal to individuals who are willing to experiment with a new or unconventional lifestyle.

Hypothesis 2a: Openness to experience will be positively related to entrepreneurial intentions.

Success in a critical early task of entrepreneurship—opportunity recognition—is especially likely to be related to imagination, creativity, and openness to new ideas (Ciavarella

et al., 2004; Morrison, 1997). Entrepreneurs are also likely to rely on their creativity to solve day-to-day problems and formulate firm strategies using the limited resources at their disposal (e.g., Baron, 2007; Schumpeter, 1942/1976; Zhao & Seibert, 2006). Although not consistently related to job performance in all occupations, openness is related to performance in learning situations such as school and workplace training (Barrick & Mount, 1991). Successful entrepreneurship is also likely to require constant information monitoring and learning to keep up with changing tastes and market trends, competitor behavior, and new technologies.

Hypothesis 2b: Openness to experience will be positively related to entrepreneurial performance.

Emotional stability. People who are emotionally stable are described as calm, stable, even-tempered, and hardy. Entrepreneurs in both the popular imagination and the academic literature are typically described as hardy, optimistic, and steady in the face of social pressure, stress, and uncertainty (Baron, 1999; Locke, 2000). They take on physical and emotional burdens, and they press ahead where others might be discouraged by obstacles, setbacks, or self-doubt. These entrepreneurial traits and behaviors describe someone with a high level of emotional stability. People low on emotional stability (also referred to as high neuroticism), on the other hand, feel vulnerable to psychological stress and experience a range of negative emotions more frequently and intensely, including anxiety and worry, depression, and low self-esteem. They are sensitive to negative feedback and tend to become discouraged by small failures. They may feel worried, hopeless, or panicked in response to difficult situations. Entrepreneurs take on a great deal of personal responsibility for the success or failure of their new venture. Pressures include a heavy personal workload, critical decision making with little precedent as a guide, and often considerable financial consequences at stake. People low on emotional stability are unlikely to want to take on the personal responsibilities and strains associated with the entrepreneurial role.

Hypothesis 3a: Emotional stability will be positively related to entrepreneurial intentions.

People who are low on emotional stability are also likely to perform poorly in the entrepreneurial role. Meta-analytical results indicate that emotional stability is consistently and positively related to job performance across occupations (Barrick, Mount, & Judge, 2001). The role of entrepreneur is likely to be even more challenging and stressful than most traditional types of employment. This is because starting and operating one's own business involves new and unanticipated challenges, highly uncertain outcomes, and high personal stakes in the outcome. High levels of anxiety, depression, and negative moods such as anger, hostility, and depression are likely to interfere with one's ability to make sound decisions, put in the amount of effort required, persist in the face of obstacles or criticism, and effectively lead and influence others. Judge, Bono, Ilies, and Gerhardt's (2002) meta-analytical findings show that emotional stability is positively related to leadership emergence and effectiveness. Entrepreneurs high in emotional stability are more likely to cope with problems and high stress through positive thinking and direct action (Costa & McCrae, 1992). They behave in a calm and confident manner and focus on the tasks at hand even under stress and thus should perform better in the entrepreneurial role.

Hypothesis 3b: Emotional stability will be positively related to firm performance.

Extraversion. People high on extraversion are gregarious, outgoing, warm, and friendly; they are energetic, active, assertive, and dominant in social situations; they experience more positive emotions and are optimistic; and they seek excitement and stimulation. Assertiveness, energy, a high activity level, and optimism are traits that have been associated with people's perception of entrepreneurs (e.g., Baron, 1999; Locke, 2000). Research using Holland's vocational typology shows that extraverts are attracted to enterprising (i.e., business) occupations (Costa, McCrae, & Holland, 1984). An entrepreneurial career may appear to be more stimulating and exciting than many traditional business occupations, and thus more appealing to extraverts. In addition, entrepreneurs can be viewed as the leaders of their new venture teams (Vecchio, 2003), and extraversion and its associated components, such as energy, assertiveness, and sociability, are associated with people's implicit perceptions of the leadership role (Lord, DeVader, & Alliger, 1986). The match between the traits of extraversion and the attributes associated with leading a new venture lead us to expect extraverts to be more attracted to entrepreneurship.

Hypothesis 4a: Extraversion will be positively related to entrepreneurial intention.

We also expect the entrepreneur's level of extraversion to be positively related to firm performance. Many of the tasks engaged in by entrepreneurs are likely to involve social interaction, including the communication of vision and enthusiasm, building networks with outside backers and other constituents, establishing relationships among employees and partners, and negotiating deals with suppliers and customers (Markman & Baron, 2003). Meta-analytical results show that extraversion is positively related to job performance for managers and salespeople, similar to occupations that also involve high levels of social interaction (Barrick et al., 2001). Vecchio (2003) has highlighted the many similarities between the dynamics of leadership and the task of leading an entrepreneurial venture. Judge et al.'s (2002) meta-analytical results show extraversion to be the strongest personality predictor of leadership. Because the traits associated with extraversion fit the task demands of the entrepreneurial role, we expect extraversion to be positively related to entrepreneurial firm performance.

Hypothesis 4b: Extraversion will be positively related to firm performance.

Agreeableness. Agreeableness is a dimension that assesses one's attitude and behavior toward other people. People high on agreeableness are characterized as trusting, altruistic, cooperative, and modest. They show sympathy and concern for the needs of others and tend to defer to others in the face of conflict. Someone low on agreeableness can be characterized as manipulative, self-centered, suspicious, and ruthless. Barrick, Mount, and Gupta (2003) reported that people high on agreeableness are most likely to have career interests in social occupations such as social work and teaching, rather than business, because those occupations provide frequent interpersonal interactions where they can work for the benefit of others. Entrepreneurship involves withdrawing from or eschewing traditional employment settings where trusting and helping relationships may be formed. Entrepreneurship involves

establishing a for-profit enterprise that is built around the entrepreneur's own needs and interests (Singh & DeNoble, 2003). The entrepreneur must fight hard for the survival of the new businesses, sometimes to the detriment of previous employers, partners, suppliers, and even one's own employees. Given the limited leeway for altruistic behavior and the high likelihood of guarded and even conflictual interpersonal relationships associated with entrepreneurship, highly agreeable people are unlikely to find the entrepreneurial role an attractive one.

Hypothesis 5a: Agreeableness will be negatively related to entrepreneurial intentions.

We also expect agreeableness to be negatively related to entrepreneurial success. Some theorists have viewed the ability to build trusting relationships with venture capitalists (e.g., Cable & Shane, 1997) or among founding team members (e.g., Eisenhardt & Schoonhoven, 1990) as a critical element of entrepreneurial success. However, being too trusting may be detrimental if it leads to gullibility and easy exploitation by others. Entrepreneurs typically have only very limited resources and a small margin for error; they often do not have a long-term knowledge of or experience with business partners, clients, or investors where trust could be reasonably developed. The ability to drive hard bargains, look out for one's own interests, and even manipulate others may be more important skills for survival and growth (Zhao & Seibert, 2006). Consistent with this logic, we expect less agreeable individuals to be more successful as entrepreneurs.

Hypothesis 5b: Agreeableness will be negatively related to firm performance.

Risk propensity. Risk propensity can be defined as a personality trait involving the willingness to pursue decisions or courses of action involving uncertainty regarding success or failure outcomes (Jackson, 1994). Although situational elements can play a large role in one's preference for risk (e.g., March & Shapira, 1987), research suggests that individual predispositions do influence behavior across situations involving uncertainty or risk (e.g., Jackson, Hourany & Vidmar, 1972; Sitkin & Weingart, 1995). In this study, as noted above, risk propensity is treated as a personality dimension separate from those established in the FFM (e.g., Paunonen & Jackson, 1996).

Classic definitions of the entrepreneur as one who is willing to bear risk can be attributed to Cantillon in the 18th century (Cantillon, 1755/1931), Mill in the 19th century (Mill, 1848), and Knight in the 20th century (Knight, 1921). Modern scholars continue to view the proclivity to take risk as an important trait associated with entrepreneurs (e.g., Baron, 2007; Markman & Baron, 2003; Stewart & Roth, 2001), with some referring to risk-taking propensity as a "hallmark of the entrepreneurial personality" (Begley & Boyd, 1987). It is clear that risk-taking propensity is a key attribute associated with entrepreneurs in the popular imagination. For example, Baron (1999) and Chen et al. (1998) found risk propensity to be associated with people's stereotype of the entrepreneur. Based on the process of person-environment matching, we therefore expect people who score high on risk propensity to be more attracted to entrepreneurship.

Hypothesis 6a: Risk propensity will be positively related to entrepreneurial intention.

Although willingness to bear risk may be critical for initiating a new venture, we believe that risk propensity as a personal disposition may not be beneficial for subsequent entrepreneurial firm performance. The paradoxical role of risk propensity is reflected in previous scholars' discussions of entrepreneurship. For example, although classic definitions are built around the idea that the entrepreneur is one who undertakes risk (e.g., Knight, 1921), entrepreneurs are also seen as people who manage, minimize, or reduce risk (e.g., Miner, 1993). Chen et al. (1998) propose both "risk taker" and "risk reducer" roles for entrepreneurs, whereas McClelland (1961) proposes a moderate preference (i.e., 50-50 odds of success) for risk among successful entrepreneurs. Empirical results relating risk propensity to entrepreneurial status reflect these conflicting points of view (cf. Miner & Raju, 2004; Stewart & Roth, 2004).

Baron (2007) notes that attention to the types of outcomes associated with different stages of entrepreneurship may help reconcile conflicting findings regarding the role of risk propensity in entrepreneurship. In our view, an "appetite" for risk propels one to undertake an entrepreneurial venture, but this same proclivity to take risks may be detrimental after the launch of the new venture. This is because, after the initial stage of new venture founding, entrepreneurs are typically required to manage risk very carefully to maximize profitability and preserve the new venture's limited resources. A strong propensity for risk may lead the entrepreneur to gamble firm resources on new and untested products, technologies, markets, or strategies when persistent exploitation of a known competitive advantage would be more effective. Thus, although we expect risk propensity to be positively related to entrepreneurial intentions, we expect it to be negatively related to firm performance.

Hypothesis 6b: Risk propensity will be negatively related to firm performance.

Moderation by Firm Performance Type

Scholars have used a wide variety of indicators to assess entrepreneurial firm performance. This is because firm performance is a multifaceted construct that no single indicator can fully capture (Brush & Wanderwerf, 1992). Typical measures used to assess firm performance include financial indicators such as sales revenue, profit, liquidity, return on investment, and return on assets. Other managerial indicators of performance examined in previous research include firm size (number of employees), productivity (output per man hour), firm survival, and subjective ratings of overall performance. Such measures fall into two broad categories—profitability and operational effectiveness (Venkatraman & Ramanujam, 1986)—and are often assessed together using composite indicators (Brush & Wanderwerf, 1992).

Changes in firm performance relative to the previous base, or growth, is a primary concern for entrepreneurial firms because strong profitability and operational effectiveness are rarely achievable at firm inception (e.g., Davidsson, Delmar, & Wiklund, 2006). Growth in indicators such as sales, profits, and employment reflects the momentum and ultimate potential of the firm and is therefore frequently regarded as the most important basis on which to evaluate new venture performance (e.g., Baum & Locke, 2004; Baum et al., 2001; Davidsson

et al., 2006). We therefore treat performance indicator type (profitability and operations vs. relative growth) as a methodological moderator in our analysis. We view relative growth as a more appropriate indicator of new venture performance and therefore expect stronger effects of entrepreneur personality on relative growth than on profitability and operational effectiveness.

Hypothesis 7: Personality effects will be stronger against relative growth measures of firm performance than against profitability and operational measures of firm performance.

Method

Searching and Screening Studies

In July 2007, we conducted a literature search using several electronic databases including PsycINFO, ABI-Inform, Academic Search Elite, Business Source Elite, WilsonBusiness, and Dissertation Abstracts International. We were interested in collecting all studies that reported the relationships between psychological traits (keywords searched include *personality, trait, motivation, need, psychology, individual difference, cognition, and attitude*) and (a) entrepreneurial intentions (keywords searched include *intention, aspiration, orientation, and inclination*) or (b) entrepreneurial performance (keywords searched include *performance, success, growth, failure, and survival*). In addition, we used several approaches to supplement our electronic search. First, we checked the references of all currently included empirical studies to identify additional articles of interest. Second, we surveyed previous narrative reviews (e.g., Busenitz et al., 2003; Rauch & Frese, 2007) and meta-analyses (e.g., Miner & Raju, 2004; Stewart & Roth, 2001) to find relevant studies. Third, we browsed major entrepreneurship research outlets, such as *Entrepreneurship Theory and Practice* (formerly *American Journal of Small Business*) 1979 to 2006, *Frontiers of Entrepreneurship Research* 1981 to 2006, *Journal of Business Venturing* 1985 to 2006, and *Journal of Small Business Management* 1980 to 2006.

We set several criteria to select primary studies for the meta-analysis. First, the primary study must include the measurement of a personality trait that can be categorized in terms of the FFM or risk propensity to be included in the study. Constructs that show no consistent relationship to any dimension (e.g., need for autonomy) or relationships with multiple dimensions (e.g., Type A personality) were excluded. Second, the primary study must include a dependent variable that can be classified as a measure of either entrepreneurial intention or entrepreneurial firm performance. We do not include start-up activities or current status as a proxy of entrepreneurial intention. Third, the sample used in the primary study must be appropriate for the dependent variable examined. Entrepreneurial intentions data should be collected at the prelaunch stage from a sample that includes only individuals who have not yet started a venture (e.g., students); entrepreneurial performance data should be collected after the launch stage from a sample of individuals who have founded and personally managed their own businesses (e.g., entrepreneur). Corporate entrepreneurs, social entrepreneurs, or patent holders who are not founders of for-profit enterprises do not fit our

definition and are thus excluded. Finally, the study must include a Pearson correlation coefficient (or its equivalent, e.g., an F value). For some studies, we transformed standard beta coefficients into correlation coefficients using Peterson and Brown's (2005) formula.

Following the above selection rules, we included a final total of 60 studies with 66 independent samples, with a total sample size of 15,423 individuals. Eighteen out of the 60 studies were from nonjournal sources such as book chapters, dissertations, conference presentations, or reports. The number of studies and the sample size for each relationship varies as indicated in Tables 1 and 2. A table of primary studies with sample characteristics and outcome types is available from the first author.

Coding and Analytical Techniques

Published empirical correlations were used to guide the assignment of personality scales to FFM dimensions. Although most previous meta-analyses using the FFM have relied on experts' subjective judgments to assign scales to the Big Five constructs (e.g., Barrick & Mount, 1991; Judge et al., 2002), accumulating evidence regarding the empirical relationships among personality variables and constructs guided by the FFM has made it possible to make these assignments based on observed correlations. We assigned a trait to one of the FFM dimensions only when consistent empirical evidence was available that the trait was correlated with that dimension and not strongly correlated with any other dimension. (A table indicating the assignment of each personality variable within the FFM and the studies on which the assignment was based is available from the authors). As noted, risk propensity measures were treated as a separate, sixth dimension of personality for this study. Only variables explicitly designed to be trait measures of risk propensity (e.g., "risk taking" from the Jackson Personality Inventory) were assigned to this dimension.

If the same study design was carried out in multiple but independent subgroups (full replication), results from those subgroups were entered into the meta-analysis as independent samples (Hunter & Schmidt, 1990, p. 451). If a study used multiple measures of the same construct (e.g., different indicators of growth) on the same pool of subjects, we averaged over measures and used the single result as the effect size for the study, consistent with the recommendation of Dalton and Dalton (2005). The sample-weighted mean uncorrected correlation (\bar{r}) is reported in the tables. We corrected each primary correlation for attenuation because of measurement error in the predictor and the criterion, and then we calculated the sample-weighted means of these corrected correlations as the estimated population correlation ($\hat{\rho}$). When the reliability information was not reported, we used the mean of the reliabilities reported in other studies included in the meta-analysis on the same relationship. No corrections were made for firm performance measures unless it was a multi-item construct (e.g., overall performance ratings) with reported reliability.

In addition to the point estimates, we also report the 90% confidence interval (CI) and 80% credibility interval (CRI) around the estimated population correlations. The CI is based on the uncorrected standard error of the mean effect size and estimates the variability in the mean effect size. The CRI is based on the corrected standard deviation and provides an

estimate of the variability of the individual effect sizes across studies (Whitener, 1990). A 90% CI around a point estimate excluding zero suggests that the point estimate would be greater (or lesser, as the case may be) than zero in 95% of the cases if the estimation procedures were repeated many times. An 80% CRI that does not include zero indicates that 90% of the individual correlations in the population excluded zero (Judge, Piccolo, & Ilies, 2004). A relatively large CRI suggests the possible operation of one or more moderator variables. When testing moderation effects specified in advance, Hunter and Schmidt (2004, p. 423) advocated confidence interval comparisons instead of significance test. If the confidence intervals of different categories do not overlap, the moderation effect exists. We need to caution that this approach tends to be conservative (Schenker & Gentleman, 2001) and is used as a "rule of thumb" instead of an alternative significance test.

Results

Meta-analytic results for the six personality dimensions are shown in Table 1. For entrepreneurial intentions, the CIs of all dimensions except agreeableness exclude zero, providing evidence that the true effect differs from zero. Conscientiousness, openness to experience, emotional stability, extraversion, and risk propensity are each positively related to intentions to become an entrepreneur, as proposed in Hypotheses 1a, 2a, 3a, 4a, and 6a. The largest effect size is for risk propensity ($\hat{\rho} = 0.40$), followed by openness ($\hat{\rho} = 0.24$) and emotional stability ($\hat{\rho} = 0.22$). The widths of CRI are moderate to large (0.31 to 0.53), suggesting the possible operation of moderators. Hypothesis 5a is not supported.

For entrepreneurial performance, the CIs of all dimensions except agreeableness and risk propensity exclude zero, providing evidence that these effects differ from zero. Conscientiousness, openness to experience, emotional stability, and extraversion are each positively related to entrepreneurial firm performance. The largest effect size is for openness ($\hat{\rho} = 0.21$), followed by conscientiousness ($\hat{\rho} = 0.19$) and emotional stability ($\hat{\rho} = 0.18$). The widths of CRIs for all constructs are moderate to large (0.31 to 0.72), suggesting the possible operation of moderators.

Table 1 also shows the results using firm performance type as a moderator for the four personality constructs for which data are available. The CIs overlap for every personality dimension, suggesting no significant differences across outcome types. Hypothesis 7 was therefore not confirmed. Examination of each performance type separately, however, suggests a somewhat more complex pattern of relationships. Conscientiousness and openness are each positively related to firm growth ($\hat{\rho} = 0.28$ and $\hat{\rho} = 0.23$, respectively) but their CIs for profitability/operations include zero, suggesting a possible null effect for this type of performance. Thus, Hypothesis 1b and 2b are only conditionally supported. Emotional stability was positively related to both growth ($\hat{\rho} = 0.13$) and profitability/operations ($\hat{\rho} = 0.17$), and none of its CIs includes zero, supporting Hypothesis 3b. Analysis of separate performance types was not possible for extraversion but the positive effect of overall performance provides conditional support for Hypothesis 4b. As mentioned earlier, agreeableness and risk propensity are not related to overall performance; thus, Hypothesis 5b and 6b are not supported. It is important to note that for risk propensity, the nonoverlapping CIs on

Table 1
Results of Meta-Analysis

Predictor	Criterion	<i>k</i>	<i>N</i>	\bar{r}	$\hat{\rho}$	SD_{ρ}	90% CI		80% CRI	
							Lower	Upper	Lower	Upper
C	Intention	12	3,804	.16	0.19	0.15	0.11	0.27	0.00	0.37
	Performance	24	3,193	.15	0.19	0.28	0.09	0.29	-0.17	0.55
	Growth	13	1,554	.23	0.28	0.23	0.16	0.40	-0.02	0.58
	Profitability/operations	14	1,801	.09	0.11	0.29	-0.03	0.25	-0.26	0.48
O	Intention	11	3,017	.20	0.24	0.21	0.14	0.36	-0.02	0.51
	Performance	15	2,461	.15	0.21	0.20	0.10	0.30	-0.05	0.46
	Growth	9	1,406	.16	0.23	0.01	0.15	0.30	0.21	0.24
	Profitability/operations	6	998	.12	0.17	0.33	-0.10	0.43	-0.26	0.59
ES	Intention	12	3,938	.19	0.22	0.14	0.15	0.30	0.04	0.40
	Performance	29	4,446	.14	0.18	0.12	0.13	0.23	0.02	0.34
	Growth	8	1,588	.11	0.13	0.12	0.03	0.22	-0.03	0.29
	Profitability/operations	22	2,845	.13	0.17	0.11	0.12	0.23	-0.03	0.31
E	Intention	7	2,020	.14	0.16	0.12	0.07	0.25	0.01	0.32
	Performance	9	1,476	.08	0.09	0.13	0.01	0.19	-0.07	0.26
A	Intention	6	1,889	.03	0.04	0.16	-0.08	0.16	-0.16	0.24
	Performance	4	931	.04	0.05	0.15	-0.11	0.20	-0.14	0.24
R	Intention	7	2,283	.30	0.40	0.15	0.30	0.51	0.21	0.59
	Performance	15	2,494	-.02	-0.02	0.20	-0.12	0.08	-0.27	0.23
	Growth	7	1,166	.03	0.03	0.27	-0.15	0.22	-0.32	0.38
	Profitability/operations	5	910	-.05	-0.05	0	-0.14	0.03	-0.05	-0.05

Note: \bar{r} = sample weighted average observed effect size; $\hat{\rho}$ = estimated population effect size, after correcting for measurement error in both the predictor and the criterion; SD_{ρ} = the standard deviation of population effect size; *k* = number of studies; *N* = total sample size; CI = confidence interval; CRI = credibility interval. C = conscientiousness, O = openness to experience, ES = emotional stability, E = extraversion, A = agreeableness, R = risk propensity. Extraversion and agreeableness do not have sufficient studies for performance subcategories.

Table 2
Multiple Regression Results

Trait	Intentions			Performance		
	β/R^a	<i>SE</i>	<i>t</i>	β/R^a	<i>SE</i>	<i>t</i>
C	0.18	0.02	9.47*	0.19	0.02	8.39*
O	0.22	0.02	12.17*	0.21	0.02	9.32*
ES	0.14	0.02	6.90*	0.09	0.02	3.83*
E	0.11	0.02	5.84*	0.05	0.02	2.04*
A	-0.09	0.02	4.30*	-0.06	0.02	2.33*
Multiple <i>R</i>	0.36	0.02	19.89*	0.31	0.02	14.14*

Note: C = conscientiousness, O = openness to experience, ES = emotional stability, E = extraversion, A = agreeableness.

a. With the exception of the multiple *R* estimate in the last row, all estimates in the β/R column are standardized regression coefficients.

* $p < .01$.

intention and performance, respectively, indicate a significant difference in risk propensity's effects: Risk propensity is positively related to entrepreneurial intentions but not related to entrepreneurial firm performance. No other personality dimensions have such different effect sizes across the two dependent variables.

To examine the effect size of the full FFM set of variables on entrepreneurial intentions and performance, we used Hunter's (1992) regression program. In separate analyses, we regressed each dependent variable on the five personality dimensions as predictors. We used Ones, Viswesvaran, and Reiss's (1996) meta-analytic estimates of the intercorrelations among the Big Five dimensions. As suggested by Viswesvaran and Ones (1995), we used the harmonic mean of the sample size per dimension as the sample size for this analysis. Risk propensity was excluded from this analysis because it is a compound construct, and meta-analyzed estimates of its intercorrelations with the Big Five variables were not available.

The multiple regression results are shown in Table 2. The multiple *R* between the five personality dimensions and entrepreneurial intentions was 0.36, whereas the multiple *R* with entrepreneurial performance was 0.31. According to Meyer et al. (2001), such effect sizes can be viewed as large for psychologists. The results were highly consistent across the two outcomes. The strongest personality effect was for openness followed by conscientiousness, with slightly weaker effects for emotional stability, followed by extraversion and agreeableness.

Discussion

Our study provides evidence that four of the Big Five personality dimensions are related to both entrepreneurial intentions and entrepreneurial performance. Openness to experience and conscientiousness appear to be the personality constructs most strongly and consistently associated with both these important outcomes. Only agreeableness appears to be unrelated to either outcome, although multiple regression results indicate small but statistically

significant results in the expected negative direction even for agreeableness. The estimated effect size for the Big Five constructs as a set is moderate in magnitude, explaining 13% of the variance in entrepreneurial intention and 10% of the variance in entrepreneurial performance. These meta-analytic findings contradict the conclusions of previous narrative reviews (e.g., Gartner, 1988) and suggest that personality does play a role in the intention to become an entrepreneur and success as an entrepreneur.

Our results are also consistent with the notion that entrepreneurial intentions and entrepreneurial performance together explain the emergence of personality differences among entrepreneurial and managerial populations found in previous meta-analyses (e.g., Collins et al., 2004; Stewart & Roth, 2001; Zhao & Seibert, 2006). For example, our meta-analytically derived multiple regression estimate for the effect size of conscientiousness was 0.18 for intention to become an entrepreneur and 0.19 for entrepreneurial firm performance. This implies that more conscientious people are attracted to entrepreneurship and are also more likely to succeed once they become an entrepreneur. Together, these two findings explain why entrepreneurial populations score more highly on conscientiousness than do managers, consistent with the effect size of 0.26 reported by Zhao and Seibert (2006). Likewise, the small negative effects for agreeableness on entrepreneurial intention ($-.09$) and performance ($-.06$) are consistent with the finding reported by Zhao and Seibert (2006) that entrepreneurs are, on average, less agreeable ($-.22$) than their nonentrepreneurial counterparts.

Our results for risk propensity are particularly interesting because they shed light on inconsistent meta-analytic findings in the entrepreneurship literature (e.g., Miner & Raju, 2004; Stewart & Roth, 2001, 2004). Stewart and Roth (2001) conclude that risk propensity is positively related to entrepreneurial status, whereas Miner and Raju (2004) provide evidence, based on a different set of studies, that entrepreneurs are more risk avoidant. The effect based on all the studies from both meta-analyses is positive, but the confidence interval includes zero (Stewart & Roth, 2004). In response to Miner and Raju (2004), Stewart and Roth (2004) point out that a number of studies in the Miner and Raju's meta-analysis included outcome measures reflecting firm performance (e.g., survival, growth) rather than entrepreneurial status. On one hand, our current results show risk propensity to be moderately related to entrepreneurial intention, which we argue should lead to the higher level of risk propensity among entrepreneurs found by Stewart and Roth (2001). On the other hand, our results also show that risk propensity is not significantly related to entrepreneurial performance. Thus, we provide empirical evidence that combining studies of entrepreneurial status and entrepreneurial performance together in one meta-analysis will lower the overall effect size, possibly to the point where no significant effect can be detected, which provides partial support for Miner and Raju (2004). Our results, based on a more fine-grained analysis of distinct outcomes associated with different stages of the entrepreneurial process, thus provide a more detailed understanding of the role of risk propensity in entrepreneurship and help reconcile previously contradictory conclusions in the literature. These results suggest that future research on the individual characteristics, cognitions, or behavior of entrepreneurs should pay increased theoretical attention to the stage of entrepreneurship from which they collect data.

Because meta-analytic effect sizes are comparable across studies, it is instructive to compare our findings regarding personality and entrepreneurial firm performance with studies that examine personality and job performance for traditionally employed managers (Barrick

et al., 2001; Hurtz & Donovan, 2000). For example, Hurtz and Donovan (2000) found conscientiousness to be the strongest predictor (.19), followed by emotional stability (.13) and extraversion (.13). Although our current results demonstrate comparable effect sizes for these three constructs, a major exception is openness to experience. Openness was the strongest effect in our analysis for entrepreneurs but has shown only weak and nonsignificant effects in previous research as a predictor of the job performance of managers (Barrick et al., 2001; Hurtz & Donovan, 2000). This suggests that the major personality construct differentiating high performance in a managerial role from high performance in an entrepreneurial role is openness to experience. Unlike managerial performance, successful entrepreneurial performance is facilitated by a disposition toward new or unconventional ideas, values, and actions. Openness to experience is the personality dimension most closely associated with creativity and performance in learning situations (e.g., Barrick & Mount, 1991; Costa & McCrae, 1992). Future research might more closely examine the specific domains of openness and the clusters of related behaviors and competencies that may relate to effective entrepreneurship. For example, people high on openness to ideas show a willingness to consider unconventional ideas. People high on openness to fantasy enjoy a vivid imagination and develop detailed fantasies (Costa & McCrae, 1992). Perhaps these unconventional ideas and elaborate fantasies form the basis of the entrepreneur's initial vision for a new venture. Openness to values may underlie the entrepreneur's willingness to question established ways of doing business and lead them to offer products and services that cater to new lifestyles or social arrangements (e.g., green construction). These facets of openness may have their strongest relationship with entrepreneurial opportunity recognition. Other facets of openness such as aesthetics may have less to do with entrepreneurship.

By examining studies focused on outcomes associated with early prelaunch and later postlaunch stages, we did find significantly different effects for risk propensity at different stages of the entrepreneurial process. It appears that risk propensity is a fairly important disposition during the early stage of entrepreneurship because it is individuals who are more willing to undertake risk who are more interested in becoming entrepreneurs. These intentions are important because they may be related to the extent to which individuals seek out or recognize new business opportunities, build business relationships, acquire resources, and prepare themselves to launch a new venture (Bird, 1988; Krueger et al., 2000). Once the venture is launched, however, risk propensity as a disposition of the entrepreneur is apparently neither clearly an asset nor a liability. The relatively large credibility interval around risk propensity suggests that even in the postlaunch stage, its relationship to new venture performance might be moderated by other, as yet unknown variables. Individual variables such as expertise or environmental variables such as munificence (Baum et al., 2001) might interact with risk-taking propensity to predict firm performance.

Zhao and Seibert (2006) theorized that the processes identified by Schneider's (1987) attraction-selection-attrition (A-S-A) model would apply to the entrepreneurial context. Consistent with the A-S-A framework, entrepreneurial intention represents one's attraction to the entrepreneurial role, whereas poor new venture performance can be seen as a major source of involuntary attrition from entrepreneurship. Thus, our results support the idea that A-S-A processes apply to the entrepreneurial context. Our results also extend theories of person-environment fit to the realm of entrepreneurial work. As observed above, for the Big

Five constructs at least, the traits that lead one to be attracted to entrepreneurship are the same traits that lead one to be a more successful entrepreneur. This suggests that people's perceptions of the personality-related requirements of the entrepreneurial role are accurate and lend support to the notion that a self-initiated process of person–job matching occurs among entrepreneurs in much the same way as it occurs for other types of occupational or career choices. Good person–job fit is also likely to produce high satisfaction and commitment (Kristof-Brown et al., 2005), attitudes likely related to voluntary continuation as an entrepreneur and a process leading to more pronounced personality differences between entrepreneurs and managers.

The methodological moderation analysis suggested no significant differences between firm growth and profitability/operational performance indicators for any of the four personality constructs for which we had sufficient data to perform the analysis. Conservatively, we must reject the hypothesis that personality shows a stronger relationship to growth outcomes than profitability/operational outcomes. However, the confidence interval with profitability/operations as the performance indicator excluded zero only for emotional stability but included zero for conscientiousness and openness. Thus, as expected, the most consistent results emerge for firm growth performance, the type of performance outcome most relevant for new ventures. We feel that any conclusions regarding differences by performance type are currently unjustified given the relatively conservative nature of confidence interval comparisons and the small number of studies involved in the openness effect size estimate. We encourage future researchers to collect multiple indicators of firm performance and to pay more explicit attention to the type firm performance measures for which they develop hypotheses.

Practical Implications

There are several important practical implications to our findings. The personality effects we find in this study may be used for career counseling and training purposes. Our results suggest that students and educators should highlight conscientiousness, emotional stability, and openness to experience as traits associated with successful entrepreneurship. Individuals low on these traits may find an entrepreneurial career less satisfying than they anticipated. Openness to experience seems to be particularly important, as it appears to be the variable that most differentiates successful entrepreneurs from performance in other managerial and work roles. Career counselors and educators might also put less emphasis on certain traditional “entrepreneurial personality traits,” especially with regard to extraversion and risk propensity. Despite popular beliefs, our results show no effect of risk propensity and only a very small effect of extraversion on entrepreneurial performance. The classic image of the entrepreneur as a “risk taker” or an “extrovert” may discourage some individuals from becoming entrepreneurs who would otherwise be successful at this pursuit. It is also appropriate for educators to advise students that personality explains “only” about 10% of the variance in firm performance, and they should not place undue weight on this one set of factors. Competencies, such as social skills (Baron & Tang, in press), have been found to be related to entrepreneurs' success, and those competencies can be learned.

Limitations and Future Research

The limitations for this study flow chiefly from the limitations of the primary studies on which our meta-analysis is based. Approximately 75% of the performance studies and all intention studies included in our analysis are cross-sectional in nature, raising a question regarding the causal direction of our observed effects. The fact that the FFM provides extensive evidence regarding the temporal stability and even genetic heritability of the personality constructs mitigates this concern considerably. A second limitation is that our results for firm performance are based on individuals who have chosen to become entrepreneurs. To the extent that personality influences the choice to become an entrepreneur—and our results show that this is the case—the entrepreneurial population under study for firm performance effects will be based on a restricted range of personality. Because we have no reliable information to estimate the extent of range restriction, we choose not to correct for it, which is consistent with the recommendation of Dalton and Dalton (2005). However, it is important to note that any bias introduced by range restriction is conservative and that the estimates are accurate when generalized only to entrepreneurial populations. The third limitation is that the number of primary studies was small for some hypotheses (e.g., Hypotheses 5a and 5b); thus, the results of such tests should be interpreted with caution.

It is beyond the scope of this article to propose a general model of entrepreneurs' personality, and some models already exist in narrative reviews (e.g., Rauch & Frese, 2007). But here we provide a few suggestions for future research. One fruitful route is to examine additional moderators. We feel the following moderators are especially interesting: facets of FFM dimensions, entrepreneur types, and firm types. For example, although the achievement facet of conscientiousness may be positively related to entrepreneurial intentions and performance, other facets, such as virtue, may have no clear or consistent relationship with entrepreneurship, whereas conformity to rules and respect for traditional norms may even have a negative relationship to entrepreneurial success. Aggregation across facets may therefore provide downwardly biased estimates of effect size because of the inclusion of such scales. We have already mentioned the role that different facets of the openness dimension may play in entrepreneurship. Echoing calls from previous narrative reviews (e.g., Gartner, 1988), we suggest future researchers to carefully select the personality variables they include, now within the basic framework and accumulated findings from the FFM. Entrepreneurs are a heterogeneous population, and it may be worthwhile to differentiate between those who willingly choose to pursue an entrepreneurial career and those who are forced into this career because no other employment option is available. It is likely that personality effects will be more pronounced in "weak" situations where individuals have discretion to make their own choices. Firm type may also moderate the effect size of personality on firm performance. For example, entrepreneurs' extraversion and agreeableness may have stronger effects on performance in service-oriented firms, where interaction with customers and clients is central, whereas entrepreneurs' openness may be more important in technology-oriented firms, where keeping current with emerging discoveries are more important.

A second direction for future research on entrepreneurs' personality is the mechanism through which entrepreneurs' personality affects firm performance in the postlaunch stage. Potential mediating variables include organizational culture/climate and strategy. A

well-established literature links personality to organizational climate. As Schneider (1987) put it, the people make the place. An entrepreneur who is very high on achievement motivation, for example, is likely to attract others to the new venture who are also achievement oriented. Founder and top management team personalities are likely to influence organizational climate or culture, in this example leading to an emphasis on goal accomplishment and individual achievement over other values (Schein, 2004). Some empirical findings suggest that organizational culture has important effects on overall levels of employee motivation, stress, and satisfaction—indirect contributors to firm performance—as well as directly with firm performance (e.g., Kotter & Heskett, 1992). Similarly, personality may be related to the type of strategy pursued by the firm. Entrepreneurial orientation (Lumpkin & Dess, 1996) is especially interesting in this context because some dimensions appear to be related to the Big Five personality framework. It is possible that entrepreneurs' personalities and preferences can influence the top management team over time and help develop a strong entrepreneurial orientation at the firm level, which further contributes to firm performance. Future research needs to explore how elements of entrepreneurs' personalities relate to specific behaviors of the entrepreneur or characteristics of the new venture, which ultimately relate to the firm success.

Conclusion

Entrepreneurship plays an important role in a dynamic modern economy. Failure as an entrepreneur can be costly to society in terms of missed opportunities and lost resources and can be devastating to the individual entrepreneur in terms of its financial and psychological impacts. Therefore, developing a better understanding of entrepreneurial processes and the variables that attract people to entrepreneurship and that facilitate success in an entrepreneurial role is an important undertaking. Our article shows that personality constructs have a role to play in developing this understanding.

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