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Personality and Entrepreneurship*

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Abstract:

Does personality matter? Is an individual who is open to experience more or less likely to become an entrepreneur? Is it better to score low or high in agreeableness for surviving as an entrepreneur? To the extent that personality captures one part of entrepreneurial abilities, which are usually unobservable, the analysis of traits and personality characteristics helps better understanding such abilities. This article reviews research on the relationship between personality and entrepreneurship since 2000 and shows that possessing certain personality characteristics will make it more likely that an individual will start an own business and hire staff. More specifically, with respect to the entry decision, research finds that nearly all so-called Big Five factors as well as several specific personality characteristics influence the entry probability into entrepreneurship. Further, entrepreneurs are more likely to hire, the higher they score in risk tolerance, trust, openness to experience, and conscientiousness. However, different factors such as low scores in agreeableness, the only Big Factor that does not affect entrepreneurial entry, influence entrepreneurial survival. And for some of characteristics that influence entrepreneurial entry, like high scores in the factor openness for experience or in risk tolerance, “revolving door effects” are found, explaining why some entrepreneurs subsequently exit again the market.

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Introduction

Innovative entrepreneurs do not only invent new technologies, develop new products, create new processes, and find new marketing innovations, they may also open new markets (Parker 2018, Kritikos 2014). By establishing new businesses, entrepreneurs also intensify competition for existing businesses and may stimulate employment growth by generating new jobs when they enter the market (Fritsch 2008). Moreover, they are procyclical and have some predictive power over the business cycle (Koellinger and Thurik 2012). Therefore, entrepreneurs are vital for economic growth and for structural change in a country (Wennekers and Thurik 1999).

At the same time, entrepreneurs are a rare species. In developed economies, typically one to two percent of the working population starts entrepreneurial activities in a given year, with only a minority of these being innovative entrepreneurs (GEM 2020). Given the scarcity of entrepreneurs, they attract a significant amount of media attention, whether as stars of TV shows in many countries or the subject of intense news coverage globally, including a 2009 Economist special report celebrating them as “global heroes.” The 2009 Economist report provides two major insights. First, entrepreneurs are “a different breed of manager” in that they have different, distinct, personality characteristics. Second, men make up the majority of entrepreneurs. Thus, it is clear that individual personality matters when analyzing who becomes and who is an entrepreneur – background issues when addressing two legitimate questions: (1) why do only few individuals choose to become, and remain, entrepreneurs; and (2) why do so few women, as opposed to men, start entrepreneurial activities.

Research on the entrepreneurial personality is long-standing, typically occurring in waves (Caliendo and Kritikos 2012). In the 1980s, research concentrated on comparing average traits of the stock of entrepreneurs with other employment groups. This research design was massively criticized: Gartner (1985) argued that the differences in personality traits among entrepreneurs is much greater than differences between entrepreneurs and non-entrepreneurs, thus making it impossible to determine the personality profile of a typical entrepreneur. Additionally, Blanchflower and Oswald (1998, p.51) concluded that “psychology apparently does not play a key role,” while Aldrich (1999) claimed that research on personality traits had reached an apparent empirical dead end.

Subsequently, research has taken a different route, either by addressing heterogeneity issues among entrepreneurs or by analyzing to what extent personality is associated with entrepreneurial decisions at certain points in time of an entrepreneurial life, with the entry decision into entrepreneurship being the most prominent one.

This contribution reviews the main insights that can be derived from the economic and psychological studies conducted since the turn of the millennium on how personality traits are associated with the status of being an entrepreneur and with various entrepreneurial decisions. First, the article briefly discusses in what sense personality traits are related to entrepreneurial activities. Secondly, it provides an overview over various measures of personality. In this context, it is important to emphasize that there are two approaches to measuring personality in relation to entrepreneurship. Some make use of general approaches of measuring personality traits, most often the “Big Five” model, others use specific personality characteristics that are related to entrepreneurial decision making. The Big Five classification organizes various personality variables into a succinct personality construct (see Costa and McCrae, 1992). Reliability and validity are, according to its proponents, good reasons to use this taxonomy: relationships between personality and entrepreneurial processes are better identified than using specific characteristics. By contrast others argue, see inter alia Dudley et al. (2006), that general traits are poorly linked to entrepreneurial activities. This article provides an overview over both approaches. Thirdly, the article summarizes results from empirical studies in economics and psychology analyzing how personality is associated with the status of being an entrepreneur and how it influences specific decisions, for instance becoming an entrepreneur, the hiring decision, or exiting from entrepreneurship, as well as earnings from entrepreneurship. Last, but not least, the review explores whether the inclusion of personality traits helps in understanding the gender gap in entrepreneurship.

Conceptual Background

Psychology tells us that, in general, personality is an essential determinant of occupational choices (see Holland, 1997). Consequently, the use of personality traits to explain employment status is also increasingly used by economists (Borghans et al., 2008). In light of the aforementioned criticism, Rauch and Frese (2007, p.1) programmatically argued that the “person should be put back into entrepreneurship research,” noting that entry into entrepreneurship and success as an entrepreneur is not a random process of actions but is crucially influenced by the personality of the entrepreneur. Further, Caliendo et al (2014a) investigate the explanatory power of having introduced various personality measures to models that investigate the probability of being an entrepreneur. They find that all personality constructs jointly contribute about 30% to the full model, which means that the explanatory power of personality is comparable to the most prominent determinants of entrepreneurship, namely prior work experience and education.

Following occupational choice models (see e.g. Davidsson, 2004), this article includes results on all persons who freshly start an own business, thus primarily on the founders, owners, and managers of a business under own liability. At this point of an entrepreneurial career, it is not yet clear whether entrepreneurial activities have the potential for innovation. This means that this article takes a rather expansive view of entrepreneurship, jointly considering the various types of entrepreneurs, without discriminating between various sub-types.

To classify which personality variables are related to entrepreneurial decisions, a short review of typical entrepreneurial tasks is necessary as well as of how personality may impact the completion of such tasks. The ability to identify and exploit opportunities is critical for individuals entering entrepreneurship. Exploitation typically requires producing a good or service, which might involve innovation. Specifically, decisions throughout the production, marketing, and selling process will determine whether an entrepreneur’s business successfully starts, survives, or fails. These steps for entrepreneurs range from the basic quality and quantity of production, deciding upon investments in the business, its marketing, and the delivery of goods or services to their customers; this also requires identifying the competition.

Take the first hiring decision of employees in the new venture as a specific example. Entrepreneurs face complex tasks that impose substantial responsibility. New administrative duties range from recruiting (screening and selection) to all aspects of managing employees, whether making payroll, ensuring productive work, or paying social insurance contributions. Further, given the asymmetric information about their abilities, new entrepreneurs must signal their own general abilities while seeking employees (see Bublitz et al., 2017).

Thus, risk, if not uncertainty, dominates the costly, challenging, and rapid decisions that entrepreneurs must make. Subsequently, until they actually sell their goods and services, emotional stability is required to survive the time after their decisions are made. Hence, beyond their knowledge, professional competencies, and expertise, entrepreneurs need skills and abilities affected by their personality, whether internal locus of control, risk tolerance, emotional stability or extraversion. The business goals of entrepreneurs are not just affected by these aforementioned internal factors, but also external factors, ranging from political events to regulation and general economic issues to specific sector related issues. The heuristic suggests that an entrepreneur’s strategies and goals mediate the influences of all traits and personality characteristics on their decisions; as do the internal and external factors (see e.g. Baum and Locke, 2004). Consequently, the traits and personality characteristics influencing entrepreneurial decisions must be selected. The links between entrepreneurial decisions, traits, and personality characteristics are conceptualized in the following section.

Relationship between Personality Traits and Entrepreneurial Activities

The question of what role personality plays for occupational choices has been discussed since the attraction-selection-attrition approach of Schneider (1987). The model was adapted by Zhao and Seibert (2006) for entrepreneurship, thus allowing for the hypothesis that the personality traits of entrepreneurs affect not just the likelihood of being an entrepreneur, but also of becoming an entrepreneur and of other entrepreneurial decisions. Entrepreneurial tasks can be matched with traits in two ways. First, a concise personality construct can be organized out of the variety of personality traits. Second, given a list of entrepreneurial tasks, one can define a list of related, specific personality characteristics, especially if the broad trait taxonomy is not precise enough to give a deeper understanding of entrepreneurial behavior because "differentiations are washed out when reporting the Big Five categories" (Rauch and Frese 2007, p. 357).

To investigate the effects of broad personality traits, the Big 5 taxonomy is employed, developed by Costa and McCrae (1992). It aggregates a wide set of traits and assigns them to five different main factors: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Costa and McCrae 1992).

The first trait is openness to experience, which is related to personality characteristics like intellectual curiosity, creativity, imagination, and fantasy. A person scoring high for openness to experience behaves more imaginatively, reflectively, and unconventionally than others. They are the opposite of narrow-minded and tend to be more innovative compared to individuals scoring low on this trait (Zhao and Seibert 2006). As defined by Schumpeter, the innovative aspect of entrepreneurs is reflected in many traits aggregated in openness to experience, especially the innovative and explorative part of an individual scoring high for openness to experience (Zhao and Seibert 2006). Overall, given that individuals scoring high in openness to experience are curious and have an innovation-seeking personality, it is obvious to expect that openness to experience will be positively related to entrepreneurial decision making.

The second trait, conscientiousness, is based on two characteristics, one is the need for achievement and the other is dependability. Individuals scoring high in this trait are perceived as being very organized, hardworking, and persistent. This should be positively related to job performance (see Rauch and Frese, 2007). Need for achievement is especially critical for entrepreneurial activities, as entrepreneurs, due to their status, are in more control of the performance of their venture and efforts to pay themselves off. Dependability appears to be also important for entrepreneurs as this trait enhances, and is necessary for, relations with business partners. In particular, entrepreneurs need to establish new connections with suppliers, customers, cooperation partners, and financiers. Thus, conscientiousness is positively related to entrepreneurial activities because the outcome of entrepreneurs depends more on their own performance, with conscientious individuals being better able to rely on themselves and their own diligence and hard work.

Extraversion describes the extent to which people are outgoing and talkative, thus how important social interaction with as many people as possible is to them. They tend to be more forceful and confident, energetic and live less secluded lives than others. Extraverted individuals tend to have more social relationships and establish them more easily than introverts (Caliendo et al. 2014a). Psychologists argue that extraversion is important for managers, but even more important for entrepreneurs as they have to establish many new relations and interact with many people, including customers, partners, or potential employees. Thus, it is expected that extraversion is positively associated with entrepreneurial decisions.

Individuals with high scores in agreeableness are more cooperative, conflict averse, altruistic, friendly, and caring. High levels of agreeableness might reduce the willingness of setting (sometimes necessary) personal borders and standing up for one's own goals as well as the willingness to negotiate for personal interests or in the interest of the own venture and vice versa (Zhao and Seibert, 2006). As negotiation skills are important for

entrepreneurs once they have established their businesses and as they work in a less protected environment, rather low scores for agreeableness should be beneficial for entrepreneurs.

Neuroticism is associated with being unstable and nervous as well as showing low levels of emotional stability. Individuals with high scores of neuroticism also tend to be less stress tolerant, less self-confident, more impulsive, and more vulnerable. As entrepreneurs work in more unstable environments compared to well-established companies, low levels of neuroticism will be beneficial for entrepreneurs (Zhao et al., 2010). Similarly, when focussing on subsequent firm performance, emotional stability allows for handling unexpected situations and bearing the risk of being an entrepreneur while not losing focus on important entrepreneurial tasks. Therefore, low neuroticism scores are associated with entrepreneurial decision making.

As previously emphasized, there is an ongoing debate concerning which traits and personality characteristics are relevant for entrepreneurial processes. Proponents of the specific personality characteristic approach argue that it is impossible to meaningfully combine the numerous personality variables into a construct like the Big Five. Therefore, coming to the more specific personality characteristics, there are several research approaches providing a full list of such personality characteristics that may matter in relation to entrepreneurial decisions (see for instance Rauch and Frese, 2007). Important examples of personality characteristics matching entrepreneurial tasks include risk tolerance (Chell et al., 2008), locus of control (Rotter, 1966), trust (Logan, 2009), and self-efficacy, which is the "belief that individuals can perform tasks and fulfil roles, and is directly related to expectations, goals and motivation" (Cassar and Friedman 2009).

Every entrepreneurial decision requires risk tolerance to some degree because the outcome of any given investment cannot be fully predicted. Similarly, the hiring of employees is a risky decision (Kihlstrom and Laffont, 1979). Hence, more risk-tolerant individuals are more likely to become entrepreneurs. Importantly, risk tolerance does not have a unidirectional relationship with entrepreneurial decisions. Indeed, theoretical considerations suggest that risk tolerance has an inverse U-shaped relationship with entrepreneurial performance and survival as riskier investments could also lead to an increasing probability of large losses with the consequence of bankruptcy, leading to failure or closure (Caliendo et al. 2010).

Locus of control, based on a concept by Rotter (1996), refers to beliefs of individuals regarding what determines their future life outcomes. If individuals show high internal locus of control, then they believe that future outcomes are mainly dependent on their own performance and efforts. For low internal locus of control, individuals tend to believe that future life outcomes are determined by external factors rather than their own effort. High scores for internal locus of control are positively associated with entrepreneurial entry and performance of the firm as entrepreneurs must constantly make decisions related to their venture outcomes and, therefore, must believe in their own effectiveness regarding these outcomes.

Trust is defined as the extent to which people rely on others. In terms of entrepreneurship, trust is necessary for entrepreneurs because while establishing new ventures, they must build new relationships and cooperation. Simultaneously, trust can also be harmful as it can be exploited by others (Caliendo et al. 2012). Thus, trust may have a positive effect at the beginning of venture creation, but more ambiguous results when it comes to subsequent entrepreneurial decisions.

Self-efficacy is related to the "belief that individuals can perform tasks and fulfil roles, and is directly related to expectations, goals and motivation" (Cassar and Friedman 2009). In case of entrepreneurship, individuals scoring high in self-efficacy are perceived as more confident, which is associated with a positive effect on making risky entrepreneurial decisions due to the fact that entrepreneurs believe in their own ability to handle challenging situations (Salmony and Kanbach 2021). There are two ways of measuring self-efficacy (Bandura, 1997; Miao et al., 2017). It is either surveyed as a general measure that captures a personality characteristic, thus as generalized self-efficacy (GSE), or related to a specific domain, in this case as entrepreneurial self-efficacy

(ESE). The main advantage of GSE in comparison to ESE is that generalized self-efficacy is seen as personality trait because it encompasses “a broad and stable sense of personal competence to deal effectively with a variety of stressful situations” (Luszczynska et al., 2005, p. 81). Therefore, this article concentrates on GSE. (A concise review of the influence of ESE on entrepreneurial performance is delivered by Newman et al., 2019).

How does the Personality of Entrepreneurs differ from Employees?

The empirical part of this article starts with a general comparison of the traits of individuals who are entrepreneurs with those who are in other employment forms, typically the traits of average employees. Some studies narrow the comparison down to managers, as they bear a similar amount of responsibility and make decisions comparable to entrepreneurs. Of course, depending on the size of the study, the country, and the chosen comparison group, the findings in these studies differ to some extent.

Starting with the Big Five, there is broad consensus across existing studies that entrepreneurs are more open to experience than all other employment groups (see e.g. Envick and Langford 2000, Zhao and Seibert, 2006, who provide results of a meta-study, as well as Caliendo et al. 2014a, Antoncic et al., 2015, Kerr et al., 2019). There is a less strong consensus about the Big-Five traits of neuroticism and agreeableness. Some find that the probability of being an entrepreneur decreases with high scores in these two traits when compared to the broader working population (Envick and Langford 2000, Zhao and Seibert, 2006, Antoncic et al., 2015), even if this relationship is not always significant but points in the same direction (Caliendo et al., 2014a). Kerr et al. (2019) confirm the negative relationship between neuroticism and the probability of being an entrepreneur in comparison to a specific group, namely innovative employees and non-founder CEOs, while they observe that this specific group scores even lower in agreeableness than entrepreneurs. The most diverging results are observed for the remaining two Big-Five traits: for extraversion it is found that entrepreneurs score higher in this trait versus various parts of the working population (Caliendo et al., 2014a, Antoncic et al 2015, Kerr et al, 2019). Zhao and Seibert (2006) find no significant difference between entrepreneurs and managers, while Envick and Langford (2000) find a negative relationship. Even more divergence is observed for conscientiousness. There is no significant difference in this trait between entrepreneurs and employees (Caliendo et al., 2014a, Antoncic et al 2015). Kerr et al (2019) observe that entrepreneurs are more conscientious than innovative employees and non-founder CEOs; so do Zhao and Seibert (2006) in their comparison to managers, while Envick and Langford (2000) find the opposite relationship for this trait.

With respect to specific personality traits beyond the Big 5 taxonomy, results are reviewed for four previously mentioned characteristics: risk attitudes, locus of control, trust, and self-efficacy. There is clear evidence for a positive relationship between high scores in risk tolerance and the probability of being an entrepreneur (see e.g. Stewart and Roth, 2001, Hansemark, 2003, Caliendo et al. 2009, 2014a, Kerr et al , 2019). Comparing entrepreneurs to all other groups of employed individuals, Caliendo et al (2009) find significantly higher scores of risk tolerance for entrepreneurs, even when controlling for all other Big-5 personality traits (Caliendo et al. 2014a). These results are in line with Kerr et al (2019), who compare different personality traits of entrepreneurs with CEOs as well as innovative employees. They find evidence that entrepreneurs are much more risk-tolerant than the other two groups. So do Stewart and Roth (2001) and Rauch and Frese (2007) in their comparison of entrepreneurs with managers, although they highlight that differences between these two groups, albeit significant, are smaller than in comparison to employees.

Scoring high in internal locus of control is estimated to positively influence the probability of being an entrepreneur in comparison to employees (Caliendo et al, 2014a). When it comes to a comparison between entrepreneurs and managers, findings are more mixed. A comparison between entrepreneurs and CEOs shows that entrepreneurs have the highest score for internal locus of control (Kerr et al., 2019). Contrasting these results,

Rauch and Freese (2007) find that entrepreneurs score similar to managers and conclude that this personality characteristic might be as important for entrepreneurs as for managers. (Rauch and Freese 2007)

There is less evidence for trust and entrepreneurship, although it is an important characteristic for entrepreneurial activities, when building up new firms. Caliendo et al. (2012) observe that entrepreneurs show higher levels of trust compared to regular-employed and non-employed individuals but score lower than managers; the latter result also revealing that being able to trust others is even more important in a managerial environment. Mickiewicz and Rebmann (2020) argue that trust is linked to entrepreneurial values and norms, which in turn influence the actions of an entrepreneur, thus ultimately entrepreneurial outcome variables.

Last, but not least, results of the relationship between self-efficacy and the probability of being an entrepreneur seem to be relatively clear: there is a positive relationship between the two. Obschonka and Stuetzer (2017) find that high scores in self-efficacy increase the probability of being self-employed. Moreover, in an earlier study, Utsch et al. (1999) observe that entrepreneurs score higher in generalized self-efficacy than managers. Further, when comparing entrepreneurs to CEOs and innovative employees, Kerr et al (2019) finds the highest values of self-efficacy for entrepreneurs, followed by CEOs.

Overall, the literature paints a relatively clear picture that entrepreneurs have a distinct personality when compared to employees. They score higher in the Big Five traits openness for experience and extraversion, but mostly lower in agreeableness and neuroticism. They are more risk tolerant than employees and have greater internal locus of control. They also have more trust in others and have greater self-efficacy than employees. However, the comparisons to other employment groups, like managers and CEO, reveal a less clear relationship. Moreover, the analysis also makes clear that these mere comparisons do not reveal to what extent a certain personality characteristic is important for entrepreneurial decision making. For instance, entrepreneurs might not differ in their risk tolerance from managers. However, such an observation does not allow for the conclusion that risk tolerance is not important for conducting entrepreneurial activities, as is claimed in parts of the existing literature. Therefore, it is necessary to review how traits and personality characteristics influence the decision to become an entrepreneur and further entrepreneurial decisions.

The Influence of Personality on the Entry Decision into Entrepreneurship

Analysing the transition from other employment forms to entrepreneurial activities is again conducted in various ways. In most approaches, all other employment forms are merged together; however, some empirical analyses differentiate between those who start their activities from employed or unemployed positions.

As for the Big-Five traits, there is a clearly confirmed positive relationship between openness to experience and the decision to become an entrepreneur (Schmitt-Rodermund 2004, Zhao et al., 2010, Caliendo et al., 2014a). Further, evidence on the influence of extraversion on the decision to become an entrepreneur is consistent and clear: it has a positive and significant influence. (Zhao et al., 2010, Schmitt-Rodermund 2004, Caliendo et al., 2014a). While agreeableness has no significant influence on the entry decision (Zhao et al, 2010, Caliendo et al, 2014a), neuroticism is observed to have a negative influence (Zhao et al., 2010, Schmitt-Rodermund 2004). This is confirmed in Caliendo et al. (2014a), but their empirical analysis points to an important observation: this effect is no longer significant once risk tolerance is controlled for. Thus, the influence of neuroticism actually captures the influence of risk tolerance on the entry decision of entrepreneurship. For conscientiousness, the last Big-Five trait, findings are less unanimous: results are either positive (Zhao et al. 2010, Schmitt-Rodermund, 2004) or not significant (Caliendo et al, 2014a).

Risk tolerance is the personality characteristic that receives the broadest attention when trying to understand the influence of personality on entrepreneurial entry. There is strong empirical evidence that mostly points in the same direction: the more risk tolerant individuals are, the more likely they start entrepreneurial activities

and vice versa, thus confirming conventional wisdom that becoming an entrepreneur means making risky decisions (Parker 1997, Cressy 2000, Stewart and Roth 2001, Cramer et al 2002, Hartog et al., 2002, Kan and Tsai 2006, Norton and Moore 2006, Zhao et al, 2010, Caliendo et al, 2009, 2014a, Vereshchagina and Hopenhayn 2009). Moreover, various studies point to the importance of risk tolerance as it has the strongest effect on the entrepreneurial entry decision compared to all Big-5 traits (Zhao et al, 2010) and has relatively high explanatory power (Caliendo et al.2014a).

Despite broad support, there is some doubt regarding how risk tolerance is measured. For instance, Miner and Raju (2004) point to the necessity of considering measurement effects and the heterogeneity between self-reported and objective measurement; they are also concerned about an overestimation effect of risk-tolerance. The analysis of Caliendo et al. (2009) explicitly addresses this issue by using an experimentally validated measure for risk tolerance and confirms that risk tolerance positive affects the entry into entrepreneurship.

Digging deeper into the question of whether different forms of risk tolerance measures have different effects, Caliendo et al (2009) use four different risk measurements (risk in general, two risk measurement methods for financial and occupational risk decisions, and a relative risk aversion parameter) to show that high scores for occupational risk have the strongest influence on the entry decision into self-employment.

Last, but not least, two studies differentiate between previous employment forms, namely between those who start their entrepreneurial activities coming from employment and those coming from unemployment. Caliendo et al (2009) show that the positive influence of risk tolerance on entrepreneurial entry is especially true for individuals starting directly from an employed position. Individuals deciding to enter self-employment out of unemployment are not significantly affected by risk tolerance. Block et al (2015) divide entrepreneurs in two groups – necessity- and opportunity-driven – referring to the intention behind entry into entrepreneurship. This differentiation has some similarities to the previous employment status. Accordingly, their results point in a similar direction with respect to the influence of risk tolerance on entrepreneurial entry.

The other specific personality characteristics are less well investigated in the context of entrepreneurial entry. For internal locus of control, two studies find that a high score for internal locus of control significantly influences the entry probability into entrepreneurship (Korunka et al., 2003 and Caliendo et al., 2009). Trust in general is also expected to positively influence the probability of becoming an entrepreneur. (Caliendo et al. 2012, 2014a). Differentiating between different measurement of trust, Caliendo et al (2012) further find that the overall positive influence of trust is mainly driven by the high scores for “passive trust,” thus for the question of whether individuals have “profited from people they have never met before.” In addition, Maxwell and Levesque (2014) observe that entrepreneurs showing proactive trust-building behaviour have a higher probability to be funded.

Self-efficacy is also seen as an important personality characteristic predicting business entry. According to Rauch and Frese (2007), high scores in self-efficacy have a positive and significant influence on the probability of business creation. Similarly, Markman et al. (2002) find that patent inventors who were planning to venture a business scored higher in generalized self-efficacy than patent inventors who had no such plans. Laguna (2013) examines general self-efficacy, analyzing its role in the entrepreneurial process for unemployed individuals. Generalized self-efficacy beliefs are an important predictor of start-up intention and significantly increase the probability of business start-up. Thus, research finds that personality strongly matters for this entrepreneurial decision. High values in three factors of the Big Five approach – openness to experience, extraversion, and conscientiousness – and low scores in the factor neuroticism increase the probability of entry into entrepreneurship. Research further finds that some specific personality characteristics, namely risk tolerance, need for achievement, locus of control, trust, and self-efficacy have strong partial effects on the entry decision. This observation clarifies that these constructs are able to explain variance beyond the Big Five approach.

The hiring decision among entrepreneurs

The first hired employee plays an outsized role, becoming crucially important for not just the long-term success of the entrepreneur, but also for society, with regards to job creation. However, beyond Caliendo et al (2022a, 2022b), the influence of personality traits on the hiring decision of entrepreneurs is not yet analyzed. Using data from the German Socio-Economic Panel (SOEP), they compare different groups, differentiating between two transition paths: upon venturing their business, either employees are hired immediately or they hire after having had some experience with their new business. The length of time between founding a business and hiring the first employee is shortened as risk tolerance increases. The importance of risk tolerance as a crucial variable underlying firm growth is reflected in the fact that a one-standard-deviation increase is akin to having a university degree (Kihlstrom and Laffont, 1979). Other personality characteristics do not matter for those who hire from solo-entrepreneurship.

Much in contrast to this, individuals who hire upon establishing their business are more likely to do so, if they score higher on openness to experience, conscientiousness, risk tolerance, and trustfulness (Caliendo et al., 2022a), clarifying that personality affects hiring decisions throughout the stages in ways that are partly the same and partly different. The other Big Five factors (extraversion, agreeableness and neuroticism) unfold no influence on the hiring decision. Moreover, Caliendo et al. (2022b) also reveal that entrepreneurs scoring high in self-efficacy are more likely to hire an employee.

Personality and income from entrepreneurial activities

Few literature reports how personality impacts income from entrepreneurial activities. Hamilton et al (2019) made a comprehensive analysis of the relationship between the Big-Five traits and entrepreneurial income taking the self-selection process towards entrepreneurship into account. They observe a negative influence of openness to experience, agreeableness and conscientiousness to entrepreneurial earnings while only high scores in extraversion make higher entrepreneurial incomes more likely. In particular the negative influences of openness to experience and of conscientiousness are remarkable as these traits increase entry probabilities into entrepreneurship. High scores in openness may, as Hamilton et al (2019, p. 664f) argue, "undermine entrepreneurial success if it means that individuals are less committed to a new business venture once it has been started", while high scores in conscientiousness may be related to noticing rules leading to income losses. "This possibly links conscientiousness to a high disutility from breaking rules even if doing so will improve business performance."

Two studies focus on specific personality characteristics in the context of entrepreneurial income. Hvide and Panos (2014) investigate how risk tolerance relates to earnings from entrepreneurial activities. Instead of directly measuring risk preferences they use information from stock market participation and find that higher risk rather reduces entrepreneurial earnings. They interpret the result as a selection effect, according to which entrepreneurs with higher risk tolerance are more easily entering entrepreneurship with then less ambitious ideas. Because of this kind of self-selection more risk tolerant entrepreneurs are also achieving lower earnings from their activities. Caliendo et al (2022b) investigate how self-efficacy influences entrepreneurial incomes and find a positive relationship between this personality characteristic and earnings. They argue that individuals with higher levels of self-efficacy will have stronger commitment to their entrepreneurial aims. As a consequence such individuals implement more consequently their business strategies leading to higher incomes.

The exit decision from entrepreneurship

One final decision that is also explicitly investigated is the decision to exit from entrepreneurship which is certainly connected to the previous analysis on earnings from entrepreneurship. Ciavarella et al (2004) and Caliendo et al. (2010, 2014a, 2022b) scrutinize how personality is related to the decision to terminate this employment form. Understanding the influence on the exit decision also helps to understand what kind of traits help to keep entrepreneurs in the business. Ciavarella et al (2004) find a negative and significant influence of openness to experience on the probability to survive, being consistent with the previous finding of the negative influence of this trait on entrepreneurial incomes. Somehow contrasting, conscientiousness has a positive and significant influence on survival in their study, clarifying that high scores in this trait may reduce incomes, but not in a way that entrepreneurs who follow rules leave more often markets. Rather to the contrary, scoring high in this trait seems to help keeping the business in the market, just because entrepreneurs are following rules and do their entrepreneurial job in a well-organized and persistent way. These two factors are not found to be significant in Caliendo et al (2014a). By contrast they observe that, among the Big Five, it is agreeableness that matters. High scores in this trait drive entrepreneurs out of the market. A potential explanation for this finding is that individuals with low scores in agreeableness are the better, more selfish negotiators, thus increasing their survival probability. This explanation is also consistent with the negative influence of agreeableness on entrepreneurial incomes. In both studies, the two other Big Five factors (extraversion and neuroticism) unfold no influence on the exit decision.

Moreover, individuals with low scores in internal locus of control are more likely to give up their business (Caliendo et al 2014a), as do entrepreneurs who score low in self-efficacy (Caliendo et al. 2022b). Lastly, Caliendo (2010, 2014a) find a non-monotonic, u-shaped relationship between risk tolerance and exit from entrepreneurship: entrepreneurs with low scores as well as those with high scores are more likely to exit the market than entrepreneurs with medium scores in risk tolerance. The observation of a U-shaped influence of risk tolerance on entrepreneurial exit clarifies that not only are entrepreneurs more likely to leave the market if they avoid any risky decisions, but that also riskier investments lead to an increasing probability of large losses with the consequence of bankruptcy, leading to failure or closure (see Chell et al., 2008). In other words: individuals with medium risk tolerance scores are more likely to survive as entrepreneurs.

Personality and the Gender Gap in Entrepreneurship

In most countries, as pointed out in the introduction, fewer women are involved in entrepreneurial activities compared to men (Kelley et al. 2013). The gap between men and women already starts with the decision of entry and continues when observing the stock of self-employed: the share of women is significantly lower (see inter alia Fairlie and Robb 2009, Fritsch et al., 2015). This phenomenon persists as does the question of why it is the case. As this article focusses on the relationship between personality and entrepreneurship, whether men and women are characterized by different personality traits is reviewed, along with understanding to what extent this helps explaining differences between men and women regarding their entrepreneurial decisions.

Some explanatory power is given to risk tolerance. General comparisons reveal that women are more risk averse than men (see inter alia Caliendo et al., 2009, Dohmen et al. 2011). As presented in the previous section, this is supposed to have a negative influence for women on the decision to enter entrepreneurship. Analysis conducted for women and men shows that the general results for risk-tolerance are stable for both genders in the sense that risk tolerance is associated with a positive and significant impact on the transition into entrepreneurship (Caliendo et al. 2009). Thus, part of the gap can be explained by the higher risk aversion among women (Caliendo et al. 2009, 2014b). But it is not only entry that is negatively affected by risk-aversion, the same

accounts for the exit decision. Fairlie and Robb (2009) find such negative effects for women in the USA, Caliendo et al (2014a) are in line with that for Germany.

With respect to the Big Five personality traits, Caliendo et al (2014b) study finds a surprising effect: if men and women were equal in terms of scores in the Big Five characteristics, female entry rates would be even lower, the entrepreneurial gender gap would be larger.

Overall, one personality characteristic, i.e. risk tolerance, is able to explain part of the gender gap in entrepreneurship between men and women, but there must be other variables beyond the personality that further explain this gap.

Summary

Personality traits influence entrepreneurial decision making. Thus, empirical research found a way out of the dead end that was diagnosed at the turn of the millennium (Aldrich 1999). However, research since then also clarifies that it does not make much sense to search for the entrepreneurial personality, as was previously attempted. Rather, to the extent that personality captures one part of entrepreneurial abilities, such analysis helps understanding these abilities, which are usually unobservable. Being equipped with certain personality characteristics will make it more likely that individuals start an own business and hire staff. Yet, at the same time, some of these characteristics may also explain why some entrepreneurs subsequently exit the market.

Tables 1 and 2 summarize the main research findings since 2000. With respect to the entry decision, research finds that nearly all Big Five factors – except for agreeableness – alongside all four considered specific personality characteristics influence the probability of entry into entrepreneurship. The picture starts changing when the hiring decision is considered. Entrepreneurs are more likely to hire, the higher they score in risk tolerance, trust, openness to experience, and conscientiousness. Moreover, among those who hire after having gained some experience as solo entrepreneurs, risk tolerance remains the only personality variable influencing the hiring decision, shortening the time until entrepreneurs hire their first employee (not shown in Tables 1 and 2).

The picture becomes more complex when focusing on the exit from entrepreneurship. Only three characteristics that influenced the entry decision unfold the same influence on survival, i.e. the opposite of the exit decision, namely high scores in conscientiousness, locus of control, and self-efficacy. One Big Five factor is key for the survival as an entrepreneur, but not for becoming an entrepreneur or for the hiring decision. Agreeableness, which does not drive self-selection into entrepreneurship, does positively influence the exit decision. For some characteristics, a “revolving door effect” is found. High scores in openness for experience drive the entry decision into entrepreneurship as well as the hiring decision. Entrepreneurs who score high in this factor may exit the market precisely due to this very same characteristic that influenced their entry into this status as well as the hiring in the first place. Similarly, if entrepreneurs continue to be willing to take high risks in their businesses, another variable that influenced their entry decision and their hiring decision, they are more likely to give up their businesses than entrepreneurs with a medium level of risk tolerance. Consequently, this self-selection process with regard to personality traits adds to the explanation why some entrepreneurs fail.

These results also distill why it is crucial to relate personality constructs to entrepreneurial decisions instead of comparing entrepreneurs with others. For instance, Busenitz and Barney (1997) as well as Rauch and Frese (2007) report inconclusive results or small effects of risk tolerance or of locus of control when entrepreneurs are compared to managers. The results presented in this contribution clarify that both locus of control and risk tolerance, as personality characteristics, are crucial for all entrepreneurial decisions and have substantial explanatory power. Moreover, when it comes to the gender gap in entrepreneurship, it is also revealed that differences between the two genders is partially explained by differences in risk tolerance. Such results cannot be revealed by simple group comparison.

Table 1: The Influence of the Big 5 Personality Traits on Entrepreneurial Decision Making

	Big 5 Personality Traits				
	Open	Consc	Extra	Agree	Neurot
a) Being an entrepreneur in comparison to employees	+	X	+	-	-
b) Becoming an entrepreneur	+	+	+	0	-
c) hiring decision	+	+	0	0	0
d) Entrepreneurial Income	-	-	+	-	-
e) Exit	+	-	0	+	0

Notes: + indicates a mostly positive influence among the reviewed literature, - indicates an mostly negative effect among the reviewed literature, x indicates mixed findings, 0 no significant findings

Table 2: The Influence of Four Personality Characteristics on Entrepreneurial Decision Making

	Risk-attitudes	Locus of control	Trust	Self-efficacy
a) Being an entrepreneur in comparison to employees	+	+	+	+
b) Becoming an entrepreneur	+	+	+	+
c) hiring decision	+	0	+	+
d) Entrepreneurial Income	-	0	0	+
e) Exit	u-shaped	-	0	-

Notes: + indicates a mostly positive influence among the reviewed literature, - indicates an mostly negative effect among the reviewed literature, x indicates mixed findings, 0 no significant findings, an empty cell indicates missing research

These findings have several implications, some of which are touched upon here. Having found that personality differently affects entrepreneurial decisions implies that certain characteristics like being creative (as one part of the factor openness to experience) or being risk tolerant are helpful when starting an entrepreneurial career, while others, like being assertive (at the low end of the factor agreeableness), are important for establishing a business. This may explain why serial entrepreneurs specialize in starting new ventures and selling them before the businesses mature.

These findings are also important for the entrepreneurial environment. Policymakers frequently debate how to create support systems that increase awareness of entrepreneurship as an occupational choice. It might be worth starting training programs that help individuals learn about their own personality vis-à-vis entrepreneurial activities. Such programs might be especially helpful for individuals who grew up in an environment that did not offer any peer support to develop entrepreneurial skills and abilities.

Coaches assisting entrepreneurs during the start-up stage may use the results of personality tests to analyze the strengths and weaknesses of individual entrepreneurs. By offering "personalized support" in light of information about the personality of each coached entrepreneur, services can be improved. Similarly, exploring

whether certain characteristics predispose individuals to benefit more from entrepreneurship training is important. For instance, Fairlie and Holleran (2012) report that individuals who are more risk tolerant benefit more from entrepreneurship training than less risk tolerant individuals.

Last, but not least, as the policy debate centers more and more on business growth, the analysis enhances the understanding of what characteristics influence the decision of becoming an employer and why many solo entrepreneurs refrain from making this transition. When further designing public policy instruments that support entrepreneurs in their aim to grow their businesses, such as job creation programs, it is important that these take a holistic approach. Having demonstrated the importance of personality, coaching at the point of the hiring decision may identify potential individual strengths that can be further supported and developed, as well as address potential deficits of individuals who aim to become employers.

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