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Personality Traits of Entrepreneurs: A Review of Recent Literature

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Foundations and Trends[®] in Entrepreneurship

Published, sold and distributed by:

now Publishers Inc.
PO Box 1024
Hanover, MA 02339
United States
Tel. +1-781-985-4510
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:

now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

The preferred citation for this publication is

S. P. Kerr, W. R. Kerr and T. Xu. *Personality Traits of Entrepreneurs: A Review of Recent Literature*. Foundations and Trends[®] in Entrepreneurship, vol. 14, no. 3, pp. 279–356, 2018.

ISBN: 978-1-68083-449-9

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Volume 14, Issue 3, 2018
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Foundations and Trends® in Entrepreneurship, 2018, Volume 14, 4 issues. ISSN paper version 1551-3114. ISSN online version 1551-3122. Also available as a combined paper and online subscription.

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Personality Traits of Entrepreneurs: A Review of Recent Literature

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ABSTRACT

We review the extensive literature since 2000 on the personality traits of entrepreneurs. We first consider baseline personality traits like the Big-5 model, self-efficacy and innovativeness, locus of control, and the need for achievement. We then consider risk attitudes and goals and aspirations of entrepreneurs. Within each area, we separate studies by the type of entrepreneurial behavior considered: entry into entrepreneurship, performance outcomes, and exit from entrepreneurship. This literature shows common results and many points of disagreement, reflective of the heterogeneous nature of entrepreneurship. We label studies by the type of entrepreneurial population studied (e.g., Main Street vs. those backed by venture capital) to identify interesting and irreducible parts of this heterogeneity, while also identifying places where we anticipate future large-scale research and the growing depth of the field are likely to clarify matters. There are many areas, like how firm performance connects to entrepreneurial personality, that are woefully understudied and ripe for major advances if the appropriate cross-disciplinary ingredients are assembled.

*Comments are appreciated and can be sent to skerr3@wellesley.edu.

Sari Pekkala Kerr, William R. Kerr and Tina Xu (2018), "Personality Traits of Entrepreneurs: A Review of Recent Literature", *Foundations and Trends® in Entrepreneurship*: Vol. 14, No. 3, pp 279–356. DOI: 10.1561/0300000080.

Introduction

Entrepreneurial firms and the founders behind these ventures are in vogue everywhere. Cities across the United States are sprouting new incubators and accelerators and introducing programs to attract innovative talent. Foreign countries are also quite active, with nations ranging from China to Chile experimenting in new ways to foster new firm formation. The fascination with entrepreneurs is not brand new, of course, and a literature dating to the 18th century explores what drives entrepreneurs and whether their traits matter for the outcomes of their ventures. This literature now spans many fields and has introduced multiple concepts and methods related to the analysis of entrepreneurial characteristics. In this review, we collect and organize the latest findings on the prevalence of various personality traits among the entrepreneurial population and their impact on venture performance. We cover academic work ranging from economics to psychology to management studies, with a focus on studies published after 2000.

Many studies consider the “traits of entrepreneurs” or the “traits that make entrepreneurs successful.” As Åstebro *et al.* (2014) highlight, the publication in 1921 of Frank Knight’s book *Risk, Uncertainty and Profit* marked a key launching point into rigorous and careful research on the personalities of entrepreneurs that set them apart from general business managers. In the decades that followed, research has continued to investigate specific individual traits that prompt people to become

entrepreneurs, as well as personal motivations and preferences that keep entrepreneurs on their chosen path. These studies have often focused on high-growth settings or firms financed by venture capital (VC), where entrepreneurs face a high probability of their business failing, a very small probability of extremely positive outcomes, and a possibly low average return to the monetary and time investments made into their businesses. Standard economic theory must be augmented to explain such a pursuit, and many scholars have tried to understand the “homo entrepreneurus” (a moniker introduced by Uusitalo, 2001).

Yet, the term “entrepreneur” is also applied in academic research to many groups beyond the founders of Silicon Valley startups. The studies that we document in this review range in terms of their definitions of entrepreneurship to also include creators of “Main Street” small businesses or even young college students attending an entrepreneurship class. While these groups are all connected to entrepreneurial activity, recent work shows the remarkable degree to which these subpopulations behave differently (e.g., Hurst and Pugsley, 2011b; Levine and Rubenstein, 2017), and the typical personality traits of individuals will vary greatly by form of entrepreneurial activity. In our review, we attempt to pay close attention to the group under the microscope of each study and note where subpopulations are generating different results.

We conduct this survey with an applied empirical researcher in mind, although we hope this review is useful for many others too. Applied researchers today have access to data for measuring entrepreneurship that was unthinkable a decade ago. Most noticeably, researchers can now utilize large-scale administrative datasets built on employer-employee data to model entrepreneurial transitions. Taking the United States as one example, while cutting-edge work in the 2000s often used firm-level entry rates measured in datasets like the Census of Manufactures or Venture Xpert, we increasingly have researchers accessing comprehensive panel data on individuals like the Linked Employer-Household Database to model entrepreneurial transitions. Other countries further hold frontier administrative datasets that combine founding behavior with anything from the prescription drug histories of individuals to their stock portfolios. Beyond administrative datasets, researchers now build their own specialized datasets: tracking cohorts from entrepreneurial

training programs; accessing gig economy transactions from a leading on-line platform; crafting from LinkedIn profiles of entrepreneurs receiving venture financing; conducting customized surveys of entrepreneurs in co-working spaces; and much more. This wealth of opportunity has led to a flowering of research that measures career histories and individual-level traits that predict entrepreneurship.

While these frontier datasets afford opportunities to ask exciting new questions, researchers must also confront new challenges. As one considers individual-level factors that promote entry, questions arise as to when and how the personalities of founders should be considered. Some are directly interested in the phenomenon, wanting to study for example the risk tolerance of founders of high-growth startups. For others, the research question lies elsewhere, but there is a worry about personality being an important omitted factor that biases empirical results. For yet others, personality could be the channel or mechanism through which some studied events produce short- and long-run effects. While some classic studies have looked at how personality traits impact transitions into self-employment, this new work covers a much broader and more heterogeneous terrain, ranging from the opening of small-scale service businesses to high-growth entrepreneurship. As the options continue to proliferate for modeling individual- and team-level entrepreneurship, it becomes more important to have a perspective of the personality traits associated with entrepreneurship and how they influence the research being conducted.

Three decades ago, in a very influential article, Gartner (1988) criticized the study of entrepreneurial personality traits, arguing instead for a focus on how organizations emerge. Gartner disapproved of the varying definitions being used for entrepreneurship, preferring to focus on a definition that emphasized the functional creation of new organizations. Gartner also questioned collecting traits of entrepreneurs using survey methodologies to discern an “ideal” personality for entrepreneurial performance. The shadow of this critique has been on the literature for a long time, and it is far from clear that these new efforts will overcome the challenges that Gartner (1988) outlined, as we re-surface many of these same challenges throughout this review. Yet, the better recognition of heterogeneity among entrepreneurs and powerful new data sources

suggest it might be fruitful to reexamine some of these areas again, some 30 years later. After all, the focus for many is now on describing how personality may influence the creation of new organizations, addressing at least some of Gartner's concern.

We focus our survey on three core themes: (1) the personality traits of entrepreneurs and how they compare to other groups; (2) the attitudes towards risk that entrepreneurs display; and (3) the overall goals and aspirations that entrepreneurs bring to their pursuits. These themes cover most of the main theoretical contributions to the entrepreneurial traits literature, which are quite diverse, while at the same time enabling the identification of common concerns across apparently separate research streams. There are some personality traits and cognitive biases that we spend less time on, such as over-confidence and how it differs from risk attitudes. This was not due to a prejudice against these traits, but mainly the literature-driven foundation of our inquiry that we describe in the next section. With a few exceptions, we concentrate on empirical studies and meta reviews of them to give a flavor of the recent applied work in this field, spending limited time on lab or experimental studies.

An appendix to our survey provides a short discussion of some major factors influencing entrepreneurial decisions beyond personality: demographics, household assets and financing constraints, measurable skills like work experience and education, and local environment. This auxiliary discussion is short and far from comprehensive, meant only to provide some background helpful for understanding the "soft data" covered in this review and how they interact. For those interested in measuring entrepreneurial risk attitudes and personality traits in their own work, an additional online appendix¹ documents some of the survey instruments commonly utilized. This appendix also provides more detailed notes on the research papers that we review.

We do not pretend to uncover a once-and-for-all synthesis with this review, and nor do we pretend to resolve longstanding debates like whether entrepreneurs are "born or made." The heterogeneity across entrepreneurs within just Cambridge, Massachusetts suggests that a unique set of factors does not exist, much less the vast differences in entrepreneurial pursuits across countries, industries, and similar. Few

¹ Available at: http://dx.doi.org/10.1561/0300000080_app.

applied researchers when confronted with massive empirical datasets would even contemplate such grandiose aims. Instead, we provide a unified discussion of the vast body of research related to these three key topics and embrace the heterogeneity where it exists. An accurate and unvarnished depiction of the variance in studies is important for contemplating how academic work can provide better empirical insights that inform entrepreneurship training programs, policy initiatives designed to bolster startup activity, and so on.

In our opinion, the state-of-the-art study on entrepreneurial characteristics is one that (1) utilizes longitudinal data on a large and representative sample of individuals, (2) measures personality traits before entry decisions are made, and (3) carefully measures individual traits such as risk aversion and entrepreneurial self-efficacy. These conditions are necessary for statistically precise comparisons of entrepreneurs to other employee and managerial groups, better insight into differences across types of entrepreneurs (e.g., self-employed vs. growth-oriented employers), and in-depth analysis of subsequent startup performance. The literature is especially weak on this performance dimension. These conditions are not sufficient for assigning causal roles for personality traits—a very daunting task—but they are probably necessary ingredients. Ahn (2010) and Levine and Rubenstein (2017) are examples of innovative and impressive studies that utilize the National Longitudinal Survey of Youth (NLSY), although the NLSY's small sample generates constraints. Hvide and Panos (2014) and Caliendo *et al.* (2014) also show frontier examples that build upon longitudinal administrative records and national surveys. Even with this gold standard in mind, the practical limits of building such platforms—especially the off-the-shelf tradeoff of using administrative records that provide universal employment histories but limited collection of personality traits—suggest that there is still much to gain from carefully conducted surveys that focus on narrow and clearly specified groups of interest and define a relevant comparison group that entrepreneurs are contrasted with.

We hope this survey provides a useful input into several complementary streams of work. There are often four-fold or larger differences in entrepreneurship rates across U.S. cities (e.g., Glaeser *et al.*, 2015), and those for venture capital are even sharper (e.g., Samila and Sorenson, 2011). Moreover, the rate of new business formation is declining in

the United States (e.g., Decker *et al.*, 2014). Many business leaders and policy makers are looking to build better environments to support entrepreneurship, and this review highlights softer personality traits and risk attitudes that can be considered along with more typical factors like financing conditions. As Chatterji *et al.* (2014) describe, successful interventions to build the entrepreneurial base need to activate the local population, versus just relying on attracting entrepreneurs from afar, and research on these softer elements is of first-order importance in designing quality initiatives and policy experiments.

The findings related to personality characteristics and other attributes of entrepreneurs, as well as the correlation of those characteristics with business performance, also imply that there may be scope for including some personality development modules in entrepreneurship education. Many academic institutes have introduced entrepreneurship training, ranging from high schools to executive programs, but these programs have to date focused more on hard skills rather than personality mapping and softer preparations. While some personality traits are fixed, Rauch (2014) provides some examples of how, for example, self-efficacy and achievement motivation can be influenced with relatively simple interventions. A clearer understanding of the specific traits of entrepreneurs and their heterogeneity may help to better match potential entrepreneurs to settings that are most closely aligned with their strengths.

Finally, we hope to connect to future academic work. There are very few scholars in the diverse entrepreneurial literature that regularly read the full range of academic output described below, much less utilize it in shaping their own research (including ourselves). Yet, these interfaces are precisely where we need the most urgent attention. To give an example, the very sparse number of studies that connect firm performance outcomes to the personality traits of entrepreneurs are a significant limitation to our capacity to describe the quality margin of entrepreneurial ideas. Applied microeconomics researchers that utilize administrative and longitudinal data have an excellent toolkit to model these startup outcomes, but they are among the least exposed to the latest perspectives on personality traits. A goal of this survey is to help close these information gaps and encourage more cross-disciplinary work in this area.

1

Personality Traits

Research on the personality traits of entrepreneurs took off in the mid-20th century, unifying approaches from economics, psychology, sociology, and business management to answer the questions: Who is an entrepreneur? What drives them? What traits define them? The first few decades faced many conceptual challenges as researchers struggled to develop a solid theoretical framework and appropriate measurement tools. In 1971, economist Peter Kilby famously compared the entrepreneur to A. A. Milne's Heffalump, a fictional elephant that all investigators approached with improvised proxies from their disciplines, each asserting that they had discovered the ever-elusive creature's behavior.¹ In the 1980s, this discordance in the literature led some researchers to conclude that there was no correlation between personality and entrepreneurship (e.g., Brockhaus and Horwitz, 1986; Gartner, 1988).

However, since the start of the 21st century and with the notable rise of public and intellectual fascination with startup culture, the entrepreneurial personality literature has enjoyed a resurgence and convergence toward an increasingly consistent set of theoretical frameworks,

¹Kilby (1971) and A. A. Milne, *Winnie the Pooh* (1926) and *The House at Pooh Corner* (1928).

1.1. Prevalence of Personality Traits in Entrepreneurs vs. Other Populations

9

with meaningful insights toward innovation policy and business education. The bulk of recent literature seeks to answer two main questions: (1) Do certain traits predict an individual's likelihood of becoming an entrepreneur, and (2) Do certain traits predict an entrepreneur's likelihood of achieving "successful" outcomes? These answers are pursued by investigating the prevalence of personality characteristics in entrepreneurs versus other populations, as well as by analyzing the correlation of these characteristics with entrepreneurial performance factors such as business survival and growth (e.g., Baron, 2004).

While personality theory remains rife with its own set of contentions, researchers have primarily gravitated over the last few decades to the Big-5 factor personality model. Several additional traits have been fused into the Big-5 for entrepreneurial work, including self-efficacy, innovativeness, locus of control, and risk attitudes (which we reserve for individual discussion in the second part of this literature review). Researchers often mix and match these traits to describe a multidimensional "entrepreneurial orientation." In this literature review, we mostly focus our discussion on literature published after 2000 to detail the newest wave of personality research and the cutting-edge questions. Rauch *et al.* (2009), Rauch (2014) and Patterson and Kerrin (2014) provide reviews of some of the seminal contributions that came earlier.

1.1 Prevalence of Personality Traits in Entrepreneurs vs. Other Populations

Many researchers compare the traits of entrepreneurs to employed workers or the general population to identify characteristics that define entrepreneurs as a group. It may seem a foolish or unnecessary task to compare Steve Jobs or Elon Musk to the average person, and many books describe the special biographies and personalities of these great entrepreneurs. Here, however, the literature has a very different focus. For every Jobs or Musk, we have thousands of entrepreneurs seeking growth-oriented businesses and many more seeking to build a business for themselves as self-employed proprietors. The collective impact of these individuals on our economy is enormous, even if they don't start Apple or SpaceX. This literature is concerned with investigating and

defining the regularities and differences in the personalities of these entrepreneurs.

For this review, we combed through hundreds of studies on J-Stor, Econstor, and the on-line journal databases available at Harvard Business School and Wellesley College, covering journal articles and dissertations spanning economics, psychology, and management studies. We restricted our focus to articles published after 2000, as a resurgence of interest into entrepreneurial behavior generated a new crop of studies that had not been meaningfully summarized. Data used in the studies came from the United States, Canada, Australia, New Zealand, Germany, France, Italy and other European economies. We considered articles with various definitions of entrepreneurs, most commonly self-employed individuals or business owner-managers. We excluded studies looking solely at subsistence entrepreneurship, partially because these studies are so sparse. Many of the personality questionnaires were conducted with business-track university students, while other studies used national data sets including all fields and industries of employment. While Frese (2009) highlights how entrepreneurial action extends to efforts beyond for-profit firm creation (e.g., social activism), we focus this survey on the venture creation process in the private sector. We purposefully spend less time on the variations of overconfidence, optimism, and risk taking given the detailed recent review of Åstebro *et al.* (2014) on these issues.

Studies on risk attitudes were searched using the keywords “risk preference,” “risk propensity,” “risk aversion,” and “risk tolerance.” We included risk measures of various kinds, including self-reported answers in longitudinal surveys, hypothetical gambling situations, and investment history metrics. Studies on personality traits were searched using keywords such as “personality,” “traits,” and “orientation,” as well as the specific trait names covered in this survey. We included the most commonly used personality concepts (Big-5, need for achievement, internal locus of control, innovativeness, and self-efficacy). In a few studies that used composite measures of “entrepreneurial orientation,” we turned to the reported underlying data for disaggregation of individual variables. We excluded personality traits for which there was too little literature to summarize meaningfully: need for autonomy,

stress/uncertainty tolerance, tenacity, self-esteem, discipline, delay of gratification, and so on.

After combing through research databases for the relevant and academically rigorous articles, we compiled them into a set of tables (contained in the online appendix). The first series of tables lists studies by risk attitudes (28 studies). The second series lists studies by personality traits: Big-5 (10), need for achievement (12), locus of control (13), self-efficacy/proactivity (11), innovativeness (12), stress/uncertainty tolerance (4) and need for autonomy (4). The third series lists studies by the stage of business they apply to: career choice/business creation (14), survival/success (14), and exit (1). The final series lists studies by other types of comparisons: comparing demographics (11) and comparing with environmental factors (6). These tables form the starting point of our summary of each subset of literature, as well as comparisons on the methodologies, conceptual tools, findings, and efficacy of each approach.

Before reviewing these studies, it is important to identify broad caveats and limitations to this literature stream. First, many studies lack the preferred structure outlined in the Introduction, with the unfortunate result that it is often unclear as to whether individuals with a given set of personality traits selected into entrepreneurship, or whether the traits were developed endogenously by individuals after becoming entrepreneurs. This reverse causality concern is especially prominent for cross-sectional surveys and data tabulations. Additionally, even when the measurement of personality traits does precede entrepreneurial choices, this does not guarantee that this trait was the causal factor. For example, individuals from wealthy families may score high on risk tolerance levels because they have the security of their family's money, and perhaps availability of financial resources is the true factor that prompts entrepreneurship, independent of risk tolerance. Without observing and measuring the wealth of individuals, we are liable to mismeasure the role of risk tolerance for decisions. This concern over omitted variable bias is true for individual studies, and it is compounded when comparing studies drawn from countries and settings that have differing cultural factors that are also known to influence personality traits, such as entrepreneurial motivation and achievement orientation (Stewart and Roth, 2007). Finally, survey-based analyses

often have small sample sizes, which may explain some of the variation in results seen across studies.

Understanding these caveats, we proceed with a summary of the main personality-related results. The online appendix to this review contains additional details for most of the papers mentioned. The collected information includes country of coverage, personality traits and demographics considered, measurement approach, data sources and sample size, outcomes and findings (including reference group), and the population of entrepreneurs considered. While first developed for our own use, we hope this is a useful resource for those wishing to dig deeper on these diffuse literatures.

1.1.1 Big-5 Model

The Big-5 model is a multidimensional approach towards defining personality, through measuring openness, conscientiousness, extraversion, agreeableness, and neuroticism. It has been the predominant model for personality traits since the 1980s, and the Big-5 traits have been found to influence career choice and work performance (e.g., Costa and McCrae, 1992; Digman, 1990; Goldberg, 1990; John *et al.*, 2008; Rauch, 2014). The five “macro traits” cover a distinct set of characteristics, as described in John *et al.* (2008, p. 138):

- *Openness to experience*: describes the breadth, depth, originality, and complexity of an individual’s mental and experiential life
- *Conscientiousness*: describes socially prescribed impulse control that facilitates task- and goal-orientated behavior
- *Extraversion*: implies an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality
- *Agreeableness*: contrasts a prosocial and communal orientation toward others with antagonism and includes traits such as altruism, tender-mindedness, trust, and modesty

- *Neuroticism*: contrasts emotional stability and even-temperedness with negative emotionality, such as feeling anxious, nervous, sad, and tense

Differences between entrepreneurs and managers

The bulk of the existing studies comparing the prevalence of Big-5 traits between populations of entrepreneurs and managers occurred between 1960 and 2000. Managers are frequently used as a comparison point for entrepreneurs given the potential need of both groups to direct workers and manage multiple tasks. In a meta-analysis of 23 studies conducted from 1970 to 2002 in a variety of countries and reported in English-language journals, Zhao and Seibert (2006) find entrepreneurs to be more open to experience, more conscientious, similar for extraversion, less agreeable, and less neurotic (or in the Big-5 lingo, O+, C+, E, A-, N-). Many individual studies, of course, show deviations from this pattern. For example, in a survey by Envick and Langford (2000) of 218 entrepreneurs and managers in a large Canadian city, the authors find entrepreneurs to be significantly less conscientious and agreeable than managers and less extraverted (O+, C-, E-, A-, N-), while confirming the other patterns observed in the meta study.

These characteristic differences between entrepreneurs and the average employed person are often theoretically ascribed to the “attraction-selection-attrition model” (Schneider, 1987). According to this model, workers are attracted to jobs whose demands and opportunities match their talents, motives, and personality traits; employers or financiers then select applicants whose aptitudes and motives fit their criteria; and workers then stay in their occupational group when they find their professional situation more rewarding than alternative positions. We review next each of these five traits as they would be presented in this model.

Entrepreneurs are consistently found to be more *open to experience* than managers (O+). Researchers hypothesize that in the context of a business venture, an entrepreneur is likely to be attracted to constantly changing environments and the novelty of new challenges. Individuals who thrive on challenges and novel environments are those who present creative solutions, business models, and products, and the openness of entrepreneurs may aid these functions. Meanwhile, managers are

often selected by their superiors for their ability to execute and deliver high-quality and low-variance results for a given set of directions rather than seek out original solutions. Thus, researchers theorize that both the environment and job requirements of an entrepreneur select for individuals who are more open to experience.

Zhao and Seibert (2006) suggest that higher *conscientiousness* is the most significant difference between entrepreneurs and managers (C+). Conscientiousness is a composite of achievement motivation and dependability. Zhao and Seibert (2006) find that entrepreneurs and managers are similar in dependability, but entrepreneurs score significantly higher than managers in the achievement facet. In a meta-analysis of 41 studies, Collins *et al.* (2004) also conclude that individuals who pursue entrepreneurial careers are significantly higher in achievement motivation than individuals who pursue other types of careers, and Stewart and Roth (2007) similarly conclude that entrepreneurs are more achievement-oriented than managers. It is frequently hypothesized that those with high achievement motivation are drawn to environments in which success is more closely attributed to their own efforts, rather than a larger institutional setting in which business success or failure is less a function of one's individual efforts.

There is a lack of consensus on whether entrepreneurs score higher than managers on *extraversion* (E). This trait measures the extent to which one is dominant, energetic, active, talkative, and enthusiastic (Costa and McCrae, 1992). Some researchers hypothesize that extraversion could be more important for entrepreneurs than managers since entrepreneurs act as salespeople for their ideas to investors, partners, employees, and customers. Zhao and Seibert (2006) conclude, however, that no reliable difference emerges in the literature. Ensvick and Langford (2000), who found that entrepreneurs were less extraverted than managers, suggested that many entrepreneurs may run small businesses from their homes to be away from large bureaucracies that demand one to be relentlessly sociable. This is an area where the definition of "entrepreneur" matters greatly: self-employed persons and growth-oriented founders tend to exhibit very different characteristics.

Finally, entrepreneurs are often found to have modestly smaller amounts of *agreeableness* and *neuroticism* (A-, N-) but these differences measured are quite small between entrepreneurs and managers.

Some researchers hypothesize that, because most entrepreneurs eventually become the CEOs of their own ventures, they do not need to worry about pleasing other people around them, whereas managers must at least please their own bosses. Zhao and Seibert (2006) find entrepreneurs to be less neurotic than managers, suggesting that this is because entrepreneurs require exceptional self-confidence to take on the risks of starting a venture. Overall, however, there is not a strong pattern of significant results in the current literature on these two dimensions.

Differences across entrepreneurial populations

Recent work seeks to measure these traits across different types of entrepreneurs or different levels of intent, and these variations are as exciting and policy relevant as the macro-level depiction of entrepreneurs versus the average person. Antoncic *et al.* (2015) conduct 62 face-to-face interviews at firms and 501 questionnaires at educational institutions in Slovenia, classifying people into four groups: practicing entrepreneurs who already own a firm (30.2% of responses); potential entrepreneurs who intend to establish their own firm in the following three years (9.9%); maybe-entrepreneurs who might establish their own firm sometime in the future (46.7%); or non-entrepreneurs who never intend to set up their own firm (13.2%). The study finds variations that mirror the meta-survey results for openness: practicing entrepreneurs are the most open to experience, potential entrepreneurs slightly less open, maybe-entrepreneurs even less open, and non-entrepreneurs the least open. The surveyed entrepreneurs are also less agreeable, but the patterns in meta-analyses are not reflected for conscientiousness and neuroticism (in total, O+, C, E+, A-, N). Antoncic *et al.* (2015) corroborates the broad consensus that entrepreneurs tend to be more open to experience than the general population, while the other traits are harder to determine.

What lies behind this latter uncertainty? Much of the variation across individual studies can be attributed to the small sample sizes, which usually only capture a few hundred respondents (Envick and Langford, 2000; Antoncic *et al.*, 2015). But small sample sizes are unlikely to be the only answer, as the patterns in meta-analyses like

Zhao and Seibert (2006) and Zhao *et al.* (2010) overlap but are also not fully congruous. This limitation for meta-analyses may in part reflect the influence of environment on each entrepreneurial population's traits, such that generalizations across populations, industry, and culture are an impossible task. Necessity- versus opportunity-driven entrepreneurs certainly bring different personality traits, and even the opportunity-driven entrepreneurs in New York City might be different from those in Silicon Valley. Perhaps as more studies are conducted, we will become better equipped to separate the noise of small samples from the actual differences in personality traits for entrepreneurship across environments, which would be a major accomplishment.

Another critique of the Big-5 framework is the overly general nature of these macro personality traits, such that they cannot easily predict situation-specific behaviors of entrepreneurs; also, an understanding of a person's Big-5 personality may not help in understanding the specific mechanisms through which personality impacts entrepreneurial attitudes and actions (e.g. Kanfer, 1992; Rauch, 2014). Frustrated by these limitations of the Big-5 framework to describe a coherent portrait of the entrepreneur, researchers have shifted toward creating a multidimensional personality framework that incorporates other qualities like self-efficacy, innovativeness, locus of control, and need for achievement. We describe these next.

1.1.2 Self-Efficacy and Innovativeness

In the uncertain and competitive environment of new venture creation, many researchers hypothesize that entrepreneurs thrive on a strong sense of personal self-efficacy to execute their visions and a keen eye for innovation to identify new products and markets. Self-efficacy describes a person's "belief that he/she can perform tasks and fulfill roles, and is directly related to expectations, goals and motivation" (Cassar and Friedman, 2009). High self-efficacy correlates with work-related performance (Stajkovic and Luthans, 1998), small business growth (Baum and Locke, 2004), academic performance (Hackett and Betz, 1989; Luszczynska *et al.*, 2005), and career choice (Lent and Hackett, 1987). Self-efficacy is measured on two levels of specificity, either as generalized self-efficacy

or domain-specific Entrepreneurial Self-Efficacy (ESE). Most researchers focus on the more situation-relevant ESE measure.

Chen *et al.* (1998) define ESE as a composite of self-efficacy toward five tasks: innovation, risk-taking, marketing, management, and financial control. Surveying students in three business study programs, they find that entrepreneurship students have a higher ESE average in marketing, management, and financial control than do organizational psychology and management students. Perhaps entrepreneurship programs draw students who feel confident in many areas due to the diverse demands of being an entrepreneur, or it could be that study of entrepreneurship instills this ESE. Chen *et al.* (1998) also find that business founders have a higher ESE in innovation and risk-taking than non-founders, even as the locus of control remains the same across the two populations. In addition, researchers hypothesize that entrepreneurial types may also simply be more confident, which would induce them to score themselves higher across the board in the subjective surveys typically used to collect data. We discuss evidence related to this point below. Rather than evaluating whether entrepreneurs have a greater ESE than other groups (which seems a somewhat tautological question), most researchers have focused on the effect of ESE on firm performance. This evidence will be considered in section 1.2.

Utsch and Rauch (2000) examine innovativeness and initiative as mediators of achievement orientation, which in this case is a composite measure of self-efficacy, higher-order need strength, need achievement, and internal locus of control. Their surveys and interviews capture 201 German entrepreneurs defined as founders, owners, and managers of a small business with less than 50 employees. Innovativeness is found to be a mediator, while initiative is not. (The psychology literature talks about “mediators,” which for an economist roughly means a mechanism via which one thing impacts another.) Likewise, innovativeness correlates positively and significantly with the personality traits of self-efficacy, higher-order need strength, and need achievement, but not with internal locus of control.

In general, innovativeness refers to how individuals respond to new things (Goldsmith and Foxall, 2003). Innovativeness can be considered as a global or domain-specific personality trait, or as a behavioral

concept such as the adoption of new products by consumers. Different ways to measure innovativeness have been suggested at least since the 1970s (Hurt *et al.*, 1977), but no uniform measure exists across the studies reviewed here. In one study, Marcati *et al.* (2008) argue that domain-specific innovativeness of founders completely mediates their general innovativeness in a sample of 188 entrepreneurs of small- and medium-sized firms of various industries. Both forms of innovativeness display generally consistent correlations with Big-5 traits, not indicating major differences in their origins.

Kickul and Gundry (2002) analyze the relationship between 107 small-firm owner-managers' strategic orientation, personality, and innovation. They adopt the Miles and Snow strategic orientation typology, which divides business strategies into prospector, defender, analyzer, and reactor strategies.² Kickul and Gundry (2002) find that the prospector strategic orientation mediates proactive personality and three types of innovations: innovative targeting processes, innovative organizational systems, and innovative boundary supports. They likewise find that those with proactive personalities are more likely to both take on a prospector strategy orientation and innovate in their work, which is to be expected.

Given the vast number of Big-5 and risk attitude studies (the latter of which are discussed below in Section 2), it is quite surprising how little attention has been paid to the innovativeness of entrepreneurs as it relates to their personalities. This is a place where the biographies of Steve Jobs alone likely outnumber the formal academic studies! Nevertheless, scholars likely agree that entrepreneurs need to be able to tolerate some risk and to create or recognize new business opportunities, perhaps also innovating new products and concepts that can be brought to market. Related industry-level evidence certainly supports this, with industries showing high rates of entry by small firms also tending to have high rates of innovation and high productivity growth (Parker, 2009).

²Barney and Griffin (1992): "A prospector strategy constantly seeks out new markets and opportunities; a defender strategy concentrates on protecting current markets and maintaining stable growth; an analyzer strategy both tries to maintain market share and seek out new market opportunities; a reactor strategy fails to anticipate or influence events in the environment."

One explanation for this gap may be related to the measurement of “innovativeness”: we simply do not have an agreed-upon set of survey questions to measure someone’s innovativeness in the way that we can measure risk preferences or Big-5 traits. As such, the metrics used in the literature are scattered, and universal, domain-specific measures of entrepreneurial innovativeness remain elusive. Another explanation is that the identification of ESE traits is especially sensitive to the reverse causality and omitted variable bias concerns described earlier, raising the difficulty in studying it or in interpreting results (Bandura, 1997; Forbes, 2005). Consequently, scholars may be reluctant to pursue it for fear of limited publication possibilities.³

Cassar and Friedman (2009) compare nascent entrepreneurs in the startup phase of new ventures with a control group drawn from the general working-age population. A nascent entrepreneur is defined by the Panel Study of Entrepreneurial Dynamics (PSED) as anyone who is currently trying to start a new business, expects to be an owner or part owner of the firm, and has been active in doing so for the past 12 months. Cassar and Friedman (2009) assert that their data, drawn from the PSED and interview and survey responses of 431 American nascent entrepreneurs, overcome inference challenges due to venture survivorship and recall bias. They present evidence that higher ESE increases the likelihood of being a nascent entrepreneur as well as the successful founding of an operating business.

To sum, theory and a limited dose of empirical evidence suggest that entrepreneurs possess higher self-efficacy than managers and non-entrepreneurs (Chen *et al.*, 1998). This is perhaps partly due to proactive personalities being more likely to innovate (Kickul and Gundry, 2002). Innovativeness, in turn, can mediate one’s achievement motivation in a way that mere initiative does not (Utsch and Rauch, 2000). In a

³Many studies instead focus on the “innovativeness” of the firm rather than on that of the founder, basing their analyses on patents, R&D efforts, reported product and process innovations, and similar measurable firm traits. We abstract away from those studies, which are obviously important in their own way, to maintain the survey focus on the personality findings. Hyytinen *et al.* (2015) provide a strong survey of this parallel literature and analyze Finnish survey data combined with official business register data. They find a positive correlation between the innovativeness of the firm and its survival, although a causal interpretation is not established. For risk-loving entrepreneurs, any positive impact of firm innovativeness turns negative.

longitudinal study, Cassar and Friedman (2009) confirm that those with high ESE are more likely to become nascent entrepreneurs and successful founders. However, the limits of this literature should not be downplayed. There is still a clear lack of studies successfully isolating the pre-founding characteristics of to-be entrepreneurs on these dimensions, as well as longitudinal studies that track characteristics of individuals over time. Given the high potential for endogenous ESE, this is a large caveat to be addressed.

1.1.3 Locus of Control

An important trait in the entrepreneurship literature is locus of control (LOC). A person with an internal LOC conceptualizes that their own decisions control their lives, while those with an external LOC believe the true controlling factors are chance, fate, or environmental features that they cannot influence. Rotter's (1954) theory of social learning first introduced the LOC concept. Persons with internal LOC believe that they can influence outcomes through their own ability, effort, or skills, rather than external forces controlling these outcomes. Previous research has linked belief in internal control to the likelihood of engaging in entrepreneurial activity (e.g., Shapero, 1975; Brockhaus, 1982; Gartner, 1985; Perry, 1990; Shaver and Scott, 1991).

Many researchers emphasize LOC in their work. Barrick (2005) claims that "specific 'traits rely on explicit description of entrepreneurial activities that may be situated in time, place and role,' which is why specific characteristics such as risk tolerance, need for achievement, or locus of control are more useful in predicting entrepreneurial performance than the Big Five." Caliendo *et al.* (2009) re-evaluate that assertion and, along with other researchers, suggest that traits such as LOC can be more directly extrapolated onto decision-making in the professional field.

Notably, LOC is considered to be a culturally dependent trait. Mueller and Thomas (2001) find that countries with more individualistic cultures (as opposed to collectivist cultures) show greater internal LOC, and that LOC and innovativeness are both learned traits.⁴ This

⁴The Hofstede (1980) index places countries such as the United States, United Kingdom, Canada and Ireland to the individualist end of the spectrum, and countries

cultural variance is affirmed by Tajeddini and Mueller (2009), who find that LOC is higher in British entrepreneurial populations than Swiss entrepreneurial populations in the high-tech industry. The authors argue that the difference could be related to the Hofstede's (1980) defined variations in cultural characteristics such as individualism, uncertainty avoidance, and risk propensity.

Many researchers find internal LOC to be stronger in entrepreneurial populations than in other populations. Levine and Rubenstein (2017) find in NLSY longitudinal data that those who become a self-employed person running an incorporated business display a strong internal LOC prior to founding their firm than those who are employed by others or self-employed in unincorporated businesses. This echoes earlier findings by Evans and Leighton (1989), and many studies find parallel results. In a cross-sectional study, Korunka *et al.* (2003) measure that Austrian entrepreneurs (defined as "successful new owner-managers") have a strong internal LOC compared to "nascent entrepreneurs." Gürol and Atsan (2006) find that Turkish students who are more entrepreneurially inclined have a higher LOC. Caliendo *et al.* (2014) argue that internal LOC is among the personality traits that best predicts entrepreneurial entry and exit decisions. Hansemark (2003) finds in tracking Swedish entrepreneurship students over 11 years that LOC predicts entry into entrepreneurship for men but not for women.

Looking within entrepreneurial populations, a higher internal LOC is further associated with venture growth. Rauch and Frese (2007b) find in their meta-analysis that an internal LOC has a significant correlation with business creation and eventual business success. Surveying 168 Chinese entrepreneurs in small and medium-sized enterprises in Singapore, Lee and Tsang (2001) find internal LOC positively correlates with venture size and growth rates. At the same time, Lee and Tsang (2001) note that personality traits are less important than industrial and managerial experience and skills in explaining firm growth in their sample. Overall, the LOC personality trait finds extensive support and is rather homogeneous across types of entrepreneurs.

such as China and Singapore to the collectivist end of the spectrum. See also Thomas and Mueller (2000).

1.1.4 Need for Achievement

The need for achievement refers to an individual's desire for significant accomplishment, mastering of skills, and attaining challenging goals. Researchers hypothesize that entrepreneurs might hold a high need for achievement, as building a business from scratch demonstrates one's individual abilities in ways that are often hard to match when working within a system in which responsibility is diffuse. Along with LOC, this important role for need for achievement finds strong support in the literature along several dimensions.

Need for Achievement (nAch) is a concept based on McClelland's (1985) "acquired-needs theory" and is one of the dominant needs affecting individual actions in a workplace context. The concept was first introduced by Murray (1938), and later developed and popularized by McClelland (1961, 1985). Many researchers have found that a high need for achievement predicts entry into entrepreneurship, although this finding is sometimes challenged in specific contexts. Among the settings discussed above, the higher need for achievement is evident in the studies of the Austrian entrepreneurs (Korunka *et al.*, 2003) and the Turkish students (Gürol and Atsan, 2006), but not in the study of Swedish entrepreneurship students (Hansemark, 2003). Comparing four Austrian studies, Frank *et al.* (2007) conclude that the need for achievement selects individuals for entry into entrepreneurship. Turning to comparative analyses across countries, Stewart and Roth (2007) conclude from a meta-analysis of 18 studies and 3,272 subjects that entrepreneurs exhibit a higher achievement motivation than managers regardless of country or type of instrumentation ("projective" or "objective").⁵ Further differences are also evident across sub-groups of venture founders. Mueller and Thomas (2001) find that Swiss entrepreneurs have a higher need for achievement than U.K. entrepreneurs, suggesting that the trait varies across cultures and countries.

Some researchers also identify a link between the need for achievement and business performance. For example, the meta-analysis of

⁵Projective instruments utilize unstructured stimuli to get respondents to reveal underlying or hidden emotions or internal conflicts (e.g., Holzman inkblot tests), whereas objective tests utilize comprehensive personality instruments.

Collins *et al.* (2004) finds that both projective and self-reported measures of achievement motivation predict entrepreneurial intentions and performance. Rauch and Frese (2007a) find similar results. However, Frank *et al.* (2007) argue that the need for achievement, along with other personality factors, is much less relevant than environmental resources and many “process configurations” (such as the set of management functions including planning, organization, and human resource practices) in explaining entrepreneurial performance.

1.2 Correlation of Personality Traits with Venture Phases

We noted in the Introduction that research has mostly investigated how personality characteristics correlate with probability of entry into and exit out of entrepreneurship, as well as with various measures of success as an entrepreneur (including venture creation, venture growth, and long-term venture survival). By contrast, academic work is only beginning to scratch the surface of how personality characteristics link to specific phases in the venture process or to consider narrower topics like industry-specific innovation or business plan quality.

1.2.1 Probability of Entry into Entrepreneurship

Entry into entrepreneurship is often defined as the act of starting a new business venture. The correlation between personality traits and probability of successful entry into entrepreneurship is typically measured in two ways. First, taking advantage of university settings, many researchers analyze student personalities in correlation with their current entrepreneurial intent, their perceived learning, perceived ability, and personal investment. Second, studies use national longitudinal panel datasets like the PSED or the German Socioeconomic Panel (GSOEP) to track whether measured personality traits in those large-scale surveys predicted later business founding.

Cross-Sectional Studies and Meta-Analyses

Research teams surveying student populations focus by necessity on future career intentions and early developmental views of entrepreneur-

ship. For example, Singh and DeNoble (2003) examine the relationship between the Big-5 traits and entrepreneurial intent, perceived ability, and personal investment among 342 students at a large state university on the west coast of the United States. They find that openness is positively related to perceived ability and personal investment, whereas neuroticism negatively relates to intent and ability. They also test for variability between studies that had defined entrepreneurs as founders versus business leaders, finding no significant differentiation between the two categories. Synthesizing 60 studies describing the relationship between Big-5 traits and entrepreneurial intentions and performance, Zhao *et al.* (2010) find that entrepreneurial intentions are positively related to openness to experience, conscientiousness, extraversion, emotional stability, and risk propensity, and that only agreeableness was irrelevant in explaining entrepreneurial intentions (O+, C+, E+, A, N-). Among these, risk propensity garners the strongest support, followed by openness and emotional stability.

Looking to non-Big-5 traits, Korunka *et al.* (2003) survey 1,169 nascent entrepreneurs and new business owner-managers in Austria to study their action patterns. Of 627 new business owner-managers, 153 who meet success criteria also display a high need for achievement, high internal LOC, and medium risk-taking propensity. The study also considered three startup configurations for nascent entrepreneurs to combine analysis of personality traits with situational factors. The first configuration, “nascent entrepreneurs against their will,” consists of those with a strong push factor and comparatively little social or network support. This group holds a comparatively low need for achievement, low internal LOC, and low personal initiative. The “would-be nascent entrepreneurs” have unfavorable financial situations but otherwise strong self-realization motives and internal LOC. Finally, “networking nascent entrepreneurs with risk-avoidance patterns” have supportive environments and strong resources, yet high risk-avoidance.

In a sample of 265 Master of Business Administration (MBA) students across five American universities, Zhao *et al.* (2005) find that individuals are most likely to form entrepreneurial intentions directly because they have high ESE, which in turn is influenced by learning and experience, and to a lesser degree, by risk propensity. However, even as

gender was not related to ESE, women reported lower entrepreneurial career intentions, suggesting that the relationship of gender to entrepreneurial intentions is likely quite complex. As pointed out by Miao *et al.* (2016) in their meta-analysis of ESE, most other studies also find a positive relationship between ESE and entrepreneurial intentions and/or venture creation.⁶

To summarize these cross-sectional studies and meta-analyses, students who display certain Big-5 traits (i.e., more open to new experiences, more conscientious, more extraverted, and less neurotic) and higher levels of ESE, internal LOC, and need for achievement are the group most likely to enter entrepreneurship after graduating from university. These studies also highlight the environmental and gender factors that influence these choices.

Longitudinal Studies

To move from entrepreneurial intentions to actual business formation, researchers need to track a group over time. For example, Hansemark (2003) tracks students from a Swedish entrepreneurship program over an 11-year period by matching psychological data with Swedish registries of new businesses. The author measures the predictive validity of initially measured personality characteristics toward becoming an entrepreneur at some point in the future, relative to a matched control group. Internal LOC has predictive validity for men but not for women; somewhat surprisingly the need for achievement is not predictive for either gender. These results are inconsistent with those of Korunka *et al.* (2003) and two studies discussed next.

Kessler *et al.* (2012) interview 227 Austrian business founders three times between 1998 and 2005. The authors find that personality traits of need for achievement, LOC, and risk taking predict early success, measured by first sales revenues, but not longer-term business survival. The relevance of internal LOC is also observed in the Caliendo *et al.* (2014) study of 10 waves of the GSOEP from 2000 through 2009. More broadly, the GSOEP study finds that some personality traits, such as

⁶In addition to studies already mentioned, see also Miner (2000), Müller and Gappisch (2005), Barbosa *et al.* (2007), and Wilson *et al.* (2007).

openness to experience, extraversion, and risk tolerance, predict entry, but entirely different ones, such as agreeableness or other levels of risk tolerance, govern exit choices from self-employment. Only internal LOC holds a similar influence on both the entry and exit decisions. Caliendo *et al.* (2014) report that these personality traits can explain 30% of the overall variance, with risk tolerance, LOC, and openness leading the way.

Two studies specifically consider the impact of ESE on various phases of the entrepreneurial process. First, Cassar and Friedman (2009) find in the PSED sample that ESE increases the likelihood of creating an operating business. Second, Brinckmann and Kim (2015) report that ESE facilitates the development of formal business plans, while entrepreneurial perseverance tends to promote engagement in business planning studies.

To summarize, recent literature mostly agrees that internal LOC and need for achievement are important predictors of entry into entrepreneurship. Risk-taking is also found to correlate with business founding but not necessarily with performance or exit. Finally, there also seems to be a link between ESE and business founding, as well as with specific related functions such as business planning skills.

1.2.2 Growth and Success as an Entrepreneur

Most researchers and policymakers are interested in not only what traits predict entry into entrepreneurship, but what traits contribute to successful venture performance measures such as growth, investment, long-term survival, and self-reported success. The literature becomes rather sparse and idiosyncratic over these various metrics, so we cycle quickly across them and provide some sample findings. (In addition, it is worth recalling that some studies would consider the innovativeness discussed above as a personality trait as a possible outcome metric.)

Firm growth is one of the most common measures of venture success. In their sample of 201 German founders, Utsch and Rauch (2000) find that measures of innovativeness predict employment growth and profit growth, while measures of initiative correlate only with profit growth. Additionally, they find a positive interaction effect between innovation

and ESE.⁷ Baum and Locke (2004) conduct a six-year longitudinal study of North American architectural woodwork firms. They find that situationally specific motivations of goals, self-efficacy, and communicated vision have direct effects on venture growth, mediating other traits like passion, tenacity, and new resource skill.

In some settings, researchers can study how personality traits correlate with firm investment. Cassar and Friedman (2009) find that ESE increases the amount of personal resources an entrepreneur invests into a venture, as measured by proportion of personal wealth invested in the venture and number of hours per week devoted to the venture. This type of personal investment is also reflected at the student level, with Singh and DeNoble (2003) finding that personality could predict the amount of time students spent preparing for future business efforts.

Another popular measure is the long-term survival of the firm, as it can be readily measured through techniques as simple as business registers, web presence, or phone directories. Ciavarella *et al.* (2004) find that high conscientiousness is positively related to long-term venture survival (eight years or more), compared to a negative relationship for the entrepreneur's openness to experience and no relationship for the other Big-5 personality traits.

Many surveys ask entrepreneurs to rate their success. Different entrepreneurs may have very different views as to how successful their ventures are, and the typical proxies used by researchers (e.g., growth and survival) may not correlate very well with the self-defined success or performance. For example, Poon *et al.* (2006) assess performance among 96 Malaysian entrepreneurs by asking respondents to rate their company's growth, sales volume, market share, and profit using a scale ranging from 'very poor' (1) to 'very good' (5). Respondents rate these four performance criteria relative to that of competitors and their own expectations, yielding an 8-item performance scale. The study finds that internal LOC is positively connected to firm performance, but lesser support exists for ESE and achievement motivations.

⁷Miao *et al.* (2016) synthesize 26 studies in their meta-analysis of ESE and firm performance to find a moderately-sized positive correlation (0.309) between these variables.

Finally, researchers summarize the relationship between personality traits and successful venture performance through meta-analyses. For example, Rauch and Frese (2007a) identify that the traits most significantly correlated with business success include the need for achievement (.30), innovativeness (.27), “proactive personality” (.27), generalized self-efficacy (.25), stress tolerance (.20), need for autonomy (.16), locus of control (.13), and risk-taking (.10). The authors note that these relationships are of moderate magnitude and that heterogeneity across the different studies allows the possibility of moderators, which could be included for future studies. Another meta-analysis by Zhao *et al.* (2010) finds that conscientiousness, openness to experience, emotional stability, and extraversion are positively related to entrepreneurial firm performance as measured by firm survival, growth, and profitability. While risk taking is positively related to business foundation, it does not correlate with eventual business growth and success.

Additional studies focus on how intelligence interacts with the personality traits. One example is the Baum and Bird (2010) field study of 143 U.S.-based founders of high-growth printing industry firms. The authors find that “successful intelligence,” which is defined by them to consist of practical, analytical, and creative elements, combines with high ESE to promote venture growth over four years. Likewise, Hmieleski and Corbett (2008) find that improvisational behavior combined with high ESE has a positive relationship with sales growth. It is often difficult to bring much conceptual order to these studies as they combine personality traits with different empirical constructs, and the results are sometimes counterintuitive. We worry most about studies where individuals define whether they are successful, and such statements are very subjective and can only be evaluated against initial goals for the business, which vary substantially.

1.2.3 Probability of Exiting Entrepreneurship

While many researchers scrutinize the decision to start a firm, very few consider how personality characteristics relate to decisions to exit from entrepreneurship. As a rare exception, Caliendo *et al.* (2014) find using

the GSOEP panel dataset that agreeableness increases the likelihood of exit from entrepreneurship, and an internal LOC makes exits less likely. The authors note that risk tolerance also had a non-monotonic relationship with the exit decision.

1.3 Moderating Traits and Environmental Factors

Personality characteristics correlate with each other, while at the same time being impacted and shaped by environmental forces. Researchers in all disciplines frequently describe how personality factors interact with or are moderated by other individual traits (e.g., gender, education) and external conditions (e.g., industry dynamics, city traits). For example, we noted earlier the Tajeddini and Mueller (2009) study that compares 133 Swiss entrepreneurs with 120 British entrepreneurs in the high-tech industry. U.K. techno-entrepreneurs scored higher on surveys in autonomy, risk propensity, and LOC, while Swiss techno-entrepreneurs scored higher on achievement need, tolerance for ambiguity, innovativeness, and confidence. Because the technology industries in both countries are quite similar in terms of development and institutional support, Tajeddini and Mueller (2009) attribute the variation to cultural differences rather than other environmental factors.

Similarly, Hmieleski and Baron (2008) examine a three-way interaction of ESE, dispositional optimism, and environmental dynamism on firm performance (e.g., revenue growth and employment growth). The researchers define environmental dynamism as the rate of unpredicted change occurring within a given industry, following the approaches of Dess and Beard (1984) and Sharfman and Dean (1991). They find that high ESE improved firm performance in dynamic environments when combined with moderate optimism, but was detrimental when combined with high optimism. In stable environments, ESE's effects are weak and not moderated by optimism. Hmieleski and Baron (2008) conclude that high ESE is not always beneficial for entrepreneurs and that environment and industry difference may interact strongly with personality traits in terms of their impact for venture outcomes.

Researchers in some disciplines (but rarely economics) go further than the study of interactions to construct "a complex process model

of the entrepreneur,” in which the relationships among these variables are mapped out and ultimately govern venture success. The diagram in Figure 1.1 is adapted from Frese (2009) and Brandstätter (2011) to illustrate this process.

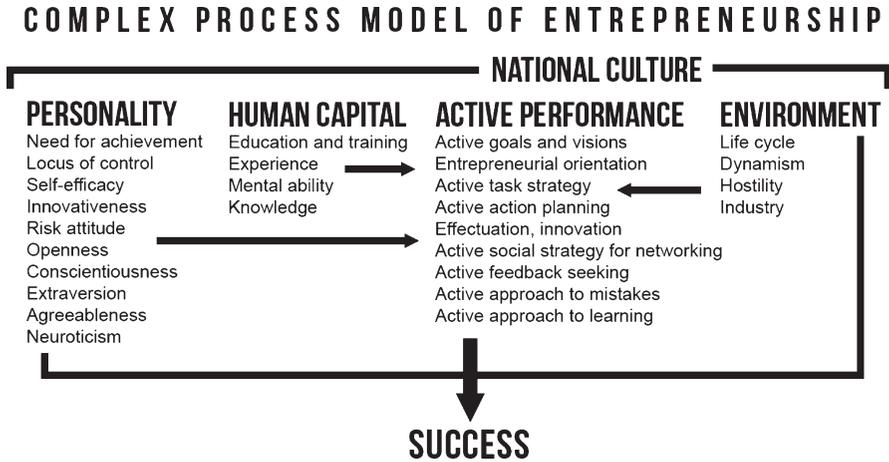


Figure 1.1: Prototype Complex Process Model of Entrepreneurship

Entrepreneurship does not occur in a vacuum, and personality traits, human capital, and environment weave the context for each attempt to start and operate a new business. Regardless of discipline, this complex and integrated nature of entrepreneurship suggests that researchers must approach their setting carefully to reach reliable conclusions and be careful to consider how much the results of any one study can port across locations.

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