



## ARE YOU EXPERIENCED OR ARE YOU TALENTED?: WHEN DOES INNATE TALENT versus EXPERIENCE EXPLAIN ENTREPRENEURIAL PERFORMANCE?

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*We explore whether entrepreneurial performance is due to innate talent or the accumulation of entrepreneurial experience. Using a novel data set with multiple observations of founding attempts per individual, we generate a unique measure of entrepreneurial talent. In contrast to prior findings, the relative importance of experience versus talent changes with the context. When the current market or technology is familiar, experience dominates. However, when the venture context is unfamiliar, talent is more important. Individuals with experience and talent handle both familiar and unfamiliar aspects and may extract more from a given level of experience. The findings advance our understanding of how the drivers of venture performance shift with the broader technological and industry environment and places limits on when experience aids performance. Copyright © 2012 Strategic Management Society.*

### INTRODUCTION

A well-known observation is that entrepreneurs with greater experience in founding ventures are more likely to launch successful firms. Indeed, many studies show that the prior entrepreneurial experience of the founder positively influences the performance of subsequent ventures (Stuart and Abetti, 1990; Delmar and Shane, 2006). Moreover, serial entrepreneurs—those individuals who founded more than one business—create a disproportionate share of both entrepreneurial firms and economic impact (Roberts and Eesley, 2011). Correspondingly, serial entrepreneurs create a high proportion of jobs and economic growth relative to the larger number of novice or one-time only ones.

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Learning is the usual theoretical explanation for the link between entrepreneurial experience and venture performance. That is, as entrepreneurs found successive firms, they are likely to learn valuable lessons—such as how to develop a viable business model, access financial resources, and hire wisely—from that start-up experience. For example, Baron and Ensley (2006) find that experienced entrepreneurs have more sophisticated and accurate mental models of entrepreneurial opportunities than do novices. As a practical example, serial entrepreneur Steve Blank founded numerous firms, presumably learned from those experiences, and then created his highly successful firm, Epiphany. Thus, serial entrepreneurs are likely to learn from their entrepreneurial experiences and, so, are more likely to found higher-performing firms. For a review, see Politis (2005).

But while the ‘learning from experience’ explanation is appealing, talent is a subtler, yet possible, explanation. This explanation argues that talented entrepreneurs are more likely to succeed in their

early ventures because of their superior innate ability. Their early success is then likely to encourage these talented entrepreneurs to launch additional new firms. Given their talent, these entrepreneurs are likely to have further success in their subsequent ventures. For example, serial entrepreneur Steve Jobs was successful in his initial venture, Apple, and persisted in founding subsequent ventures that were also highly successful (i.e., Next, Pixar). In contrast, less talented entrepreneurs are less likely to succeed in their early ventures. This lack of success is then likely to discourage them from founding firms. As a result of these differences, the pool of entrepreneurs who found multiple ventures (i.e., serial entrepreneurs) is likely to be more talented and, therefore, more successful than the pool of all entrepreneurs, including one-time entrepreneurs (Chen, 2011; Gompers *et al.*, 2010). This alternative explanation is theoretically important because it calls into question the significance of learning from experience. It is practically important because it suggests that entrepreneurial talent is more relevant than entrepreneurial experience to the founding of successful firms.

In this article, we contrast these two explanations for the superior performance of experienced entrepreneurs. We ask whether *the superior performance of serial entrepreneurs is due to their experience or their talent*. We further add to extant research by examining the contingencies under which one is more important than the other and the interaction of talent with experience. We rely on unique survey data from 2,111 entrepreneurs that advantageously captures a long time span that covers nearly entire careers of entrepreneurs. Thus, we have a particularly rich data set to examine our question.

Our core contribution is to highlight the importance of entrepreneurial talent for venture performance. Specifically, we disentangle the effects of talent and experience. We find that both are germane and that it is important to theorize about the role the context plays in models of venture performance. Their relative importance is shaped by industry familiarity, technical familiarity, and context disruption. More broadly, we contribute to learning theory. While prior research focuses on the effects of experience on learning (Argote, 1999; Bingham and Eisenhardt, 2011), we add the role of talent. We find that performance is a function of talent as well as experience and that the interaction of talent with experience is particularly likely to generate high performance. We also specify the boundary conditions of experience for performance in learning theory.

## BACKGROUND LITERATURE AND HYPOTHESES

Extant literature finds that entrepreneurs with more founding experience are more likely to launch successful subsequent ventures than novice entrepreneurs (Lamont, 1972; Starr and Bygrave, 1992; Vesper, 1980; Wright, Westhead, and Sohl, 1998). For example, serial entrepreneurs are more likely to found firms with higher sales (Delmar and Shane, 2006) and lower failure rates (Brüderl, Preisendorfer, and Ziegler, 1992; Dencker, Gruber, and Shah, 2009; Franco and Filson, 2006; Gimeno *et al.*, 1997) than novices. They are also more likely to raise external capital more quickly and from higher quality and status investors (Shane and Stuart, 2002; Hsu, 2007; Hallen and Eisenhardt, forthcoming); so they launch more successful firms.

Learning is the usual theoretical explanation. The argument is that entrepreneurs learn from their prior founding experiences, resulting in increased performance. By engaging in multiple foundings, entrepreneurs develop a more accurate understanding of how to complete successfully the many tasks of founding a firm, such as identifying a business model, gaining financial resources, and hiring key executives. Experienced entrepreneurs are also more likely to identify viable opportunities (Baron and Ensley, 2006), and engage more effectively in strategic processes such as product development and internationalization (Bingham and Eisenhardt, 2011; Gilovich, Griffin, and Kahneman, 2002). In contrast, entrepreneurs with only large firm experience are less likely to have learned how to identify superior opportunities and execute them (Wasserman, 2003; Delmar and Shane, 2006). Finally, consistent with the literature on experts (Hayes, 1989), experienced entrepreneurs are more likely to develop routines they can quickly reuse in the next venture rather than spending time developing them.

Overall, this 'learning by doing' enables experienced entrepreneurs to imprint their ventures more effectively at the outset by choosing better opportunities (Huber, 1991; Ingram and Baum, 1997; Baum and Ingram, 1998). As time goes on, they are better able to develop viable business models, raise funding, install superior strategic processes, and complete the tasks involved in setting up a new firm. Prior experience in this case allows the entrepreneur to reuse strategies, network connections, and industry-specific knowledge. With more prior founding experience, the entrepreneur has seen a wider

spectrum of issues and problems during the start-up process. The greater the number of prior start-up experiences he/she has to draw from, the less likely that the decisions that need to be made in the next venture will be unexpected or unknown to the entrepreneur. While an inexperienced entrepreneur may spend valuable time and money discussing and trying out different solutions to problems that arise, the experienced entrepreneur has likely already encountered these problems and has solutions. Specifically, we propose:

*Hypothesis 1a: An entrepreneur with more venture founding experience is more likely to found a high-performing venture.*

We also expect that venture experience will be particularly advantageous for focal venture performance when the entrepreneur is familiar with critical aspects of that venture. That is, when the context surrounding the new venture is more familiar to the entrepreneur and, thus, more similar to the past, learning from prior entrepreneurial experience will be of particular relevance (Argote and Ingram, 2000; Argote, Beckman, and Epple, 1990). Lessons from the past will more directly transfer to the current situation. We define familiarity as having a close acquaintance or being well known. For example, when entrepreneurs engage with familiar technologies, they are likely to face fewer surprises and less likelihood to encounter problems. There have been opportunities to work out bugs, increase predictability, and better understand customer needs related to the technology (Levinthal and March, 1993; Meyer and Roberts, 1986). Similarly, when an entrepreneur starts a firm in a familiar industry, he/she is likely to understand the competitive dynamics of the industry. He/she will already be familiar with customers, suppliers, and ways of doing business in the industry. He/she may be able to use analogies from prior experience that fit particularly well with the current venture (Gavetti, Levinthal, and Rivkin, 2005), and he/she can reuse existing relationships. When problems arise, in a more familiar context, there is a greater likelihood that they have an overlap with problems that the entrepreneur has already faced in a previous venture.

Even when choosing which entrepreneurial opportunity to pursue, if entrepreneurs stick to an industry or technology they are familiar with, they are more likely to identify a valuable opportunity. When the entrepreneur knows the market, customer

preferences, and potential distribution or channel partners, he/she is more likely to choose a promising opportunity. In contrast, if the experienced entrepreneur strays into potential opportunities in an unknown area, it is more likely that unexpected challenges will arise or that the product will not be exactly what consumers want or a critical sales strategy or aspect of the business model will not work in the end. The experienced entrepreneur in a familiar domain has experience with a greater number of the constraints that must be satisfied for an idea to be a good business opportunity.

Finally, and in contrast with the benefits gained from experiences, experienced entrepreneurs may gain hubris and overconfidence along with experience (Hiller and Hambrick, 2005), making them particularly ineffective in unfamiliar contexts. For example, they may underestimate the uncertainty associated with a less familiar technology. Entrepreneurs will be less likely to benefit from their prior venture experience if their focal industry has undergone a major disruption. When the industry is disrupted, experienced entrepreneurs no longer have an understanding of industry dynamics and their experience is not likely to give them an advantage. It is then less likely that problems they encounter will be ones with which they are familiar and have a known solution from experience. Overall, we argue that entrepreneurial experience will be particularly likely to aid venture performance when the focal venture is in a context that is familiar to the entrepreneur. Both in opportunity selection and in execution, the more an experienced entrepreneur remains in a familiar context, the fewer surprises that will be encountered and the higher the likely performance of the venture.

*Hypothesis 1b: The positive effect predicted in H1a will be stronger for ventures started under more familiar conditions.*

Talent is a second, yet less explored, explanation for the positive link between serial entrepreneurs and performance. Here we argue that a significant source of success in starting ventures is time-invariant entrepreneurial talent differences across individuals. Schumpeter (1934) was the first in the literature to suggest that entrepreneurs have skill or talent, rather than simply being bearers of risk. Since then, relatively little scholarly work has examined entrepreneurial talent. Lucas (1978) refers to managerial talent in firm formation and defines it as an ability to get more output per worker. Others similarly have

defined talent as the ability to get greater entrepreneurial earnings out of a given amount of capital invested (Evans and Jovanovic, 1989). Amit, Glosten, and Muller (1990: 1233) define entrepreneurial talent as 'the ability to combine tangible and intangible assets and to deploy them to meet customer needs in a manner that cannot easily be imitated.' Others have defined talent as having a market timing and managerial component (Gompers *et al.*, 2010). We attempt to synthesize and simplify these definitions. By entrepreneurial talent, we mean superior ability to consistently see viable entrepreneurial opportunities and effectively act upon them to generate greater venture performance.

Given their superior ability, talented entrepreneurs are more likely to succeed in their initial ventures, and these successes are then likely to motivate them to found successive firms (Gompers *et al.*, 2010). As a result, serial entrepreneurs may form a more talented pool of individuals than the pool of all entrepreneurs. Less talented first-time entrepreneurs may fail in their initial ventures and decide not to found a subsequent firm. Alternatively, they may face difficulty in recruiting new cofounders or raising capital. This may lead to the well-known relationship between serial entrepreneurs and venture performance.

Innate entrepreneurial talent involves more abstract reasoning, divergent thinking, synthesizing disparate ideas, and frame-breaking behaviors. These talents allow them to identify higher quality entrepreneurial opportunities since this task requires more than simply applying prior, historical experience. Every potentially valuable entrepreneurial opportunity has some aspects that are unique or unexpected. Where merely experienced entrepreneurs might mistakenly apply prior lessons, talented entrepreneurs can more naturally think through the more novel, less familiar aspects of the venture. A new opportunity may require a business model that has not been tried before or a distribution channel that needs to be created from scratch. If the opportunity requires that new markets are created or new sales and marketing strategies be generated, then the talented entrepreneur has an advantage in being able to think more flexibly rather than reflexively applying an old strategy from a prior venture. Appropriate strategic actions may be ambiguous and unpredictable or experience may not apply when an entrepreneurial opportunity is very new, highly risky, and unfamiliar. Precisely in these conditions, experience may not apply and talented entrepreneurs will excel. Overall, these arguments lead us to propose:

*Hypothesis 2a: An entrepreneur with more innate talent is more likely to found a high-performing venture.*

Entrepreneurial talent will be less advantageous when entrepreneurs encounter more familiar conditions. Talent is less of an advantage when the entrepreneur has already experienced this set of conditions and is already familiar with the appropriate strategic decisions and responses. In familiar conditions, the talented entrepreneur does not need to sort out new frameworks or work out the best commercialization choices to make. Talent is less relevant, when familiar contexts allow the selection and reuse of prior experience. If decisions or problems arise that the entrepreneur has seen and solved previously, then talent is less useful because the problem is not one of generating new solutions, but simply applying prior experience. The talented but inexperienced entrepreneur might waste valuable time thinking up possible commercialization choices and reinventing the wheel, while an experienced entrepreneur already knows the solution and can more quickly make decisions and move forward.

Correspondingly, we also expect that entrepreneurial talent will be particularly advantageous when entrepreneurs face less familiar conditions (e.g., different industry, disrupted industry, and novel technology). In these contexts, entrepreneurs must sort out appropriate strategic actions when many factors—such as market opportunities, business models, customers, and marketing channels—are ambiguous and unpredictable. Entrepreneurs with innate talent may find it easier to apply their talent toward thinking through these novel situations in which experience may simply not apply. Similar to an individual with mathematical talent who can derive an appropriate formula from first principles, talented entrepreneurs can rely less on memorized routines learned from past experience. Instead, they are more able to figure out correct strategic actions from reasoning through the appropriate choices in a new situation. They are capable of more abstract reasoning and synthesizing information. In addition, talented entrepreneurs may be more confident of their abilities when faced with unpredictability. Finally, they are more likely to engage in frame-breaking activities—such as experimentation, questioning, and observation—that are associated with divergent thinking (Dyer, Gregersen, and Christensen, 2008). Such thinking enables entrepreneurs to spot viable opportunities sooner and provide novel

insights for executing them in less familiar contexts. The ability to handle the unfamiliar and unexpected results in more consistently high performance since the unfamiliar and unexpected are aspects that introduce inconsistency into performance.

Second, especially in less familiar contexts, talented entrepreneurs may be better able to gain needed resources than less talented ones. Since unfamiliar contexts make it particularly challenging for resource providers to judge which ventures are most promising, they are likely to support entrepreneurs they view as more talented (they may infer that talent from prior successful experience). Similarly, early hires may be looking for evidence of something special beyond just previous experience in unfamiliar contexts. Here the reassurance that whatever unexpected events may happen, a previously successful founder will have the talent to figure out how to succeed, may attract superior employees in unfamiliar contexts. Overall, resource providers, early hires, and customers alike seek more innately talented entrepreneurs in unfamiliar contexts because such talent signals that the venture will be able to navigate the unfamiliar context and, so, be more likely to succeed (Eisenhardt and Schoonhoven, 1990). In contrast, in more familiar contexts, resource providers are more likely to trust entrepreneurs who have experience in the given domain and a talented but unproven founder in the given context has less of an advantage.

As experience is less likely to be advantageous in unfamiliar contexts, this is when the benefit of talent will manifest. The lessons of experience may simply not apply and entrepreneurs must relearn causal relationships (Kaplan and Tripsas, 2008; Siggelkow, 2001). Indeed, experienced entrepreneurs may be at a particular disadvantage because they may misapply their learning since it is difficult to figure out which lessons from the past may still apply. For these reasons, we expect that talent will be more beneficial in unfamiliar conditions and less of an advantage in familiar conditions.

*Hypothesis 2b: The positive effect predicted in H2a will be weaker when starting a venture in familiar conditions.*

Finally, we argue that talented entrepreneurs are particularly likely to gain advantages from their prior venture experience. As such, there is likely to be an interaction between learning from entrepreneurial experience and innate talent.

First, since entrepreneurs with more innate talent are likely to make fewer errors, it is easier for them to make correct inferences about causality. Highly talented entrepreneurs may take in more aspects of an experience by making fewer 'unforced errors.' The inference advantage suggests that talented entrepreneurs may learn more from any failures since they can better isolate the reasons behind the failure. In contrast, less talented entrepreneurs are likely to make so many mistakes that they cannot effectively learn. They have more difficulty with inference about the sources of success or failure.

A second reason is that talent and experience are important for complementary aspects of venture performance. For example, ventures often blend the familiar with the unfamiliar. As we argued, experienced entrepreneurs effectively address the former while talented entrepreneurs excel when addressing the latter. Similarly, ventures combine different types of tasks that are better performed by talented versus experienced entrepreneurs. Talented entrepreneurs may select better opportunities and execute them more effectively when they have experience. Consistent with this argument, cognitive science research finds that successful problem solving requires that problems be defined by a goal and by the knowledge necessary to achieve the goal (Newell and Simon, 1972). In other words, individuals must know what to do as well as learn how to do it to achieve high performance (Siegler, Deloache, and Eisenberg, 2003). Talent may provide better insight into what to do, such as which opportunities to pursue, while experience provides better guidance in how to proceed in the pursuit of an opportunity.

The third reason is that talented entrepreneurs are better able to extract more value from the same amount of venture experience than less talented individuals. In support of this argument, prior research finds that some entrepreneurs are better able to develop useful heuristics and higher-level lessons leading to higher performance than others who have a similar amount of experience but learn less from it (Bingham, Eisenhardt, and Furr, 2007). The reason is that going from experience to higher-order understanding and heuristics is not automatic. Rather, it requires additional cognitive processing, including the ability to think abstractly and with greater temporal facility. More talented entrepreneurs are more able to engage in this additional cognitive processing of moving from experience to higher-order lessons applicable in a next venture. In addition, a higher level of talent allows more active learning and

improvisation, reducing errors due to the unfamiliar aspects of experience. Talent may reduce the amount of pure trial and error by more effective capture of learning and better recognition of when prior learning applies.

Finally, talented entrepreneurs may also be able to learn more lessons from experience and do so faster because they are more likely to rely on divergent thinking, such as from questioning, observing, and experimenting. These behaviors aid in responding to unfamiliar contexts and gaining more learning from their experience (Dyer *et al.*, 2008). Moreover, practicing these discovery skills may make talented entrepreneurs likely to gain even more learning from their experiences over time. The arguments suggest that more talented individuals are better able to extract lessons from experience and combine talent with experience to address venture contexts. Familiarity affects the relative importance of experience and talent, yet as long as the venture has some aspects that are familiar and some that are unfamiliar, we expect the combination of experience and talent to be advantageous. Thus, we propose the following:

*Hypothesis 3: There will be a positive interaction between talent and experience: an entrepreneur higher in both talent and entrepreneurial experience is especially more likely to found a high-performing venture.*

## METHODS

### Data and sample

We use a novel survey administered to all 105,928 alumni from the Massachusetts Institute of Technology (MIT) to generate a sample of firms for which we have detailed information on founders and their firms' performance. An alumni survey is particularly advantageous because it enables gathering data from a well-defined population of comparable individuals and because it increases the response rate and likely trust of potential respondents (Lazear, 2004; Lerner and Malmendier, forthcoming; Burt, 2001).

The first stage of this survey in 2001 generated 43,668 responses out of the entire population of 105,928 alumni. Out of 7,798 alumni who indicated they had founded a company, 2,111 founders completed detailed surveys in 2003, a response rate of 25.6 percent. Industries include aerospace, architec-

ture, biomedical, chemicals, consumer products, electronics, energy, finance, telecommunications, and software. They reported on all firms they had founded prior to 2003. We updated this database in 2006 with data from Compustat (public companies) and Dun and Bradstreet (private companies), which provides information on all firms seeking credit. Of our 2,111 respondents, we eliminated 44 duplicates, leaving a sample of 2,067.<sup>1</sup> Of these 2,067 alumni, 960 founded multiple companies and 1,107 founded only one company (the two populations have similar response rates).<sup>2</sup> In research using this database (Hsu, Roberts, and Eesley, 2007), *t*-tests of the null hypothesis indicate that the average (observed) characteristics of the responders and nonresponders are statistically the same for the 2001 (all alumni) and 2003 (alumni entrepreneurs) surveys. A key advantage of this database is its long time horizon, allowing analysis of almost entire careers. Other advantages include no sample bias based on either venture capital backing or selection based on performance. All alumni who could have founded a firm are included in the population.

## Measures

### Dependent variables

We measure venture performance by firm revenue. Revenue is a particularly appropriate measure because most entrepreneurs seek revenue whereas not all seek to be acquired or an IPO. We compute the variable *log revenues* as the natural log of the revenue for the most recent fiscal year in operation and adjust for inflation (2001 \$). We obtain revenue from the Dun and Bradstreet database. A firm is included in this database when it seeks a credit rating, making this source particularly complete. We match about 80 percent of our firms to this source. For the remaining firms, we use self-report revenue from the surveyed entrepreneurs. 1,370 survey respondents (out of 2,111 firms) report revenues for their firms. To alleviate concerns of response bias, we examine the proportions of firms 'in operation,' 'acquired,' and 'out of operation' in the group reporting revenues (1,370 observations) and the group of nonresponders (687 observations). We find that the

<sup>1</sup> Out of those 2,067 surveys, missing responses on some variables bring our final number of observations in the regressions down to 1,901 depending on the model (or 1,075 when restricted to software ventures only).

<sup>2</sup> Serial entrepreneurs had a 30.4 percent response rate. Single firm founders had a 21.8 percent response rate.

proportions are roughly equivalent with 68.5 percent of those reporting revenues still in operation versus 62.3 percent of nonresponders. 10.9 percent of the reporting firms were out of operation versus 10.8 percent for the nonresponders. 19.7 percent of the reporting firms were acquired versus 18.8 percent.

We use an additional performance measure to further test for robustness. The *high rev* variable is set equal to one if the firm is in the top 10 percent of revenues and zero otherwise.

#### Independent variables

##### Entrepreneurial experience

We measure entrepreneurial experience by the number of firms that the entrepreneur has founded prior to the current one, coded as the variable *experience*. Consistent with prior research (Stuart and Abetti, 1990; Delmar and Shane, 2006), this is an appropriate measure because it focuses on the number of experiences an entrepreneur has with the task of starting a firm.

##### Talent

We use a novel measure that exploits a particular strength of our study, the panel structure of the data—i.e., observations of multiple firm foundings for many entrepreneurs. We compute this measure by running a regression with individual-level fixed effects on *log revenues* to generate a set of individual-level coefficients for those entrepreneurs who founded more than one firm. This enables us to identify individuals who consistently found firms with higher revenues and, thus, entrepreneurs who are likely to possess greater talent. For example, consider two individuals, each with same entrepreneurial experience (e.g., two ventures). The one who consistently has higher revenues would have a higher individual fixed effect than the other. The reason why talent results in more consistently higher performance is because entrepreneurial firms are a mixture of the familiar and some degree of the unfamiliar. The ability to engage in more abstract and divergent thinking allows the entrepreneur to better handle the unfamiliar and unexpected that, otherwise results in variation in performance. These individual fixed effects coefficients form a time-invariant talent measure, *talent*. Consistent with prior literature, individual fixed effects are an appropriate measure of talent because they capture time-invariant outcomes. They have often been used to assess talent—for instance when estimating the returns to education

where these fixed effects are often calculated using wages from employment (Ashenfelter and Zimmerman, 1997). But since we are interested in talent relevant to entrepreneurial performance, not employee performance, we generate the individual fixed effects coefficients using venture firm revenues rather than employee wages.

##### Familiarity

We use three measures of familiarity to examine the influence of context on the importance of venture experience versus talent. The first measure assesses familiarity by whether the current venture is in the same industry as the entrepreneur's prior ventures. Specifically, we measure *industry familiarity* by computing the number of prior ventures of the focal entrepreneur that have the same four-digit SIC code as the current venture. This is an appropriate level because four-digit SIC captures industry effects at a sufficient level of detail to indicate familiarity and is commonly used in research to define industries (Zajac, 1988). We match SIC and VEIC codes using the Dun and Bradstreet Million Dollar database and VentureXpert, the source of VEIC data. We converted VEIC to SIC codes with a matching scheme (Dushnitsky and Lenox, 2005).

The second measure of familiarity assesses whether the entrepreneur is familiar with the commercialization of the technical innovation of the focal venture. We measure *technical familiarity* by measuring the novelty of the technology since entrepreneurs cannot be familiar with commercializing a new technology. The presence of intellectual property commonly indicates a novel technology. First, we develop multiple measures of novel technology: *IP\_univ* coded as one if the innovation comes from a university, *IP\_lab* coded as one if the innovation comes from a research lab, *IP\_owned* coded as one if the venture owns the intellectual property (regardless of whether it was patented), *Patent01* coded as one if the firm holds patents on the technology. *IP\_author* coded as one if the founder is the creator of the intellectual property, and *IP\_critical* coded as a one if the entrepreneur indicated that intellectual property is critical to the company formation. Second, after confirming that these measures have high rater reliability and load on a single factor ( $\alpha = 0.735$ ), we create an index measure from the factor weightings. We then code *technical familiarity* as one if the firm is below the median and zero if it is above the median innovativeness. We also examine whether

the results are robust to using the innovation measures (reverse coded) separately.

The third measure of familiarity assesses whether an extreme technological disruption has occurred in the industry. Specifically, we exploit a disruption in the software industry—i.e., the Internet dot-com boom that began in about 1997. This disruption required software entrepreneurs to grapple with extreme technical and commercial disruption. We specify the years after 1997 as the period of greatest disruption to existing software distribution channels, business models, and technology. We use the measure *disrupt-software* coded as one for ventures founded after 1997 and zero otherwise.

#### Control variables

Since older firms are often larger with higher revenues, we control for the age of the start-up, as measured by the log *firm age*. Since industry factors often affect firm performance, we control for industry using the relevant four-digit SIC code. This is an appropriate level because four-digit SIC captures industry effects in sufficient detail and is commonly used in research to define industries (Zajac, 1988). We match SIC and VEIC codes using the Dun and Bradstreet Million Dollar database and VentureXpert. For private firms, we converted VEIC codes to SIC codes with a prior matching scheme (Dushnitsky and Lenox, 2005). Since country of origin may affect firm performance, we also include a set of country dummies. The United States was the most common country (89.8 percent), followed by other North American locations (Canada at 1.4 percent and Mexico at 0.6 percent).

Since the general experience of entrepreneurs may also affect firm performance, we control for founder

age (Evans and Leighton, 1989). The variable *founder age* is coded as the entrepreneur's age at founding. We also control for some founding team effects. Since larger and more diverse founding teams may found higher performing firms, we control for *team size* and *functional diversity* (Eisenhardt and Schoonhoven, 1990; Roberts, 1991). Finally, since funding from professional investors may positively influence firm performance (Hellmann and Puri, 2002; Hsu, 2007), we measure *external funding* as equal to one if the firm raised funds from professional venture capital firms or angel investors.

## ANALYSIS

Since our dependent variable is continuous (logged revenues), we use ordinary least squares regressions. Each of our models predicts the performance of the current venture based on the prior venture experience and talent of the founder, the familiarity of the venture to prior ventures, and our controls. We test our hypotheses by interacting our measures of experience and talent with various measures of familiarity. Our models use robust standard errors since each venture is not independent of past ventures, generating a potential source of heteroskedasticity.

## RESULTS

Table 1 includes means, standard deviations, and correlation matrix for our variables. There are no important correlations among the independent vari-

Table 1. Pair-wise correlations and descriptive statistics

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10
1 Experience	3.00	1.41	1.00									
2 Talent	2.28	5.34	-0.05	1.00								
3 Industry familiarity	0.61	0.49	0.70	0.01	1.00							
4 Technical familiarity	0.50	0.50	0.00	0.12	-0.05	1.00						
5 Log (firm age)	2.34	0.86	0.00	0.13	0.00	0.10	1.00					
6 Team size	1.05	1.22	0.00	0.00	-0.04	0.16	-0.03	1.00				
7 Functional diversity	1.23	0.48	0.00	-0.01	-0.02	0.06	0.00	0.56	1.00			
8 Ext. funding	0.17	0.38	0.00	-0.01	0.01	-0.09	-0.14	0.35	0.22	1.00		
9 Disrupt-software	0.80	0.40	0.52	-0.04	0.52	-0.02	-0.19	-0.03	-0.01	0.02	1.00	
10 Log (rev)	12.17	5.14	-0.03	0.59	0.02	0.06	0.19	0.02	0.03	0.01	-0.09	1.00

Table 2. OLS regressions predicting logged revenues

	(2-1)	(2-2)	(2-3)	(2-4)	(2-5) Software	(2-6) Software	(2-7)
Experience	0.423*** (0.092)	0.457*** (0.113)	0.235 (0.146)	0.424*** (0.091)	0.941*** (0.221)	0.624*** (0.185)	0.367*** (0.109)
Talent	0.842*** (0.021)	0.075*** (0.024)	0.842*** (0.021)	0.880*** (0.029)	0.919*** (0.026)	0.786*** (0.060)	0.787*** (0.037)
Industry familiarity		0.754** (0.296)					
Technical familiarity				-0.525 (0.333)	0.162 (0.228)		
Talent*industry familiarity		-0.084+ (0.057)					
Experience*technical familiarity			0.316* (0.181)				
Talent*technical familiarity				-0.066* (0.037)			
Experience*disrupt- software					-0.363+ (0.135)		
Talent*disrupt-software						0.154* (0.077)	
Talent*experience							0.033* (0.020)
<b>Controls</b>							
Log(firm age)	1.123*** (0.099)	0.993*** (0.122)	1.126*** (0.099)	1.114*** (0.100)	0.868 (0.866)	1.143*** (0.227)	1.139*** (0.099)
Disrupt-software					1.197 (1.925)	-0.547 (0.408)	
Industry F.E.	YES	YES	YES	YES	YES	YES	YES
Country F.E.	YES	YES	YES	YES	YES	YES	YES
Constant	-3.323*** (0.879)	-15.317*** (1.178)	-2.951*** (0.909)	-3.143*** (0.885)	4.896 (4.338)	8.863*** (3.058)	-3.061*** (0.904)
Adj. R-sq.	0.619	0.620	0.620	0.828	0.731	0.620	0.620
Obs.	1901	1901	1663	1783	1075	1075	1901

\*\*\*, \*\*, \*, and + indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively. One-tailed t-tests. 9,165 firm-individual observations. Post-disruption equals after 1997 for software firms. Fixed effects are indicated by F.E. Controls for the *team size*, *functional diversity*, *external funding*, and *age at founding* are included but not shown to save space. Note that we do not interact experience and industry familiarity because the industry familiarity coefficient captures the impact of experience in a familiar industry.

ables and controls, reducing concerns about multicollinearity. However, there are a few correlations over 0.5. For this reason, we examined variance inflation factors. None of the independent variables have a variance inflation contribution greater than 10, the generally accepted range for individual variables (Kennedy, 1998). The mean VIF was 2.53 and the highest one was on the talent measure at 5.73. In particular, Table 1 shows that talent and experience are not correlated.

Table 2 reports the results for the OLS analysis of talent and experience hypotheses predicting venture

performance as measured by logged revenues. In Hypothesis 1a, we argued that venture experience would result in a higher performing venture. In Model 2-1, we examine this hypothesis, controlling for talent. Since the coefficient for *experience* is positive and significant ( $\beta = 0.423$ ,  $p < 0.001$ ), we confirm H1a—that entrepreneurial experience is likely to improve venture performance.

We include *talent* in these models to examine the impact of experience, controlling for *talent*. In Hypothesis 1b, we argued that venture experience would be particularly important when starting a

venture in a familiar context. We examined this hypothesis by using the three measures of familiarity. In Model 2-2, we examine the impact of experience in the same industry through the variable *industry familiarity* and find a significant ( $\beta = 0.754$ ,  $p < 0.01$ ) and positive coefficient, supporting the hypothesis. Note that interacting *experience* and *industry familiarity* would not make sense, since *industry familiarity* is the number of prior ventures in the same industry and *experience* is the total number of prior ventures.

In Model 2-3, we examine the interaction of experience and *technical familiarity* and find a significant ( $\beta = 0.316$ ,  $p < 0.05$ ), positive relationship. Finally, in Model 2-5, we narrow the sample to the software industry to examine the interaction of experience with *post-disruption*, which measures the software industry disruption of the dot-com boom. As expected, we find a negative and significant ( $\beta = -3.63$ ,  $p < 0.10$ ) relationship, indicating marginal support that experience lowers performance after an industry disruption. These results consistently support Hypothesis 1b by indicating that prior venture experience results in significantly higher performance when remaining in a familiar context.

We next examine the talent predictions for venture performance. In Model 2-1, we examine Hypothesis 2a, which argues that more talented entrepreneurs are more likely to found high performing firms, controlling for experience. We find significant ( $\beta = 0.842$ ,  $p < 0.001$ ) and positive support and, thus, confirm that *talent* is also likely to improve firm performance.

In Hypothesis 2b, we argue that *talent* is particularly relevant in less familiar conditions. We test Hypothesis 2b with an interaction term between *talent* and *industry familiarity* in Model 2-2. The coefficient on the interaction term is negative and significant ( $\beta = -0.084$ ,  $p < 0.10$ ). The results support the hypotheses by showing that *talent* is relatively less important when the industry is more familiar. In Model 2-4, we examine the interaction between talent and technical familiarity and, consistent with the hypothesis, find a negative, significant ( $\beta = -0.066$ ,  $p < 0.05$ ) relationship. In Model 2-6, we narrow the sample to the software industry and examine the interaction of talent with disruption. As expected, we find a significant ( $\beta = 0.154$ ,  $p < 0.05$ ) and positive relationship.

Finally, in Hypothesis 3, we argue that there is a positive interaction between talent and experience. Talented entrepreneurs benefit significantly more

from venture experience relative to less talented entrepreneurs. Talent enables an individual to extract more performance-enhancing learning from experience. We find moderate support for this hypothesis in Model 2-7 ( $\beta = 0.033$ ,  $p < 0.05$ ).<sup>3</sup>

## DISCUSSION AND CONCLUSION

Our core contribution is to establish the importance of entrepreneurial talent for venture performance. Most importantly, we contribute to the literature by theorizing about how the drivers of venture performance differ across different types of broader industry environments. We seek to answer a fundamental yet unaddressed question in entrepreneurship research—when does experience (versus talent) matter for entrepreneurial firm performance? By doing so, we contribute to the strategy and entrepreneurship literature in three main ways.

### Implications for entrepreneurship

Rather than a single, universal blueprint for success, we offer a novel view about how the factors driving venture performance shift according to the broader industry and technological context. We contribute to the entrepreneurship literature by disentangling the effects of talent and experience and offering a lens on when each is more important. Specifically, we find evidence that talent plays a stronger role than venture experience in driving venture performance in certain conditions. Prior work largely concludes that venture founding experience universally leads to venture performance (Stuart and Abetti, 1990; Delmar and Shane, 2006).

We show that if the context were not taken into account, prior work would get it wrong by overstating the role of venture experience. When the current venture is less familiar, talent plays a larger role. Experience can even lead to lower performance in some cases. However, when the current venture is more familiar, venture experience is more important. Our contribution is a step toward a line of research

<sup>3</sup> The findings largely hold when alternative talent measures are used. These alternative talent measures are the number of educational degrees and a dummy variable for whether the individual has a graduate degree of any type. The capacity to reason abstractly, develop heuristics, and exhibit greater ability for information processing appear to accompany high levels of education (Schroder, Driver, and Steufert, 1967). These results are available from the authors.

further theorizing dimensions of the market or technology that may change the factors necessary for venture performance. We provide a way forward to theoretically and systematically think about how some individuals may be better positioned to capitalize on certain types of entrepreneurial opportunities. In addition, our methodological contribution is a measure of talent in entrepreneurship.

Using this measure, we are among the first to articulate how combining talent and experience results in an individual better suited to pursue entrepreneurial opportunities. Talented entrepreneurs make fewer mistakes, abstraction skills allow them to form heuristics, and divergent thinking gives them better frame-breaking skills. This allows them to learn more from venture experience, combining talent and experience addresses complementary tasks—the familiar and the unfamiliar.

### Implications for organizational learning

Our findings also have implications for the literature on organizational learning. We suggest that individual talent is important to take into consideration. Prior literature has argued that organizations benefit from the learning that occurred as their founder makes sense of prior experiences (Ingram and Baum, 1997; March, 1991; Politis, 2005 Thomas, Sussman, and Henderson, 2001). We contribute to this literature by pointing out that learning from experience is more important in certain contexts and highly talented individuals are able to extract more value from experience. Future work should think of learning as a function not only of prior experience, but also of the talent of the founder to be able to find more of the relevant lessons within that experience and apply them to the next venture. Our results challenge the prior findings that it is an individual's experience with a particular organization that matters (Huckman and Pisano, 2006). Instead, our results show that an entrepreneur can transfer learning to a new venture. Highly talented founders, since they learn more from each experience, have greater incentives to generate additional entrepreneurial experiences. In short, they appear to learn faster, or learn more from their experiences, providing further benefit to their new ventures.

Our findings place important theoretical boundaries on organizational learning, especially as it relates to unfamiliar situations requiring abstract reasoning, such as entrepreneurship. Regarding strategy, we find conditions when novice entrepreneurial

firms may be better positioned to challenge experienced industry entrepreneurs and leaders. After an industry technological disruption, talented but inexperienced entrepreneurs have a better chance of seizing the opportunity. After an industry disruption, the impact of prior founding experience became negative. In unfamiliar dynamic environments and after industry shifts, managing may require talent more akin to cognitive flexibility rather than learning (Furr, 2011). When there is technical innovation or when venture experience preceded major shifts in the industry, the expected benefits of entrepreneurial experience may not materialize and talented novices can overtake industry veterans. We are among the first to show how entrepreneurs manage when the situation mixes elements that are familiar and unfamiliar. Talented individuals do better in unfamiliar settings because they are better at abstract reasoning from first principles and better in divergent thinking to see new paths in unfamiliar terrain.

In conclusion, entrepreneurial experience and talent both contribute to entrepreneurial performance, but are of differing importance under different conditions. The benefit to venture experience occurs when individuals with experience in the same stable industry found a firm using familiar technology. Our findings suggest that a talented but inexperienced entrepreneur may be foolhardy to compete against experienced entrepreneurs in a mature industry with established technology. Yet, it might be a missed opportunity for that same individual to become intimidated by experienced entrepreneurs, particularly with innovative technology or in a brand new industry. As conventional wisdom suggests, entrepreneurial experience matters—but as we highlight, the key is to observe the relevant context. We hope that our contribution advances the knowledge of our field and informs future research on the ways in which the context surrounding the venture shapes the factors leading to success.

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## REFERENCES

Amit R, Glosten L, Muller E. 1990. Entrepreneurial ability, venture investments, and risk sharing. *Management Science* **36**(10): 1232–1245.

Argote L. 1999. *Organizational Learning: Creating, Retaining, and Transferring Knowledge*. Kluwer Academic Publishers: New York.

Argote L, Beckman SL, Epple D. 1990. The persistence and transfer of learning in industrial settings. *Management Science* **36**(2): 140–154.

Argote L, Ingram P. 2000. Knowledge transfer: a basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes* **82**(1): 150–169.

Ashenfelter O, Zimmerman D. 1997. Estimates of the returns to schooling from sibling data: fathers, sons, and brothers. *Review of Economic and Statistics* **79**(1): 1–9.

Baron R, Ensley M. 2006. Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Management Science* **52**: 1331–1344.

Baum JAC, Ingram P. 1998. Survival-enhancing learning in the Manhattan hotel industry, 1898–1980. *Management Science* **44**(7): 996–1016.

Bingham CB, Eisenhardt KM. 2011. Rational heuristics: the ‘simple rules’ strategists learn from their process experiences. *Strategic Management Journal* **32**(13): 1437–1464.

Bingham CB, Eisenhardt KM, Furr NR. 2007. What makes a process a capability? Heuristics, strategy, and effective capture of opportunities. *Strategic Entrepreneurship Journal* **1**(1/2): 27–47.

Brüderl J, Preisendorfer P, Ziegler R. 1992. Survival chances of newly founded business organizations. *American Sociological Review* **57**(2): 227–242.

Burt RS. 2001. Attachment, decay, and social network. *Journal of Organizational Behavior* **22**(6): 619–643.

Chen J. 2011. Selection and serial entrepreneurs. Working paper, Copenhagen Business School, Denmark.

Delmar F, Shane S. 2006. Does experience matter? The effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization* **4**(3): 215–247.

Dencker J, Gruber M, Shah S. 2009. Knowledge acquisition activities, prior knowledge, and the survival of new firms. *Organization Science* **20**(3): 516–537.

Dushnitsky G, Lenox MJ. 2005. When do incumbents learn from entrepreneurial ventures? Corporate venture capital and investing firm innovation rates. *Research Policy* **34**(5): 615–639.

Dyer JH, Gregersen HB, Christensen C. 2008. Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures. *Strategic Entrepreneurship Journal* **2**(4): 317–338.

Eisenhardt KM, Schoonhoven CB. 1990. Organizational growth: linking founding team, strategy, environment, and growth among U.S. semiconductor ventures, 1978–1988. *Administrative Science Quarterly* **35**(3): 504–529.

Evans DS, Jovanovic B. 1989. An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy* **97**(4): 808–827.

Evans DS, Leighton LS. 1989. Some empirical aspects of entrepreneurship. *American Economic Review* **79**(3): 519–535.

Franco AM, Filson D. 2006. Spin-outs: knowledge diffusion through employee mobility. *RAND Journal of Economics* **37**(4): 841–860.

Furr N. 2011. Cognitive flexibility and technological change. Working paper, Brigham Young University, Provo, UT.

Gavetti G, Levinthal DA, Rivkin JW. 2005. Strategy making in novel and complex worlds: the power of analogy. *Strategic Management Journal* **26**(8): 691–712.

Gilovich T, Griffin D, Kahneman D. 2002. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge University Press: Cambridge, U.K.

Gimeno J, Folta TB, Cooper AC, Woo CY. 1997. Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly* **42**(4): 750–783.

Gompers PA, Kovner A, Lerner J, Scharfstein DS. 2010. Performance persistence in entrepreneurship. *Journal of Financial Economics* **96**(1): 18–32.

Hallen BL, Eisenhardt KM. Catalyzing strategies and efficient tie formation: how entrepreneurial firms obtain investment ties. *Academy of Management Journal*. Forthcoming.

Hayes JR. 1989. Cognitive processes in creativity. In *Handbook of Creativity*, Glover JA, Ronning RR, Reynolds CR (eds). Plenum Press: New York; 135–145.

Hellmann T, Puri M. 2002. Venture capital and the professionalization of start-up firms: empirical evidence. *Journal of Finance* **57**(1): 169–197.

Hiller NJ, Hambrick DC. 2005. Conceptualizing executive hubris: the role of (hyper-)core self-evaluations in strategic decision making. *Strategic Management Journal* **26**(4): 297–319.

Hsu DH. 2007. Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Research Policy* **36**(5): 722–741.

Hsu DH, Roberts EB, Eesley CE. 2007. Entrepreneurs from technology-based universities: evidence from MIT. *Research Policy* **36**(5): 768–788.

Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**(1): 88–115.

Huckman RS, Pisano GP. 2006. The firm specificity of individual performance: evidence from cardiac surgery. *Management Science* **52**(4): 473–488.

Ingram P, Baum J. 1997. Opportunity and constraint: organizations’ learning from the operating and competitive

experience of industries. *Strategic Management Journal*, Summer Special Issue **18**: 75–98.

Kaplan S, Tripsas M. 2008. Thinking about technology: applying a cognitive lens to technical change. *Research Policy* **37**(5): 790–805.

Kennedy P. 1998. *A Guide to Econometrics* (4th edn). MIT Press: Cambridge, MA.

Lamont L. 1972. What entrepreneurs learn from experience. *Journal of Small Business Management* **10**(3): 36–41.

Lazear EP. 2004. Balanced talents and entrepreneurship. *American Economic Review* **94**(2): 208–211.

Lerner J, Malmendier U. With a little help from my (random) friends: success and failure in post-business school entrepreneurship. *Review of Financial Studies*. Forthcoming.

Levinthal DA, March JG. 1993. The myopia of learning. *Strategic Management Journal*, Winter Special Issue **14**: 95–112.

Lucas RE. 1978. On the size distribution of business firms. *Bell Journal of Economics* **9**(2): 508–523.

March JG. 1991. Exploration and exploitation in organizational learning. *Organization Science* **2**(1): 71–87.

Meyer MH, Roberts EB. 1986. New product strategy in small technology-based firms: a pilot study. *Management Science* **32**(7): 806–821.

Newell A, Simon HA. 1972. *Human Problem Solving*. Prentice Hall: Englewood Cliffs, NJ.

Politis D. 2005. The process of entrepreneurial learning: a conceptual framework. *Entrepreneurship Theory and Practice* **29**(4): 399–424.

Roberts EB. 1991. *Entrepreneurs in High Technology: Lessons from MIT and Beyond*. Oxford University Press: New York.

Roberts EB, Eesley CE. 2011. Entrepreneurial impact: the role of MIT—an updated report. *Foundations and Trends in Entrepreneurship* **7**(1/2): 1–149.

Schroder HM, Driver MJ, Steufert S. 1967. *Human Information Processing*. McGraw-Hill: New York.

Schumpeter J. 1934. *Theory of Economic Development*. Harvard University Press: Cambridge, MA.

Shane S, Stuart T. 2002. Organizational endowments and the performance of university start-ups. *Management Science* **48**(1): 154–170.

Siegler R, Deloache J, Eisenberg N. 2003. *How Children Develop*. Worth Publishers: New York.

Siggelkow N. 2001. Change in the presence of fit: the rise, the fall, and the renaissance of Liz Claiborne. *Academy of Management Journal* **44**: 838–857.

Starr JA, Bygrave WD. 1992. The second time around: the outcomes, assets, and liabilities of prior start-up experience. In *International Perspectives on Entrepreneurship Research 1991: Proceedings of the First Annual Global Conference on Entrepreneurship Research*, Birley S, MacMillan IC (eds). North Holland: Amsterdam, The Netherlands; 340–363.

Stuart RW, Abetti PA. 1990. Impact of entrepreneurial and management experience on early performance. *Journal of Business Venturing* **5**(3): 151–162.

Thomas JB, Sussman SW, Henderson JC. 2001. Understanding ‘strategic learning’: linking organizational learning, knowledge management, and sensemaking. *Organization Science* **12**(3): 331–345.

Vesper KH. 1980. *New Venture Strategies*. Prentice Hall: Englewood Cliffs, NJ.

Wasserman N. 2003. Founder-CEO succession and the paradox of entrepreneurial success. *Organization Science* **14**(2): 149–172.

Wright M, Westhead P, Sohl J. 1998. Editors’ introduction: habitual entrepreneurs and angel investors. *Entrepreneurship Theory and Practice* **22**(4): 5–21.

Zajac EJ. 1988. Interlocking directorates as an interorganizational strategy: a test of critical assumptions. *Academy of Management Journal* **31**(2): 428–438.