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Dealing with Failure: Why Serial Entrepreneurs Change Industries Between Ventures, and What it Costs Them

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Abstract

As part of the recent interest in serial entrepreneurship, studies have investigated the presence (or absence) of learning benefits from a first to a second venture. We extend this literature by integrating behavioral concepts on attribution and learning from failure that highlight the differences in behavioral responses to success versus failure. We theorize that serial entrepreneurs whose first venture failed are likely to blame the external environment and change industries for their second venture, and that this industry change is costly in that it invalidates much of their potentially-useful industry experience, lowering the chance of success in their second venture. By contrast, founders of failed ventures are unlikely to change aspects of their first business (when starting their second venture) that would be attributable to their leadership ? strategy, management style, and planning style. Using data on both entrepreneurs in China and the U.S., we find support for our theory and show that it is primarily those serial entrepreneurs whose first venture succeeded and who stay in the same industry that perform better on their second venture. The results have important implications for the study of serial entrepreneurship, and more broadly for research on behavioral responses to failure.

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As part of the recent interest in serial entrepreneurship, studies have investigated the presence (or absence) of learning benefits from a first to a second venture. We extend this literature by integrating behavioral concepts on attribution and learning from failure that highlight the differences in behavioral responses to success versus failure. We theorize that serial entrepreneurs whose first venture failed are likely to blame the external environment and change industries for their second venture, and that this industry change is costly in that it invalidates much of their potentially-useful industry experience, lowering the chance of success in their second venture. By contrast, founders of failed ventures are unlikely to change aspects of their first business (when starting their second venture) that would be attributable to their leadership – strategy, management style, and planning style. Using data on both entrepreneurs in China and the U.S., we find support for our theory and show that it is primarily those serial entrepreneurs whose first venture succeeded and who stay in the same industry that perform better on their second venture. The results have important implications for the study of serial entrepreneurship, and more broadly for research on behavioral responses to failure.

INTRODUCTION

Given the interest in entrepreneurship as a career (coupled with the fact that most ventures fail), it is inevitable that many entrepreneurial founders will found more than one venture over time. Research on entrepreneurship has highlighted that serial entrepreneurship¹ is a prevalent phenomenon (Wright, Robbie & Ennew, 1997) and that serial entrepreneurs differ from other types of entrepreneurs in important ways (Westhead, Ucbasaran & Wright, 2005). Most importantly for the performance of their subsequent ventures, recent research has highlighted that serial entrepreneurs often have increased access to capital (Hsu, 2007) and are in a position to learn from their earlier experience (Gruber, MacMillan & Thompson, 2008; Lazear, 2005), and thus experience higher overall performance in their subsequent ventures (Eesley & Roberts, 2012; Paik, 2013; Parker, 2013). Thus, serial entrepreneurs are presumed to gain knowledge and capabilities from their prior experience that helps their subsequent ventures be more successful.

While agreeing that serial entrepreneurs may experience higher success rates than novice entrepreneurs, Gompers, Kovner, Lerner & Scharfstein (2010) offer a different causal interpretation. By showing that only successful novice entrepreneurs demonstrate a higher rate of subsequent venture success (as opposed to failed novice entrepreneurs), they claim support for a “revealed quality” explanation, and not a learning one. They argue that this finding (and subsequent analysis) shows that low quality novice entrepreneurs fail initially and do not pursue a subsequent venture (on average), while higher quality entrepreneurs experience success initially and return for a second venture. Thus, the pool of serial entrepreneurs is inherently of higher quality than that of novice entrepreneurs due to selection.

¹ Serial entrepreneurship includes both serial (sequential) entrepreneurs that found a second venture only after leaving their initial venture, as well as portfolio entrepreneurship where the founder creates the second venture while staying involved with the first venture.

We argue that the implications of venture success and failure for novice entrepreneurs who choose to pursue a second venture are more complex than simply revealed quality. Based on the Behavioral Theory of the Firm (Cyert & March, 1963; Greve, 2003), we know that failure will lead the entrepreneur to make changes between the first and second venture, but the key question is exactly what is more or less likely to be changed, and how do those changes affect (positively or negatively) future venture performance? In this study we offer a theory of changes from initial to second ventures among serial entrepreneurs that builds on research on the challenges in learning from failure (Baumard & Starbuck, 2005; Eggers, 2012), sensemaking in entrepreneurship (Zacharakis, Meyer & DeCastro, 1999), and psychological research on attribution (Jones & Harris, 1967). The core of the theory suggests that the failure of an initial entrepreneurial venture is likely to lead the founder to blame external factors (as opposed to themselves), which will lead them to change industries from the first to the second venture, but not to change other aspects of the business (namely their strategic or managerial style). This abandoning of the industry in which the entrepreneur has experience has implications for the success of the second venture, as industry experience has been shown to be a key ingredient for entrepreneurial success (Agarwal, Echambadi, Franco & Sarkar, 2004; Chatterji, 2009), so a change in industry will invalidate any industry-specific learning from the first venture (and potentially the founder's pre-entrepreneurship experience). Thus, the change in industry between the first and second venture may actually be the mechanism by which failed novice entrepreneurs do not succeed subsequently. Improper learning from failure discards potential learning and leads the founder to take erroneous steps in starting their second venture.

We test our theory by focusing only on serial entrepreneurs (those that start at least two ventures) using an expansive cross-industry survey set in China, and supplement these results

with VentureXpert data on U.S.-based venture capital backed ventures. The results between the two settings show that (a) initial venture failure leads founders to change industries for their second ventures, and (b) changing industries is detrimental to second venture performance.² In addition, the Chinese data also show that founders do not change strategy, planning, or management style between ventures. We continue to see a consistent effect of initial success as well, suggesting that the “revealed quality” hypothesis is also supported in addition to our learning-based hypothesis. These results are consistent with an attribution-based perspective on entrepreneurial sensemaking post-failure, a process that leads founders to make sub-optimal decisions between ventures.

This study contributes to the literature on serial entrepreneurship, entrepreneurial sensemaking, and the broader literature on learning from failure. In terms of serial entrepreneurship, our study clears up some prior confusion about the potential learning benefits of serial entrepreneurship (Gompers et al., 2010; Hsu, 2007) by highlighting that learning differs for successful versus failed experience. Our data suggest that only successful initial entrepreneurs that also remain in the same industry see a consistent performance increase, suggesting a complicated relationship between experience and outcomes in serial entrepreneurship. In terms of entrepreneurial sensemaking, prior studies asking founders to attribute blame for their venture’s failures have found no evidence of attribution biases (Zacharakis et al., 1999), but our data shows a behavioral pattern consistent with such attributional errors, which may suggest that entrepreneurs are not always open and honest (potentially even with themselves) when diagnosing new venture failures. In terms of learning from failure, our study shows additional evidence of behaviorally inefficient responses to failure (Baumard & Starbuck, 2005; Eggers,

² Note that we use a propensity score matching approach to eliminate concerns about the endogeneity of initial venture failure.

2012) and emphasizes the tradeoffs that managers face when attempting to learn from failure – reducing the risk of future failure based on their perceptions of the causes of failure, versus integrating and utilizing accumulated experience to improve performance.

THEORY & HYPOTHESES

Prior Research on Serial Entrepreneurship

Serial entrepreneurs – those with experience founding more than one venture – are quite common (MacMillan, 1986; Westhead & Wright, 1998), with one study of European entrepreneurs estimating that about 15% of entrepreneurs have prior entrepreneurial experience (Hyttinen & Ilmakunnas, 2007). One stream of research on serial entrepreneurs focuses on the differences between different types of entrepreneurs, with findings suggesting that novice and serial entrepreneurs are similar along many dimensions, but differ in terms of work experience, age, and entrepreneurial motive (Westhead & Wright, 1998; Wiklund & Shepherd, 2008).

Another set of research focuses on the implications of serial entrepreneurship, particularly on the “learning by doing” aspects of previous entrepreneurial experience. Zhang (2011) suggests that serial entrepreneurs will be more skillful and socially connected than novice entrepreneurs (see also Amaral, Baptista & Lima, 2011; Rerup, 2005), and Hsu (2007) finds that such experience increases the likelihood of receiving venture capital funding. Parker (2013) agrees that serial entrepreneurs obtain benefits from their initial experiences, and finds that they run successively better-performing businesses. Thus, most of the existing research suggests that prior entrepreneurial experience provides a strong benefit for entrepreneurs, especially in terms of obtaining funding and developing better decision making skills.

As mentioned earlier, recent research in finance (Gompers et al., 2010) suggests that the improved performance of serial entrepreneurs (versus novice entrepreneurs) is a function of revealed quality instead of learning by showing that the benefits of prior experience accrue primarily to those entrepreneurs with successful experience instead of failed prior experience. While it may be unsurprising that successful serial entrepreneurs are more successful subsequently than failed serial entrepreneurs, we suggest that the extensive work on the difficulties of learning from failure indicate that there may be a complex and nuanced relationship between the outcomes of prior experience and subsequent outcomes. We explore this complexity below.

Learning from Success & Failure

Our core theoretical proposition is that the behavioral processes at play for serial entrepreneurs differ based on the success versus failure of the founder's initial venture. These behavioral processes emerge from three different theoretical literatures – learning from failure, entrepreneurial sensemaking, and attribution theory. We outline the key elements of each below in framing and deriving our specific hypotheses.

To the extent that an entrepreneur would be expected to learn from a first venture before starting a new venture, prior literature suggests that learning will be starkly different based on the success or failure of the initial venture. Denrell & March (2001) show theoretically and Eggers (2012) highlights empirically the fact that organizations can readily draw improper inferences from failures, and can retreat away from potentially viable opportunities through a process of updating expectations. Additionally, learning from failure is difficult because it requires agreement and acknowledgement of the causes of the failure in question (Cannon & Edmondson, 2001). As a result, success and failure leads not only to different learning outcomes (Madsen &

Desai, 2010) but also to different behavioral outcomes (Eggers & Suh, 2012; Guler, 2007). For these reasons, it may be difficult for an entrepreneur to gain the same learning benefits from failure as from success (Baumard & Starbuck, 2005), and the failure experience may lead to specific behaviors that are suboptimal.

There are many factors that affect the potential for a new venture to be successful. As a result of this complexity and only a single experience as a data point, interpreting the failure of a venture *ex post* requires a sensemaking process (Daft & Weick, 1984). In the case of entrepreneurship, such sensemaking processes may vary based on cultural background (Cardon, Stevens & Potter, 2011) and role in the venture creation process (Zacharakis et al., 1999). In the case of a serial entrepreneur, the founder must step back after the initial failure and consider the source of failure in order to make sense of the process and facilitate learning. As a result, while venture failure clearly presents rich experiences and information that provide an opportunity for learning (Cope, 2011; Politis & Gabrielsson, 2009), the ability to actually harness that learning effectively entails both sensemaking about the failure process and accurate attribution of the cause of the failure (Shepherd, 2003; Yamakawa, Peng & Deeds, 2010), in line with the existing broader literature on learning from failure.

In considering the process by which initially failed entrepreneurs interpret their initial experience before moving on to a subsequent venture, we focus on the role of attribution on the cause of the failure. Classic psychology work on attribution suggests that individuals are likely to blame factors beyond their control for failures, and credit their own actions for successes (Jones & Harris, 1967; Weiner, 1985), and this perspective has been used in organizational contexts to explain phenomena from leadership (Weber, Camerer, Rottenstreich & Knez, 2001) to capability

development and organizational learning from success and failure (Bingham & Davis, 2012; Lant, Milliken & Batra, 1992; Repenning & Sterman, 2002).

In the context of entrepreneurship, an attributional perspective suggests that failed entrepreneurs may be likely to blame factors beyond their control for their initial venture failures. For a serial founder, that suggests that blame may be placed on external factors such as customers, suppliers, and competitors, instead of being turned internally on the entrepreneur and his or her abilities or choices. In the case of entrepreneurs, prior research has shown that entrepreneurs are likely to be overconfident in their own abilities and the merits of their ideas (Bernardo & Welch, 2001; Busenitz & Barney, 1997), which likely will increase their propensity to blame factors beyond their control for the failure of their ventures. The result will be that, based on this external attribution of failure, a serial entrepreneur whose initial venture has failed will be much more likely to change an external factor such as the industry (which would capture suppliers, customers, and competitors) before founding a second venture. This external attribution is likely to lead to a change of industry between the first and second venture for serial entrepreneurs whose first venture ended in a failure.

Hypothesis 1 (H1): Among serial entrepreneurs, those whose initial venture was a failure are more likely to change industry between the first and second venture than serial entrepreneurs whose initial venture was a success.

Conversely, based on attribution theory (Jones & Harris, 1967), the founder of a failed venture is unlikely to blame their own actions for the failure. This will lead to little likelihood of changes in internal factors of the organizations between the initial and the subsequent venture. We focus on three internal factors – management style, planning, and strategy. First, we consider management style in terms of the degree of centralization versus decentralization in decision making (Miller & Dröge, 1986), which has important implications for the use of lower level knowledge (Atuahene-Gima, 2003), organizational search behavior (Siggelkow & Rivkin, 2006),

and stakeholder management (Wong, Ormiston & Tetlock, 2011). Second, we consider managerial planning style (Falshaw, Glaister & Tatoglu, 2006; Van de Ven, 1980), which affects the organization's ability to deal with environmental turbulence (Boyd, 1991) through a longer-term focus within new ventures (Robinson & Pearce, 1984). Third, we consider the value creation strategy in terms of differentiation versus cost-focus (Zott & Amit, 2008), which has well-established implications for how the firm interacts with competitors and customers in its business environment (McDougall & Robinson, 1990; McGee, Dowling & Megginson, 1995). When the serial entrepreneur starts a second venture, these aspects of the business are more likely to be preserved irrespective of the outcome of the initial venture. While we do not hypothesize about non-effects, based on this perspective we believe that more manager-specific factors such as strategy, and planning and management styles are unlikely to change between ventures based on the success or failure of the initial venture.

The Effect of Changing Industries

Above, we hypothesized that serial entrepreneurs whose initial venture results in failure are likely to change industries for their second venture. There are important implications of this change in industry based on a behavioral and interpretive response to the initial venture's failure. Specifically, prior work has shown that the industry experience of new venture founders is an important predictor of new venture success (Agarwal et al., 2004). Chatterji (2009) shows this relationship between industry experience and new venture success in the medical device space, Phillips (2002) in the context of Silicon Valley law firms, and Klepper & Sleeper (2005) in laser industry startups. While these studies all focus on prior industry experience gained by the founder from having previously worked at an incumbent firm in the space, we believe that there are two mechanisms by which the importance of industry experience will also affect serial

entrepreneurs that change industries between ventures. First, the experience in the initial venture builds industry-specific experience that could be translated to the second venture if they are both in the same industry. Thus, this effect manifests as a very specific and contingent type of learning. Second, given the benefits of prior industry experience for entrepreneurship, it is likely that most novice entrepreneurs will create a new venture in an industry in which they have expertise. This is consistent with Klepper's work on disagreements and spinouts (Klepper, 2007; Klepper & Thompson, 2010), where new venture founders create their venture after their previous employer declined to pursue their preferred strategy. Thus, if a serial entrepreneur changes industry between their first and second venture, it is more likely that their first venture is in the industry in which they have prior experience, and the second in a new industry for the founder. Therefore, we suggest that serial entrepreneurs changing their industry between ventures may suffer a disadvantage by abandoning their pre-entrepreneurial industry knowledge and their first venture industry experience, as at least some portion of the knowledge they have gained is likely to be industry specific human capital (Campbell, Coff & Kryscynski, 2012; Neal, 1995), limiting its applicability in another industry context. Thus, it is possible that changing industries would at least partially mediate the (negative) relationship between initial venture failure and subsequent venture success. To the extent that such partial mediation exists, it would suggest a degree of learning (or at least nonoptimal behavioral updating) between ventures for serial entrepreneurs, instead of only a "revealed quality" story (Gompers et al., 2010). Of course, if the mediation is only partial, then such a "revealed quality" story may be valid, but it would not necessarily explain the entirety of outcomes.

Hypothesis 2 (H2): Among serial entrepreneurs, changing industries between ventures will partially mediate the negative relationship between initial venture failure and new venture success.

DATA & METHODS

The primary data used to evaluate our hypotheses come from an original survey of serial entrepreneurs located in or near Beijing, China. Beijing is one of the most developed areas for entrepreneurial activities in China (Global Entrepreneurship Monitor (GEM) China Report, Gao et.al, 2006, 2008). The data were collected between September and December in 2012. We hired a 12-person team to collect the data, and before they began work we conducted a detailed training session. The survey was delivered via face-to-face interviews and the investigator wrote down all responses from the informant. This ensured clarity on the goals of the questions and limited distractions for the respondents.

To conduct the survey, investigators went door-to-door in areas where there are many small and new businesses. Investigators went into any businesses there and asked the founder of the company if he or she would participate in the survey and whether the founder had ever owned another business before the current company. If the founder did not wish to participate or if they had never owned another company, the investigators terminated the interview and went to another company. As would be expected for such a detailed and labor-intensive survey, the response rate was low (just below 10%). Through significant effort, we were able to collect usable data from 252 serial entrepreneurs. Table 1 offers basic descriptive data on the final sample.

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Before discussing the specifics of the survey and the data, there are two important aspects of the data collection and survey design process to note. First, this study focuses *only* on serial entrepreneurs. Thus we do not observe any founders that do not start at least two ventures, which addresses important concerns about the endogeneity of the decision to start a second venture.

Our results can be interpreted as documenting the effects of failure and industry change on a host of outcome measures (discussed below) *conditional on choosing to start a second venture*.

Second, our sampling approach and methodology is completely independent of traditional sources of bias such as venture capital funding. In fact, most of our entrepreneurs used personal or “friends and family” funding to start their businesses, and most were in industries that do not typically receive significant VC funding (e.g., wholesale and retail, and home and food products, as opposed to computer services and software). Thus, the sample likely more closely approximates a broad range of entrepreneurial ventures than the supplementary data we later employ to test aspects of our theory in the US context.

Variables

Our study uses a series of dependent variables to assess the impact of initial venture failure on subsequent venture decisions. Our behavioral dependent variables (those documenting specific aspects of the second business) fall into three categories. First, we utilize two measures of industry change, one ($\Delta industry$) is a dummy variable equal to one if the self-reported industries of the first and second ventures are different (the Chinese government classifies firms into 11 industries), and zero otherwise.³ We also asked founders to assess the relationship between their original venture and their current venture. Founders were asked to categorize their prior and current venture into one of the following categories, hypothetically if the initial venture was closed: the current company is the supplier of the last company, the current company is the distributor or consumer of the last company, the current company almost does the same thing as the last company, the current company is the complement of the last company, the current company is a substitute for the last company, or no relationship. For analysis purposes, we

³ A full transition matrix showing the initial and second industries for all ventures in the sample is included in Appendix A.

created a single variable (*relation*) that was coded as one if the new firm had any relationship to the prior (supplier, customer, competitor, complement, or substitute) and zero otherwise.

Second, we measure strategy by asking the founders how central a differentiation or a cost leadership strategy was to their first ($diff_{t-1}$ and $cost_{t-1}$) and current ($diff_t$ and $cost_t$) ventures. The scales for these strategy measures are borrowed from Zott and Amit (2008). For the dimension of differentiation, the scale includes 5 items that describe differentiation and the entrepreneurs are asked to point out to which extent their companies use a differentiation strategy and how much they value the strategy of differentiation. The scale of low cost strategy is similar with that of differentiation, and it includes 4 items. In Zott and Amit (2008), the Cronbach's alphas are 0.66 for differentiation and 0.76 for cost, and in our research the Cronbach's alphas are 0.842 and 0.863 for differentiation and cost in the current venture and 0.869 and 0.892 for differentiation and cost in the prior venture, respectively, which suggests that these measures have strong reliability.

Third, we asked founders about their planning and management styles for both their prior venture and their current venture. The scale for planning is borrowed from Falshaw, Glaister & Tatoglu (2006), and the entrepreneurs select the suitable location between two opposite descriptions according to the situation of their companies (select a value between 1 and 5). These descriptions are about the planning process in the company and there are 10 items all together. In Falshaw, Glaister & Tatoglu (2006), the Cronbach's alpha was 0.74, and in our research the Cronbach's alphas are 0.903 for the current venture and 0.898 for the prior venture, which suggest strong reliability. The scale for management style is borrowed from Miller and Dröge's (1986) work on decentralization. The entrepreneurs are asked to identify which level in their company has the authority to make different decisions (0 board/owner; 1 for CEO; 2 for

divisional or functional manager; 3 for sub-department head; 4 for first-level supervisor; and 5 for shop level operatives). Miller and Dröge (1986) did not report the Cronbach's alpha of decentralization, but in our research the Cronbach's alpha of this scale is 0.95 for the current venture and 0.965 for the prior venture. From these we calculate the absolute value of changes from the prior to the current venture ($\Delta planning$ and $\Delta management$) that we use to assess the degree to which the manager changed his or her planning or management style between ventures.

For our performance measures, we asked the founders about the three year growth rate of their current ventures across a variety of measures of growth, namely *grow sales*, *grow profits*, *grow fixed assets*, *grow employees*, and *grow (market) share*.

Our remaining variable of theoretical interest focuses on the success or failure of the prior venture. Given the relative few number of acquisitions in our data (5 out of 280 total founders surveyed) and the uncertainty over the perceptions of performance based on acquisition in China, we exclude these observations completely. Therefore, we code the initial venture as a success if it was an ongoing firm, and zero otherwise (*failure*). In this respect, we can view these entrepreneurs more as portfolio entrepreneurs (managing more than one business at a time) than serial entrepreneurs. In most cases, close family members were managing the initial business and the founder him or herself was managing the new business.

For control variables, we include measures of founder *age*, whether the founder is *female*, founder *education* (categorical measure for high school, junior college, bachelor's, post-graduate study, and doctorate), a perceptual measure of the importance of entry timing in the current industry (*entry timing*), and dummies for the current industry to capture both the fact that some industries require more specialized knowledge and that performance might vary by industry.

Endogeneity and Matching

One potential concern in our empirical approach involves the endogeneity of the initial venture failure. Stated differently, the concern would be that “bad” entrepreneurs would fail in their initial venture AND change industries, while good entrepreneurs may not change industries (even if they fail). One option would be two-stage least squares (2SLS), but this requires both a strong first stage model and an instrumental variable approach, but our attempts typically could not build models with R-squared values above 0.10 and we do not have any available variables that strongly correlate with first venture performance but that do not correlate with second venture performance or the likelihood of changing industries.

An alternate solution is to use a matching approach, ensuring that the sample does not contain observations that were “doomed” to initial failure that look dramatically different from those that were more likely to be successful. The propensity score matching approach that we take in this study is similar to that used in recent management research (Chrisman & Patel, 2012; De Figueiredo, Meyer-Doyle & Rawley, 2013). The propensity score matching approach that we take is based on the propensity of the first venture to fail based characteristics of the entrepreneur (age, gender, education) and the initial venture (entry timing, differentiation, cost leadership). We also use industry-time dummies, where the year of initial venture founding is grouped into categories for pre-1996, 1996 to 2000, 2001 to 2005 and after 2005. These industry-time dummies (4 time periods times 11 industries means 44 dummies) control for the external selection environment for the initial venture and the baseline likelihood of failure.

The propensity regression and resulting histogram are included in Appendix B. We use a very narrow radius matching approach, where all treated observations (where the initial venture failed) without a comparable untreated observation whose propensity score within 0.01 (on a 0-

to-1 scale) is excluded. Through this process, we drop from 250 observations to 219 observations in our matched sample. All further regressions reported are conducted on only those 219 observations, though using all 250 observations produces similar results.

Analytical Method and Descriptive Statistics

With one observation per founder, we use a standard logit model for the dichotomous DVs ($\Delta industry$ and *relation*) and standard OLS for the other DVs. To test mediation, we follow the guidelines laid out by Baron and Kenny (1986). Correlations are presented in Table 2. Most of the significant correlations are between either the various growth measures (which are used as DVs in separate regressions) or between the strategy choices of initial and prior ventures (which is to be expected). Of the other correlations that are significant, the highest deal with the control variable noting the importance of entry timing. Removing this variable from the regressions does not qualitatively change the results reported here. In general, these statistics do not raise concerns about multicollinearity.

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RESULTS

Our first hypothesis suggested that the failure of a prior venture would lead the serial entrepreneur to change industries when starting a second venture. The results of models evaluating this effect are shown in Table 3. In Model 1, the dependent variable ($\Delta industry$) tracks whether the entrepreneur changed industries from one venture to the next. The results clearly show that prior failure ($p < 0.01$) leads to more industry changes than prior success. Similarly, Model 2 assesses whether there is any relationship (supplier, complementor, etc.) between the industries of the first and second businesses, and indicates that prior failure dramatically reduces

the likelihood ($p < 0.001$) of a relationship. Additional analyses (available from the authors upon request) show that the effects of failure on a change in industry or a reduction in relatedness between ventures are stronger for male entrepreneurs, younger entrepreneurs, and less educated entrepreneurs. Prior research has shown that men (Barber & Odean, 2001), younger people (Kovalchik, Camerer, Grether, Plott & Allman, 2005), and less educated people are all more likely to be subject to the type of overconfidence that may increase the probability of blaming external aspects of the business for failure. These results provide clear support for Hypothesis 1.

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Table 3 also evaluates whether failure leads entrepreneurs to change their planning (Model 3) and management (Model 4) styles in response to prior failure. The results clearly show that *failure* has no significant relationship with changes in either planning or management. In fact, one of the only predictors of changes in either is *education* ($p < 0.05$ in each), which may suggest that these entrepreneurs had the education and intelligence to recognize their own shortcomings in their original ventures.

We also suggested that failure would have no such effect on business factors that reflect on the manager him or herself, such as strategy, management style, and planning style. Table 4 evaluates the likelihood of changes in strategy based on prior success or failure. The results in Model 1 suggest that failure alone does not lead to a change in the level of differentiation used by the firm. Model 2 suggest a similar pattern for cost-focused strategies. Both models actually show that (through the *cost_{t-1}* variable in Model 1 and *diff_{t-1}* variable in Model 2) entrepreneurs appear more likely to dramatically change their strategy in their subsequent venture when their first venture was a success, and actually may increase their reliance on their chosen strategy when their first venture fails. All told, the results in Tables 3 and 4 also support our assertion that

the same relationship between failure and industry change (an external factor) would be absent for strategy, planning, and management (internal factors).

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In Table 5, we turn our attention to the implications of both failure in the first venture and changes in industry from one venture to the next. In lieu of selecting one specific measure of success (especially given the lack of liquidity in the Chinese financial markets that makes an IPO an inappropriate measure of success), we offer five measures of growth in the current venture – sales, profits, fixed assets, employees, and market share. With the exception of employees (where neither *failure* nor $\Delta industry$ are significant), the results are clear and consistent – changing industries from the first to the second venture has a negative and significant effect on growth rates, even when controlling for the success or failure of the initial venture. And, given the shift in the coefficient on *failure* across the models, it is clear that $\Delta industry$ partially mediates the effect of *failure* on the various growth measures (except in cases where failure is not significantly related to growth). To further explore this dynamic, we split the ventures into four categories based on whether the founder’s initial venture succeeded or failed and whether or not the founder changed industries. These results are shown in Table 6. In the case of sales and profits growth, it is clear that founders that were initially successful and founded their second venture in the same industry experience a significant increase in performance for their second venture. In the case of profits and market share, founders whose first venture failed and yet they remained in the same industry experienced better performance than those that failed and changed industries. These results comprehensively support H2, which suggested that changing industry would partially mediate the negative effect of initial failure on subsequent success, and also show support for the theory that failure also reveals underlying entrepreneurial quality.

----- INSERT TABLES 5 AND 6 ABOUT HERE -----

Robustness: The U.S. Context

In Appendix C, we detail an analysis of the U.S. context that mirrors some of the assessments conducted in our Chinese survey data. The primary differences are that the U.S. data includes only venture-backed firms, founder matching is challenging, and we cannot assess aspects like strategy change or management style. In general, however, the results in the U.S. context are largely consistent with those in the Chinese survey data – failure of a venture leads to increased likelihood changing industries for a second venture, and we find support for both the negatives of industry change and the “revealed quality” explanation.

DISCUSSION

In this study, we build from the premise that serial entrepreneurs – like managers in many other contexts (Baumard & Starbuck, 2005; Cannon & Edmondson, 2001; Eggers & Suh, 2012) – are likely to exhibit different behavioral responses to success versus failure of their actions and decisions. Based on attribution theory (Jones & Harris, 1967; Weber et al., 2001), we suggest that serial entrepreneurs will attribute the failure of their first venture to the external industry, and therefore change industries between the first and second venture. Conversely, they will not change internal, manager-specific aspects of strategy, management, or planning style. This change in industry, however, will have the effect of eliminating any potential benefits from industry-specific knowledge (Chatterji, 2009), which then decreases the chance of success of the second venture. We use data from two very different sources and contexts – an original survey of serial entrepreneurs in China and VentureXpert data on VC-backed startups in the U.S. – to support our theory, while also providing confirmatory evidence of a “revealed quality” effect of

first venture success (Gompers et al., 2010). The combined result is that serial entrepreneurs whose first venture succeeded *and* who remain in the same industry from the first to the second venture are the group of serial founders who demonstrate stronger performance in their second venture.

This study has implications for specific implications for the study of serial entrepreneurship, and more general applications for research on the behavioral response to failure. From the perspective of the literature on serial entrepreneurship, prior literature has been divided – some have argued that serial entrepreneurs receive a benefit based on their status as serial founders (Eesley & Roberts, 2012; Hsu, 2007), while others have suggested that there is no such benefit and that serial successful entrepreneurs are simply demonstrating their own inherent quality (Gompers et al., 2010). Our study suggests that the nature of sensemaking in serial entrepreneurship – specifically the diagnosing of the success or failure of the initial venture – makes this discussion significantly more complicated. Just because only serial entrepreneurs that were successful in their first venture experience higher subsequent performance does not suggest that learning does not occur, as learning is different for success versus failure (Denrell & March, 2001; Eggers & Suh, 2012). But our study shows clear evidence that one behavioral response to initial venture failure – the desire to change industries for the second venture – is both tied to initial venture failure and results in lower performance for the second venture. These results offer some suggestions about future research in serial entrepreneurship, as further work is clearly needed to disentangle the many aspects of learning and behavioral response that occur between the closing of the first venture and the creation of the second.

From the perspective of the literature on behavioral responses to failure, this study integrates attribution more closely into the literature on failure, suggesting that interpretation and

sensemaking from failure experience may be significantly complicated by the likelihood of blaming external factors for failure. Consistent with work suggesting that managers need to agree on the cause of failure in order to learn from failure (Cannon & Edmondson, 2001), our perspective suggests that such potentially erroneous and certainly noisy attributions make learning in the context of entrepreneurial failure very difficult. Our study is among the first to apply this framework to the realm of entrepreneurship, and thus provides some clear evidence at the level of the individual manager (founder), as opposed to many prior studies that have worked only at the organizational level (Eggers, 2012; Haunschild & Sullivan, 2002). Given the importance of attribution and individual sensemaking, it makes sense that future work on the behavioral responses to failure should emphasize a clear means of understanding attribution for failure in discerning outcomes (Haunschild & Rhee, 2004). These findings suggest that there may be an important tradeoff between trying to remedy the cause of the initial failure and the ability to learn from the failure experience. Most of the literature showing positive benefits of learning from failure focus on large, ongoing organizations who do not change industries (Chuang & Baum, 2003; Haunschild & Rhee, 2004; Haunschild & Sullivan, 2002). Thus, these firms may be better positioned to exploit their new knowledge. For entrepreneurs, the tradeoff is quite clear – change what they perceive as to blame for the initial failure (the external environment in this case), or stay put to better use the acquired knowledge. Further research both in entrepreneurship and in larger organizations should further explore this tradeoff.

Like any study, this study has its limitations. Some of these stem from the limitations present in any study utilizing survey data – potential non-response bias, retrospective biases, etc. In the case of our study, however, many of these are limited as we focus primarily on actions and descriptions, and less on interpretations, as well the fact that it is highly unlikely that respondents

had any idea what answers the study was hoping to find. Other potential limitations include the fact that we have only limited measures of internal and external changes between ventures, and the fact that our results are effectively correlational as we do not have an instrumental variable approach or a natural experiment approach (though the chronological order of our effects are exceptionally clear). Future research could both explore other factors internal and external to the organization that the founder may or may not change between ventures, and devise a better identification strategy to test causality more convincingly.

This study offers a theory that failed novice entrepreneurs are likely to blame the external environment and therefore change industry before starting a second venture, and that this industry change will result in lower performance in the second venture. Conversely, business decisions that reflect more on the manager will be more consistent between ventures. We find broad support for this theory through two datasets – one a survey of Chinese entrepreneurs, and one a sample of US VC-backed startups. The results contribute to the ongoing interest in serial entrepreneurship, as well as to the behavioral theory of the firm and learning from failure.

REFERENCES

- Agarwal, R., Echambadi, R., Franco, A. M., & Sarkar, M. 2004. Knowledge transfer through inheritance: Spin-out generation, development and survival. *Academy of Management Journal*, 47(4): 501-522.
- Amaral, A. M., Baptista, R., & Lima, F. 2011. Serial entrepreneurship: impact of human capital on time to re-entry. *Small Business Economics*, 37(1): 1-21.
- Atuahene-Gima, K. 2003. The Effects of Centrifugal and Centripetal Forces on Product Development Speed and Quality: How Does Problem Solving Matter? *Academy of Management Journal*, 46(3): 359-373.
- Barber, B. M. & Odean, T. 2001. Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. *The Quarterly Journal of Economics*, 116(1): 261-292.
- Baron, R. M. & Kenny, D. A. 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6): 1173-1182.
- Baumard, P. & Starbuck, W. H. 2005. Learning from failures: Why it may not happen. *Long Range Planning*, 38(3): 281-298.
- Bernardo, A. E. & Welch, I. 2001. On the Evolution of Overconfidence and Entrepreneurs. *Journal of Economics & Management Strategy*, 10(3): 301-330.
- Bingham, C. B. & Davis, J. P. 2012. Learning Sequences: Their Existence, Effect, and Evolution. *Academy of Management Journal*, 55(3): 611-641.
- Boyd, B. K. 1991. Strategic planning and financial performance: A meta-analytic review. *Journal of Management Studies*, 28(4): 353-374.
- Busenitz, L. W. & Barney, J. B. 1997. Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, 12(1): 9-30.
- Campbell, B. A., Coff, R., & Kryscynski, D. 2012. Rethinking Sustained Competitive Advantage from Human Capital. *Academy of Management Review*, 37(3): 376-395.
- Cannon, M. D. & Edmondson, A. C. 2001. Confronting failure: Antecedents and consequences of shared beliefs about failure in organizational work groups. *Journal of Organizational Behavior*, 22(2): 161-177.
- Cardon, M. S., Stevens, C. E., & Potter, D. R. 2011. Misfortunes or mistakes?: Cultural sensemaking of entrepreneurial failure. *Journal of Business Venturing*, 26(1): 79-92.
- Chatterji, A. K. 2009. Spawned with a silver spoon? Entrepreneurial performance and innovation in the medical device industry. *Strategic Management Journal*, 30(2): 185-206.

Chrisman, J. J. & Patel, P. C. 2012. Variations in R&D Investments of Family and Nonfamily Firms: Behavioral Agency and Myopic Loss Aversion Perspectives. *Academy of Management Journal*, 55(4): 976-997.

Chuang, Y.-T. & Baum, J. A. C. 2003. It's All in the Name: Failure-Induced Learning by Multiunit Chains. *Administrative Science Quarterly*, 48(1): 33-59.

Cope, J. 2011. Entrepreneurial learning from failure: An interpretative phenomenological analysis. *Journal of Business Venturing*, 26(6): 604-623.

Cyert, R. M. & March, J. G. 1963. A Behavioral Theory of the Firm. Englewood Cliffs, NJ: Prentice-Hall.

Daft, R. L. & Weick, K. E. 1984. Toward a model of organizations as interpretation systems. *Academy of Management Review*, 9(2): 284-295.

De Figueiredo, R. J. P., Meyer-Doyle, P., & Rawley, E. 2013. Inherited agglomeration effects in hedge fund spawns. *Strategic Management Journal*, 34(7): 843-862.

Denrell, J. & March, J. G. 2001. Adaptation as Information Restriction: The Hot Stove Effect. *Organization Science*, 12(5): 523-538.

Eesley, C. E. & Roberts, E. B. 2012. Are You Experienced or Are You Talented?: When Does Innate Talent versus Experience Explain Entrepreneurial Performance? *Strategic Entrepreneurship Journal*, 6(3): 207-219.

Eggers, J. P. 2012. Falling flat: Failed technological investments and industry evolution. *Administrative Science Quarterly*, 57(1): 47-80.

Eggers, J. P. & Suh, J.-h. 2012. Knowledge and motivation: How negative feedback in old vs. new domains translates into organizational action and performance. New York University Working Paper.

Falshaw, J. R., Glaister, K. W., & Tatoglu, E. 2006. Evidence on formal strategic planning and company performance. *Management Decision*, 44(1): 9-30.

Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. 2010. Performance persistence in entrepreneurship. *Journal of Financial Economics*, 96(1): 18-32.

Greve, H. R. 2003. Organizational learning from performance feedback: A behavioral perspective on innovation and change: Cambridge University Press.

Gruber, M., MacMillan, I. C., & Thompson, J. D. 2008. Look Before You Leap: Market Opportunity Identification in Emerging Technology Firms. *Management Science*, 54(9): 1652-1665.

Guler, I. 2007. Throwing good money after bad?: A multi-level study of sequential decision making in the venture capital industry. *Administrative Science Quarterly*, 52: 248-285.

Haunschild, P. R. & Sullivan, B. N. 2002. Learning from complexity: Effects of prior accidents and incidents on airlines' learning. *Administrative Science Quarterly*, 47(4): 609-643.

Haunschild, P. R. & Rhee, M. 2004. The Role of Volition in Organizational Learning: The Case of Automotive Product Recalls. *Management Science*, 50(11): 1545-1560.

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

Hyytinen, A. & Ilmakunnas, P. 2007. What distinguishes a serial entrepreneur? *Industrial and Corporate Change*, 16(5): 793-821.

Jones, E. E. & Harris, V. A. 1967. The attribution of attitudes. *Journal of Experimental Social Psychology*, 3(1): 1-24.

Klepper, S. & Sleeper, S. 2005. Entry by Spinoffs. *Management Science*, 51(8): 1291-1306.

Klepper, S. 2007. Disagreements, Spinoffs, and the Evolution of Detroit as the Capital of the U.S. Automobile Industry. *Management Science*, 53(4): 616-631.

Klepper, S. & Thompson, P. 2010. Disagreements and intra-industry spinoffs. *International Journal of Industrial Organization*, 28(5): 526-538.

Kovalchik, S., Camerer, C. F., Grether, D. M., Plott, C. R., & Allman, J. M. 2005. Aging and decision making: a comparison between neurologically healthy elderly and young individuals. *Journal of Economic Behavior & Organization*, 58(1): 79-94.

Lant, T. K., Milliken, F. J., & Batra, B. 1992. The role of managerial learning and interpretation in strategic persistence and reorientation: An empirical exploration. *Strategic Management Journal*, 13(8): 585-608.

Lazear, E. P. 2005. Entrepreneurship. *Journal of Labor Economics*, 23(4): 649-680.

MacMillan, I. C. 1986. To really learn about entrepreneurship, let's study habitual entrepreneurs. *Journal of Business Venturing*, 1(3): 241-243.

Madsen, P. M. & Desai, V. 2010. Failing to learn? The effects of failure and success on organizational learning in the global orbital launch vehicle industry. *Academy of Management Journal*, 53(3): 451-476.

McDougall, P. & Robinson, R. B. 1990. New venture strategies: An empirical identification of eight 'archetypes' of competitive strategies for entry. *Strategic Management Journal*, 11(6): 447-467.

McGee, J. E., Dowling, M. J., & Megginson, W. L. 1995. Cooperative strategy and new venture performance: The role of business strategy and management experience. *Strategic Management Journal*, 16(7): 565-580.

- Miller, D. & Dröge, C. 1986. Psychological and Traditional Determinants of Structure. *Administrative Science Quarterly*, 31(4): 539-560.
- Neal, D. 1995. Industry-Specific Human Capital: Evidence from Displaced Workers. *Journal of Labor Economics*, 13(4): 653-677.
- Paik, Y. 2013. Serial Entrepreneurs and Venture Survival: Evidence from U.S. Venture-Capital-Financed Semiconductor Firms. *Strategic Entrepreneurship Journal*: n/a-n/a.
- Parker, S. C. 2013. Do serial entrepreneurs run successively better-performing businesses? *Journal of Business Venturing*, 28(5): 652-666.
- Phillips, D. J. 2002. A genealogical approach to organizational life chances: The parent-progeny transfer among Silicon Valley law firms, 1946-1996. *Administrative Science Quarterly*, 47(3): 474.
- Politis, D. & Gabrielsson, J. 2009. Entrepreneurs' attitudes towards failure: An experiential learning approach. *International Journal of Entrepreneurial Behaviour & Research*, 15(4): 364-383.
- Repenning, N. P. & Sterman, J. D. 2002. Capability Traps and Self-Confirming Attribution Errors in the Dynamics of Process Improvement. *Administrative Science Quarterly*, 47(2): 265-295.
- Rerup, C. 2005. Learning from past experience: Footnotes on mindfulness and habitual entrepreneurship. *Scandinavian Journal of Management*, 21(4): 451-472.
- Robinson, R. B. & Pearce, J. A. 1984. Research Thrusts in Small Firm Strategic Planning. *Academy of Management Review*, 9(1): 128-137.
- Shepherd, D. A. 2003. Learning from Business Failure: Propositions of Grief Recovery for the Self-Employed. *Academy of Management Review*, 28(2): 318-328.
- Siggelkow, N. & Rivkin, J. W. 2006. When exploration backfires: Unintended consequences of multilevel organizational search. *Academy of Management Journal*, 49(4): 779-795.
- Van de Ven, A. H. 1980. Problem Solving, Planning, and Innovation. Part I. Test of the Program Planning Model. *Human Relations*, 33(10): 711-740.
- Weber, R., Camerer, C., Rottenstreich, Y., & Knez, M. 2001. The Illusion of Leadership: Misattribution of Cause in Coordination Games. *Organization Science*, 12(5): 582-598.
- Weiner, B. 1985. An attributional theory of achievement motivation and emotion. 92(4): 548-573.
- Westhead, P. & Wright, M. 1998. Novice, portfolio, and serial founders: are they different? *Journal of Business Venturing*, 13(3): 173-204.

- Westhead, P., Ucbasaran, D., & Wright, M. 2005. Decisions, Actions, and Performance: Do Novice, Serial, and Portfolio Entrepreneurs Differ?*. *Journal of Small Business Management*, 43(4): 393-417.
- Wiklund, J. & Shepherd, D. A. 2008. Portfolio Entrepreneurship: Habitual and Novice Founders, New Entry, and Mode of Organizing. *Entrepreneurship Theory and Practice*, 32(4): 701-725.
- Wong, E. M., Ormiston, M. E., & Tetlock, P. E. 2011. The Effects of Top Management Team Integrative Complexity and Decentralized Decision Making on Corporate Social Performance. *Academy of Management Journal*, 54(6): 1207-1228.
- Wright, M., Robbie, K., & Ennew, C. 1997. Venture capitalists and serial entrepreneurs. *Journal of Business Venturing*, 12(3): 227-249.
- Yamakawa, Y., Peng, M. W., & Deeds, D. L. 2010. How does experience of previous entrepreneurial failure impact future entrepreneurship? *Academy of Management Proceedings*, 2010(1): 1-5.
- Zacharakis, A. L., Meyer, G. D., & DeCastro, J. 1999. Differing Perceptions of New Venture Failure: A Matched Exploratory Study of Venture Capitalists and Entrepreneurs. *Journal of Small Business Management*, 37(3): 1-14.
- Zhang, J. 2011. The advantage of experienced start-up founders in venture capital acquisition: evidence from serial entrepreneurs. *Small Business Economics*, 36(2): 187-208.
- Zott, C. & Amit, R. 2008. The fit between product market strategy and business model: implications for firm performance. *Strategic Management Journal*, 29(1): 1-26.

TABLE 1: Survey Sample Description

Founder Gender	
Male	57.5%
Female	42.5%
Founder Age	41.4 years old
Founder Education Level	
High school or technical secondary school	13.1%
Junior college	41.7%
Bachelor degree	23.8%
Postgraduate diploma	18.3%
Doctorate	3.2%
What happens to last company	
Still exists	47.2%
Closed	52.8%
Information of current venture	
Firm Age	12 years old
Fixed asset	2.1million RMB
# Employees	14
Industry (top 4)	
Wholesale and retail industry	36.1%
Lease and business service	20.2%
House and food	11.5%
Information transmission, computer service, and software	9.1%

TABLE 2: Pairwise correlations in survey data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. $\Delta industry$	1.00																
2. <i>relation</i>	0.51*	1.00															
3. $diff_t$	-0.19*	-0.33*	1.00														
4. $diff_{t-1}$	-0.24*	-0.41*	0.70*	1.00													
5. $cost_t$	-0.12	-0.33*	0.71*	0.59*	1.00												
6. $cost_{t-1}$	-0.20*	-0.47*	0.60*	0.72*	0.77*	1.00											
7. $\Delta planning$	0.14*	-0.01	0.24*	0.14*	0.21*	0.12	1.00										
8. $\Delta management$	0.09	0.11	-0.02	-0.10	-0.07	-0.13*	0.05	1.00									
9. <i>grow sales</i>	-0.19*	-0.14*	0.10	0.07	0.17*	0.11	-0.01	-0.04	1.00								
10. <i>grow profit</i>	-0.25*	-0.08	0.04	0.04	0.04	0.02	-0.03	-0.06	0.79*	1.00							
11. <i>grow fixed assets</i>	-0.15*	-0.08	-0.04	0.06	0.03	0.05	-0.06	-0.13	0.74*	0.72*	1.00						
12. <i>grow employees</i>	-0.01	-0.07	0.09	0.16*	0.11	0.19*	-0.05	-0.05	0.43*	0.33*	0.43*	1.00					
13. <i>grow share</i>	-0.16*	-0.08	0.09	0.21*	0.12	0.20*	-0.11	-0.17*	0.46*	0.42*	0.56*	0.67*	1.00				
14. <i>failure</i>	0.19*	0.27*	0.04	0.05	-0.03	-0.10	0.02	0.06	-0.20*	-0.18*	-0.07	0.00	0.05	1.00			
15. <i>entry timing</i>	-0.24*	-0.31*	0.60*	0.70*	0.57*	0.68*	0.09	-0.08	0.10	0.13	0.05	0.16*	0.23*	0.04	1.00		
16. <i>female</i>	0.03	-0.04	-0.05	-0.13	-0.04	-0.05	-0.10	-0.12	-0.09	-0.11	-0.06	0.05	0.12	0.10	-0.03	1.00	
17. <i>age</i>	0.19*	0.17*	-0.01	-0.03	0.02	-0.05	0.02	0.02	-0.10	-0.03	-0.07	-0.08	-0.04	0.09	0.11	-0.04	1.00
18. <i>education</i>	-0.05	-0.01	0.23*	0.13*	0.09	-0.02	0.21*	0.10	0.07	0.07	0.02	-0.03	-0.07	0.00	0.07	0.12	-0.19*

N = 219

*: Significant at $p < 0.05$

TABLE 3: Failure, industry change, and management style change

	(1) $\Delta industry$	(2) $relation$	(3) $\Delta planning$	(4) $\Delta management$
<i>failure</i>	1.014** (0.328)	-1.707*** (0.379)	0.028 (0.044)	0.045 (0.057)
<i>diff_{t-1}</i>	-0.423 (0.267)	0.657* (0.317)	-0.012 (0.037)	-0.038 (0.048)
<i>cost_{t-1}</i>	0.358 (0.257)	0.570+ (0.291)	0.066+ (0.035)	-0.031 (0.045)
<i>entry timing_{t-1}</i>	-0.598** (0.208)	0.0632 (0.221)	-0.013 (0.028)	0.004 (0.035)
<i>female</i>	-0.085 (0.337)	0.859* (0.383)	-0.048 (0.046)	-0.133* (0.058)
<i>age</i>	0.063** (0.020)	-0.053* (0.021)	0.003 (0.003)	0.001 (0.003)
<i>education</i>	0.074 (0.165)	-0.412* (0.199)	0.055* (0.022)	0.062* (0.029)
industry dummies	<included>	<included>	<included>	<included>
Constant	-0.776 (1.370)	-1.838 (1.541)	-0.259 (0.188)	0.246 (0.240)
Observations	219	219	219	219
R-squared	0.179	0.291	0.184	0.006

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 4: Failure and strategy change

	(1) <i>diff_t</i>	(2) <i>cost_t</i>
<i>failure</i>	0.072 (0.092)	0.072 (0.086)
<i>diff_{t-1}</i>	0.333*** (0.106)	0.158 (0.099)
<i>diff_{t-1} x failure</i>	0.122 (0.137)	-0.363** (0.128)
<i>cost_{t-1}</i>	0.320** (0.103)	0.537*** (0.096)
<i>cost_{t-1} x failure</i>	-0.255* (0.129)	0.247* (0.121)
<i>female</i>	-0.031 (0.094)	-0.072 (0.088)
<i>education</i>	0.147** (0.049)	0.079+ (0.046)
<i>age</i>	0.005 (0.005)	0.003 (0.005)
industry dummies	<included>	<included>
Constant	0.420 (0.458)	1.002* (0.427)
Observations	219	219
R-squared	0.584	0.656
Adjusted R-squared	0.544	0.623

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 5: Performance implications of failure and industry change

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	<i>grow sales</i>		<i>grow profit</i>		<i>grow fixed assets</i>		<i>grow employees</i>		<i>grow share</i>	
<i>failure</i>	-5.656*	-4.523+	-4.714*	-3.314	-1.049	-0.293	0.683	0.893	1.725	2.871
	(2.364)	(2.392)	(2.105)	(2.105)	(1.932)	(1.964)	(1.794)	(1.837)	(2.330)	(2.356)
Δ <i>industry</i>		-5.904*		-7.288**		-3.935+		-1.089		-5.965*
		(2.588)		(2.277)		(2.124)		(1.988)		(2.549)
<i>female</i>	-3.092	-2.606	-4.428*	-3.828+	-2.427	-2.103	1.920	2.010	3.671	4.162+
	(2.441)	(2.425)	(2.174)	(2.134)	(1.995)	(1.991)	(1.852)	(1.863)	(2.406)	(2.389)
<i>age</i>	-0.0931	-0.0392	0.00757	0.0741	-0.0621	-0.0262	-0.142	-0.132	-0.0642	-0.00976
	(0.130)	(0.131)	(0.116)	(0.115)	(0.106)	(0.108)	(0.0988)	(0.101)	(0.128)	(0.129)
<i>education</i>	1.549	1.393	2.195+	2.002+	1.398	1.294	-0.529	-0.558	-0.197	-0.355
	(1.299)	(1.287)	(1.157)	(1.133)	(1.062)	(1.057)	(0.986)	(0.989)	(1.280)	(1.268)
<i>diff_t</i>	-1.295	-1.900	-0.300	-1.048	-2.202	-2.606+	0.812	0.700	0.750	0.138
	(1.813)	(1.814)	(1.615)	(1.596)	(1.482)	(1.489)	(1.376)	(1.393)	(1.787)	(1.787)
<i>cost_t</i>	3.649*	3.945*	-0.188	0.178	1.551	1.748	0.987	1.042	1.764	2.063
	(1.746)	(1.733)	(1.555)	(1.525)	(1.427)	(1.423)	(1.325)	(1.331)	(1.721)	(1.707)
industry dummies	<included>	<included>	<included>	<included>	<included>	<included>	<included>	<included>	<included>	<included>
Constant	11.51	13.31	12.54	14.76	10.93	12.13	6.686	7.017	-6.678	-4.866
	(11.19)	(11.10)	(9.965)	(9.769)	(9.147)	(9.115)	(8.492)	(8.528)	(11.03)	(10.94)
Observations	219	219	219	219	219	219	219	219	219	219
R-squared	0.124	0.146	0.121	0.164	0.061	0.077	0.123	0.124	0.119	0.142
Adj R-squared	0.054	0.074	0.052	0.093	-0.013	-0.001	0.053	0.050	0.049	0.070

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE 6: Performance implications of failure and industry change

	(1) <i>grow sales</i>	(2) <i>grow profit</i>	(3) <i>grow fixed assets</i>	(4) <i>grow employees</i>	(5) <i>grow share</i>
success & same	10.39** (3.143)	10.56*** (2.764)	4.197 (2.580)	0.185 (2.416)	3.075 (3.098)
success & different	2.828 (3.561)	1.479 (3.132)	-1.203 (2.923)	-1.480 (2.738)	-3.818 (3.510)
fail & same	4.411 (3.479)	5.671+ (3.060)	2.617 (2.856)	0.572 (2.674)	5.130 (3.429)
<i>female</i>	-2.280 (2.481)	-3.476 (2.182)	-1.816 (2.036)	2.123 (1.907)	4.344+ (2.445)
<i>age</i>	-0.0366 (0.131)	0.0770 (0.115)	-0.0238 (0.108)	-0.131 (0.101)	-0.00828 (0.129)
<i>education</i>	1.485 (1.297)	2.101+ (1.141)	1.375 (1.065)	-0.526 (0.997)	-0.303 (1.279)
<i>diff_t</i>	-1.950 (1.818)	-1.101 (1.599)	-2.650+ (1.493)	0.683 (1.398)	0.110 (1.792)
<i>cost_t</i>	3.917* (1.736)	0.148 (1.527)	1.723 (1.425)	1.032 (1.335)	2.047 (1.711)
industry dummies	<included>	<included>	<included>	<included>	<included>
Constant	3.355 (11.31)	4.670 (9.946)	8.318 (9.284)	6.985 (8.695)	-7.695 (11.15)
Observations	219	219	219	219	219
R-squared	0.148	0.167	0.079	0.124	0.143
Adjusted R-squared	0.071	0.092	-0.004	0.045	0.066

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix A: Transition matrix

Table A1: Transition matrix for first and second ventures in Chinese sample

		Second Business										Total	
		Manufacturing	Utilities	Construction	Transportation	Info Tech	Retail	Hotel/Cater	Financial	Real Estate	Business Svc		Other
First Business	Manufacturing	27%		7%			33%		7%		20%	7%	100%
	Utilities												
	Construction			67%			33%						100%
	Transportation												
	Info Tech				4%	70%	4%		4%	13%	4%		100%
	Retail	3%	1%	4%	1%	2%	60%	12%	1%	2%	13%	1%	100%
	Hotel/Cater	3%		5%		3%	38%	28%	3%	5%	13%	3%	100%
	Financial					25%			50%	25%			100%
	Real Estate			20%	20%		40%			20%			100%
	Business Svc	4%		4%	2%	6%	13%	4%	8%	2%	56%		100%
	Other						17%	33%			33%	17%	100%

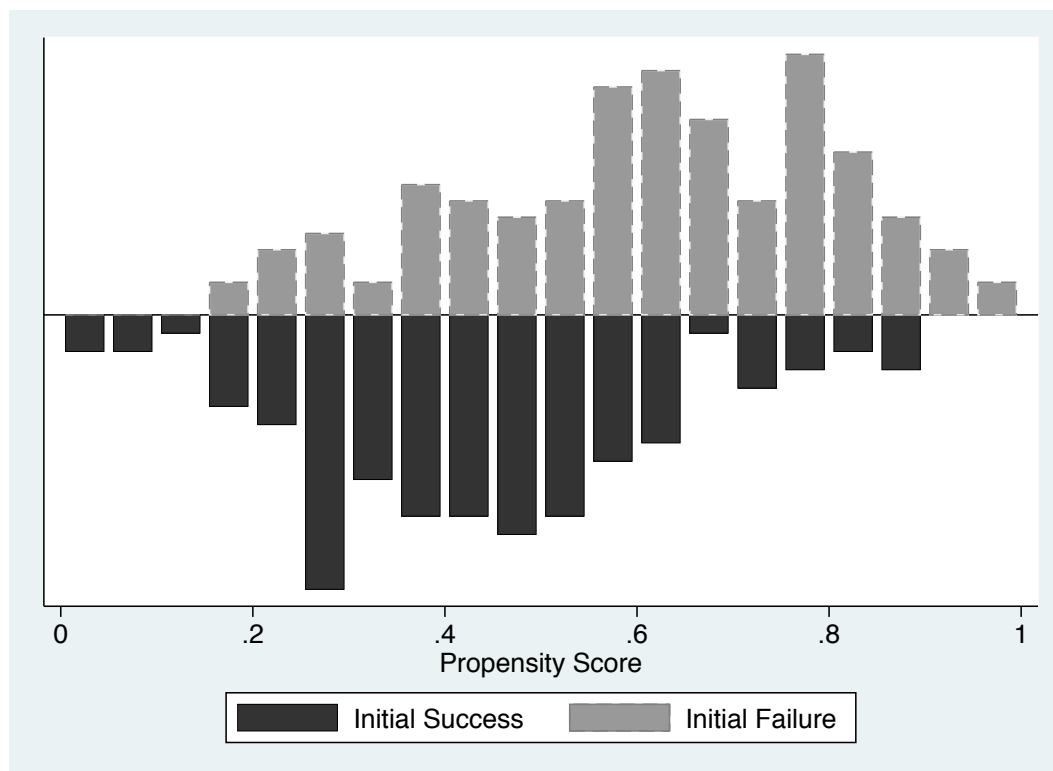
Appendix B: Propensity score matching

Table B1: First stage predicting initial venture failure

	(1) <i>succ_{t-1}</i>
<i>age</i>	0.019 (0.012)
<i>female</i>	0.486** (0.187)
<i>education</i>	-0.053 (0.097)
<i>diff_{t-1}</i>	0.434** (0.149)
<i>cost_{t-1}</i>	-0.480** (0.150)
<i>entry timing_{t-1}</i>	0.074 (0.118)
industry dummies	<included>
period dummies	<included>
industry-period dummies	<included>
Constant	-0.402 (0.829)
Observations	240
pseudo r-squared	0.142

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Figure B1: Propensity scores by treated and untreated samples

Appendix C: The U.S. Context

To assess the whether these results would hold in the U.S. context, we use data on VC-backed ventures from VentureXpert. There are some important caveats about comparing this data to our Chinese data. First, the U.S. data only covers VC-backed ventures, and thus has a selection bias that our Chinese data does not have. Second, VentureXpert does not clearly identify company founders in all cases, so our sample is not as clean as the Chinese data from that perspective. Third, the U.S. context includes the dot-com bubble of the late 1990s, where many experienced entrepreneurs without prior Internet experience created Internet ventures. We will explore this in the data below.

As noted above, the data come from VentureXpert, and cover all VC-backed ventures through 2009. To be able to track exit outcomes, we focus only on ventures founded before 2006. As with our Chinese data, we focus only on serial entrepreneurs. Our variables are largely identical to those used in prior research on the performance implications of serial entrepreneurship (Gompers et al., 2010). We code a venture as a success if it experiences an IPO or acquisition event (*success* and *success_prior*), and we use six industry categories to track the industries of different ventures (and construct *industry change*). For control variables in the performance regressions, we include dummies noting whether the venture was founded in California (*cal*) or Massachusetts (*mass*), whether the first round of VC funding was early seed funding versus later funding (*earlyseed*), the number of VCs in the initial funding syndicate (*investors*), the experience of those VC investors in terms of prior investments (*exper*), the age of the venture at initial VC funding (*months*), and the number of founders of the firm (*founders*). We also include dummies for the six industries and for the founding year of the venture.

The results of the test of whether prior failure leads to industry switching are shown in Table C1. In Model 1 (without any controls) it is clear that prior success is negatively related to industry change – founders whose initial ventures failed were more likely to change ventures for their second ventures. The relationship holds in Model 2 (with year dummies), but moves just outside of significance in Model 3 when industry dummies are included. To assess the affect of the potential that many founders (successful and otherwise) changed to the Internet space to take advantage of the dot-com explosion, we exclude second ventures founded between 1995 and 2000 in Model 4. This model again shows the same relationship – initial failure leads to an increased rate of industry changing between the first and second ventures.

----- INSERT TABLE C1 ABOUT HERE -----

The results of the venture performance models are included in Table C2, where *success* for the current venture (and prior) is defined as IPO or acquisition. The results in Model 1 show the results for the full sample. In this case, neither initial success nor a change in industry is significantly related to the performance of the second venture, though both coefficients have the expected signs (positive for initial success and negative for industry change) and both are just outside significance at $p < 0.10$. Model 2 focuses on the same restricted sample without the Internet bubble and show similar results to Model 1. In Model 3, we segment success vs. failure and changing industry into four discrete buckets, as we did in Table 7 above with the Chinese data. These results show a similar pattern to many of the earlier results – a significant and positive effect of jointly having successful experience *and* staying in the same industry, and no real effect for any other condition (though both *success & different* and *fail & same* are positive). We interpret this as suggesting that there may be weak effects of both initial success (likely the

“revealed quality” effect that prior studies have noted) and industry experience, but only when added together does the effect achieve statistical significance.

----- INSERT TABLE C2 ABOUT HERE -----

In general, we view these results as being largely consistent with the Chinese data that we showed earlier, though there clearly are some different aspects of the data in the U.S. context (and given the selection issues of focusing only on VC-backed ventures.

TABLE C1: Failure and industry change in US data

	(1)	(2)	(3)	(4)
	$\Delta industry$	$\Delta industry$	$\Delta industry$	$\Delta industry$
<i>succ_prior</i>	-0.406*** (0.107)	-0.403*** (0.111)	-0.150 (0.121)	-0.314* (0.143)
industry dummies			<included>	<included>
year dummies		<included>	<included>	<included>
Constant	0.451*** (0.0885)	0.294+ (0.174)	-0.213 (0.268)	0.0471 (0.301)
Observations	1664	1664	1519	1069
chi2	14.49	35.43	98.82	70.95

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE C2: Implications of failure and industry change in US data

	(1) <i>succ</i>	(2) <i>succ</i>	(3) <i>succ</i>
<i>succ_prior</i>	0.155 (0.127)	0.261 (0.163)	
Δ <i>industry</i>	-0.141 (0.119)	-0.153 (0.150)	
success & same			0.286+ (0.164)
success & different			0.115 (0.167)
fail & same			0.0763 (0.211)
<i>cal</i>	0.0721 (0.131)	-0.0189 (0.163)	0.0713 (0.131)
<i>mass</i>	0.0792 (0.211)	-0.0270 (0.270)	0.0767 (0.211)
<i>early seed</i>	-0.405** (0.143)	-0.365* (0.179)	-0.407** (0.143)
<i>investors (ln)</i>	-0.0377 (0.107)	-0.0747 (0.135)	-0.0383 (0.107)
<i>months</i>	-0.0139*** (0.00229)	-0.0115*** (0.00236)	-0.0139*** (0.00230)
<i>exper (ln)</i>	0.0124 (0.0321)	0.0489 (0.0410)	0.0127 (0.0321)
<i>founders</i>	-0.0655 (0.0800)	0.0170 (0.0938)	-0.0671 (0.0800)
industry dummies	<included>	<included>	<included>
year dummies	<included>	<included>	<included>
Constant	3.720*** (0.547)	2.864*** (0.557)	3.608*** (0.547)
Observations	1600	1112	1600
chi2	279.6	225.9	281.0

Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001