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Source: *The Academy of Management Journal*, Vol. 58, No. 6 (December 2015), pp. 1785-1803

Published by: Academy of Management

Stable URL: <https://www.jstor.org/stable/24758275>

Accessed: 28-09-2021 08:07 UTC

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DEALING WITH FAILURE: SERIAL ENTREPRENEURS AND THE COSTS OF CHANGING INDUSTRIES BETWEEN VENTURES

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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 previous to a subsequent 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 previous venture failed are likely to blame the external environment and change industries for their subsequent venture, and that this industry change is costly in that it invalidates potentially useful industry experience, thereby hindering their subsequent venture. In contrast, founders of failed ventures are unlikely to change aspects of their previous business (when starting their subsequent venture) that would be attributable to their leadership—that is, strategy, decision-making, and planning style. Using data on entrepreneurs in China and the U.S., we find support for our theory. The results have important implications for the study of serial entrepreneurship, and more broadly for research on behavioral responses to failure.

INTRODUCTION

Serial entrepreneurship¹ is common (Wright, Robbie, & Ennew, 1997), and research has suggested that serial entrepreneurs differ from inexperienced 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; Zhang, 2011) and are in a position to learn

from their earlier experience (Gruber, MacMillan, & Thompson, 2008; Lazear, 2005), achieving higher performance in their subsequent ventures (Eesley & Roberts, 2012; Paik, 2014; Parker, 2013). Thus, serial entrepreneurs are presumed to learn by gaining knowledge and capabilities from prior experience that helps their subsequent ventures to be more successful.

But do all serial entrepreneurs learn and benefit equally from prior entrepreneurial experience, or are there important sources of heterogeneity in learning? The link between entrepreneurial experience and subsequent venture performance is complex, and the evidence is inconclusive (Toft-Kehler, Wennberg, & Kim, 2014). Recent research has suggested important moderating factors that affect the relationship between experience and subsequent venture performance, such as industry context (Eesley & Roberts, 2012), the number of total ventures started (Toft-Kehler et al., 2014), or the time between ventures (Parker, 2013). We argue that the link between previous venture experience and subsequent venture performance is unclear because, in part, research has not properly accounted for the changes in behavior that affect learning, either positively or negatively.

This study offers a behavioral theory of learning in serial entrepreneurship that seeks to address how

We gratefully acknowledge helpful comments on previous versions of this study from Deepak Hegde (who also provided useful data), Lisa Leslie, Nydia Macgregor, and Mirjam Van Praag, as well as seminar participants at NYU Stern, the Organization Theory Junior Faculty Workshop, the West Coast Research Symposium, and DRUID. We are indebted to helpful comments from editor Martine Haas and three anonymous reviewers. Any remaining errors are our own.

¹ Serial entrepreneurship includes both serial (sequential) entrepreneurs that found a subsequent venture only after leaving their previous venture, as well as portfolio entrepreneurship where the founder creates the subsequent venture while still owning the previous venture.

outcomes drive changes in behavior, and how those behavioral changes affect learning and performance. Building from the Behavioral Theory of the Firm (Cyert & March, 1963; Greve, 2003) and integrating work on the challenges in learning from failure (Baumard & Starbuck, 2005; Eggers, 2012) and psychological research on attribution (Jones & Harris, 1967), we suggest that strategic and organizational changes between ventures may have dramatic effects on subsequent venture performance. Our theory suggests that the failure of an entrepreneurial venture is likely to lead the founder to blame external factors (as opposed to themselves), which leads them to change industries from the previous to the subsequent venture, but not to change other aspects of the business (namely their strategy or managerial style). This industry switch has implications for the success of the subsequent venture: as industry experience has been shown to be a key ingredient for entrepreneurial success (Agarwal, Echambadi, Franco, & Sarkar, 2004; Chatterji, 2009), industry change invalidates some industry-specific expertise. Thus, while the success or failure of a previous venture may tell us something about the underlying quality of the serial entrepreneur (Gompers, Kovner, Lerner, & Scharfstein, 2010), the failure of a previous venture may also have important implications for the behavior and choices made by the entrepreneur, and these behavioral changes may then drive the ability to learn from experience, thereby affecting subsequent performance.

We test our theory of heterogeneity in behavior and learning for serial entrepreneurs using an expansive cross-industry survey set in China, and supplement these results with VentureXpert data on U.S.-based venture capital (VC) backed ventures. The results show that (a) previous venture failure leads founders to change industries for their subsequent venture, and (b) changing industries is detrimental to subsequent venture performance.² In addition, founders do not change their strategy, planning, or management decision-making style between ventures. The effect of changing industries is not contingent on prior venture failure, meaning that the results are consistent with a behavioral, attribution-based perspective on entrepreneurial behavior post-failure, a process that leads founders to make sub-optimal decisions between ventures.

This study contributes to the literature on serial entrepreneurship, as well as the broader literature on

learning from failure. In terms of serial entrepreneurship, our study is part of a growing collection of work arguing that learning from entrepreneurial experience is not a simple or linear process (Eesley & Roberts, 2012; Parker, 2013; Toft-Kehler et al., 2014), and helps to clarify disagreement about the conditions under which serial entrepreneurs may or may not learn from prior experience (Gompers et al., 2010; Hsu, 2007). The use of a behavioral learning and decision-making lens provides insights into this ongoing discussion that have previously been absent by focusing on the behavioral choices that entrepreneurs make, instead of simply linking experience and performance. Given the importance of industry-specific experience for entrepreneurial success (Chatterji, 2009), this study offers a theory and evidence about what may lead entrepreneurs to sacrifice this experience based on the success or failure of their previous venture. Our results show that remaining in the same industry from previous to subsequent venture is more important for later venture performance compared to the outcome of the previous venture, suggesting that the accumulation of industry-specific experience is likely a key explanation for the success of serial entrepreneurs.

In terms of learning from failure, our study shows additional evidence of behaviorally inefficient responses to failure (Baumard & Starbuck, 2005; Eggers, 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 utilizing accumulated experience to improve performance. More broadly, the incorporation of attribution into an understanding of how individuals and organizations make sense of and learn from failure emphasizes not just the importance of attribution (Cannon & Edmondson, 2001), but the fact that attribution affects the behavioral choices that managers make when responding to failure. This suggests that attribution may be an important aspect of learning from failure not only because it affects sensemaking, but also because it influences the chosen remedial steps to address failure (Haunschild & Rhee, 2004).

THEORY AND HYPOTHESES

Serial Entrepreneurship and Learning from Failure

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

² We use propensity score matching to reduce concerns about the endogeneity of previous venture failure.

about 15% of entrepreneurs have prior entrepreneurial experience (Hyytinen & Ilmakunnas, 2007). One stream of research on serial entrepreneurs focused on the differences between types of entrepreneurs, 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). More relevant for the current study is research focusing on the implications of serial entrepreneurship, particularly on the “learning by doing” aspects of previous entrepreneurial experience (Parker, 2013). Zhang (2011) suggested that serial entrepreneurs will be more skillful and socially connected than novice entrepreneurs, particularly in terms of raising capital (see also Amaral, Baptista, & Lima, 2011; Rerup, 2005), and Hsu (2007) found that such experience increases the likelihood of receiving VC funding. Thus, many prior studies have suggested that serial entrepreneurs learn from their experience—particularly in terms of developing social connections—and see improved performance in subsequent ventures.

Other research, however, has suggested that entrepreneurs may only benefit from successful prior experience (Gompers et al., 2010). This perspective—that the benefits of experience may accrue differently for those with successful versus unsuccessful prior experience—aligns with a wealth of research on learning from failure in the tradition of the Behavioral Theory of the Firm (Cyert & March, 1963). Denrell and March (2001) showed theoretically, and Eggers (2012) highlighted empirically, that organizations can easily draw improper inferences from failures, particularly because of the small sample of experiences and the noisy cues that typically accompany failure experience (Rerup, 2009).³ Such inefficient learning from failure can lead firms to retreat from potentially viable opportunities through a dynamic process of updating expectations. Additionally, learning from failure is difficult because it requires acknowledgment and acceptance of the causes of the failure in question (Cannon & Edmondson, 2001). As a result, success and failure lead not only to different learning outcomes (Madsen

³ Certainly, a wealth of research on learning from failure has highlighted that failure can be an important source of organizational learning (e.g., Chuang & Baum, 2003; Sitkin, 1992). All of this work, however, suggests that the learning processes behind dealing with failure may be complicated by emotional, political, or cognitive factors, and this forms the underlying basis of our theory.

& Desai, 2010), but also to different behavioral outcomes (Eggers & Suh, 2015; 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. In the case of a serial entrepreneur, the founder must step back after the previous 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 understanding 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.

Together, these perspectives suggest that serial entrepreneurs may be in a position to learn from their prior venture experience, but that such learning is complicated. To understand the behavioral complications that arise from dealing with failure and planning a subsequent business, we articulate a sequence of decisions made in the context of entrepreneurial perceptions of prior outcomes. This study focuses on the question of what serial entrepreneurs change between previous and current ventures based on the outcome of the previous venture, and seeks to understand the consequences of those changes.

Attribution and Industry Change

Based on the idea that failure will lead serial entrepreneurs to make changes between their previous and current business, we focus on the role of attribution of the cause of the failure to understand what, specifically, they may change. Attribution research has suggested that individuals are likely to blame factors that are 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 ranging 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).

For entrepreneurs, an attributional perspective suggests that failed entrepreneurs may blame factors

...

that are beyond their control for their previous venture failures. Such external factors may include the actions of customers, suppliers, and competitors, as opposed to the entrepreneur's abilities or choices. 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 is likely to 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 previous 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 subsequent venture. This external attribution is likely to lead to a change of industry between the previous and subsequent venture for serial entrepreneurs whose previous venture ended in failure.

Hypothesis 1: Among serial entrepreneurs, those whose previous venture was a failure are more likely to change industry between the previous and subsequent venture, compared to serial entrepreneurs whose previous venture was a success.

The Effect of Changing Industries

Above, we hypothesize that serial entrepreneurs whose previous venture resulted in failure are likely to change industries for their subsequent venture. There are important implications of this change in industry from a learning perspective. Specifically, prior work has shown that the industry experience of new-venture founders is an important predictor of venture success (Agarwal et al., 2004). Chatterji (2009) showed this relationship between industry experience and venture success in medical devices, Phillips (2002) in Silicon Valley law firms, and Klepper and Sleeper (2005) in laser-industry startups. While these studies all focus on prior industry experience gained through the founder's previous employment (i.e., spinouts), the same effect is expected to hold for serial entrepreneurs across separate ventures. Previous venture experience builds industry-specific learning that could be translated to the subsequent venture if they are both in the same industry. This industry-specific experience effect manifests as contingent learning, and suggests that the learning process for serial entrepreneurs is closer to the accumulation of industry-specific experience

than the accumulation of entrepreneurial experience.⁴ Therefore, we suggest that serial entrepreneurs that change industries between ventures may suffer a disadvantage by abandoning their previous industry experience, as at least some portion of the knowledge they gained is industry-specific human capital (Campbell, Coff, & Kryscynski, 2012; Neal, 1995), which limits its applicability to other industry contexts.

Hypothesis 2: Among serial entrepreneurs, changing industries between ventures will reduce the performance of the subsequent venture.

To the extent that the failure of the previous venture leads to lower subsequent venture performance, as shown in prior work (Gompers et al., 2010; Parker, 2013), we suggest that changing industries may at least partially mediate the (negative) relationship between previous venture failure and subsequent venture success. If such mediation exists, it would suggest a degree of learning (or at least nonoptimal behavioral updating) between ventures for serial entrepreneurs. This contrasts with claims that previous failure simply reveals low quality entrepreneurs, a story involving no learning at all (Gompers et al., 2010).

Alternative Explanations

Contrary to the behavioral attribution-based theory suggested above, alternative explanations exist for the relationship between previous venture success or failure and subsequent venture performance. We offer brief discussions of three alternative explanations, and the accompanying empirical expectations, below.

Consistent with prior work on serial entrepreneurs (Gompers et al., 2010), it may be true that there are persistent quality differences among entrepreneurs, and that these quality differences lead entrepreneurs to fail (probabilistically) in all ventures, *and* to needlessly change different aspects of their businesses.⁵

⁴ We recognize that founder experience before the previous venture—whether as an employee or in a different venture—may also play a role in affecting outcomes. Unfortunately, our data do not include this information. It is worth noting that, since our data cover the current and previous venture plus any time in between, we can account for (on average) the last 14 years of experience for our subjects.

⁵ We also address this explanation empirically through a matching approach to ensure that we only compare entrepreneurs that faced a similar probability of earlier venture failure; this is discussed later.

Such an explanation is likely to lead the founder to change aspects of the business beyond just the industry. We focus on three potential factors—management decision-making style, organizational planning approach, and firm strategy.⁶ Based on attribution theory (Jones & Harris, 1967), the founder of a failed venture is unlikely to blame themselves for failure. This should decrease the likelihood of changes being made to internal factors between the previous and subsequent ventures.⁷ If our behavioral attribution-based explanation is incorrect and low-quality entrepreneurs simply make many changes between ventures, we should see failure (presumably correlated with underlying entrepreneurial quality) affect strategy, planning, and decision making in the same way that it affects industry.

Second, it may be true that changing industries (which is presumed to be costly) will be the mechanism by which low-quality entrepreneurs decrease their own performance outcomes. This would explain both the relationship between previous venture failure and industry change, as well as the relationship between industry change and lower subsequent performance (Hypotheses 1 and 2 above). Importantly, however, such an explanation suggests that higher-quality entrepreneurs that are either unlucky and fail in their earlier venture, or that change industries (potentially for good reason) should not suffer the same performance penalty for their subsequent ventures. This suggests a moderating relationship between previous venture failure and industry change.

⁶ We consider management style in terms of the degree of centralization versus decentralization in decision making (Miller & Dröge, 1986), managerial planning style in terms of how proactive versus reactive the planning process is within the firm (Falshaw, Glaister, & Tatoglu, 2006; Van de Ven, 1980), and value-creation strategy in terms of differentiation versus cost focus (Zott & Amit, 2008).

⁷ Obviously, all aspects of the business—from the industry in which it is situated to the nature of decision making—represent choices of the entrepreneur. However, industry choice is fundamentally different, as it is not reasonably changeable after entry (except by creating a new business), while other aspects of the firm, including strategy, management, and planning styles, remain *more* flexible and responsive to entrepreneurial choices after entry. Thus, we believe that while failure might lead to other changes in the operation of the subsequent business (compared to the previous), attribution theory suggests a far stronger likelihood of industry change versus other types of change in the businesses.

Finally, it is possible that founders whose previous venture failed will seek to change *any* aspect of their business before their subsequent venture, but that changing industries is easier than changing aspects such as strategy, planning, and management decision-making styles. In this case, we might expect that changing industries would be less costly for subsequent venture performance, as this goes against the idea of it being easiest to change. Similarly, we expect that changes made between the previous and subsequent ventures would be costly, including changes to strategy, planning, and management.

DATA AND 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 (Gao, Jiang, Li, & Cheng, 2006). 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 investigators wrote down all responses from the informants. 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, as well as 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. Of the 1,138 business founders that our surveyors spoke with,⁸ about 55% (627) were willing to take the survey, which is a reasonable rate given the face-to-face nature of the survey. Of those initially willing to participate, some (151) were excluded for having never founded another business despite having been told that the survey was about serial entrepreneurship, and some (223) started but did not finish the survey. That left us with 253 completed and usable surveys. Table 1 offers basic descriptive data on the respondent sample and shows that, importantly for

⁸ In total, our surveyors approached 3,625 businesses, but the founder was not present at the time of the visit in approximately 69% of the visits.

our theory, just under half of the entrepreneurs had their previous venture fail and a similar percentage changed industries between the previous and current venture. The average founder was 41 years old at the time of the survey, and ran a business with 13 employees and 2.1 million RMB in assets (about \$345,000 USD).

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 did not include any founders that had not started at least two ventures, which addresses important concerns about the endogeneity of the decision to start a subsequent venture.⁹ 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 subsequent venture*. Second, our sampling approach and methodology is free of traditional sources of bias, such as selecting to use VC funding. In fact, all 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 is likely to more closely approximate a broad range of entrepreneurial ventures than the supplementary data we later employ to test aspects of our theory in the U.S. context.

Prior research has suggested that collectivist cultures such as China may be more likely to take blame for failure themselves (Miller, 1984). We feel that this is not a problem for our sample for four reasons. First, collectivist cultures are less likely to display attribution biases because they are less likely to blame other people for failure. Our attribution theory is not based on blaming other people (e.g., employees), but based on blaming the external environment. This should not be as subject to collectivist norms as if we were highlighting blame of other people. Second, our sample focuses on entrepreneurs, who are likely to be more similar to Western, individualistic respondents than average Chinese citizens, as these businesspeople have embraced capitalist opportunities in their country. Third, as we discuss below, we asked our entrepreneurs why their first venture

⁹ To the extent that any respondent had founded more than two previous businesses, the questions were framed as being about the most recent previous business and the current business.

TABLE 1
Survey Sample Description

Founder female (%)	40.2
Founder age (years)	41.2
Founder education level (%)	
High school or technical secondary school	13.1
Junior college	41.7
Bachelor's degree	23.8
Postgraduate diploma	18.3
Doctorate	3.2
Previous venture closed (%)	48.4
Changed industry (%)	45.7
Information on current venture	
Firm age (years)	12.1
Fixed assets (million RMB)	2.1
# Employees	13.0
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

failed, and the majority favored externally attributable reasons.

Variables

Our study uses a series of dependent variables (DVs) to assess the impact of previous venture failure on subsequent venture decisions. Our behavioral DVs (documenting aspects of the subsequent business) fall into three categories. First, we utilize two measures of industry change, one (Δ industry) is a dummy variable equal to “1” if the self-reported industries of the previous and subsequent ventures differ (the Chinese government classifies firms into 11 industries), and “0” otherwise. Table 2 shows a full transition matrix between previous and current venture, and shows a large variety of transitions. For example, 27% of those who founded their previous venture in manufacturing stayed in that industry for their subsequent venture, while 33% went to retail and 20% to business services. In general, many of the founders whose previous venture was not in retail transitioned to that industry for their subsequent venture. Interestingly, however, only 60% of those whose previous venture was a retail business stayed in retail, suggesting that many people believed that retail would be a good business but those with experience in that industry as a founder were less certain.

In addition to this measure of industry change, we asked founders to assess the relationship

TABLE 2
Transition Matrix for Previous and Subsequent Ventures in Chinese Sample

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

between their previous and their current venture. Founders were asked to assign their previous and current venture to one of the following categories (hypothetically, if the previous venture has been 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 does almost 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 created a single variable (*relation*) that was coded as "1" if the new firm had any relationship to the prior (supplier, customer, competitor, complement, or substitute) and "0" otherwise, as we found no substantive differences between different types of relationships.

Second, we measure strategy in that we asked the founders how central a differentiation or a cost-leadership strategy was to their previous and current ventures. The scales for these strategy measures are borrowed from Zott and Amit (2008). The scale includes five items that describe differentiation, and the entrepreneurs were asked to point out the extent to which their companies use a differentiation strategy and how much they value the strategy of differentiation. The scale of low-cost strategy is similar to that of differentiation, and it includes four items. In Zott and Amit (2008), the Cronbach's alphas were .66 for differentiation and .76 for cost, and in our research the Cronbach's alphas are .842 and .863 for differentiation and cost in the current venture and .869 and .892 for differentiation and cost in the prior venture, respectively, which suggests that these measures have strong reliability. To derive the specific measure that we use in our models, we take the ratio of differentiation to cost leadership for the previous ($diff_{t-1}$) and current ($diff_t$) businesses, and we measure the change in strategy from the previous to the current business by calculating:

$$\Delta strategy = \frac{|diff_t - diff_{t-1}|}{diff_{t-1}}$$

The measure captured the normalized amount of change in strategy.

Third, we asked founders about their planning and management decision-making styles for both their prior and current venture. The scale for planning is borrowed from Falshaw, Glaister, and Tatoglu (2006), and is designed to capture the formality of the strategic planning process within the firm, with

higher values capturing more flexible and informal planning processes. The survey comprises 10 items (using a 1–5 Likert scale). In Falshaw et al. (2006), the Cronbach's alpha was .74, and in our research the Cronbach's alphas are .903 for the current venture and .898 for the previous venture, which suggests strong reliability. The scale for decision-making style is borrowed from Miller and Dröge's (1986) work on decentralization. The entrepreneurs were asked to identify which level in their company has the authority to make different decisions (0 for board or owner; 1 for CEO; 2 for divisional or functional manager; 3 for subdepartment 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 .95 for the current venture and .965 for the prior venture. From these we calculate $\Delta planning$ and $\Delta management$, similar to $\Delta strategy$, to assess the degree to which the manager changed his or her planning or management style between ventures.

For performance, we asked the founders about the three-year growth rate of their current ventures across a variety of measures, namely *grow sales*, *grow profits*, *grow fixed assets*, *grow employees*, and *grow (market) share*. In the results shown here we group these responses as a single factor (*growth*), but the results are consistent if we treat each measure separately.

Our remaining variable of theoretical interest focuses on the success or failure of the prior venture. Given the relatively few acquisitions in our data (five out of 253 total founders surveyed) and the uncertainty over perceptions of performance based on acquisition in China, we exclude these observations completely. Therefore, we code the previous venture as "1" (success) if it is an ongoing firm (typically still owned by the entrepreneur but managed by friends or close family members), and "0" otherwise (*failure*). As a result, the successful entrepreneurs in our sample can be viewed as portfolio entrepreneurs (managing more than one business at a time). The typical gap between the founding of the previous business and the founding of the subsequent business, however, is significant (6.2-year mean, five-year median, with 59% being five years or more). For all entrepreneurs with a failed previous venture, they closed their earlier business before opening the current business, and thus are true serial entrepreneurs. As a result, more than 80% of our sample is either a "true" serial entrepreneur or a portfolio entrepreneur that managed their previous business for

a substantial period of time (five or more years) before starting their subsequent business. For these reasons, we feel that our sample is largely representative of serial entrepreneurs, as opposed to being limited only to portfolio entrepreneurs.

For control variables, we use a series of founder-level variables that include measures of the founder's *age*, the founder's *entrepreneurial experience* at the time of founding for the current venture, whether the founder is *female*, and founder *education* (categorical measure for high school, junior college, bachelor's, post-graduate study, and doctorate). We also include a set of variables to describe the previous venture (for the behavioral outcomes of changes in industry, strategy, planning, or management) or the current venture (for performance growth measures), including measures of strategy ($diff_t$, $diff_{t-1}$) and management style ($management_t$, $management_{t-1}$, $planning_t$, $planning_{t-1}$). We also include dummies for the primary source of capital for the previous and current venture (categories for personal funds, family funds, and funds from friends—there was virtually no access to VC or other funding during the period of our study), a dummy noting whether the same funding source was used for both the previous and current venture (*same funding*), and dummies for the current industry to capture the fact that some industries require more specialized knowledge, and that performance might vary by industry. In addition, in the performance regressions we control for organizational size ($assets_t$, log transformed—similar results with employees instead of assets) and *venture age*.

Given the fact that all of our data come from a single survey with a single respondent, it is possible that common method variance (CMV) could be a concern. We do not feel that this is likely to be a significant issue in our data for multiple reasons. First, many of our measures (e.g., whether the prior venture has been closed) are objective, and thus not subject to methodological biases. Second, for our measures of strategy, planning, and management, we primarily focus on the *change* in those measures from the previous to the current venture, which therefore control for individual-level concerns about CMV (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Third, additional analyses (available from the authors upon request) investigating the Harman one-factor test (Harman, 1967) and the CFA Marker approach (Richardson, Simmering, & Sturman, 2009) for dealing with CMV produced no substantive changes in our results. Thus, we feel that our results as reported are relatively free from CMV concerns.

Endogeneity and Matching

One potential concern in our empirical approach involves the endogeneity of the previous venture failure. Stated differently, the concern would be that “bad” entrepreneurs would fail in their previous venture *and* change industries, while good entrepreneurs may not change industries (even if they fail). One option would be two-stage least squares, but we have neither a sufficiently strong first-stage model nor a suitable instrumental variable that strongly correlates with previous venture performance but that does not correlate with subsequent venture performance or the likelihood of changing industries.

An alternate solution is to use matching, ensuring that the sample does not contain observations that were “doomed” to previous failure and that thus 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), and is based on the propensity of the previous venture to fail based characteristics of the entrepreneur (age, gender, education) and the previous venture (entry timing, differentiation, cost leadership). We also use industry–time dummies, where the year of previous venture founding is grouped into categories for pre-1996, 1996 to 2000,

2001 to 2005, and after 2005. These industry–time dummies (four time periods times 11 industries means 44 dummies) control for the external selection environment for the previous venture and the base-line likelihood of failure.

The propensity regression is shown in Table 3 and the resulting histogram in Figure 1. The results show that ventures founded by females were more likely to fail, as were those favoring a differentiation strategy. While the coefficients are suppressed, the industry–time dummies are highly significant in aggregate. These findings all conform to expectations. The histogram shows treated individuals (those whose first venture failed) above the x-axis, and those whose first venture succeeded below. While there is a great deal of overlap in Figure 1, we see a pronounced shift to the right above the axis—the model clearly suggests that these founded ventures were significantly more likely to fail, so that matching on the propensity to fail should allow us to exclude some ventures that were highly likely to fail given their founding conditions. For matching, we use a very narrow radians matching approach, where all treated observations (where the previous venture failed) without an untreated observation with a propensity score within 0.01 (on a 0-to-1 scale) is excluded. Through this process, we drop from 253 observations to 219 observations in our matched sample. All further regressions reported are conducted on only those 219 observations, though using all 253 observations produces similar results.

TABLE 3
First Stage Predicting Previous Venture Failure^a

	<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>
Time dummies	<included>
Industry–time dummies	<included>
Constant	−0.402 (0.829)
Observations	253
Pseudo R-square	0.142

^a Standard errors in parentheses.

** $p < 0.01$

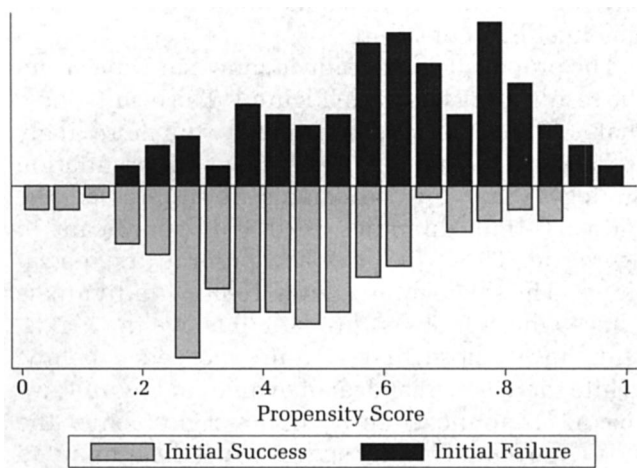
Analytical Method and Descriptive Statistics

With one observation per founder, we use logit for the dichotomous DVs (Δ *industry* and *relation*) and ordinary least squares for the other DVs. To test mediation, we follow the guidelines laid out by Baron and Kenny (1986). Correlations are presented in Table 4, and show limited levels of correlations. The most significant are between founder education and the venture measures of strategy, planning, and management, suggesting that there are typical “types” of firms that founders may create, and that these correlate with education. Removing one or more of these variables from the regressions returns consistent results, and different checks of multicollinearity (including checking variance inflation factors) do not raise any significant concerns.

RESULTS

From a behavioral perspective, Hypothesis 1 suggested that the failure of a prior venture would lead

FIGURE 1
Propensity Scores by Treated and Untreated Samples



the serial entrepreneur to change industries when starting a subsequent venture, but that other aspects of the business—strategy, planning, and management—would remain unchanged. The results of models evaluating these effects are shown in Table 5. In Model 1, the DV (Δ industry) tracks whether the entrepreneur changed industries from one venture to the next. The results clearly show that prior failure ($p < 0.05$) leads to more industry changes compared to prior success. Similarly, Model 2 assesses whether there is any relationship (supplier, complementor, etc.) between the industries of the previous and subsequent businesses, and indicates that prior failure dramatically reduces the likelihood ($p < .001$) 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.

We also suggested that failure would have no such effect on factors reflecting on the manager him or herself. Table 5 evaluates whether failure leads entrepreneurs to change their business strategy (Model 3), organizational planning (Model 4), or management decision-making process (Model 5) style in

response to prior failure. The results show that *failure* has no significant relationship with changes in any of these three areas, supporting our claims that aspects of the business more directly in the founder's control are less likely to change between ventures based on the failure of the previous venture.

In Table 6, we turn our attention to the performance implications of both failure in the previous venture and changes in industry from one venture to the next. As discussed earlier, the outcome measure is a growth rate construct across growth in sales, assets, employees, profits, and market share. Model 1 tests the effect of previous venture failure, and finds that while it is negative (as expected), it is not significant. It does not appear that, at least in our sample, the failure of the previous venture (as opposed to its success) leads to conclusively lower subsequent venture performance. This finding, while somewhat surprising, is actually consistent with what Gompers et al. (2010) reported—their results show that founders of previously successful ventures perform better than novice entrepreneurs, but it does not appear from their data (based on coefficients and standard errors) that there is a significant difference between previously successful and unsuccessful serial entrepreneurs.

Model 2 adds the measure of industry change, which shows a negative and significant ($p < .05$) coefficient. Results for using *relation* instead of the industry change dummy (not shown) offer similar results. It is clear that changing industries between the previous and current ventures results in lower levels of performance. While the non-significant finding for a main effect of *failure* on *growth* does not allow for a formal and proper test of mediation, following the standard Sobel–Goodman mediation process shows that 44% of the total effect of *failure* on *growth* is mediated by Δ industry.¹⁰ Thus, while we cannot technically say that industry change mediates the relationship between previous failure and subsequent growth, it is clear that the failure of the previous venture leads to the change in industry between previous and current ventures, and that this

¹⁰ The direct effect of *failure* on one growth measure (profits) is actually negative and significant, allowing for a formal test of mediation on that specific measure. The same Sobel–Goodman test suggests that 32.4% of the effect is mediated in that case. In addition, the direct effect of *failure* on *growth* in the full, unmatched sample of 252 observations is negative and significant ($p < .10$), and the Sobel–Goodman test shows that 27.2% of the effect is mediated by Δ industry.

TABLE 4
Pairwise Correlations in Survey Data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 growth	1.000														
2 failure	-0.101	1.000													
3 Δ industry	-0.197*	0.194*	1.000												
4 Δ strategy	-0.149*	-0.128	0.123	1.000											
5 Δ planning	-0.064	0.019	0.137*	0.014	1.000										
6 Δ management	-0.114	0.061	0.094	-0.034	0.052	1.000									
7 entrepreneurial exper	-0.078	0.680*	0.133*	-0.104	0.078	-0.027	1.000								
8 female	-0.021	0.101	0.034	0.117	-0.101	-0.120	0.055	1.000							
9 age	-0.078	0.092	0.194*	-0.124	0.023	0.022	0.276*	-0.040	1.000						
10 education	0.016	-0.003	-0.050	-0.051	0.215*	0.104	-0.066	0.120	-0.189*	1.000					
11 differentiation _t	-0.161*	0.101	-0.038	0.146*	0.034	0.107	-0.046	-0.047	-0.038	0.205*	1.000				
12 planning _t	-0.214*	0.006	0.089	0.246*	-0.148*	-0.060	-0.030	0.079	-0.050	-0.354*	-0.148*	1.000			
13 management _t	-0.081	0.029	0.139*	-0.072	0.095	0.329*	-0.035	0.089	0.038	0.264*	0.166*	-0.280*	1.000		
14 size (assets, ln) _t	0.077	-0.151*	0.027	-0.068	0.340*	0.131	-0.070	-0.169*	-0.032	0.421*	0.142*	-0.439*	0.363*	1.000	
15 venture age	-0.229*	0.012	0.208*	-0.011	0.139*	0.041	0.318*	-0.029	0.568*	-0.149*	-0.108	-0.032	0.085	0.135*	1.000
16 same funding	0.072	0.127	-0.050	-0.141*	-0.055	-0.132	0.167*	-0.071	0.036	-0.085	-0.019	0.006	-0.112	-0.105	0.012

N = 219

* Significant at $p < 0.05$

change of industry is detrimental to subsequent venture performance.

We further explore this effect in Model 3, which includes an interaction term between *failure* and Δ industry. The result is not significant, which means that the main effect of Δ industry is not contingent on whether the founder's previous venture failed. Thus, all entrepreneurs, regardless of their previous outcomes, experience a penalty from changing industries; it is simply that those entrepreneurs whose previous venture failed are more likely to change industries. This "non-finding" is important, as it provides evidence counter to claims that changing industries may simply be how low-quality entrepreneurs unwittingly sabotage their subsequent ventures. Based on that logic, we would expect that the "costs" of changing industry would be contingent on the failure of the previous venture. These results, instead, suggest that all entrepreneurs are subject to a penalty for switching industries.

Model 4 includes the measures of change in strategy, planning, and management to assess whether changing anything from the previous to the current business is detrimental to performance. While the coefficients on all three variables are negative, none is significant, suggesting that changes in these aspects of the business are less "costly" in terms of subsequent venture performance compared to changes in industry. Collectively, these results suggest that previous venture failure leads entrepreneurs to change industries (and nothing else) between ventures, despite the fact that industry change is the most costly for subsequent venture performance. These results are consistent with a behavioral explanation, where the founder responds (or overreacts) to the failure of the previous venture.

Attribution and Alternate Explanations

In describing our theory earlier, we suggested that the mechanism for both change of industry between the previous and subsequent venture would be driven by attribution, and that this would explain both the change of industry and the "non-change" in other aspects of the business more closely associated with the founder him- or herself. We offer two types of evidence to support our claims of attribution. First, the observed empirical results are consistent with a behavioral attribution theory, and relatively inconsistent with the three other plausible explanations offered in our Theory section. An argument that low-quality entrepreneurs may change many things post-failure (and then fail again due to low quality) would predict that previous venture failure would

TABLE 5
Failure, and Changes in Industry, Strategy, and Management Style^a

	(1) Δ industry	(2) relation	(3) Δ strategy	(4) Δ planning	(5) Δ management
<i>failure</i>	1.119* (0.475)	-2.060*** (0.533)	-0.044 (0.058)	0.002 (0.060)	0.106 (0.078)
<i>differentiation_{t-1}</i>	-0.737+ (0.438)	0.616 (0.541)	-0.135* (0.057)	-0.048 (0.059)	0.080 (0.077)
<i>planning_{t-1}</i>	0.571** (0.199)	-0.646** (0.208)	0.059* (0.023)	-0.115*** (0.024)	0.060+ (0.032)
<i>management_{t-1}</i>	0.115 (0.199)	0.024 (0.218)	-0.013 (0.026)	-0.025 (0.027)	-0.009 (0.035)
<i>entrepreneurial exper</i>	-0.043 (0.093)	0.172+ (0.101)	-0.001 (0.012)	0.016 (0.012)	-0.016 (0.016)
<i>female</i>	-0.112 (0.346)	0.672+ (0.381)	0.049 (0.042)	-0.050 (0.044)	-0.114* (0.058)
<i>age</i>	0.048* (0.021)	-0.077** (0.023)	-0.003 (0.003)	-0.000 (0.003)	-0.000 (0.003)
<i>education</i>	-0.014 (0.184)	-0.378+ (0.205)	-0.006 (0.022)	0.019 (0.023)	0.050+ (0.030)
<i>same funding</i>	-0.298 (0.506)	0.137 (0.567)	-0.070 (0.059)	-0.102+ (0.062)	-0.117 (0.080)
funding dummies	<included>	<included>	<included>	<included>	<included>
industry dummies	<included>	<included>	<included>	<included>	<included>
Constant	-2.824 (1.760)	4.601* (1.991)	0.342 (0.212)	0.705** (0.221)	0.017 (0.288)
Observations	219	219	219	219	219
R-squared			0.195	0.336	0.155
χ^2 -Squared	54.02	72.92			

^a Standard errors in parentheses.

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

lead to changes in strategy, planning, and management in the same way that it leads to changes in industry between ventures. This supposition is not supported in the data (see the non-significant effect of failure in Models 3–5 in Table 5). An argument that low-quality entrepreneurs would fall victim to a desire to change industries as the means to their subsequent venture struggles would predict that the interaction between previous failure and industry change would be significant, so that the effect of changing industries would only be negative when the entrepreneur had also failed previously. This supposition is not supported in Models 3–4 in Table 6. An argument that changing industries is easier and less costly than other changes (to explain why industry changes post-failure as opposed to anything else) would predict that, at the very least, changes in strategy, planning, and management style from the previous to the current venture would be detrimental to performance. Again, the results in Model 4 of Table 6 do not support this explanation, and indicate that changing industries is far more costly compared to other changes. These findings support

a behavioral basis for attribution and do not support other explanations.

Second, while we were strongly concerned that entrepreneurial founders would not be honest with us about how they viewed the failure of their previous venture, and thus viewed the decision to change industries (and nothing else) as “revealed attribution” consistent with the idea of revealed preferences, we asked founders whose previous venture had failed why they felt the venture failed. The results (Table 7) show that three of the four highest-rated reasons for venture failure are clearly “external” in terms of blame placing (industry competition, market changes, and high input costs) and would be likely to lead to a change in industry. The most internal-focused reasons for failure (including having the wrong business model and mismanagement) were much less supported in responses to the survey. In addition, we asked a subsample of our survey respondents whose previous venture failed *and* who changed industries why they changed industries. Anecdotal responses from survey respondents included, “There was something wrong with the last business; I did not

TABLE 6
Performance Implications of Failure and Industry Change^a

	(1) <i>growth</i>	(2) <i>growth</i>	(3) <i>growth</i>	(4) <i>growth</i>
<i>failure</i>	-2.970 (2.255)	-1.968 (2.285)	-2.969 (2.726)	-2.904 (2.779)
Δ <i>industry</i>		-3.671* (1.738)	-4.813* (2.426)	-4.664+ (2.462)
<i>fail</i> x Δ <i>industry</i>			2.178 (3.222)	2.206 (3.242)
Δ <i>strategy</i>				-1.392 (2.776)
Δ <i>planning</i>				-0.512 (2.467)
Δ <i>management</i>				-2.070 (2.117)
<i>entrepreneurial exper</i>	0.382 (0.469)	0.291 (0.467)	0.286 (0.468)	0.275 (0.473)
<i>female</i>	0.391 (1.656)	0.584 (1.644)	0.820 (1.683)	0.584 (1.734)
<i>age</i>	0.168 (0.106)	0.200+ (0.106)	0.205+ (0.106)	0.195+ (0.108)
<i>education</i>	-0.143 (0.921)	-0.227 (0.913)	-0.154 (0.921)	-0.107 (0.935)
<i>differentiation_t</i>	-6.174** (2.162)	-6.702** (2.158)	-6.667** (2.161)	-6.441** (2.226)
<i>planning_t</i>	-3.151*** (0.870)	-2.930*** (0.869)	-2.884** (0.873)	-2.791** (0.889)
<i>management_t</i>	-1.801+ (1.032)	-1.534 (1.030)	-1.563 (1.033)	-1.274 (1.093)
<i>size (assets, ln)_t</i>	0.891 (0.606)	0.841 (0.601)	0.839 (0.602)	0.819 (0.626)
<i>venture age</i>	-0.808*** (0.192)	-0.778*** (0.191)	-0.783*** (0.191)	-0.776*** (0.193)
<i>family funds_t</i>	3.869* (1.794)	4.196* (1.785)	4.206* (1.788)	3.858* (1.829)
<i>friends funds_t</i>	3.823 (2.565)	3.927 (2.543)	3.875 (2.548)	4.114 (2.649)
<i>same funding</i>	5.041* (2.232)	4.752* (2.216)	4.727* (2.220)	4.318+ (2.263)
Industry dummies	<included>	<included>	<included>	<included>
Constant	21.57* (8.861)	21.69* (8.784)	21.67* (8.796)	21.94* (8.866)
Observations	219	219	219	219
R-square	0.285	0.301	0.303	0.307

^a Standard errors in parentheses.

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

select the right industry,” “The profit of the last industry was too low and the development was slow,” and multiple claims that the new industry was “better” for the entrepreneur. When asked to select from a variety of options, the most popular included feeling that the new industry was “better,” the availability of resources in the new industry, and having better industry-level expectations for the new industry. These findings, while not conclusive, are strongly consistent with a behavioral attribution explanation

for the decision to change industry (and nothing else) between the previous and current ventures.

Robustness: The U.S. Context

In the Appendix, 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 could not

TABLE 7
Explanations for Failure

Explanation	Overall	Rank	Int/Ext
Competitive forces	3.34	1	External
Market changes	3.08	2	External
Unrealistic expectations of entrepreneurship	2.91	3	Ext/Int
High input costs	2.86	4	External
Wrong business model	2.82	5	Internal
Lack of funding	2.77	6	Internal
Government policy changes	2.74	7	External
Mismanagement	2.66	8	Internal
Too early entry	2.58	9	Internal
Internal team disagreements	2.41	10	Internal

assess aspects such as strategy or management style. In addition to allowing us to confirm our findings for serial entrepreneurs, these data also enable us to compare the performance of experienced versus novice entrepreneurs and account for the endogenous decision to start a subsequent business after the previous venture's outcome. In general, 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 of changing industries for a subsequent 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, 2015)—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 previous venture to the external industry, and therefore change industries between the previous and subsequent 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 subsequent venture. We use data from two 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. Our study shows clear evidence that the decision to change industries for the subsequent venture is both tied to previous venture failure and results in lower performance for the subsequent venture. These results offer some suggestions for 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 previous venture and the creation of the subsequent.

This study responds to calls for more research on the role of the individual in serial entrepreneurship (Ucbasaran, Alsos, Westhead, & Wright, 2008), and specifically complements existing studies on serial entrepreneurs. We focus on two extant studies in particular. First, Gompers et al. (2010) found important performance differences for serial entrepreneurs based on whether their previous venture succeeded or failed, and explained this as “revealed quality”—high-quality entrepreneurs succeed consistently, while low-quality founders fail repeatedly.¹¹ Importantly, our results suggest that these previous results do not necessarily preclude a learning effect because Gompers et al. presumed that learning would be similar for successful versus failed entrepreneurs. Based on our behavioral perspective, we suggest that if there is a persistent performance effect of successful entrepreneurs, this may be because failure leads serial entrepreneurs to make changes (specifically industry changes) that decrease performance. Our results do not necessarily preclude a “revealed quality” effect, but only suggest that this may not be the only reason for any persistence in entrepreneurial performance across ventures.

Second, Parker (2013) investigated whether serial entrepreneurs perform better after prior success or prior failure. His findings generally support the idea that prior success breeds later success (consistent with Gompers et al., 2010), but importantly found that this increased success rate decays rapidly. This finding agrees with our perspective that it is not necessarily immutable quality that drives performance across successive ventures, but accumulated knowledge and expertise that can decay. Importantly, Parker (2013: 661) discussed the idea that expertise may decay because of industry-switching

¹¹ While their results show clear differences between successful serial entrepreneurs and novice entrepreneurs (Gompers et al., 2010: 25), it is less clear statistically whether there is a significant difference between successful and failed serial entrepreneurs (our results would suggest that there is not).

behavior, and tested an interaction term between prior success and industry change, finding no effect. This is consistent with our findings—the effect of changing industry is not contingent on prior success or failure. Parker did not, however, report the main effect of industry change (see our results in Table 5), which is where this study focuses. As a result, our findings are consistent with and complementary to Parker's, with our study adding the perspective that the incidence of failure itself in the previous venture may lead to changing industries between ventures, and this industry change may be a source of the mean reversion that Parker found.

Additionally, this study's finding that changing some aspects of the business between ventures is more problematic than changing others complements the existing literature on the importance of experience by entrepreneurs. Most research has focused on the importance of industry-specific experience (Agarwal et al., 2004; Chatterji, 2009; Eesley & Roberts, 2012), and our research certainly confirms those findings. Our theory and results also suggest that other types of experience (namely strategy, management style, and decision-making style) may not be as specific in their contribution to learning, and thus can be more readily changed and adapted to meet current conditions for entrepreneurs. Future research should further investigate the specific aspects of experience that are mutable versus those that are lost when contextual changes are made. To the extent that changing aspects of the business such as strategy do not affect subsequent performance and are not driven by prior success or failure, a potentially interesting question is what drives these changes and what (if any) performance effect do they have?

From the perspective of the literature on behavioral responses to failure, this study integrates attribution more deeply into the literature on failure, suggesting that interpreting 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 it (Cannon & Edmondson, 2001), our perspective suggests that such potentially erroneous attributions make learning in the context of entrepreneurial failure difficult. Our study is among the first to apply this framework to entrepreneurship, and thus provides evidence at the level of the individual manager (founder), as opposed to prior studies that have worked only at the organizational level (Eggers, 2012; Haunschild & Sullivan, 2002). Given the importance of attribution

and individual sensemaking, 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 previous failure and the ability to learn from the failure experience. Most of the literature showing positive benefits of learning from failure has focused on large, ongoing organizations whose founders have not changed 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 being responsible for the previous failure (the external environment), 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, the current one has its limitations. Some of these stem from the limitations present in any study utilizing survey data—potential non-response bias, retrospective bias, etc. In the case of our study, however, many of these are mitigated 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 a set number of measures of internal and external changes between ventures, and the fact that our results are effectively correlational as we do not use an instrumental variable approach or a natural experiment approach (though the chronological order of our effects is exceptionally clear). Future research could both explore other factors internal and external to the organization that the founder may 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 subsequent venture, and that this industry change will result in lower performance in the subsequent 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 U.S. 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.

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APPENDIX A

THE U.S. CONTEXT

To assess the whether our results would hold in the U.S. context, to allow us to control for the selection to start a subsequent venture, and to compare the results with the situation for novice entrepreneurs, we use data on VC-backed ventures from VentureXpert. There are some important caveats about comparing these data with 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. 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 to note 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.

TABLE A1
Failure and Industry Change in U.S. Data^a

	(1) <i>Δindustry</i>	(2) <i>Δindustry</i>	(3) <i>Δindustry</i>	(4) <i>Δindustry</i>
<i>succ_prior</i>	−0.208 ⁺ (0.115)	−0.206 ⁺ (0.116)	−0.181 (0.120)	−0.313* (0.143)
<i>inverse Mills ratio</i>	<included>	<included>	<included>	<included>
Industry dummies			<included>	<included>
Year dummies		<included>	<included>	<included>
Constant	−0.509 (0.994)	−0.578 (1.188)	0.435 (1.246)	−0.334 (1.647)
Observations	1,562	1,562	1,562	1,102
Chi-square	4.370	13.49	92.08	68.10

^a Standard errors in parentheses.

⁺ $p < 0.10$, * $p < 0.05$

We are able to control for the endogenous selection to start a subsequent venture by using the *founders* variable as a first-stage instrument in a Heckman selection model—the more founders in the previous venture, the more likely one of them will start a subsequent venture, but it should be uncorrelated with the decision to switch industries.

The results of the test of whether prior failure leads to industry switching are shown in Table A1. In Model 1 (without any controls) prior success is negatively related to industry change—founders whose previous ventures failed were more likely to change ventures for their subsequent 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 or otherwise) changed to the Internet space to take advantage of the dot-com explosion, we exclude subsequent ventures founded between 1995 and 2000 in Model 4. This model again shows the same relationship—previous failure leads to an increased rate of industry changing between the previous and subsequent ventures.

The results of the venture performance models are included in Table A2, where *success* for the current venture (and prior) is defined as IPO or acquisition. For these models, we show the full sample of data, including novice and serial entrepreneurs. The results in Model 1 show that founders with prior entrepreneurial experience (*subsequent venture* equals “1”) experience higher performance, in line with prior research from Gompers et al. (2010). In addition, we see that while the success of the prior venture shows a positive sign, it is not significant (in line with our findings in the Chinese data). The coefficient for the decision to change industries is again negative and marginally significant ($p < .10$), again in line with the Chinese data. To further decompose the results, we split the serial entrepreneur’s prior experience into four categories based on whether their previous venture succeeded or failed, and whether they changed industries. Model 2 compares the performance of these four categories of serial entrepreneurs to novice entrepreneurs (the omitted category). We find that founders whose prior ventures were successful and who remained in the same industry experience a strong boost in performance. Founders who either experienced failure but remained in the same industry, or those that experienced success and changed industries, also fare better than novice entrepreneurs. These three coefficients, however, are not significantly different from one another—thus,

either success or remaining in the same industry seems to be associated with higher performance in subsequent ventures.

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

TABLE A2
Implications of Failure and Industry Change in U.S. Data^a

	(1) <i>succ</i>	(2) <i>succ</i>
<i>subsequent venture</i>	0.294* (0.128)	
<i>succ_prior</i>	0.208 (0.132)	
Δ <i>industry</i>	−0.200+ (0.117)	
<i>success & same</i>		0.495*** (0.097)
<i>success & different</i>		0.308** (0.100)
<i>fail & same</i>		0.311+ (0.160)
<i>fail & different</i>		0.078 (0.159)
<i>cal</i>	0.287*** (0.0435)	0.287*** (0.0435)
<i>mass</i>	0.250*** (0.0700)	0.250*** (0.0700)
<i>early seed</i>	−0.122** (0.0382)	−0.122** (0.0382)
<i>investors (ln)</i>	0.219*** (0.0303)	0.219*** (0.0303)
<i>months</i>	−0.00496*** (0.000239)	−0.00496*** (0.000239)
<i>exper (ln)</i>	0.0698*** (0.00881)	0.0698*** (0.00881)
<i>founders</i>	−0.0478 (0.0313)	−0.0478 (0.0313)
Industry dummies	<included>	<included>
Year dummies	<included>	<included>
Constant	1.416*** (0.0953)	1.415*** (0.0953)
Observations	27,472	27,472
chi2	3078.8	3079.7

^a Standard errors in parentheses.

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