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# How Do Investors Evaluate Past Entrepreneurial Failure? Unpacking Failure Due to Lack of Skill versus Bad Luck

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# HOW DO INVESTORS EVALUATE PAST ENTREPRENEURIAL FAILURE? UNPACKING FAILURE DUE TO LACK OF SKILL VERSUS BAD LUCK


## ABSTRACT

Research shows most ventures fail, yet there is limited work on investors' views of entrepreneurs who have failed in the past. We address this gap and call attention to an innate asymmetry between past failure and success. That is because success requires skill and luck jointly; whereas failure materializes due to either lack of skill (mistakes) or bad luck (misfortune). We ask: Are investors 'failure-averse' and discount a failed entrepreneur even in the presence of additional information about entrepreneurial skill? Or do they make 'rational inferences' in light of the additional skill information and proceed to fund the new startup? To test whether investors are 'failure-averse' or engage in 'rational inference,' we use experiments in the context of equity crowdfunding. The results suggest that prospective crowdfunding investors rationally integrate informational cues regarding past outcomes and entrepreneurial skill.


In recent years, it has become easier than ever to launch entrepreneurial ventures due to digitization and the ensuing drop in the cost of computational power, distribution channels, and so on (Greenstein et al., 2013). The lower cost of entry has led to higher failure rates as more individuals pursue entrepreneurship (Klepper, 2015; Nanda & Rhodes-Korpf, 2014). Individuals now experiment with launching not one but multiple entrepreneurial ventures. Among those engaged in entrepreneurship, many have previously launched a venture and failed. This fact marks a qualitative change in entrepreneurship in general and has immediate implications for studying entrepreneurial resource acquisition in particular (Huang, 2018; Vissa, 2011). Hence, we ask: How do investors evaluate past entrepreneurial outcomes? Specifically, how do investors evaluate entrepreneurs who have previously experienced failure?

Investors assess entrepreneurs' past experiences to inform the likelihood of their future success (Clough et al., 2019). This assessment is a challenging task; early-stage investors face substantial uncertainty. Prospective ventures usually have no track record, and there is often little reliable information available concerning founders' entrepreneurial skill (Hallen, 2008; Hsu, 2007). Given the limited information available, investment decisions are often guided by the characteristics of the entrepreneur, such as their educational background (Colombo & Grilli, 2005;

Robinson & Sexton, 1994) and industry experience (Agarwal et al., 2004; Chatterji, 2009). Of course, the outcomes of their previous ventures are also a valuable source of information.

The existing literature typically focuses on the impact of a founder's prior successes. Past success, it is argued, drives investors to infer entrepreneurial skill, which in turn merits their investment in the founder's current venture (Gompers et al., 2010; Hsu, 2007; Hallen & Eisenhardt, 2012; Huang et al., 2020). Studies that take past failure into account often conceptualize failure as symmetric to success: if success signifies entrepreneurial skill, failure implies lack thereof (Eisenhardt & Schoonhoven, 1990; Hochberg, Ljunqvist & Vissing-Jørgensen, 2013). Yet, the empirical findings are inconclusive. While investors favorably evaluate those who were previously successful (Gompers et al., 2010; Hsu, 2007; Hallen & Eisenhardt, 2012), the findings for those who previously failed are mixed and show either a positive (Hsu, 2007) or a negative (Baum & Silverman, 2004) effect on the likelihood of an investment decision. Therefore, we revisit the implicit assumption of symmetry in the information conveyed by past failure versus past success.

Our key insight is that past failure is not always a negative cue of entrepreneurial skill; rather, it is a noisy cue. We argue that failure may result not from a lack of skill but sometimes simply because of a lack of luck. We distinguish between skill, which refers to factors within an entrepreneur's control, and luck, which denotes factors beyond an entrepreneur's knowledge or control (Baumol, 1990; Liu & De Rond, 2016). Prior examples of unexpected and uncontrollable adverse events include the Zika virus, SARS, and COVID-19 outbreaks, the 2008 global financial crisis, and the 9/11 terror attacks. While success requires that skill and luck occur jointly, failure can arise due to lack of skill (i.e., mistakes), bad luck (i.e., misfortune), or a combination of both (Cardon et al., 2011). Thus, past failure does not necessarily imply the absence of skill; it may

simply reflect the unfortunate case of bad luck. Consequently, the information that past failure conveys about entrepreneurial skill is not symmetric to that conveyed by past success (Liu & De Rond, 2016).

Our goal is to inform the resource acquisition literature by focusing on early-stage investment decisions, where credible information about the venture and its founder is scarce (Clough et al., 2019). We develop theoretical arguments from the investors' perspective. Since failure casts doubt about skill and success does not, our first hypothesis is that absent additional cues, investors will allocate fewer resources to those whose previous ventures failed than to those that succeeded. Second, we postulate that an additional skill cue can clarify the ambiguity associated with past failure (i.e., did it arise due to mistakes or outright misfortune?), and enables investors to make inferences about entrepreneurial skills and the merits of funding the current venture. In our conceptual models, the failure discount is mitigated if investors fully incorporate a credible cue of entrepreneurial skill into their decisions. Finally, we shift attention from investors who make 'rational inferences' and consider an alternative view of investors; one where investors are 'failure averse' and see the negative past outcome as damning per se. Such investors, we hypothesize, will categorically discount previously failed entrepreneurs, irrespective of the presence of skill cues.

We test our hypotheses in the context of equity crowdfunding, where individuals fund nascent entrepreneurial projects in exchange for equity through an online platform. Equity crowdfunding is an important source of funding for growth-oriented startups in the US (Bernstein et al., 2017) and ranks as second only to venture capitalists (VCs) in funding startups in the UK (Beauhurst, 2018). We pursue three online experiments using a randomized, between-subjects

design. Respondents identified as prospect investors are asked to assess an entrepreneurial venture presented in the same format used on equity crowdfunding platforms.

The findings suggest that, on average, serial entrepreneurs do not command a premium compared to first-time entrepreneurs. Moreover, we find that compared to entrepreneurs whose previous ventures succeeded, investors discount those whose previous ventures failed. Importantly, we observe that a credible skill cue mitigates this effect. In the presence of the additional skill cue, investors infer that previously failed entrepreneurs are skilled and hence merit funding. The result is unique to cues that credibly communicate skill information. As for the alternative view, we find limited evidence of outright aversion to failure among the prospective investors we study.

This study makes four contributions. First, we expand the resource-acquisition literature by studying the consequences of past failure. Specifically, we shed light on investors' assessments of past entrepreneurial failure (Cope et al., 2004; Ucbasaran et al., 2013). We build on the insight that failure may be due to either lack of skill or bad luck (Cardon et al., 2011; Mantere et al., 2013) to challenge the idea that past failure is detrimental to resource acquisition. Rather, we argue that past failure represents a noisy rather than negative cue of entrepreneurial skill. Second, we contribute to the crowdfunding literature (e.g., Agarwal et al., 2014; Mollick & Nanda, 2015). The patterns we document suggest that crowdfunders are not failure averse but rather make rational inferences from the available information. Third, we highlight the role of misfortune in the resource-acquisition literature, in line with recent calls to study the role of luck (Denrell et al., 2019). Finally, the findings inform the literature on experimental capitalism (Kerr et al., 2014). We study the conditions under which an individual whose first experiment with entrepreneurship failed may successfully raise funding for another high-growth venture.

## THEORETICAL BACKGROUND

We study how investors evaluate entrepreneurial failure. It is increasingly common for individuals to pursue several entrepreneurial ventures over time (Wright et al., 1997). We know most entrepreneurial ventures fail (van Praag, 2003). Taken together, these observations imply that many entrepreneurs have past entrepreneurial experience that concluded in failure. We explore investors' assessments of serial entrepreneurs, specifically by asking how investors evaluate those who have previously failed. We further investigate whether providing information about skills moderates the negative evaluation of past failure.

Business outcomes are primarily attributed to two factors: skill and luck (Schumpeter, 1942). "Skill" is an endogenous component which is defined as any factor where the entrepreneur has agency (Baumol, 1990). The term "luck" denotes an exogenous component and is defined as a random factor over which the entrepreneur has no control (Liu & De Rond, 2016).

Our theory development follows three steps. We first review the literature on resource acquisition, highlighting the information that investors evaluate. Next, we detail common entrepreneurial outcomes and their root causes. Finally, we derive testable hypotheses concerning investment decisions based on the informational cues available at the time of investment.

### Resource Acquisition and the Evaluation of Entrepreneurial Skill

According to the resource-acquisition literature, investors are critical stakeholders and are among the earliest and most impactful for early-stage ventures (Baum & Silverman, 2004; Hallen & Eisenhardt, 2012; Vissa, 2011). The decision to allocate resources to a nascent venture is not a simple one. Limited information and intense uncertainty make predicting the future success of early-stage ventures particularly arduous. There is usually no track record and a lack of indicators of success such as a prototype or paying customers. Moreover, information about the founders is limited and often there is no reliable evidence of their entrepreneurial skill.

In such contexts, angel investors draw on deep interactions with the entrepreneur, as well as their own experience, to generate and evaluate fine-grained information (Huang & Pearce, 2015). Relatedly, Hallen & Eisenhardt (2012) report that investors and entrepreneurs form rich interactions before formal fundraising in an effort to facilitate investment decisions. However, the availability of information may be more constrained in certain settings. In crowdfunding, for example, interactions are moderated online and tend to be limited to public Q&A forums, leaving investors with a narrow set of cues on which to base their decisions (Murray et al., 2020).

When information is scarce and interactions limited, investors look for cues of quality (Clough et al., 2019). The literature documents a host of quality signals; namely, credible information closely connected to the skill of its founders (Chen et al., 2009; Hallen & Eisenhardt, 2012). The founder's affiliation with reputable third parties serves as a signal of quality. An affiliation with a prominent investment bank (Higgins & Gulati, 2003) or a reputable venture capitalist (Gulati & Higgins, 2003; Hsu, 2004) is positively associated with subsequent funding success. Intellectual property is another source of information; ventures with patents are more likely to secure venture capital (VC) funding (Baum & Silverman, 2004; Conti et al., 2013; Heeley et al., 2007; Hsu & Ziedonis, 2013).

The question, however, is how entrepreneurs acquire the resources necessary to secure such patents or affiliations in the first place. During a venture's earliest stages, the main, if not only, asset an investor can assess is the entrepreneur (Hallen, 2008; Huang & Pearce, 2015; Kaplan et al., 2009). Previous studies explore the impact of entrepreneurs' educational and managerial experience (Bernstein et al., 2017; Colombo & Grilli, 2005; Robinson & Sexton, 1994). Arguably, entrepreneurial experience is also highly relevant, but research on the topic is scarce, and the findings regarding past failure are inconclusive. Some studies report a positive association between

previous ventures and subsequent funding (Hsu, 2007); others report a negative association (Baum & Silverman, 2004). We next address discuss a common outcome—failure—and hypothesize how it informs investors' assessment of entrepreneurial skills and the subsequent funding decisions.

**Entrepreneurial Outcomes and the Root Causes of Failure**

To facilitate the discussion, it is helpful to understand the distribution of entrepreneurial outcomes and their root causes. We present a conceptual framework linking between the two causes and the ultimate success or failure of a venture (Table 1, Panel A). We build on this to derive an observational framework and develop a set of hypotheses about the impact of informational cues on investors' assessments of a future entrepreneurial opportunity.

We treat entrepreneurial outcomes as dichotomous. The outcome is either success or failure, and the latter outcome is the most prevalent. This view reflects investors' perspectives and draws on well-documented empirical patterns. We know that entrepreneurial outcomes follow a power-law rather than a normal distribution (Crawford et al., 2015; Scherer, Harhoff & Kukies, 2000). From an investor's perspective, the outcomes are dichotomous, where the probability of success is low, but the proceeds are high. To be considered a success, a venture must generate substantial proceeds, such that the investor payoff compensates for the risk associated with the investment. Anything less is considered a failure (Metrick & Yasuda, 2010; Sahlman, 1990). Qualitative studies substantiate this view: early-stage investors expect either extraordinary profits or to lose their investments in full (Huang & Pearce, 2015).

Research on the impact of past failure on investors' decisions is scarce.[1] The handful of studies on the topic approach failure as symmetric to success: if past success is a positive signal of skill, then past failure is a negative signal of skill (Eisenhardt & Schoonhoven, 1990; Hochberg et

[1] For a review of the consequences of failure from the entrepreneur's perspective, see Ucbasaran et al. (2013).

al., 2013). We introduce a nuanced view of failure to the entrepreneurial resource-acquisition literature by identifying two distinct root causes: (a) mistakes, or failure due to low skill; and (b) misfortune, or failure due to bad luck (Cardon et al., 2011; Denrell et al., 2014; Zacharakis et al., 1999; van Praag, 2003). In other words, skill and luck can be thought of as the underlying drivers of a venture's outcome. Table 1 (Panel A) presents our conceptual framework of these root causes. In our framework, success occurs where entrepreneurial skill and good luck occur jointly (Frank, 2016).[2] Conversely, failure materializes in three possible cases: mistake, misfortune, or a combination of these.

Below, we illustrate the conceptual framework and its two root causes with anecdotes. On the one hand, failure may be due to the entrepreneur and their mistakes. Consider Plain Vanilla Games, which developed a mobile game, QuizUp, in 2012. The startup raised $40 million in venture capital but was sold in December 2016 for just $1.2 million. Hence, it is a failure from the investors' perspective. In a post-mortem analysis, the entrepreneur identified their inability to grow their client base as their strategic mistake and at the core of the failure.[3]

On the other hand, failure can be due to misfortune (i.e., an external force beyond the entrepreneur's control). Such external forces include major shocks associated with macro-financial crises, health concerns, and unexpected regulatory changes. For example, the SARS

[2] This paper takes a binary view of entrepreneurial skill. It is a common approach in theoretical models (see, e.g., Arora & Gambardella, 1997). An entrepreneur either possesses an entrepreneurial skill or does not. The abstraction facilitates parsimonious theory development (Thorngate, 1976). Note, we do not say that skill is binary in 'real life'; it is likely distributed along a continuum from unskilled to highly skilled. A useful way to align the views is to allow for a threshold level, above which an individual is considered highly skilled. We argue that the process of launching, then growing and ultimately selling a business for eleven times the initial investment, necessitates non-negligible skill. An entrepreneur cannot build and successfully sell a business purely because they are lucky. A successful entrepreneur surely possesses skill above a non-negligible threshold; above threshold skill is also associated with future success.

[3] The founder noted: "We placed our bets on the extensive collaboration with the television giant NBC. One could say that we placed too many eggs in the NBC basket. […] When I received the message from NBC that they were canceling the production of the show, it became clear that the conditions for further operation, without substantial changes, were gone." www.cbinsights.com/blog/startup-failure-post-mortem/

and Zika outbreaks dramatically affected funding to Asian and South American startups, respectively.[4] Such highly visible events have a material impact on a startups' performance. Consider, for example, the unexpected regulatory change that halted Bluesmart's rapid growth and led to its closure. The company raised $27 million to develop travel products. In 2014 it launched a popular carry-on suitcase with various features (e.g., a digital lock, proximity sensors, location tracking). Misfortune hit in 2017: a terror alert led airlines to ban from their cabins any large lithium-ion batteries, such as that in the Bluesmart carry-on. According to Bluesmart, the new rules "put our company in an irreversibly difficult financial and business situation[5]."

In sum, anecdotal evidence and prior studies highlight that skill and luck are root causes of entrepreneurial outcomes. Our conceptual framework suggests that observing past failure is not symmetric to past success. While success signifies skill, failure may arise due to lack of skill (mistakes), lack of luck (misfortune), or both.[6] Complicating matters is the fact that early-stage investors often observe a past outcome but lack credible information about its root causes. Next, we build on the conceptual framework to derive an observational framework and hypotheses.

*** INSERT TABLE 1 HERE ***

**Informational Cues and Investment Decisions: Hypotheses Development**

[4] Data provider CB Insights reports the effect of prior outbreaks on funding given to private companies. SARS' impact on the Asian private markets was swift. Total funding in 2003 and 2004 was 27% and 29% below 2002 levels, respectively. Similarly, South American private market financing activity also appeared to slow after the Zika outbreak became widely publicized. Funding activity decreased by 50% in 2016, compared to 2015 (see www.cbinsights.com/research/coronavirus-private-markets-startups).

[5] https://www.theverge.com/2018/5/1/17306410/smart-luggage-ban-bluesmart-shutdown-refunds

[6] The insight is robust to a wide range of assumptions regarding entrepreneurial skill and the role of learning. Recall, we study how investors evaluate an entrepreneur at a specific point time. Hence, we focus on entrepreneurial skill at the time an investment is contemplated. This is not a static view; nor does it ignore a more dynamic view that an entrepreneur learns over time from experiences (i.e., over $T = 0 \Longrightarrow t$). Our view of entrepreneurial skill is warranted because we study investors' assessments at a given point in time (i.e., at $T = t$). We accommodate (a) a view of skill as a fixed trait, as well as (b) a view of skill due to ongoing learning, (c) irrespective of whether learning is greater under success or failure. The only assumption we make is that of a 'stable ordering'; the process of learning retains the relative order such that those with higher/lower skill at ($T = t$) retain their respective order in the future ($T > t$).

Investment decisions are informed by observing founders' past experiences, but the relationship between future investments and past outcomes remains unclear. The challenge is twofold. First, there is an observational challenge because information on past outcomes is salient, yet credible cues of the root causes are not always available. The challenge is whether a salient cue of past failure signifies mistakes or misfortune. Second, there is a puzzle regarding the approach of investors to the observational challenge. We investigate whether investors heed additional cues when those are available. We pose the following questions: Are investors failure averse, thus discounting anyone who previously failed? Or do investors look beyond past outcomes and make rational inferences about skill when additional cues are available?

We derive hypotheses based on two alternative views of investors either making rational inferences or being failure averse. The hypotheses explore the impact of credible informational cues on investment patterns. Because previous failure might indicate a lack of entrepreneurial skill, the baseline prediction is that investors will, on average, discount past failure in comparison to past success (Hypothesis 1). Next, we conjecture whether this is because failure casts doubt on the skill of the entrepreneur or whether failure has a negative effect per se due to behavioral or social factors. If investors interpret failure as a noisy skill cue, additional information about the presence of skill should eliminate the noise and allow investors to infer skill and subsequently fund the venture (Hypothesis 2). In contrast, if investors are failure averse due to behavioral or social bias, their decisions will not be sensitive to additional skills cues. They will forgo funding even in the presence of a skill cue (Hypothesis 3). Table 2 details the two views.

*** INSERT TABLE 2 HERE ***

By testing both views, we take a theoretically comprehensive approach. The hypotheses and analyses allow us not only to find support for one view, but also to refute the alternative

view by showing the results are inconsistent with it. This comprehensive approach implies that—by design—we do not expect to find support for all hypotheses but support for one view and lack of support for the other. Next, we shift to hypothesis development.

We consider investors who evaluate a serial entrepreneur. Their key challenge is to evaluate the prospect of the future venture using limited informational cues that are observed about the previous venture. The observational framework in Table 1 (Panel B) sets out what an investor can infer about an entrepreneur's skill from the available informational cues. The framework makes a parsimonious assumption regarding the availability of informational cues; whereas past outcome is salient, additional informational cues about skill may be unavailable. The observational framework illustrates that past failure is not a negative cue of skill; rather, it is a noisy skill cue.

First, think of an investor who observes past success, yet a cue of entrepreneurial skill is not available (Cell [B1]). The investor can infer that it maps onto Cell [A4] in Panel A. Because entrepreneurial success requires both skill and luck (Frank, 2016), investors can infer that an entrepreneur who experienced past success is skilled (Gompers et al., 2010; Hsu, 2007). Therefore, the investor is more likely to fund the new startup. Next is the case of an investor who observes past failure, and a skill cue is unavailable (Cell [B3]). The ensuing inferences map onto either Cell [A1], [A2], or [A3] in Panel A. Admittedly, even skilled entrepreneurs may experience misfortune and fail (Cell [A2]). That said, failure may simply reflect the lack of entrepreneurial skill (cells [A1] and [A3]). In the absence of additional information, one cannot clearly infer whether the past failure was due to misfortune or entrepreneurial mistakes (Pfarrer et al., 2010). For this reason, investors are less likely to invest in the entrepreneur's new startup.

Table 1, Panel C shows the inferences potential investors can derive from the conceptual framework (Panel A) in light of the information available to them at the time of assessing the investment (Panel B). Panel C illustrates that the inferences associated with success and failure cues are not symmetric. Whereas success signifies entrepreneurial skill, failure may arise due to lack of skill (mistakes; e.g., Plain Vanilla Games placed too many eggs in one basket"), or a lack of luck (misfortune; e.g., the external shocks experienced by Bluesmart). Because past failure *may* imply a lack of entrepreneurial skill, we hypothesize that in the absence of other informational cues, investors will be cautious when faced by entrepreneurs who previously failed, as opposed to those who experienced past success:

> *Hypothesis 1. (Cue of Previous Entrepreneurial Outcome). Absent cues about skill, investors are less likely to fund a venture proposed by an entrepreneur who experienced past failure, compared to one who experienced past success.*

Next, we consider how an additional informational cue about an entrepreneur's skill affects investment decisions. Additional credible cues can reduce ambiguity regarding the prospects of an early-stage venture (Hallen, 2008; Huang & Pearce, 2015). While there is little conclusive work on the impact of past entrepreneurial experience, there is related work on the impact of an individual's broader experience. For example, higher levels of education are associated with successful resource acquisition (Robinson & Sexton, 1994) and subsequent venture growth (Colombo & Grilli, 2005). Prior industry experience and salient employers are also associated with VC funding (Chatterji, 2009) and entrepreneurial success (Agarwal et al., 2004). These are all visible cues from credible third parties (e.g., universities, employers) that are documented to have a positive association with subsequent investment. Recent experimental evidence from an equity platform shows consistent results: cues about an entrepreneur's elite education or evidence of a

prestigious past employer carry the largest informational value and result in fundraising success (Bernstein et al., 2017).

Hypothesis 2 addresses the impact of concurrent cues; namely, information about the outcome (of the prior venture) and skill (of the entrepreneur). The question is how investors integrate these cues. Following Bayesian statistical reasoning, we conjecture that the marginal benefit of a credible skill cue is higher in the case of past failure than past success. Absent the additional cue, investors do not know whether the previous failure was due to a mistake or misfortune. The additional information regarding skill is informative in that it mitigates the level of ambiguity regarding the root cause.

We turn to Table 1 to illustrate our predictions. If an investor observes past failure and a skill cue is available (Cell [B4] of Panel B), they can infer the entrepreneur possesses a high level of skill and thus merits funding; the case maps directly onto Cell [A2] of the conceptual framework (Panel A). This differs markedly from the situation where investors observe past failure but no other information is available (Cell [B3]). In this case, investors are unclear whether they face Cell [A1], [A2], or [A3] in Panel A. Hence, when evaluating a previously failed entrepreneur, the additional cue supports a more precise inference of entrepreneurial skill.

The benefits of an additional cue are negligible when evaluating successful entrepreneurs. An investor who observes past success and a skill cue (Cell [B2]) can infer that it maps onto cell [A4] in Panel A; that is, the entrepreneur is highly skilled. This is not significantly different from the case of observing past success with no other information available (Cell [B1]) because, in both cases, the investor will infer that they face Cell [A4] in Panel A. Thus, for past success, the additional cue does not yield more precise inferences.

In sum, the presence of a skill cue impacts the assessment of those who previously failed but has no impact in the case of those who experienced success.[7] As we set out in Table 1 (Panel B), the hypothesis compares the magnitude of a shift from left to right (i.e., absence vs. presence of a skill cue) between the top and bottom rows (i.e., past success vs. failure). That is, the marginal benefit of information about skill is greater in the presence of entrepreneurial failure than in the presence of entrepreneurial success. Hence, we conjecture:

> *Hypothesis 2 (Rational Inference). The positive effect of an additional skill cue on investors' funding a venture is larger for entrepreneurs who experienced past failure than for entrepreneurs who experienced past success.*

Up to this point, we have theorized that investors derive inferences as set out in the conceptual framework and using all the informational cues available to them. That is, investors' inferences about entrepreneurial skill (Table 1) follow Bayesian thinking. However, we also consider the alternative view that investors may be 'failure averse' as suggested in the entrepreneurship literature (Ucbasaran et al., 2013). Table 2 compared the two views.

Investors may exhibit an innate aversion to failed entrepreneurs, irrespective of the observed skill (Landier, 2005). There is historical evidence that communities ostracize those who fail (Efrat, 2006). Qualitative evidence reveals that stakeholders disengaged and penalized those businesses that filed for Chapter 11 bankruptcy in the 1980s, irrespective of the quality of their products (Sutton & Callahan, 1987). A similar pattern is observed in the experiences of 12 entrepreneurs who failed in the late 1990s: they were ignored or explicitly shunned by their bankers (Singh et al., 2015).

[7] Hypothesis 2 conjectures about the magnitude of investor's assessments under different treatments and can be formally captured by the inequality: [(Failure & Skill Cue) – (Failure)] > [(Success & Skill Cue) – (Success)]. The inequality compares the marginal effect of investor's assessments when presented with a skill cue for those who previously failed (left-hand side) versus those who previously succeeded (right-hand side).

If such 'failure aversion' prevails among early-stage investors, it will shape their investment patterns. Behavioral or social biases may direct investment outcomes. For example, Kahneman and Tversky reveal that people do not follow the statistical principle of Bayesian thinking and rely on a limited number of heuristics such as availability or representativeness (Kahneman & Tversky, 1972; Tversky & Kahneman, 1973). Heuristics may impede investors from accurately assessing the likelihood that an entrepreneur is skilled conditional on the informational cues available to them. Alternatively, there may be social explanations for failure aversion. Some communities hold strong cultural views of individual agency; namely, they believe individuals have full control of their fortunes. Thus, those cultures may dismiss the role of luck – and specifically misfortune – in bringing about failure (Frank, 2016). If behavioral or social biases prevail, investors deviate from Bayesian thinking, and interpret past failure as a cue of limited skill.

This marks a departure from our previous hypothesis, where investors make Bayesian-like inferences that incorporate cues of entrepreneurial skill in their decisions. Table 2 illustrates how the inferences and subsequent investment decisions differ. To the extent that investors are failure averse, they will discount anyone with a failed venture in their past, even in the presence of additional information about entrepreneurial skills. Drawing on the observational framework (Table 1, Panel B), the current conjecture focuses on the right-hand column (the presence of a skill cue) and compares the magnitude of moving from the top-right quadrant (Cell [B2]; success and skill cue) to the bottom-right one (Cell [B4]; failure and skill cue). An investor that makes rational inferences will heed the additional skill cue and therefore is likley to fund the new venture. This is captured in Panel B as well as the second and fourth rows of Panel C. However, failure-averse investors — affected by behavioral or social factors —are guided predominently

by past outcome (i.e., success or failure in the case of Cell [B2] and [B4], respectively). Accordingly, we hypothesize:

> *Hypothesis 3 (Failure Aversion). In the presence of skill cues, investors are less likely to fund venture proposals by entrepreneurs who have experienced past failure than venture proposals by entrepreneurs with past success.*

In conclusion, we present a theoretically comprehensive discussion that covers two distinct approaches for assessing serial entrepreneurs. The advantage of this approach is that it seeks not only to support one view, but also attempts to refute the alternative view. We say investors make 'rational inferences' if investment patterns align with Hypothesis 2 and do not support Hypothesis 3. Conversely, we conclude investors exhibit 'failure aversion' if investment patterns support Hypothesis 3 and, at the same time, do not follow Hypothesis 2.

## CONTEXT AND METHODOLOGY

We test our hypotheses using an online framed-field experimental methodology (Harrison & List, 2004) in the context of equity crowdfunding. Equity crowdfunding is a major source of early-stage financing and has been the subject of studies on resource acquisition and funding decisions (Agrawal et al., 2014; Ahlers et al., 2015; Bapna, 2019; Bernstein et al., 2017; Vulkan et al., 2016). Methodologically, we adopted an experimental approach because it allows us to identify the underlying mechanism and avoid confounding effects.

### The Crowdfunding Context

Equity crowdfunding is a form of crowdfunding whereby entrepreneurial ventures seek capital from a pool of investors in exchange for equity, usually through an online platform (Ahlers et al., 2015). It is a useful context of study for several reasons. First, it is a realistic and relevant setting. A growing number of investors invest through equity platforms such as AngelList (Bernstein et al., 2017) in the US and Crowdcube (Estrin et al., 2018) and Seedrs (Vulkan et al., 2016) in the UK. In the US, the two leading equity crowdfunding platforms (AngelList and

Wefunder) have, to date, facilitated over $1 billion of investments in startups. The UK equivalents (Crowdcube and Seedrs) have facilitated over £1.14 billion in funding and are second only to VCs in total number of deals (Beauhurst, 2018). Crowdfunding activity is expected to grow as new regulations in 2020 pushed the crowdfunding annual funding cap fivefold; to $5 million in the USA and €5 million in the European Union. Notably, equity crowdfunding is relevant not only because of the quantity of deals, but also because of the quality of the ventures funded. Ventures raising initial funds through equity crowdfunding often secure later rounds from established VCs (Butticè et al., 2020); a quarter of all UK unicorns has been funded via equity crowdfunding.[8]

Second, serial entrepreneurs are common on equity crowdfunding platforms. Data from Germany's four largest equity crowdfunding platforms suggests one out of six founders is a serial entrepreneur (Blaseg et al., 2020). A survey of European platforms reports that about half (47%) of entrepreneurs have launched a venture in the past (Di Pietro et al., 2018). Third, the features of equity crowdfunding align with our theoretical arguments. Crowdfunding is often used to fund early-stage ventures. Whereas late-stage investors can assess the business track record, early-stage ventures have little business traction; investors' assessment is focused on entrepreneurs' skill and background (Hallen, 2008; Huang & Pearce, 2015; Wu, 2016). Notably, crowdfunding investors are privy to specific informational cues because they interact with the entrepreneurs via the platform's standardized template and public Q&A forum (Murray et al., 2020). In contrast, traditional early-stage investors such as business angels access fine-grained information via private, in-person interactions (Hallen & Eisenhardt, 2012). Finally, the setting lends itself

[8] www.crowdcube.com/explore/blog/crowdcube/crowdcube-funds-14-of-all-uk-unicorns

to experimental study. We can introduce experimental manipulation while maintaining the look and feel of a crowdfunding investment opportunity.

**Choice of Methodology**

We pursue an experimental approach to identify the underlying mechanism and avoid confounding effects. This decision is guided by a concern that secondary data is subject to several shortcomings. We expand on these issues below.

First, secondary data is susceptible to measurement problems. Because entrepreneurial ventures are private companies, there is little or no publicly available information about them. Where secondary data exists, it may not lend itself to systematic coding and analysis. For example, there are numerous cues for conveying entrepreneurial skill (e.g., awards, endorsements by reputable investors), and coding such diverse informational cues would be prone to errors. The measurement problems prevent us from systematically ascertaining whether past outcomes are driven by misfortune or mistake, which could bias our results.

Furthermore, secondary data requires that we make assumptions about how informational cues become available, and this raises serious endogeneity concerns. For example, high-skill entrepreneurs may truthfully reveal outcomes of previous ventures, irrespective of their success or failure, while low-skill entrepreneurs may choose not to disclose previous entrepreneurial experiences. This will result in an inherent distortion in the secondary data, giving rise to omitted variable and endogeneity problems. Crucially, the key theoretical takeaways may be obscured. To see this, note that Hypothesis 2 predicts that investors attenuate their 'failure discount' where there is a skills cue. If entrepreneurs do not understand this, they may not report previous outcomes, particularly if their previous venture failed. We would thus be unable to observe cues of past outcomes and test our hypotheses because entrepreneurs (erroneously) are 'leaving

money on the table.' An experimental approach sidesteps the endogeneity concern because we can directly manipulate informational cues.

We adopt an online framed-field experiment (Harrison & List, 2004) where respondents' decisions are based on manipulated scenarios. The use of consistent cues and randomization of the hypothesized effects alleviates the measurement and endogeneity concerns (Aral & Walker, 2014; Bapna, 2019). The random assignment of treatments allows for causal analysis because it rules out endogeneity problems and removes the need for strong assumptions about how cues become available.

## EXPERIMENTAL APPROACH

We report the results of three framed-field experiments in the context of equity crowdfunding. Studies 1 and 2 test the hypothesized effect of informational cues regarding skill. Finally, to confirm the hypothesized effects are due to information about skill, Study 3 reports the effects of informational cues regarding luck.

## STUDY 1

### Experimental Design

We design a randomized, between-subjects experiment. Respondents are randomly assigned to one of five treatments and asked to evaluate an investment opportunity as investors. Each treatment consists of controlled manipulation of (a) the previous entrepreneurial experience (first time, serial) and, if the founder is a serial entrepreneur, we further manipulate (b) the outcome of the previous venture (failure, success), in combination with (c) an informational cue about entrepreneurial skill (available, unavailable). Table 3 overviews the experiment design.

The investment opportunity in this study is based on a real project sourced from a prominent equity crowdfunding platform. The venture seeks funding of £350,000 for a total

equity stake of 20%. To assuage privacy concerns, we anonymize the names of the venture and entrepreneurs and inform respondents of this anonymization.

The funding proposal consists of three sections: the business idea, the founding team, and the investor Q&A (see Figure 1). The sections take the form of standardized reporting templates employed by equity crowdfunding platforms. The first section contains an executive summary of the business proposed and information about the business model, market, use of proceeds, and milestones. It sets out the amount sought and the total equity offered. The second section includes short resumés of the entrepreneurs with their education, alma mater, graduation year, previous employer and job title, and (for those in the entrepreneurial experience treatment) information about the previous venture they founded. The third section, a 'Q&A discussion wall,' is a common feature of crowdfunding platforms and allows public interaction. Investors request information or challenge entrepreneurs before making their investment decision. Entrepreneurs are usually responsive, engaging in a timely and candid way (Mollick, 2014). Figure 1 reports the web pages on which the experimental treatments appear.

Following recent work, the main experimental manipulations are introduced in the Q&A and resumé sections (Kanze et al., 2018). Specifically, we edit entrepreneur's past-entrepreneurial-experience responses in the Q&A section. The advantage is that third parties supply the information, and public responses to third-party questions are perceived as more reliable than self-reports (Gomulya & Mishina, 2017). As we explain below, the responses present informational cues that are both observable and credible. The cues represent (a) past outcomes that are (b) from credible third parties. We focus on cues that investors can observe and verify. The resumé section lists the names of previous ventures for the serial-entrepreneur treatments, but not for the first-time entrepreneur treatments.

Table 3 provides an overview of the five treatments in the Q&A section. Consider the past outcome manipulation. In the failure treatment, the entrepreneur selects the 'failure' radio button using a closed-form answer. Then, in the space available for an open-ended response, they can explain that the startup, for example, "ran out of business." This explanation refers not only to the termination of an entrepreneur's involvement but also to the dissolution of the business.[9] In the 'success' treatment, the entrepreneur selects the 'success' radio button, and in the open-ended part explains the past venture "was successfully sold for 11 times the invested amount." The answers reflect entrepreneurial outcomes as perceived by investors; i.e., the previous venture was either a failure or a success. The advantage of this approach is threefold. First, it reflects the power-law distribution of entrepreneurial ventures, where many ventures fail, and a few succeed (Crawford et al., 2015; Scherer et al., 2000). Second, it is consistent with an investor's perspective (Huang & Pearce, 2015; Metrick & Yasuda, 2010; Sahlman, 1990). Finally, the outcomes are observable and credible. There are public records of business failure and dissolution. Similarly, press releases and legal documents associated with a successful exit, such as an 11-fold return, are also commonly available.

The next dimension of our treatment is the additional information about entrepreneurial skill. We explored several alternatives and ultimately opted for the one with the highest validity: inclusion in Forbes' '30 Under 30' list.[10] The manipulation amounts to the inclusion of additional

[9] Following extant work, we define failure as the "cessation of the founders' involvement in combination with discontinuity of operations" (Hoetker & Agarwal, 2007; Ucbasaran et al., 2013). This definition refers not only to the end of the entrepreneur's involvement, but also to the termination of the venture. It avoids confusion when an entrepreneur departs from an ongoing venture, which can arise for various reasons: (a) the venture underperforms, (b) the venture is performing well yet the entrepreneur underperforms, or (c) irrespective of the venture's performance, the entrepreneur departs for a different opportunity.

[10] We considered the following candidate cues: "praise by a high-profile entrepreneur and investor", "admission to Techstars accelerator", and "ability to fundraise from family and friends." These were based on extant literature and conversations with early-stage investors. In Appendix *B.1* we report the result of the validation exercise.

information in the Q&A section. Specifically, the entrepreneur replies and mentions their achievements while leading the previous venture: "[I] was proud to be named as part of Forbes' prestigious '30 Under 30' list of promising entrepreneurs." The advantage of this manipulation approach is threefold. First, it is an observable and credible cue because the Forbes list is highly visible and respected. Second, it represents the positive evaluation of the entrepreneur by third parties. Thus, it is less susceptible to entrepreneurs' personal bias and more likely to be heeded by investors. Third, the award concerns the individual entrepreneur rather than the venture's ultimate outcome and is an important cue of that person's entrepreneurial skill.[11] Moreover, it reflects entrepreneurial skill rather than general human-capital indicators, such as education and employment (Bernstein et al., 2017; Chatterji, 2009).

*** INSERT FIGURE 1 AND TABLE 3 HERE ***

Finally, we undertook five steps to establish external validity. We model the experiment on an actual venture that successfully raised equity through crowdfunding. We establish the representativeness of respondents by drawing on pools used for prospective investors in previous studies: Amazon's Mechanical Turk (Brooks et al., 2014; Kanze et al., 2018) and Prolific (van Balen et al., 2019). Third, we pre-screen potential respondents for prior investment experience. Fourth, we ensure the average investment amounts are in line with actual platform data. Fifth, we

[11] We thank an anonymous reviewer for raising this point. If respondents misinterpreted the skill cue (i.e., the Forbes '30 under 30' list) as information about the business, then we would expect them to view OtherDining as successful, even in those manipulations where it was said to have failed. The manipulation check (described below) offered an opportunity to validate this point. Respondents were asked to recall the outcome of the previous venture (i.e., OtherDining). If the skill cue is misinterpreted, we should observe more respondents failing the manipulation check because they erroneously interpret the skill cue to imply business traction. Analysis of the manipulation checks from Study 1 and 2 suggest that this is not the case: a correspondence analysis of respondents between "*Accurate Reporting of Failure"* and *"Skill Cue*" conditional on failure, suggest that respondents did not misinterpret the skill cue. The chi-squared was 0.048 (p = .827) for Study 1 and 0.026 (p = .841) for Study 2. We found similar results for the perception of success. A correspondence analysis between "*Accurate Reporting of Success"* and *"Skill Cue*" conditional on success, shows no misinterpretation of the skill cue. The chi-squared was 0.374 (p = .541) for Study 1 and no respondents misinterpreted success for Study 2.

further validate respondent pools by gauging their responses to previous successful and unsuccessful crowdfunding campaigns. Our respondents mirrored the decisions of actual crowdfunding investors.[12]

**Experimental Procedure**

The survey instrument includes the crowdfunding experiment and general questions about respondents' investments and sociodemographic profiles. It also includes attention and manipulation checks. The respondents first complete the Instructional Manipulation Check (IMC; Oppenheimer et al., 2009). Next, we use manipulation checks to confirm that respondents are 'treated'; i.e., they have seen and understood the treatment. These appear immediately after the respondents record their investments decision but before the background questions. One manipulation check asks about the outcomes of previous ventures and the other about entrepreneurs' past achievements. We exclude respondents who failed these checks. We also exclude respondents who did not meet 'sanity checks': (a) completion time is outside a range of one standard deviation below or above the average, (b) reported personal details inconsistent with their platform profile (e.g., age, educational background, or investment experience).

The experiment runs as follows. Respondents are first informed about the object of the study. On the next pages they are presented with the three sections: venture idea, team, and investor discussion. To discourage searching the venture online, the anonymized pages are presented as graphics (i.e., in png format). Afterward, respondents view the survey instrument and answer a set of venture-related questions: whether they view it as an attractive opportunity,

[12] We identified two campaigns with similar attributes that were active in the same period. One campaign successfully attracted investors and reached its funding target, while the other failed to do so. A pre-study of 246 respondents shows full alignment with crowdfunding investors. Respondents found the successful campaign more attractive than the failed campaign; a mean score of 3.84 versus 3.36, respectively ($p = .00$). Similarly, they invested more money (59% more) in the successful campaign; a mean score of £383.46 versus £240.62, respectively ($p = .04$).

consider investing, and, if so, how much they would invest. Subsequent questions cover their investment and sociodemographic profiles, which are used as controls.[13]

**Variables**

***Dependent variables***. We operationalize respondents' investment decisions using three measures (Huang & Pearce, 2015). The first, *Investment Attractiveness*, captures the response for the attractiveness of the investment opportunity using a five-point Likert scale ranging from 1 ("definitely unattractive) to 5 (definitely attractive). The second variable, *Amount Invested*, reflects the investment amount reported by respondents (if any). We winsorize the data at the 95th percentile (£10,000) to mitigate the effect of outliers. Finally, we construct a third variable, *Expected Investment*, which is the product of the previous two measures.[14]

***Treatment variables***. Treatment variables are dummy variables for the experimental manipulations. The variable *Failure* equals one where the previous venture failed and zero if it succeeded. The variable *Skill* equals one if the respondent is presented with a treatment indicating entrepreneurial skill and zero otherwise. Finally, the variable *No Experience* equals one for the treatment where the entrepreneur is a first-time entrepreneur and zero otherwise.

***Control variables***. We include a vector of controls, namely *age*, *gender*, *education background*, *employment status*, and *homeownership*, which serves as a proxy for wealth.

**Estimation**

To test the hypotheses, we estimated the following equation:

[13] Respondents are asked about the attractiveness of different facets of the opportunity, as well as their financial decision-making, previous private and professional investments, and crowdfunding experience. Respondents' risk aversion is assessed using a non-incentivized version of the multiple price list elicitation method (Holt & Laury, 2002). Finally, we collect sociodemographic profiles (e.g., age, gender, education, employment status, and location, as well as home ownership (which is a proxy for wealth)).

[14] The product of *Amount Invested* and *Investment Attractiveness* is further adjusted in tranches of 20%, so that we account for 100% of the invested amount when participants answer "5" for investment attractiveness, 80% when they answer "4", and 20% when answering "1". Results are robust to alternative tranches.

$$Y_i = \alpha + \beta_N(NoExperience_i) + \beta_F(Failure_i) + \beta_{Sk}(Skill_i) + \beta_{FSk}(Failure_i * Skill_i) + \overline{\delta} I(Respondent's\ attributes)_i + \varepsilon_i$$

where $Y_i$ is the investment decision of investor $i$ (i.e., either investment attractiveness, amount, or expected investment). The baseline treatment is a serial entrepreneur whose previous venture succeeded, and a cue of entrepreneurial skill is unavailable. The constant term α captures the baseline effect. The coefficient $\beta_N$ captures the difference between investor decisions concerning ventures of first-time entrepreneurs and the baseline case of a serial entrepreneur whose previous venture was successful. The coefficient $\beta_F$ captures the difference between investor decisions for an investment where a serial entrepreneur's previous venture failed and their decision in the baseline case. The coefficient $\beta_{Sk}$ captures the difference between investor's decisions for an investment where a skill cue is available for a serial entrepreneur, in comparison to the baseline case. The coefficient $\beta_{FSk}$ captures the difference between the decision in the baseline case and decisions where the entrepreneur reports past failure and a cue of entrepreneurial skill is available. The vector of coefficients $\overline{\delta}$ captures the effect of respondents' relevant sociodemographic characteristics and is included in some models for robustness. Finally, $\varepsilon_i$ represents the set of unobservable variables for investor $i$.

To test Hypothesis 1 (*Cue of Previous Entrepreneurial Outcome*), we focus on the coefficient $\beta_F$. We test the inequality $\beta_F < 0$, which compares the 'Failure without Skill Cue' treatment ($\beta_F$) with the baseline 'Success without Skill Cue.' If the inequality holds, it implies that investors discount entrepreneurs who previously failed (even if simply due to bad luck) compared to those who succeeded.

The test of Hypothesis 2 (*Rational Inference*) is stated by the inequality $\beta_{FSk} > 0$. In the case of serial entrepreneurs, the additional cue of entrepreneurial skill can change investors'

assessments of the current venture.[15] Finally, for Hypothesis 3 (*Aversion to Failure*), we test the inequality $\beta_F + \beta_{FSk} < 0$.[16] This implies investors discount serial entrepreneurs who previously failed, even when presented with a credible cue of entrepreneurial skill.

**Respondents**

In Study 1 we run the experimental procedure with a pool of respondents recruited through Amazon's Mechanical Turk (MTurk). We used MTurk because it has been used to study the early-stage investment decisions (Brooks et al., 2014; Kanze et al., 2018). Respondents were offered monetary compensation matching the remuneration for comparable tasks. In total, we recruited 627 respondents, 6% of whom failed the IMC. Approximately 15% and 40% failed the manipulation and sanity checks, respectively. The final sample consists of 269 respondents.[17]

Appendix D replicates the experiment for the UK, which has one of the most developed equity crowdfunding sectors. During 2019 the two leading platforms, Crowdcube and Seedrs, facilitated 424 investment rounds totaling over £224 million in funding to startups. The UK-based respondents were recruited through a well-accepted experiment platform Prolific (Peer et al., 2017). The responses suggest an average investment amount of £1,304, which falls in line with

[15] As stated in Hypothesis 2 (note 7), we test an inequality comparing the marginal effect of having a skill cue for those who previously failed (left-hand side) versus those who previously succeeded (right-hand side); [(*Failure* & *Skill Cue*) – (*Failure*)] > [(*Success* & *Skill Cue*) – (*Success*)]. Given the regression specification, the left-hand term is captured by [(*Failure* & *Skill Cue*) – (*Failure*)] = ($\beta_F$ + $\beta_{Sk}$ + $\beta_{FSk}$) - ($\beta_F$). Because previous success is the baseline, the right-hand term amounts to [(*Success* & *Skill Cue*) – (*Success*)] = $\beta_{Sk}$. The latter term cancels, leaving us with the inequality; $\beta_{FSk} > 0$.

[16] Specifically, we compare the two treatments: [(*Failure* & *Skill Cue*)] < [(*Success* & *Skill Cue*)]. Given the regression specification, the term on the left-hand side is captured by the following: [(*Failure* & *Skill Cue*)] = $\beta_F + \beta_{Sk} + \beta_{FSk}$. Because previous success is the baseline, the right-hand term is [(*Success* & *Skill Cue*)] = $\beta_{Sk}$. The latter term cancels, leaving us with the inequality; $\beta_F + \beta_{FSk} < 0$.

[17] We compare the excluded respondents to those included in the analysis. The two groups share the following key attributes: age, education, and risk profile. The excluded group has slightly fewer male respondents (60% versus 66%, p-value < .05) and homeowners (40% versus 47%, p-value < .05). Finally, we run the analysis using the full set of respondents (i.e., included and excluded) and the results are robust to those specifications.

existing work (Di Pietro et al., 2018; Vulkan et al., 2016) and information reported by the UK crowdfunding platforms.

**Descriptive Statistics**

Table 4 reports descriptive statistics for Study 1. The first two rows describe the dependent variables. On average, the respondents view the investment opportunity as moderately attractive (scoring 3.8 out of 5). The average investment of £626 is in line with that on Wefunder, a leading crowdfunding platform with an average investment amount of £661 in 2018, and is slightly lower than that reported in Bapna (2019). Respondents have an average age of 37 years old, and 74% have a college education. The average risk profile of MTurk respondents is 1.4 out of 5, and approximately half (48%) own their homes. The proportion of respondents who are female is 43%.[18] Table 5 presents respondent characteristics per condition.

**Main Results**

Table 6 presents the results for Study 1. All specifications are OLS regressions with robust standard errors. The models estimate investor decisions: *Investment Attractiveness* (Model 6.1), *Investment Amount* (Model 6.2), and *Expected Investment* (Model 6.3), and these are each repeated in Models 6.4 to 6.6 while controlling for respondents' attributes.

*** INSERT TABLES 4, 5 & 6 AND FIGURE 2 HERE ***

Before turning to the results concerning the formal hypotheses, we consider investors' assessments of first-time versus serial entrepreneurs. Given the baseline, the coefficient $\beta_N$ captures the difference between having no previous entrepreneurial experience and having a previously successful venture. The coefficient is negative, and is not statistically different from

[18] Female investors account for 27% of investors on CrowdCube, 21% on Seedrs, and 20% on Fundedbyme (Mohammadi & Shafi, 2018; Vismara, Benaroio & Carne, 2017).

zero across all models (p = .20, p = .25 and p = .21, in Models 6.1, 6.2, and 6.3, respectively). We now turn to whether investors' decisions are sensitive to cues about past outcomes and skills.

For Hypothesis 1 we test the inequality $\beta_F < 0$. In Model 6.1, the coefficient is negative and statistically significant (one-tailed test, p < .05). This represents a drop in investment attractiveness of about 0.35, or approximately 9% less than in the case of the baseline treatment. In Model 6.2, the coefficient is negative and statistically significant (one-tailed test, p = .05). Investors discount serial entrepreneurs who previously failed (compared to those who succeeded) by £460, which constitutes 61% of the baseline. In Model 6.3, the coefficient is negative, statistically significant (one-tailed test, p < 0.05), and of notable magnitude (a discount of £376, or 61% of the baseline). These results support Hypothesis 1.

Next, we test Hypothesis 2, which is captured by the inequality $\beta_{FSk} > 0$. In Model 6.1, the coefficient is positive as hypothesized, but it is not statistically significant (one-tailed test, p = .23). Investors' assessments of a venture's attractiveness do not rise in the presence of a skill cue. Analysis of the investment amount (Model 6.2) shows a positive and significant coefficient (one-tailed test, p < .05). The impact on investment amount is noteworthy: the skill cue is associated with an increase of £828, which overturns the negative main effect of the previous-outcome cue. Similarly, the coefficient in Model 6.3 is positive and significant (one-tailed test, p < .05) and represents a substantial increase of £702. The results lend partial support to Hypothesis 2.

In Figure 2, we set out the hypothesized interaction between the two cues. Panel A is informed by Model 6.1. In this panel, we see that investment attractiveness decreases when investors face a serial entrepreneur who previously failed rather than succeeded. The effect is attenuated in the presence of a skill cue, as reflected in the comparison of the dashed blue line (skill cue not available) with the solid red one (skill cue available). Panel B reveals the nuanced

impact of skill cues on the investment amount (Model 6.2). The gap between the solid red and the dashed blue lines is the marginal benefit of additional information about skills and is higher for serial entrepreneurs who previously failed than those who previously succeeded. Panel C offers similar insights regarding the expected investment amount (Model 6.3).[19]

We shift perspective from rational inference to failure aversion. The first two hypotheses test for consistency with a view of investors as making rational inferences. We now test the alternative view delineated in Hypothesis 3, where the investor is failure averse. We ask whether such investors discount serial entrepreneurs who previously failed, even in the presence of a skill cue. The test is captured by $\beta_F + \beta_{FSk} < 0$. The hypothesis is not supported. In Model 6.1, the sum of the coefficients is negative, as hypothesized, but it is not statistically significant (one-tailed test, p = .16). In Models 6.2 and 6.3, the sum of the coefficients is positive, contrary to the hypothesis, and insignificant (one-tailed tests, p = .78 and p = .79, respectively). There is no support for the view of failure aversion depicted in Hypothesis 3.

Finally, in Models 6.4–6.6, we repeat the analyses while controlling for the respondent characteristics of age, education, gender, homeownership, and risk propensity. The coefficients retain the sign and statistical significance seen in the earlier models. Hypothesis 1 is fully supported, Hypothesis 2 is supported for *Investment Amount* and *Expected Amount*, and Hypothesis 3 is not supported. The magnitude of the effects is at least as strong as in the models without controls.

**Robustness Tests**

We run a set of robustness tests, and these are reported in the Appendices. In Appendix C, we address alternative explanations. One concern we have is that our results are driven by compassion

[19] Results are robust to testing the outcome-skill interaction using a two-way analysis of variance (ANOVA).

for failed founders. We address this using charity donation as a proxy for compassion. We also control for educational and employment experience to address the concern that homophily drives investors' decisions. The results are robust to these specifications. Finally, we replicate the findings using UK-based respondents recruited via the Prolific survey platform used in recent work (Peer et al., 2017). The results are contained in Appendix D.

**Discussion**

Study 1 lends support to the view that investors rationally infer skill using all available information (Hypothesis 2) while rejecting the alternative view that investors are irrationally averse to failure (Hypothesis 3). Taken together, the results of this study substantiate our predictions that a credible skill cue can reshape investors' assessments of serial entrepreneurs.

We conduct two additional studies to further investigate our conceptual framework. These address two questions regarding the information presented to investors. In Study 2, we look at the baseline information to which the additional cue is benchmarked. In Study 3, we examine the nature of the additional cue.

## STUDY 2

We introduce a 'non-skill' cue as the baseline manipulation. Recall, in Study 1, we report that the presence of a skill cue is associated with greater investment. It could be the case that the findings confound two different explanations. The results could be driven by the provision of a credible skill cue, as we hypothesize (here the 'info-about-skill' explanation) or may simply reflect a preference for additional information about the entrepreneur, regardless of their skill (here, the 'info-about-the-entrepreneur' explanation). We seek to discern between these explanations in Study 2.

The design of Study 2 tackles this issue. It follows a design similar to Study 1 and uses the 'Forbes 30 Under 30' list as a credible cue of entrepreneurial skill. The two studies differ in the

baseline to which they benchmark the skill cue. Whereas Study 1 benchmarks a no-information baseline scenario, Study 2 benchmarks a scenario with a non-skill cue.[20] It compares the effect of the skill cue to the effect of additional, non-skill-related information about the entrepreneur. This design aids in addressing the 'info-about-the-entrepreneur' explanation and hence offers further support to the hypothesized 'info-about-skills' explanation.

**Experimental Design and Procedure**

Our experimental design and procedure here follow Study 1, with two notable differences. First, in line with our hypotheses, in Study 2, we focus on serial entrepreneurs and thus no longer include the fifth manipulation concerning first-time entrepreneurs. It follows a 2x2 randomized, between-subjects design. A treatment consists of controlled manipulation of (a) the outcome of the previous venture (failure, success) and (b) the additional informational cue (skill cue, non-skill cue). It is the latter manipulation that constitutes the second difference from the prior study. In Study 1, our additional information manipulation consisted of whether the skill cue is available or unavailable. In Study 2, the manipulation concerns whether the available cue is skill or non-skill related.

We design a non-skill cue that meets the following criteria: (a) it is commonly used information about the entrepreneur, (b) that does not constitute a credible signal of skill, and (c) uses a similar structure and amount of information as the skill cue does. We draw on past work to identify cues that meet criteria (a) and (b). Existing studies suggest that entrepreneurs often self-proclaim their achievements, energy, and commitment to the business. Such self-proclaimed passion is common among entrepreneurs but does not constitute a credible signal of skill (Cardon

[20] In Study 2 we changed the baseline such that it includes additional information about the entrepreneur, but not about their skill. The baseline changes from [(*past outcome*)] to [(*past outcome*),(*non-skill cue*)]. The difference between Study 1 and 2 can be summarized as follows: Study 1: benchmarking [(*past outcome*),(*skill cue*)] to [(*past outcome*),(no info)]. Study 2: benchmarking [(*past outcome*),(*skill cue*)] to [(*past outcome*),(*non-skill cue*)]. Because all scenarios in Study 2 include a cue about the entrepreneur, it controls for the 'info-about-the-entrepreneur' explanation and better tests for the 'info-about-skills' explanation.

et al., 2017; Chen et al., 2009; Li et al., 2017).[21] For criteria (c), we craft the non-skill cue such that the text length and grammatical structure are comparable to that of the skill cue (Mell et al., 2014). The non-skill cue is 44 words, and the skill cue 47 words long. The non-skill cue consists of the founder stating: "I was fully committed to *OtherDining development in the digital dining out business. I have always been passionate about digital platforms and curious about the startups' world since my university days. I was very excited about the opportunity I have had of leading OtherDining."*

***Descriptive Results.*** Respondents recruited on the Prolific experiment platform were pre-screened for employment and investment experience (van Balen et al., 2019). We excluded 29.2% and 20.6% of respondents who failed sanity and manipulation checks and retained 140 respondents.[22] Table 7 reports descriptive statistics, and these are in line with Study 1. The first two rows describe the dependent variables. The respondents view the investment opportunity as moderately attractive (4.91 out of 7) and invest an average of £1,421. Respondents are, on average, 43 years old, 76% have at least a college degree, and their risk profile is conservative (a score of 1.27 out of 5). Approximately 65% of respondents are homeowners. The proportion of female respondents is 44%, which is somewhat higher than in equity crowdfunding generally. Table 8 presents respondent characteristics per condition.

**Main Analysis**

We report the results of Study 2 in Table 9. All specifications are OLS regressions with robust standard errors. We begin with investors' assessments of *Investment Attractiveness* (Model 9.1),

[21] While passion does not convey skill or preparedness, investors may favor founders who exhibit passion, in addition to skill (Cardon et al., 2017; Chen et al., 2009). Hence, our tests offer a conservative estimate of the skill cue.

[22] We compare the excluded respondents to those included in the analysis. The two groups share the following key attributes: education, home ownership, and risk profile. The respondents in the excluded group had fewer males (45% versus 56%, p-value < .01) and were slightly younger (39 versus 42 years old, p-value < .01). Finally, we ran the analysis using the full set of respondents (i.e., included and excluded) and the results are robust.

*Investment Amount* (Model 9.2), and the product of the two, *Expected Investment* (Model 9.3). Models 9.4–9.6 repeat Models 9.1–9.3 while controlling for respondent attributes.

*** INSERT TABLES 7, 8, & 9 AND FIGURE 3 HERE ***

For Hypothesis 1 we test the inequality $\beta_F < 0$. In terms of investment attractiveness (Model 9.1), the sign of the coefficient is negative, as hypothesized. We test the inequality further and find the hypothesized effect is statistically significant (one-tailed test, p =.001). The magnitude of the effect is notable; attractiveness drops by approximately 0.90 out of 7 points, approximately 17% of the baseline treatment. Our findings are similar concerning the investment amount (Model 9.2); the coefficient is negative and statistically significant (one-tailed test, p =.036). The magnitude of the effect on investment amount is substantial. Investors discount serial entrepreneurs who previously failed compared to those who succeeded by £1,364.50 (i.e., 63% of the baseline). Our findings concerning the expected investment yields (Model 9.3) are similar; the coefficient is negative and significant (one-tailed test, p =.028), and the effect is notable (a discount of £1,210 or 66% of the baseline). Consistent with previous studies, the results support our Hypothesis 1.

Next, we test Hypothesis 2 using a non-skill cue as a baseline. In Model 7.1, the coefficient $\beta_{FSk}$ is positive, as hypothesized, and statistically significant (one-tailed test, p =.037). The impact on investment attractiveness is 0.785 out of 7 points, 14.5% of the baseline treatment. That is, investors presented with a credible cue of entrepreneurial skill assess the venture more favorably than those faced with a visible but not credible cue. Analysis of the investment amount (Model 9.2) yields consistent results. The coefficient is positive and significant (one-tailed test, p =.040), and the impact on the investment amount is substantial; a skill cue is associated with an increase of £1,760.60 or 81% of the baseline. We find a similar result for the expected investment (Model

9.3). The coefficient is positive and significant (one-tailed test, p =.038) and reveals an increase of £1,467.50 or 80% of the baseline treatment. The results lend support to Hypothesis 2.

In Figure 3, we highlight the value of a skill cue that is not only visible but also credible. In Panel A, the dashed blue line captures investor assessments of investment attractiveness with a non-skill cue. The additional information (which is visible yet not credible) has little impact beyond information about past outcomes. That is, a serial entrepreneur who previously failed is deeply discounted compared to one who previously succeeded. In contrast, the solid red line (which plots investors' assessments with a credible skill cue) tells a different story. The red line has a gentle slope indicating that, with a credible skill cue, investments are similarly attractive, irrespective of past outcomes. These patterns are consistent with investors making rational inferences by incorporating all additional credible information, as delineated in Hypothesis 2. Panels B and C reveal a similar pattern for the impact of a skill cue on investment amount (Model 7.2) and expected amount (Model 9.3), respectively.

Finally, we tested the alternative, that the investor is failure averse, as reflected in Hypothesis 3. The test is captured by $\beta_F + \beta_{FSk} < 0$. Analysis of investment attractiveness (Model 9.1) reveals the sum of the coefficients is negative, and the inequality is statistically insignificant (one-tailed test, p =.35). As for investment amount and expected investment (Models 9.2 and 9.3, respectively), we observe the sum of the coefficients is positive and with no statistical support (one-tailed tests, p = .73 and p = .69, respectively). These results do not support Hypothesis 3.

Finally, Models 9.4–9.6 replicate Models 9.1–9.3, controlling for respondents' characteristics. The sign and significance are fully in line with earlier analyses. Moreover, the magnitude of the hypothesized effects remains unchanged.

**Discussion**

There is strong support for Hypothesis 1 and 2 across different measures and regression specifications. There is no support for Hypothesis 3. Taken together, these findings indicate that investors make inferences based on credible cues of entrepreneurial skill rather than merely on additional (non-credible) information about the entrepreneur.

**STUDY 3**

Study 3 explores the impact of an informational cue about luck instead of a cue about skill. Our hypotheses focus specifically on the impact of additional information about entrepreneurial skills, as delineated in the observational framework (Panel B or Table 1) and tested in Studies 1 and 2 above. For completeness, in Study 3, we explore the impact of an additional informational cue that directly pertains to the luck experienced by the entrepreneur.

Before we turn to the analysis, we note that the impact of a luck cue does not mirror that of a skill cue. In Appendix A, we offer a detailed explanation by deriving an observational framework that mimics Panel B in a world where investors *sometimes* observe a luck cue (rather than a skill cue). The takeaway is that a luck cue is inherently less diagnostic than a skill cue. The reasoning is as follows. Among those who report a credible skill cue, the level of skill is, by definition, substantial. That is not necessarily the case, however, among those who experienced bad luck. Many skilled entrepreneurs may fail due to misfortune, but there could also be entrepreneurs with little or no skill who would have failed anyway. Hence, investors cannot infer skill even in the presence of a credible luck cue. It follows that, contrary to our predictions for a skill cue, the investment decision would not be sensitive to a luck cue.

**Experimental Design and Procedure**

The experimental design and procedure in Study 3 follow a 2x2 randomized, between-subjects design. We replace the additional skill cue with a luck cue. Study 3 consists of controlled

manipulation of (a) the outcome of the previous venture and (b) the additional luck cue. As before, we introduce the manipulations in the Q&A and resumé sections. Past-outcome manipulations remain unchanged, as does the baseline scenario, which consists of an additional cue that does not pertain to skill.

***Luck Cue.*** We explore a luck cue that meets the following criteria: (a) a visible and credible signal of an unexpected external event that impacts the business activity; (b) is beyond the founder's control; (c) follows commonly used information about such external events; and (d) has a similar structure and amount of information as the non-skill cue. We designate three possible luck-cue events: the Brexit referendum, the global Dyn cyberattack, and an E. coli outbreak.

Based on the results of a validation test, we use the 2016 E. coli outbreak (*E Coli*) as a proxy for luck.[23] Our luck cue refers to an E coli outbreak (*E Coli*) which took place in 2016. During that year, the UK experienced an outbreak of E. coli O157 infection, with symptoms varying from the mild to the severe. From this event, we design cues for favorable and less-favorable luck. The luck cues are in the form of a statement that the infection spread through restaurants (supermarkets) and resulted in a sudden and unexpected negative (positive) impact on the past venture's operations.

**Descriptive Results**

The respondents were recruited via Prolific, and following prior studies, we screen for employment and investment experience (van Balen et al., 2019). We exclude those who failed the sanity and manipulation checks, resulting in a sample of 130 respondents.[24]

[23] The cues were developed in 2019, well before COVID-19 was declared a pandemic by WHO (March 2020). Appendix *B.2.* reports the validation tests.

[24] We compare the excluded and included respondents. The two groups are similar on the following key attributes: gender, home ownership, and risk profile. The excluded group was slightly younger (39 versus 42 years old, p-value < .001) and consisted of fewer college-degree holders (65% versus 80%, p-value < .01). We ran the analysis using the full set of respondents (i.e., included and excluded) and the results remain robust.

We report our descriptive statistics in Table 10. The respondents view the opportunity as moderately attractive (5 out of 7 points) and invest an average of £1,415. Respondents are, on average, 44 years old, 81% have at least a college degree, 71% are homeowners, and with a conservative risk profile (1.43 out of 5 points). Female respondents account for 51%, which is somewhat higher than the rate on equity crowdfunding platforms generally. The statistics are in line with Studies 1 and 2.

*** INSERT TABLES 10 & 11, FIGURE 3 HERE ***

**Main Analysis**

In Table 11, we report the results for Study 3. Because we predict the effect of a skill cue rather than a luck cue in our hypotheses, the table does not report formal tests of these. The coefficient on *Failure* is negative and statistically significant across all models. Consistent with Studies 1 and 2, investors discount entrepreneurs who previously failed where no additional information is available. The coefficient on *Luck Cue* is statistically insignificant across the six models. We observe similar results for the interaction effect: the coefficient on *Failure* * *Luck Cue* is statistically insignificant across the models. In sum, we find that investment patterns are not sensitive to the availability of a credible luck cue.

In Figure 4, Panels A, B, and C are informed by Models 11.1, 11.2, and 11.3, respectively. These illustrate our finding that the luck cue does not have a (statistically) significant effect on investor assessment of investment attractiveness or the investment amount and expected investment. The figure illustrates that a luck cue is less informative than a skill clue about entrepreneurial skills.

**Discussion**

For purposes of completeness, in Study 3, we analyze the impact of a credible luck cue. Across the three dependent variables, we find that investment patterns are not sensitive to the cue. As

detailed in Appendix A, this is because even in the presence of a credible luck cue, uncertainty remains about the entrepreneur's skill.

## DISCUSSION AND CONCLUSION

In this study, we investigate the assessment by investors of serial entrepreneurs. Failure is the most common outcome of entrepreneurial ventures (Crawford et al., 2015; Kerr & Nanda, 2009; Scherer et al., 2000). However, we know little about how critical resource providers (such as crowdfunding investors) judge entrepreneurs' past experiences. If investors believe failure is always due to a lack of skill, this may block skilled yet once-unlucky entrepreneurs from further entrepreneurship. Accordingly, we study investors' perceptions of failure and its root causes; skill and luck. We conduct three experimental studies in the setting of equity crowdfunding to advance our understanding. Our findings suggest that investors are not failure averse. Rather, they utilize all credible informational cues to make inferences about entrepreneurial skills and hence the merits of future investments.

Our study contributes to the literature in four ways. First, we shed light on investors' assessments of past business failures. Among those who pursue entrepreneurship, many have launched a venture that subsequently failed. We explore the implications of serial entrepreneurs who previously failed (rather than succeeded) to the resource-acquisition literature. Whereas the literature assumes failure is the inverse of success (Eisenhardt & Schoonhoven, 1990; Hochberg et al., 2014), we advance the notion that past failure conveys an ambiguous signal of skill (see also Pfarrer et al., 2010). We provide empirical support for our theoretical contribution. To the best of our knowledge, ours is among the first studies to test whether investors exhibit 'failure aversion.' Our experimental study discerns failure aversion according to our conceptual framework and the possibility of a credible signal of entrepreneurial skill. We distinguish between the root causes of failure as a lack of skill or a lack of luck.

Second, our insights align with, and contribute to, the experimental capitalism literature (Kerr et al., 2014; Klepper, 2015). A core insight of this literature is that failure need not imply low skill. In fact, at the macro level, the process of creative destruction unfolds if and only if there are skilled entrepreneurs who continuously experiment with different ventures. Many of the 'experiments' will fail through no fault of the entrepreneur. To sustain an experimental dynamic, skilled entrepreneurs must not stop experimenting. The institutional and micro-level factors supporting such dynamics are the focus of experimental capitalism studies (Eberhart et al., 2017). A strong aversion to failure can impede innovative dynamics and decrease the benefit of entrepreneurial experience on an individual and social level (Kerr et al., 2014; Landier 2005).[25] In other words, the ability of entrepreneurs to continuously experiment is contingent on whether they are discounted when they fundraise for a new venture. We contribute to this literature by documenting that investors are not averse to failed entrepreneurs and, in so doing, shed light on an important micro-level mechanism that underlies experimental capitalism.

Third, our work joins a broader effort to incorporate luck into the management literature (Denrell & Liu, 2012; Frank, 2016; Liu & De Rond, 2016). Luck drives the asymmetry seen in assessing past outcomes. By recognizing misfortune (i.e., bad luck) in our conceptual framework, we show past entrepreneurial failure need not imply a lack of entrepreneurial skill. We focus on the impact of additional information about skill, primarily because credible luck cues are less common. The COVID-19 pandemic changed this and constitutes a cue of bad luck that is indeed credible (i.e., an external event with adverse business effects beyond an entrepreneur's control). We expect there will be growing academic interest in the impact of luck cues. Fortunately, our

[25] The indirect costs of failure aversion are highlighted by Kerr et al., (2014: 29): "Even if direct costs are small, significant indirect costs like a stigma of failure (Landier, 2005) may still prevent entrepreneurs from pursuing otherwise valuable tests if they only have a 10 percent chance to succeed."

work offers relevant insights on the topic. According to our theoretical framework (Table 1, Panel C) and empirical findings (Study 3), an informational cue of bad luck, even when credible, is not enough to dissipate the noise associated with past failure. Among those who experienced misfortune are low-skill entrepreneurs who would have failed anyway. Indeed, this insight shapes how investors and entrepreneurs view the COVID-19 fallout. CB Insight, a major source of startup information, notes that:

> The first half of 2020 has been defined by the Covid-19 pandemic, which saw the downfall of many iconic retailers as well as a range of startups that faltered amid a global lockdown […] The pandemic hasn't only been to blame for the ends of these startups, however. Some of these failed companies were facing problems far before the crisis, from over-promised software to stiff competition to shady business practices.[26]

That is, among those who were impacted by Covid-19, there are many individuals of limited entrepreneurial skill who were destined to fail. This suggests that failed entrepreneurs may point to the pandemic as the root cause of their failure, even when that is not necessarily the case. Our study speaks to this point directly: we present well-articulated conceptual and observational frameworks that explain why a luck cue is not as informative as a skill cue.

Fourth, we add to the crowdfunding literature (Dushnitsky & Zunino, 2019). Recent evidence indicates that equity crowdfunding is attractive to serial entrepreneurs (Di Pietro et al., 2018; Blaseg et al., 2020). Our findings complement other studies assessing the 'wisdom' of the crowd in different crowdfunding settings (Iyer et al., 2015; Mollick & Nanda, 2015) and further highlight the appeal to serial entrepreneurs.

Our study has boundary conditions that open opportunities for future work. First, we focus on investors' assessments of entrepreneurs' past experiences. We know entrepreneur-specific cues

[26] see "2020 SECOND UPDATE (8/18/20)" at https://www.cbinsights.com/research/startup-failure-post-mortem/

are important during the earliest stages (Huang & Pearce, 2015). However, the effectiveness of these clues diminishes as the venture matures and there are clearer performance cues (Hallen, 2008). Future work can explore whether the interplay between previous-outcome cues and skill decays as the venture matures. Second, our study explores investor reactions to entrepreneurs who previously failed. Future work could go beyond failure and study other sources of negative sentiment that may affect evaluations. For example, investors may respond negatively to founders from certain groups based on, for example, gender or race when evaluating their ventures (Kanze et al., 2018; Thébaud, 2015). Future research can explore whether credible skill cues dissipate the negative effect.

Third, our context is equity crowdfunding. Many early-stage entrepreneurs acquire resources through crowdfunding, and almost one in five successful unicorns in the UK utilized equity crowdfunding (Beauhurst, 2018). Further research can explore generalizability to other investors (e.g., VCs). Fourth, we focus on two facets relevant to serial entrepreneurs: past outcomes and skill cues. Scholar can study other facets, such as venture longevity (Parker, 2013) or the number of entrepreneurial attempts (Fontana et al., 2016). Finally, we adopt a binary view of skill: individuals possess skills either above or below a threshold level. We carefully document the use of "Forbes 30 under 30" as a skill proxy. We are mindful that in the entrepreneurship domain, there are other common sources of third-party certification such as an Ivy-league MBA or high-status employer like Google (Bernstein et al., 2017). Future research could explore nuances in skill-cue credibility; moderate skill cues may not be sufficiently credible to undo the effect of past failure. Scholars can also revisit the role of learning and luck in shaping entrepreneurial skills (Eggers & Song, 2015).

Our results have implications for entrepreneurs and platform owners. At the seed stage, entrepreneurs may be reluctant to disclose past failings. We show that disclosure of failure is not detrimental in the presence of an adequate cue of skill. We note that crowdfunding platforms face an opportunity to increase transaction volumes by including serial entrepreneurs and introducing mechanisms for reporting credible skill cues.

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## Table 1. The Interplay Between Entrepreneurial Skill and Past Outcomes

| *Panel A – Conceptual Framework* | | | *Panel B – Observational Framework* | | |
|---|---|---|---|---|---|
| What Are the Theoretical Drivers of Success and Failure? | | | What Do Prospective Investors Observe? | | |
| **Skill** / **Luck** | **Low Skill** | **High Skill** | **High Skill Cue** / **OUTCOME Cue** | **Not Available** | **Available** |
| **Bad Luck** | [A1] FAILURE | [A2] FAILURE | **PAST SUCCESS** | [B1] High Skill | [B2] High Skill |
| **Good Luck** | [A3] FAILURE | [A4] SUCCESS | **PAST FAILURE** | [B3] Low or High Skill | [B4] High Skill |

*Panel C: Inferring from Observational Framework in Light of Conceptual Framework*

| **Investors observe about *past* startup** | **Observational** (Panel B cell) | **Conceptual** (Arise due to Panel A cell) | **Rational Inferences about skill** | **Likely investment in *future* startup** |
|---|---|---|---|---|
| • Success<br>• Skill cue unavailable | [B1] | [A4] | High skill | Invest in new startup |
| • Success<br>• Skill cue available | [B2] | [A4] | High skill | Invest in new startup |
| • Failure<br>• Skill cue unavailable | [B3] | [A1], [A2] or [A3] | Low or High skill | Unlikely to invest in new startup |
| • Failure<br>• Skill cue available | [B4] | [A2] | High skill | Invest in new startup |

## Table 2. The Alternative Views on Failure Evaluation

| **Investor 'type'** | **'Rational Inference'** | **'Failure Aversion'** |
|---|---|---|
| **Focus** | Guided by all available credible cues | Guided by information about past outcome |
| **Inference about skill** | Pr(high skill)<br>= *fn*(past outcome, skill cue)<br>• Rationally making inferences derived from the conceptual framework (Table 1, Panel A): **Yes**. | Pr(high skill)<br>= *fn*(past outcome)<br>• Rationally making inferences derived from the conceptual framework (Table 1, Panel A): **No**.<br>• Investors exhibit failure aversion. They ignore credible cues of high skill in the case of a previous failure. |
| **Investment decisions** | Investment decisions guided by all available credible cues<br>Pr(Investment) = Pr(skill = high)<br>= *fn*(past outcome, skill cue) | Investment decisions guided solely by past outcome<br>Pr(Investment) = Pr(skill = high)<br>= *fn*(past outcome) |
| **Test predicted by Hypothesis** | Hypothesis 2 | Hypothesis 3 |

**Table 3. Treatment Overview: The Hypothesized Informational Cues in the Investor Discussion Section**

| **Manipulation** | Cue regarding Entrepreneurial Skill: ***Not Available*** | Cue regarding Entrepreneurial Skill: ***Available*** |
|---|---|---|
| Cue regarding Past Outcome: ***Success*** | *Q1 How do you plan to expand your employee base?*<br><br>*Q2: What happened to your previous startup?*<br>○ Failure<br>• Success<br><br>Thanks for your question. I worked hard to launch and grow OtherDining. Ultimately, the startup was successfully sold for 11 times the amount invested in it. On a personal note, I have learned a lot from my experience with OtherDining.<br><br>*Q3. How will you react if other players start copying your business model?*<br><br>*Q4. Will you develop an Android-compatible version?* | *Q1 How do you plan to expand your employee base?*<br><br>*Q2: What happened to your previous startup?*<br>○ Failure<br>• Success<br><br>Thanks for your question. I worked hard to launch and grow OtherDining. Ultimately, the startup was successfully sold for 11 times the amount invested in it. On a personal note, I have learned a lot from my experience with OtherDining and was proud to be named as part of Forbes' prestigious '30 Under 30' list of promising European entrepreneurs thanks to it.<br><br>*Q3. How will you react if other players start copying your business model?*<br><br>*Q4: Will you develop an Android-compatible version?* |
| Cue regarding Past Outcome: ***Failure*** | *Q1 How do you plan to expand your employee base?*<br><br>*Q2: What happened to your previous startup?*<br>• Failure<br>○ Success<br><br>Thanks for your question. I worked hard to launch and grow OtherDining. Ultimately, the startup ran out of business. On a personal note, I have learned a lot from my experience with OtherDining.<br><br>*Q3. How will you react if other players start copying your business model?*<br><br>*Q4: Will you develop an Android-compatible version?* | *Q1 How do you plan to expand your employee base?*<br><br>*Q2: What happened to your previous startup?*<br>• Failure<br>○ Success<br><br>Thanks for your question. I worked hard to launch and grow OtherDining. Ultimately, the startup ran out of business. On a personal note, I have learned a lot from my experience with OtherDining and was proud to be named as part of Forbes' prestigious '30 Under 30' list of promising European entrepreneurs thanks to it.<br><br>*Q3. How will you react if other players start copying your business model?*<br><br>*Q4: Will you develop an Android-compatible version?* |
| Cue regarding Past Outcome: ***No Experience*** | *Q1 How do you plan to expand your employee base?*<br><br>*Q2: How will you react if other players start copying your business model?*<br><br>*Q3. Will you develop an Android-compatible version?* | |

**Table 4. Descriptive Statistics of Study 1**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Investment Attractiveness | 269 | 3.77 | 0.95 | 1 | 5 |
| Amount Invested | 269 | 625.96 | 1,393.88 | 0 | 5,000 |
| Expected Amount | 269 | 526.78 | 1,194.97 | 0 | 5,000 |
| Age | 269 | 36.52 | 10.21 | 20 | 71 |
| College Education or Higher | 268 | 0.74 | 0.44 | 0 | 1 |
| Risk Propensity | 269 | 1.38 | 1.36 | 0 | 5 |
| Owns Home | 267 | 0.48 | 0.50 | 0 | 1 |
| Male | 268 | 0.67 | 0.47 | 0 | 1 |

**Table 5. Descriptive Statistics of Study 1 by Condition**

| Respondents | Success No Cue | Failure No Cue | Success Skill Cue | Failure Skill Cue |
|---|---|---|---|---|
| Age | 36.935 | 37.327 | 35.117 | 37.375 |
| College education | 0.758 | 0.727 | 0.729 | 0.750 |
| Risk Propensity | 2.468 | 2.091 | 2.217 | 2.643 |
| Owns Home | 0.500 | 0.444 | 0.467 | 0.589 |
| Male | 0.650 | 0.655 | 0.683 | 0.709 |
| N | 62 | 55 | 60 | 56 |

*Note:* F-tests show no significant differences across conditions for age, college education, risk propensity, owns home, and male.

**Table 6. Experimental Results of Study 1**

| | (6.1) | (6.2) | (6.3) | (6.4) | (6.5) | (6.6) |
|---|---|---|---|---|---|---|
| | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* |
| Failure | −0.342* | −459.5* | −376.0* | −0.324* | −418.2* | −344.7* |
| | (0.184) | (220.5) | (177.2) | (0.192) | (215.2) | (173.7) |
| Skill cue | −0.004 | −201.1 | −146.3 | 0.002 | −185.1 | −135.3 |
| | (0.156) | (264.6) | (222.8) | (0.157) | (263.0) | (222.6) |
| Failure * Skill cue | 0.173 | 828.6* | 702.1* | 0.186 | 764.6* | 655.7* |
| | (0.250) | (367.8) | (314.2) | (0.254) | (372.5) | (321.0) |
| No Experience | −0.054 | −200.1 | −126.5 | −0.088 | −275.1 | −184.9 |
| | (0.197) | (281.3) | (240.0) | (0.197) | (279.8) | (239.0) |
| Constant | 3.887*** | 756.5*** | 615.8*** | 4.432*** | 540.0 | 471.9 |
| | (0.106) | (195.4) | (157.3) | (0.311) | (394.4) | (340.8) |
| Respondent's attributes | No | No | No | Yes | Yes | Yes |
| $R^2$ | 0.019 | 0.024 | 0.024 | 0.066 | 0.049 | 0.046 |
| *N* | 269 | 269 | 269 | 265 | 265 | 265 |
| *Test of Hypothesis 1:* $\beta_F < 0$ | 0.033* | 0.019* | 0.018* | 0.047* | 0.027* | 0.024* |
| *Test of Hypothesis 2:* $\beta_{FSK} > 0$ | 0.230 | 0.013* | 0.013* | 0.233 | 0.021* | 0.021* |
| *Test of Hypothesis 3:* $\beta_F + \beta_{FSK} < 0$ | 0.159 | 0.789 | 0.790 | 0.197 | 0.748 | 0.756 |

***Notes*** Robust standard errors in parentheses. Respondent's Attributes are Age, College education or higher, Risk Propensity, Owns home, and Male. We report significance levels for one-tailed tests for hypothesized effects. Significance levels: + p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

## Table 7. Descriptive Statistics of Study 2

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Investment Attractiveness | 140 | 4.91 | 1.32 | 1 | 7 |
| Amount Invested | 140 | 1,421.11 | 2,977.73 | 0 | 10,000 |
| Expected Amount | 140 | 1,156.74 | 2,452.74 | 0 | 10,000 |
| Age | 136 | 43.21 | 12.54 | 22 | 78 |
| College Education or Higher | 140 | 0.76 | 0.43 | 0 | 1 |
| Risk Propensity | 140 | 1.27 | 1.34 | 0 | 5 |
| Owns Home | 140 | 0.65 | 0.48 | 0 | 1 |
| London | 140 | 0.05 | 0.22 | 0 | 1 |
| Male | 140 | 0.56 | 0.50 | 0 | 1 |

## Table 8. Descriptive Statistics of Study 2 by Condition

| Respondents | Success No-skill Cue | Failure No-skill Cue | Success Skill Cue | Failure Skill Cue |
|---|---|---|---|---|
| Age | 43.412 | 44.839 | 42.143 | 42.639 |
| College Education | 0.824 | 0.719 | 0.816 | 0.667 |
| Risk Propensity | 1.412 | 1.563 | 1.105 | 1.083 |
| Owns Home | 0.675 | 0.688 | 0.711 | 0.528 |
| Male | 0.441 | 0.500 | 0.658 | 0.639 |
| N | 34 | 32 | 38 | 36 |

*Note:* F-tests show no significant differences across conditions for age, college education, risk propensity, owns home, and male.

## Table 9. Experimental Results of Study 2

| | (9.1) | (9.2) | (9.3) | (9.4) | (9.5) | (9.6) |
|---|---|---|---|---|---|---|
| | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* |
| Failure | −0.914** | −1364.5+ | −1210.0+ | −1.036*** | −1368.8+ | −1249.5+ |
| | (0.295) | (751.7) | (631.9) | (0.305) | (769.4) | (640.8) |
| Skill Cue | −0.438 | −1017.1 | −907.6 | −0.399 | −720.9 | −658.5 |
| | (0.298) | (739.9) | (625.8) | (0.302) | (760.0) | (610.3) |
| Failure * Skill Cue | 0.785+ | 1760.6+ | 1467.5+ | 0.901* | 1857.4+ | 1542.5+ |
| | (0.438) | (1001.2) | (824.3) | (0.451) | (1067.8) | (875.8) |
| Constant | 5.382*** | 2163.1*** | 1843.2*** | 5.868*** | 2127.8 | 1176.1 |
| | (0.164) | (613.4) | (530.2) | (0.539) | (1588.3) | (1105.7) |
| Respondent's Attributes | No | No | No | Yes | Yes | Yes |
| $R^2$ | 0.059 | 0.028 | 0.032 | 0.110 | 0.087 | 0.096 |
| *N* | 140 | 140 | 140 | 136 | 136 | 136 |
| *Test of Hypothesis 1:* $\beta_F < 0$ | 0.001** | 0.036* | 0.028* | 0.001** | 0.039* | 0.027* |
| *Test of Hypothesis 2:* $\beta_{FSk} > 0$ | 0.038* | 0.040* | 0.038* | 0.024* | 0.045* | 0.039* |
| *Test of Hypothesis 3:* $\beta_F + \beta_{FSk} < 0$ | 0.346 | 0.725 | 0.373 | 0.338 | 0.750 | 0.444 |

***Notes*** Robust standard errors in parentheses. Respondent's Attributes are Age, College Education or Higher, Risk Propensity, Owns home, Male, and Located in London. We report significance levels for one-tailed tests for hypothesized effects. Significance levels: + p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

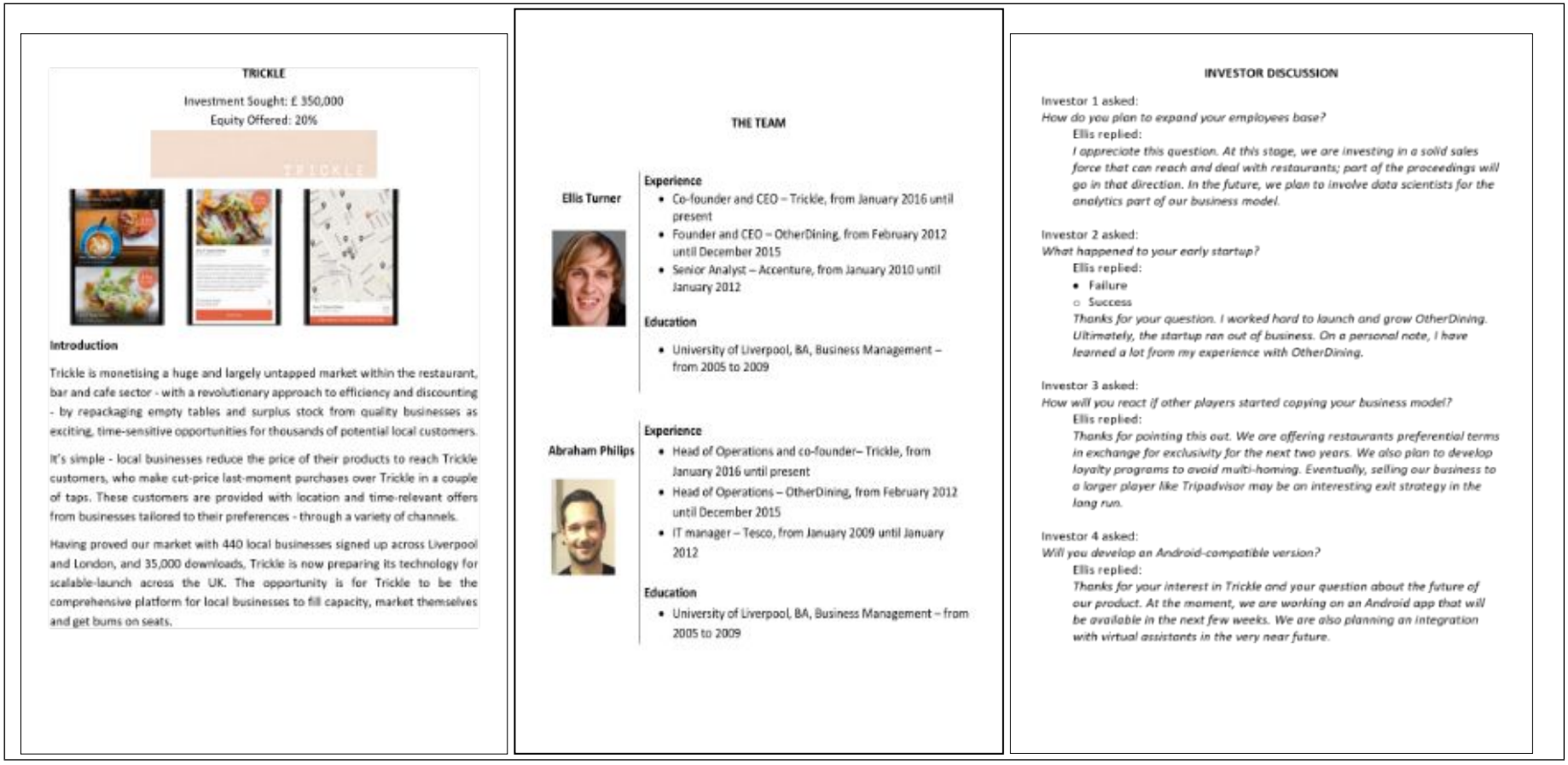
**Table 10. Descriptive Statistics of Study 3**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Investment Attractiveness | 130 | 4.99 | 1.18 | 1 | 7 |
| Amount Invested | 130 | 1,415 | 2,975.48 | 0 | 10,000 |
| Expected Amount | 130 | 1,204.90 | 2,573.91 | 0 | 10,000 |
| Age | 126 | 43.92 | 12.43 | 22 | 73 |
| College Education or Higher | 130 | 0.81 | 0.40 | 0 | 1 |
| Risk Propensity | 130 | 1.43 | 1.36 | 0 | 5 |
| Owns Home | 130 | 0.71 | 0.46 | 0 | 1 |
| London | 130 | 0.1 | 0.30 | 0 | 1 |
| Male | 130 | 0.49 | 0.50 | 0 | 1 |

**Table 11. Experimental Results of Study 3**

| | (11.1) | (11.2) | (11.3) | (11.4) | (11.5) | (11.6) |
|---|---|---|---|---|---|---|
| | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* | *Investment Attractiveness* | *Amount Invested* | *Expected Amount* |
| Failure | −0.914** | −1,365+ | −1,210+ | −0.957** | −1,352.2+ | −1,197.8* |
| | (0.295) | (751.7) | (631.9) | (0.305) | (764.9) | (633.6) |
| Luck Cue | −0.124 | −172.8 | −154.4 | −0.035 | 99.00 | 95.16 |
| | (0.256) | (871.6) | (751.0) | (0.278) | (866.0) | (740.1) |
| Failure * | 0.504 | 75.69 | 168.4 | 0.573 | −151.79 | −38.54 |
| Luck Cue | (0.402) | (1028.9) | (889.9) | (0.441) | (1079.2) | (911.9) |
| Constant | 5.382*** | 2163.1*** | 1843.2*** | 6.653*** | 3,352.2* | 2,789.6* |
| | (0.164) | (613.4) | (530.2) | (0.462) | (1371.0) | (1078.0) |
| Respondent's Attributes | No | No | No | Yes | Yes | Yes |
| $R^2$ | 0.056 | 0.035 | 0.036 | 0.201 | 0.148 | 0.152 |
| *N* | 130 | 130 | 130 | 126 | 126 | 126 |

**Figure 1. Selected Pages of the Experimental Treatment**



TRICKLE

Investment Sought: £ 350,000

Equity Offered: 20%

**Introduction**

Trickle is monetising a huge and largely untapped market within the restaurant, bar and cafe sector - with a revolutionary approach to efficiency and discounting - by repackaging empty tables and surplus stock from quality businesses as exciting, time-sensitive opportunities for thousands of potential local customers.

It's simple - local businesses reduce the price of their products to reach Trickle customers, who make cut-price last-moment purchases over Trickle in a couple of taps. These customers are provided with location and time-relevant offers from businesses tailored to their preferences - through a variety of channels.

Having proved our market with 440 local businesses signed up across Liverpool and London, and 35,000 downloads, Trickle is now preparing its technology for scalable-launch across the UK. The opportunity is for Trickle to be the comprehensive platform for local businesses to fill capacity, market themselves and get bums on seats.

THE TEAM

**Ellis Turner**

**Experience**

- Co-founder and CEO – Trickle, from January 2016 until present
- Founder and CEO – OtherDining, from February 2012 until December 2015
- Senior Analyst – Accenture, from January 2010 until January 2012

**Education**

- University of Liverpool, BA, Business Management – from 2005 to 2009

**Abraham Philips**

**Experience**

- Head of Operations and co-founder– Trickle, from January 2016 until present
- Head of Operations – OtherDining, from February 2012 until December 2015
- IT manager – Tesco, from January 2009 until January 2012

**Education**

- University of Liverpool, BA, Business Management – from 2005 to 2009

INVESTOR DISCUSSION

Investor 1 asked:
*How do you plan to expand your employees base?*
Ellis replied:
*I appreciate this question. At this stage, we are investing in a solid sales force that can reach and deal with restaurants; part of the proceedings will go in that direction. In the future, we plan to involve data scientists for the analytics part of our business model.*

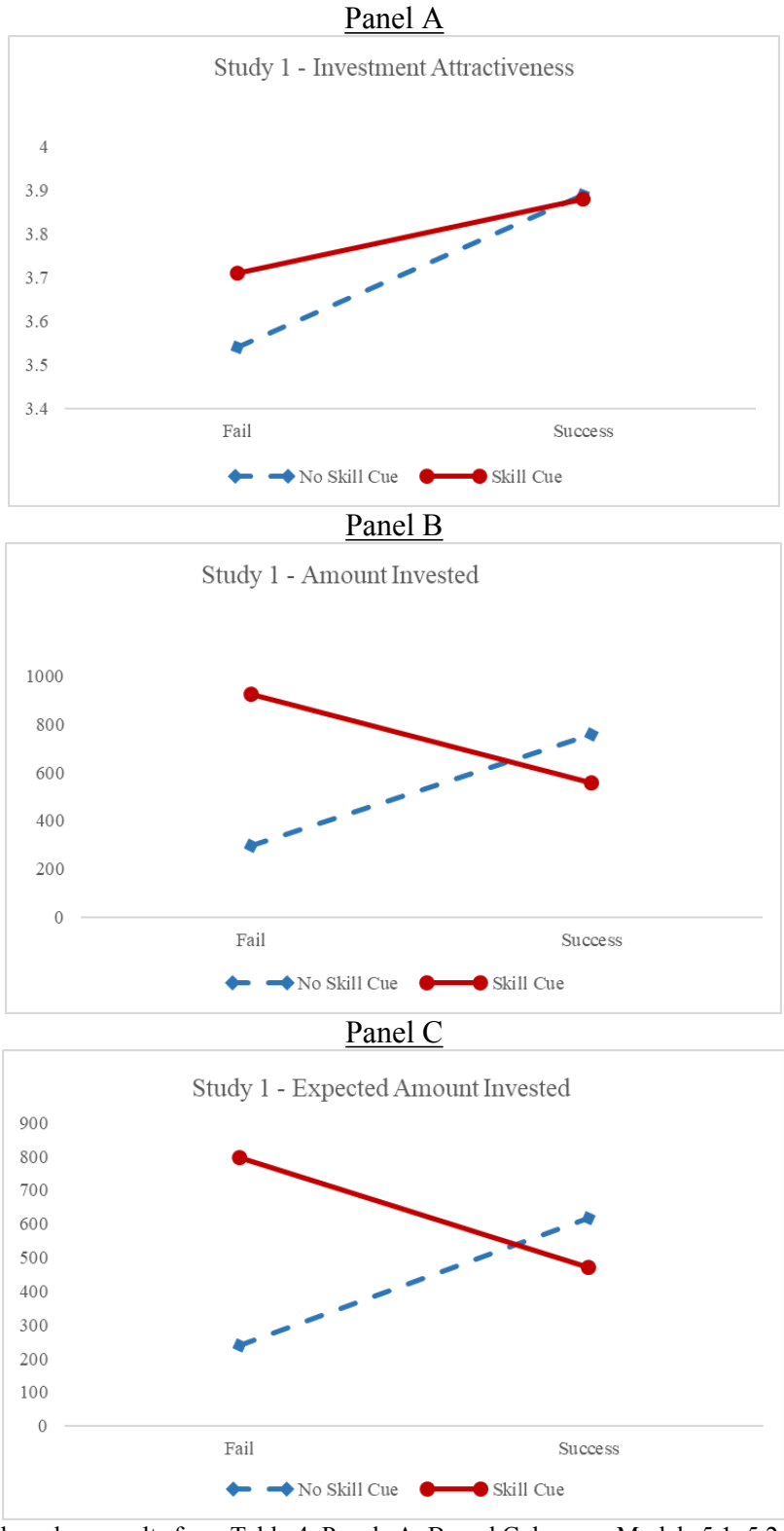
Investor 2 asked:
*What happened to your early startup?*
Ellis replied:
- Failure
- Success

*Thanks for your question. I worked hard to launch and grow OtherDining. Ultimately, the startup ran out of business. On a personal note, I have learned a lot from my experience with OtherDining.*

Investor 3 asked:
*How will you react if other players started copying your business model?*
Ellis replied:
*Thanks for pointing this out. We are offering restaurants preferential terms in exchange for exclusivity for the next two years. We also plan to develop loyalty programs to avoid multi-homing. Eventually, selling our business to a larger player like Tripadvisor may be an interesting exit strategy in the long run.*

Investor 4 asked:
*Will you develop an Android-compatible version?*
Ellis replied:
*Thanks for your interest in Trickle and your question about the future of our product. At the moment, we are working on an Android app that will be available in the next few weeks. We are also planning an integration with virtual assistants in the very near future.*

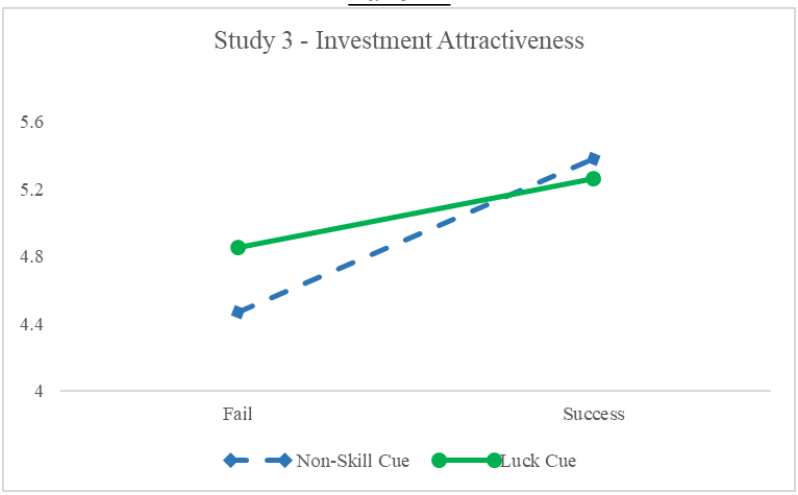
**Figure 2. The Effect of Past Outcome and Skill Cues on Investors' Evaluations, Study 1**



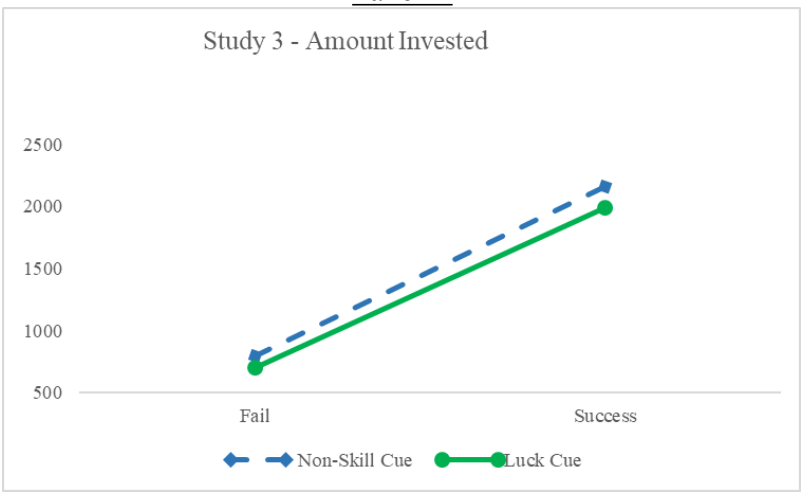

***Notes***. Figure 2 is based on results from Table 4. Panels A, B, and C draw on Models 5.1, 5.2, and 5.3, respectively.

**Figure 3. The Effect of Past Outcome and Luck Cues on Investors' Evaluations, Study 3**

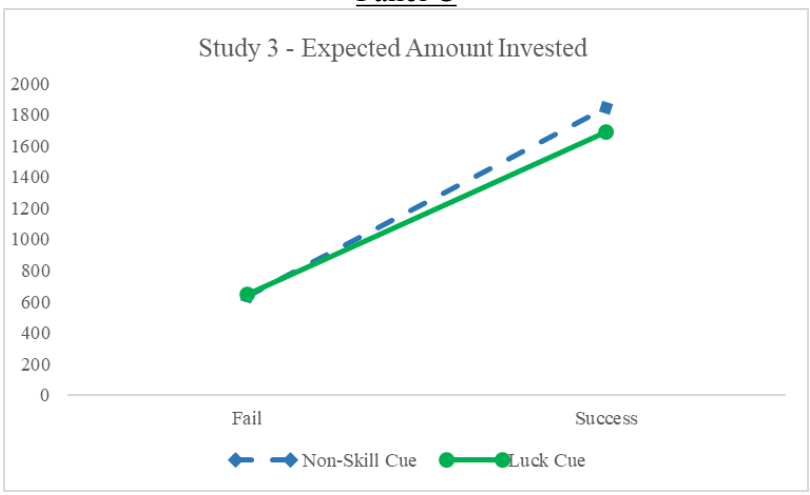
Panel A




Panel B




Panel C




***Notes***. Figure 4 is based on results from Table 10. Panels A, B, and C draw on Models 9.1, 9.2, and 9.3, respectively.

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