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'I Like How You Think': Similarity as an Interaction Bias in the Investor–Entrepreneur Dyad

Charles Y. Murnieks, J. Michael Haynie, Robert E. Wiltbank and Troy Harting

United States Air Force Academy; Syracuse University; Willamette University; United States Air Force Academy

ABSTRACT Investigating the factors that influence venture capital decision-making has a long tradition in the management and entrepreneurship literatures. However, few studies have considered the factors that might bias an investment decision in a way that is *idiosyncratic* to a given investor–entrepreneur dyad. We do so in this study. Specifically, we build from the literature on the 'similarity effect' to investigate the extent to which decision-making process similarity (shared between the investor and the entrepreneur) might bias or otherwise impact the investor's evaluation of a new venture investment opportunity. Our findings suggest venture capitalists evaluate more favourably opportunities represented by entrepreneurs who 'think' in ways similar to their own. Moreover, in the presence of decision-making process similarity, the impacts of other factors that inform the investment decision actually change in counter-intuitive ways.

INTRODUCTION

> I wasn't particularly enamoured with the venture concept, but the entrepreneur's presentation highlighted an approach to rigorous analysis much like my own . . . I didn't invest in that first venture, but we've done three deals together since our first meeting.
>
> Venture Capitalist (interviewed for this project)

Securing start-up and growth capital is crucial to a new venture's survival and success. In the face of global economic environments that are increasingly defined by strained credit markets and heightened regulation of traditional lending channels, understanding the nuances of the venture capital process – particularly with regard to the factors that impact investment decisions – takes on a renewed importance. Scholars have examined the influences of various economic and sociological criteria that researchers have

Address for reprints: J. Michael Haynie, Department of Entrepreneurship and Emerging Enterprises, Whitman School of Management, Syracuse University, 721 University Ave, Syracuse, NY 13244-2450, USA (jmhaynie@syr.edu).

presumed to inform an investor's decision to fund (or not) a new venture (MacMillan et al., 1987; Shepherd, 1999; Zacharakis and Meyer, 1998). Broadly described, these criteria include the personal attributes of the entrepreneur and the potential economic returns represented by the 'deal'. Only recently however, have scholars considered whether the characteristics of a given entrepreneur (e.g. personality, experience, social and human capital) might interact with like characteristics of the individual investor to bias decision-making in a way that is *specific* to a given investor–entrepreneur dyad (Franke et al., 2008; Matusik et al., 2006).

In 2006, Franke et al. (2006) introduced the concept of *interaction biases* to decision-making research in the venture capital (VC) context, suggesting a research orientation focused on how 'specific VCs will evaluate specific start-ups in a systematically different way' (p. 6). The authors assert that such a focus overcomes the limitations of earlier studies by analysing the interaction between the entrepreneur and the investor (as a dyad) in more rigorous terms than can be done using a simple general construct, such as 'compatibility' (Franke et al., 2006). In this study, we take up the call for a more exacting investigation of venture capital decision-making by exploring the dynamics of the investor–entrepreneur dyad in the context of what Byrne (1971) and others have described as the 'similarity effect'.

Very simply, similarity describes the extent to which there is symmetry or resemblance between two objects, persons, or concepts. As the old saying suggests, 'birds of a feather do flock together', meaning that similarity attracts (Byrne, 1971). Cognitive and social psychologists have devoted considerable attention to understanding the implications of *between-individual similarity* as a bias in the decision-making process. Generally, studies indicate that decision-makers exhibit more favourable attitudes and judgments towards objects, persons, or concepts that resemble (or are consistent with) what they believe to be true about themselves (McPherson et al., 2001). For example, research indicates that between-individual similarity reflected in such characteristics as personality (Byrne et al., 1967), physical appearance (Feingold, 1988), religion (Kerr, 1995), race (Wade and Bielitz, 2005), demographics (Tsui et al., 1992), and values (Matusik et al., 2006; Meglino and Ravlin, 1998) serves to bias decision-making in favour of those persons most similar to the decision-maker (Byrne, 1971, 1997; Harrison et al., 1998). Interestingly however, one dimension of similarity that is virtually unexplored in the literature is the similarity between individuals based on approaches to decision-making. As implied in the passage that opens this article, might similarity between the investor and the entrepreneur based on *similar* decision-making processes promote attractiveness in a way that substantively impacts important decision outcomes? We investigate this question in this study.

Specifically, we test the extent to which similarity in decision-making processes (between the investor and the entrepreneur) serves to bias the VC's evaluation of a potential investment opportunity. To this end, we use conjoint analysis to decompose the decision policies of a sample of venture capitalists, engaged in the task of evaluating the attractiveness of a series of hypothetical venture investment opportunities. We test the general hypothesis that investors will evaluate more favourably opportunities represented by individuals whose decision-making processes are similar to their own, as opposed to those whose decision-making processes are dissimilar to their own. Further,

we propose that the presence of similarity based on decision-making processes will moderate the relative importance of other attributes that are characteristic of the deal as reflected in the VCs' evaluations. Importantly, we focus on new venture investment decisions because they are situated in a context in which economic rationality *should* define the decision process (Hall and Hofer, 1993; MacMillan et al., 1987) and because decision-makers have suggested that similarity effects play an inconsequential role in determining decision outcomes (MacMillan et al., 1985). As such, this context represents a rigorous hurdle against which to test our hypotheses.

We suggest that this study makes several important contributions. First, we complement and extend the psychology, management, and entrepreneurship literatures focused on similarity effects as decision biases. This study confers empirical evidence that similarity based on decision-making processes represents an interaction bias that impacts decision outcomes. Importantly, the great majority of research on the similarity effect (especially in management) has focused on similarity based on decision *outcomes*, such as attitudes or judgments (Byrne, 1997; Ferris and Judge, 1991). In this study, we take a first step towards disentangling outcomes from the underlying cognitive *processes* responsible for those outcomes; that is, we test to see if the influence of the similarity effect bias extends beyond decision outcomes to impact the *process* by which decisions are formulated as well.

Furthermore, this study highlights important implications for understanding the relationship between investors and entrepreneurs over time and in the context of their joint role in growing and developing a new venture. The notion that investors may demonstrate a bias towards entrepreneurs who 'think' in ways similar to their own could result in a lack of cognitive diversity in the investor–entrepreneur dyad. Such diversity has been demonstrated to be important for the effective management of ventures in uncertain environments (Kilduff et al., 2000). By selecting venture opportunities led by individuals with cognitive skill sets similar to their own, investors may be unintentionally neglecting the acquisition of skills necessary to compensate for their own cognitive 'blind spots'. In turn, this situation will likely represent an impediment to the development of alternative and divergent solutions to complex problems in the face of dynamic competitive environments. Such a finding confers a novel and counter-intuitive theoretical basis for future studies focused on, for example, the causes for the types of commitment escalation exhibited in venture creation endeavours (McCarthy et al., 1993; Staw, 1981) and also illustrates a possible input to studies focused on the investor's role in founder exit decisions (Khanin et al., 2009). Finally, the theoretical contributions described above readily translate to practice. As there are substantial amounts of capital put at risk as a function of VC investment decisions (or alternatively, opportunities 'lost' as a consequence of those decisions), bringing to light all of the factors positioned to bias such decisions represents an important practical contribution. This practical imperative serves as the foundation for decades of academic inquiry focused towards understanding the bases on which venture capitalists make investment decisions (Franke et al., 2008).

In what follows, we first provide a brief overview of extant findings and theory related to VC decision-making. Next, we review the literature on the similarity effect's influences on decision-making and then extend this literature to a venture capital context in order

to develop and introduce our hypotheses. Finally, we present our empirical study and results and offer a discussion of our findings.

THEORETICAL BACKGROUND AND HYPOTHESES

Overview

Both management and psychology scholars have devoted considerable attention to understanding the factors that impact strategic decision-making. In entrepreneurship, much of this research has focused on the process by which venture capitalists make investment decisions. This literature claims a legacy that dates back over 30 years (Tyebjee and Bruno, 1984; for a review, see Franke et al., 2008), and illustrates that investors consider a host of characteristics (representative of both the entrepreneur and the opportunity) when making new venture investment decisions. For example, we know that the personal characteristics of the entrepreneur are of paramount importance to investors. As an illustration of this consistent finding, Bygrave (1997) quotes the pioneer of modern venture capital, Georges Doriot, as saying 'Always consider investing in a grade A man with a grade B idea. Never invest in a grade B man with a grade A idea' (p. 11). Further, we understand that investors devote considerable energy towards investigating the nature of the market opportunity (e.g. market growth rate, projected economic returns) the venture is positioned to exploit (Hall and Hofer, 1993; Tyebjee and Bruno, 1984). Even though extant scholarship has provided tremendous insight into what factors inform VC decision-making, we know comparatively little about how the characteristics of a given entrepreneur might interact with characteristics of the individual investor to bias decision-making in a way that is *specific* to a given investor–entrepreneur dyad (Franke et al., 2008; Matusik et al., 2006). Franke et al. (2006) take a first step towards offering such insight by providing evidence that dyadic similarity based on education and professional experience between the entrepreneur and the investor results in attraction and potential outcome bias. Building from this finding, we propose that investigations focused on the dyadic nature of the relationship between the investor and the entrepreneur represent an important avenue through which we can gain a deeper understanding of the subtle but significant nuances representative of venture capital decision-making.

Similarity Research

The 'similarity effect' describes a conceptual proposition in which increased similarity between individuals results in increased attraction (Byrne, 1971; Lazarsfeld and Merton, 1954). The similarity effect has been found to be robust across numerous settings and contexts (Byrne, 1997) and has also been demonstrated across disparate populations and cultures (Lydon et al., 1988). In organizational settings, the similarity effects between supervisors and subordinates have been linked to higher performance evaluations (Ferris and Judge, 1991; Pulakos and Wexley, 1983) and job advancement (Schaubroeck and Lam, 2002). Further, the similarity effect has been consistently replicated across various organizational contexts (Tsui and O'Reilly, 1989). For example, in a study of 194

manager–subordinate dyads, Wexley et al. (1980) found that the more managers perceived their subordinates to hold similar attitudes as themselves, the higher those managers rated their subordinates. Schaubroeck and Lam (2002) found similar results in a study of 571 bank tellers from Hong Kong and the United States.

Our extension of the work on the similarity effect to include attributes that describe how individuals make decisions involves a subtle but important distinction from the studies cited above. Specifically, the majority of the research conducted on the similarity effect has focused on the similarity between individuals based on their shared attitudes or judgments (Byrne, 1997; Harrison et al., 1998). Importantly, attitudes and judgments are *outcomes* (or are the result of) some cognitive process of reasoning and evaluation. However, an attitude or judgment is not a proxy for the decision-making *process* itself.

For example, two individuals may arrive at a similar judgment with regard to some actionable decision (e.g. to accept a new job offer), but they may arrive at that similar judgment by engaging in substantially different reasoning processes (e.g. one is very rational and linear, and the other is a 'snap' decision). Likewise, two individuals may hold different attitudes concerning a particular situation but may have employed similar reasoning processes to formulate their different attitudes. As an example from an entrepreneurial context, consider a situation related to the authors by a prominent venture capitalist interviewed as part of this research programme. During the interview, the VC recalled for the authors a situation in which an entrepreneur was invited to present a new venture concept to the partners of the firm. During the presentation, the entrepreneur methodically detailed the market strengths of the concept and also the weaknesses that represented risks to the venture. While evaluating the opportunity based on the presentation, the venture capitalist generally disagreed with the entrepreneur in regard to the strengths and weaknesses that defined the opportunity (the *outcomes* of the entrepreneur's reasoning process). However, the investor was simultaneously impressed with the decision processes the entrepreneur applied to the cognitive task of identifying those strengths and weaknesses. In this case, the VC reported to the authors that the entrepreneur's decision-making process (systematically considering the strengths and weaknesses of the opportunity) was similar to her own approach to evaluating the potential of a venture concept, and this similarity became a source of attraction between the VC and the entrepreneur. This example supports the notion that the decision outcomes (the actual strengths and weaknesses) presented by the entrepreneur were evaluated separately from the reasoning process that the entrepreneur employed to arrive at those outcomes. Thus, it follows then that the decision-making process employed by the entrepreneur may influence the investor's evaluation in a manner that is distinct from the decision outcomes.

Decision-Making, Similarity, and New Venture Investment

As noted previously, scholars have devoted considerable attention to the influences of different approaches to decision-making on subsequent decision outcomes. For example, focusing specifically on the relationship between regulatory processes and decision-making, regulatory fit studies have demonstrated that individuals evaluate the same outcomes differently depending on the regulatory process involved (Higgins et al., 2003).

When the regulatory process used to evaluate an object matches the regulatory preferences of the individual conducting the evaluation, the perceived value of the object is higher; conversely, when there is no fit between the evaluation process and the individual's preferences, the evaluation is lower, independent of the effect of the objective outcomes. Across two different studies, Higgins et al. (2003) demonstrated that participants assigned higher monetary values to a coffee mug when the decision-making process used to evaluate the mug matched that of their own preferred regulatory orientation. Further, when study subjects were directed to employ a decision-making process that differed from their preferred regulatory orientation, they assigned a lower value to the same coffee mug. Even though we are not concerned specifically with testing regulatory focus theory in this paper, these findings are conceptually germane because they demonstrate the potential for the interaction bias suggested by Franke et al. (2006); that is, similarities between the decision-making processes people prefer and those they are exposed to in a given situation can bias their evaluations.

The conceptual prescriptions of the literature on the similarity effect suggest that this type of similarity will influence the decision polices of venture capitalists engaged in the task of evaluating potential investment opportunities, because it appears that decision-makers tend to assign higher valuations to objects when they are evaluated by cognitive processes that are similar to those they prefer (e.g. Higgins et al., 2003). Thus, we suggest that when individuals consider the characteristics of another person while engaging in an evaluative task, the decision-making processes of the actors in a between-individual dyad become salient decision variables. Therefore, building on the similarity–attraction literature, theory suggests that decision-makers should give more favourable evaluations to individuals who exhibit decision-making processes similar to their own. Thus:

> *Hypothesis 1*: Venture capitalists will more favourably evaluate investment opportunities represented by individuals whose decision-making processes are similar to their own, as opposed to those whose decision-making processes are dissimilar to their own.

Although our focal interest is on the role of decision processes that represent a bias in the venture investment evaluation, it is important to acknowledge that additional evaluative criteria inform the investment decision. To that end, scholars have developed a robust body of research focused on identifying the decision criteria applied by venture capitalists during their investment evaluations (Hall and Hofer, 1993; MacMillan et al., 1985; Zacharakis and Shepherd, 2005). In their review of this literature, Franke et al. (2008) survey 13 previous studies and rank-order the top criteria espoused by VCs as important during new venture evaluation. In every one of these studies, two characteristics are paramount: (1) founder quality (representing the human and social capital of a founder/start-up team); and (2) economic quality (representing the product, market, and financial characteristics surrounding an investment opportunity). Essentially, as founder and economic quality rise, so does the probability that an investor will evaluate a particular opportunity more favourably (Muzyka et al., 1996; Shepherd, 1999).

Given the litany of work that has already investigated the distinct effects of both founder and economic quality on VC investment decisions, it is not our intention to

replicate this previous research; we do not offer similar hypotheses in this paper. Instead, we focus on the effects of decision-making-process similarity as an influence on evaluations *in the context* of these already established evaluative criteria; that is, we model the effects of decision-process similarity in the presence of other known important influences, like founder and economic quality. This is an important theoretical and empirical consideration because again, drawing from the similarity effect literature, theory suggests that in the presence of dyad-specific similarity the relative influence of the *other* attributes that inform the evaluation decision is likely impacted. To this point, Cesario et al. (2004) demonstrate that some characteristics of an object under evaluation are viewed more positively in cases in which the 'perceiver' believes that he or she represents similar attributes or characteristics as the object under evaluation. Thus, it appears that similarity based on discrete attributes of a person or object can act to change the decision-maker's evaluation (or relative 'weighting') of other attributes of that same object. According to information integration theory (Kaplan and Anderson, 1973) and cognitive evaluation theory (Montoya and Horton, 2004), these effects occur in interpersonal contexts because individuals infer that similarity across some limited dimension implies similarity more broadly. As such, individuals tend to assign higher valuations to entities that they deem to be similar to themselves.

In the context of this study, we extend this proposition to suggest that when the venture capitalist perceives that the entrepreneur is similar to him/herself as a function of decision-making processes, he/she will infer that the similarity applies more broadly to other characteristics of the entrepreneur (whether or not such similarity actually exists). An entrepreneur who demonstrates decision-making process similarity with a given investor is more likely to be perceived in a positive light and will be viewed as better positioned to make effective use of his/her human and social capital. Thus, we contend that decision-making-process similarity not only directly effects investment evaluation, but also positively moderates the influence of the founder-quality dimension on the investment decision. Thus:

> *Hypothesis 2*: Decision-making-process similarity moderates the positive relationship between founder quality and the probability of investment such that as decision-making process similarity increases, founder quality has a greater influence on the likelihood of investment.

Importantly, we do not propose a moderation effect of decision-making processes on the economic-quality dimensions of the investment decision. Unlike founder-quality characteristics, economic-quality characteristics are exogenous to the individual. As such, there is no basis in theory to suggest that decision-making process similarities are likely to have a moderating effect of the nature proposed for the founder-quality dimension.

Decision-Making Processes in Entrepreneurship: Effectual and Causal

Our primary interest is situated in the entrepreneurial domain. Therefore, it follows that in the context of 'capturing' a decision-making process to represent as a basis for

investigating the similarity effect, it is important to focus on decision-making processes that are suggested to be relevant in a new venture context. Sarasvathy (2001a) contends that decision-making in entrepreneurial environments can be characterized by two predominant processes: causation and effectuation. Causal decision-making processes 'take a particular effect as given and focus on selecting between means to create that effect' (Sarasvathy, 2001a, p. 245). On the other hand, effectual decision-making processes 'take a set of means as given and focus on selecting between possible effects that can be created with that set of means' (Sarasvathy, 2001a, p. 245). Whereas individuals engage causal processes with a particular outcome in mind and then look for the means to achieve the outcome, individuals engage effectual processes with means that are currently available and look to outcomes that can be achieved assuming available means. As examples, Sarasvathy (2001a) contrasts two approaches to venture creation to illustrate the differences between causal and effectual decision-making.

In the case of a causal decision process, the individual begins with the goal of starting a restaurant (outcome) and then proceeds to obtain the resources, like capital, real estate, etc. (means), necessary to make the restaurant a viable entity. This process emphasizes a predictive logic. Conversely, the effectual process begins with the individual's focus on assessing what resources he/she currently owns (fixed amount of capital, quirky personality, etc.) and proceeds to envision possible outcomes (fast food counter in an existing restaurant, consulting business based on food, etc.) that can be created from those available means. This process emphasizes control logic.

Importantly, neither causal nor effectual processes are represented in the literature as necessarily superior logics in an entrepreneurial context, nor as a preferred approach; instead, each strategy represents an alternative cognitive approach to be applied to entrepreneurial decision-making tasks. Further, it appears that both causation and effectuation are useful and prevalent in an entrepreneurial decision-making context. For example, in her assessment of the decision processes of expert entrepreneurs Sarasvathy (2001b) found that the majority (74 per cent) tended to prefer effectuation versus causation. That said this same study also highlights cases where certain entrepreneurs – in certain situations – preferred causation to effectuation, and also situations where entrepreneurs demonstrated no preference (Sarasvathy, 2008). So, even though Sarasvathy concludes that entrepreneurs generally demonstrate a preference for effectual processing, the study also acknowledges variability across a causal–effectual continuum in an entrepreneurial context. Thus, we suggest that causation and effectuation are theoretically relevant because causal–effectual logics have been linked to entrepreneurial decision-making.

Empirical evidence suggests that causal and effectual processes distinguish certain entrepreneurs from others. For example, in a verbal protocol study of 64 entrepreneurs, Dew et al. (2009) found that those with greater experience preferred using effectual processes to frame decisions, while those with less experience preferred causal processes. Furthermore, the type of decision-making process employed impacts decisions and their outcomes significantly. In their study of 1038 entrepreneurial decisions made among 121 investors, Wiltbank et al. (2008) conclude that differences in the use of causal and effectual decision processing can impact the attraction to and selection of certain ventures by investors (p. 5).

Importantly, we acknowledge that various alternatives exist for testing the effects of decision-making process similarity across the investor–entrepreneur dyad. For example, Regulatory Fit Theory (Higgins, 2000) posits that regulatory orientation is a key variable in decision processes. As mentioned earlier, when alignment between goal pursuit and individual regulatory orientation (promotion versus prevention) exists, evaluations are more positive (Camacho et al., 2003; Cesario et al., 2004). Similarly, Adaptation–Innovation (AI) Theory (Kirton, 1976, 1980) contends that individuals demonstrate characteristically different styles of thinking and decision-making (innovation versus adaptation). When those styles or decision-making processes are similar between individuals, interpersonal interactions are more effective (Kirton and McCarthy, 1988). Although both regulatory orientation and adaptation–innovation orientation might serve as operationalizations of decision-making process similarity in this study, we contend these options are less well-suited for our purposes as compared to causation and effectuation. First and foremost, neither regulatory orientation nor adaptation–innovation orientation has been widely applied to the entrepreneurial domain. Whereas Sarasvathy (2001a) and her colleagues (Dew et al., 2009; Wiltbank et al., 2008) demonstrate empirically that causation and effectuation are actively employed by entrepreneurs evaluating opportunities, such evidence does not exist for alternative decision processes. This distinction has both empirical and theoretical implications for this study. For example, if we were to select a construct to operationalize decision-making processes that was not previously demonstrated relevant in an entrepreneurial domain, our findings may be difficult to appropriately interpret; if we were to have selected a construct that had not been previously linked to the entrepreneurial context, it may be unclear whether insignificant findings were the result of the lack of relevance of the construct to the entrepreneurial domain, or if our results are indicative of the fact that similarity in decision processes is truly not a factor in the opportunity evaluation decision (our theoretical and empirical focus). By selecting decision-making processes known to be relevant in entrepreneurship, we mitigate this potential confound and most appropriately focus our study on the impact of similarity.

Second, subtle distinctions exist between the theoretical foci of regulatory/AI orientation and causation/effectuation. Regulatory orientation is centred on differing goals between individuals: nurturance versus security (Higgins, 1998). Adaptation–innovation orientation also assumes different goals between individuals: resolving existing problems via tried and understood methods versus attempting to discover new problems while breaking accepted modes of thought and action (Kirton, 1976). Both orientations assume that fundamentally different goals exist between individuals when engaging the associated processes. This distinction is not present in causation/effectuation. Entrepreneurs engaged in causal or effectual processes may both have the same generic goal (such as starting and growing a business), but approach it differently. Causal and effectual processes allow for the possibility that the end strategic goal is the same, but that the decision-processes to reach it differ (i.e. equifinality). This distinction is not assumed by regulatory orientation or AI orientation. Thus, while ultimately we acknowledge that different types of decision-making processes exist to test similarity effects, for the reasons cited above we contend that causation and effectuation are the best-suited for the purpose of this investigation.

SAMPLE AND METHODS

Overview

To investigate our hypotheses, we leveraged the utility of conjoint analysis as a technique to precisely decompose the decision policies of individuals engaged in a discrete decision task. We created a decision-making experiment in which a sample of venture capitalists was asked to evaluate a series of hypothetical investment opportunities and indicate the probability that they would invest in each. Each opportunity profile conveyed information about the nature of the venture concept and also information about the founding entrepreneur – including information that operationalized the entrepreneur's approach to decision-making. To create a basis for testing our similarity hypotheses, we also captured (as part of a post-experiment questionnaire) the respondents' in-use approach to decision-making (causal or effectual) in an investment context. We employed Hierarchical Linear Modelling (HLM) to decompose the aggregate decision polices of our sample and to test our hypotheses. In what follows, we describe our methods, analytical approach, and results in more detail.

Sample

Participants in this study included individuals that (1) identified their primary vocation as 'venture capitalist', and (2) were actively involved as partners or associates at VC firms in the United States. We contacted a total of 126 individuals by phone and by email to solicit their participation based on the published listings of the National Venture Capital Association. Taking the preferences of each respondent, we followed up the initial contact with either a paper-based or an internet-based version of our questionnaire; both versions were identical in content and format. In all, 60 complete surveys were returned, representing a response rate of 47.6 per cent. Our sample size is comparable to or exceeds other studies employing a conjoint methodology to evaluate VC decision-making (e.g. Franke et al., 2006, 2008; Muzyka et al., 1996; Shepherd et al., 2003) and meets the general criterion for sufficient sample size laid out by Shepherd and Zacharakis (1999). Of this sample, 41 individuals filled out the paper version of our questionnaire, while 19 completed the electronic version. We coded the different data collection techniques to control for method biases, but found no significant effects ($p > 0.05$). The mean years of experience in the VC industry represented by our sample was 6.5 years, and the mean age range of the participants was 35–44 years. For our sample, 80 per cent of the VCs (48 of 60) were male, and 73 per cent of the sample (44 of 60) reported formal education at the master's-degree level or higher.

Research Design and Variables

Conjoint analysis. A conjoint experiment represents a technique that 'requires respondents to make a series of judgments, assessments or preference choices, based on profiles from which their "captured" decision processes can be decomposed into their underlying structure' (Shepherd and Zacharakis, 1997, p. 207). A conjoint methodology is particularly well suited for the investigation of the relative influence of different decision factors

like the outcome and process elements that are the focus of this study. As we hypothesize that decision-makers will use a contingent decision policy, a conjoint methodology is a highly appropriate method to investigate the evaluation policies of the sample without relying on the participants' introspection, which has been found to be biased and inaccurate (Fischhoff, 1982; Priem and Harrison, 1994).

Research instrument and decision task. As previously stated, participants in the study were tasked with evaluating a series of hypothetical new venture investment opportunities, henceforth termed 'opportunity profiles'. These opportunity profiles were constructed based on unique combinations of three attributes (decision-making process, founder quality, and economic quality) represented at two levels each. Detailed operationalizations of these variables are described in the next section.

Given opportunity profiles based on three attributes and two levels, a design allowing us to test all main-effects and two-way interactions required each respondent to evaluate eight profiles (orthogonal full factorial). In order to test for individual consistency (test, re-test reliability), those eight opportunity profiles were fully replicated. As a result, each respondent evaluated 16 profiles that were used to elicit their decision policies. During administration, in accordance with convention when using conjoint analysis, we randomized both the order in which the opportunity profiles were presented to respondents and also the ordering of the decision attributes within each opportunity profile (decision-making processes, founder quality, and economic quality) so as to mitigate the potential for ordering effects. Respondents' 'decisions' were captured based on responses (7-point Likert scale) to questions that indicated their 'likelihood' to invest in a given opportunity. The survey instrument itself included instructions to the participants, the conjoint experiment, and a post-experiment questionnaire designed to capture participants' demographics and also their preferred decision-making process (effectual vs. causal).

The construction of the instrument followed that of other conjoint studies used to investigate decision-making in entrepreneurial contexts (e.g. Haynie et al., 2009; Shepherd, 1999; Shepherd et al., 2000). Specifically, the respondents were instructed to assume the following: (1) an interest in active investment; (2) an evaluation of the probability of investment in the context of their current business environment; (3) a proximal time horizon (within the next 12 months) for exploiting the opportunity; and (4) no capital constraints (i.e. funding is available). Further, the instructions directed respondents to consider each opportunity as a separate situation, independent of all others. The method of capturing the participants' preferred decision-making processes in the post-experiment questionnaire also followed previously published research (Wiltbank et al., 2008) and is described in greater detail in the next section.

The entire instrument was validated with in-depth interviews with venture capitalists and expert academics prior to executing the full study. All individuals confirmed the face validity of both of the attributes and the levels employed. Some VCs recommended certain changes to our instrument, such as putting keywords in boldface to highlight the salient differences and to facilitate quicker processing of the various scenarios. Further, we conducted a pilot test using a sample of 30 undergraduate students to validate our research instrument as well as our testing procedure. The results from the pilot sample

indicated that our instrument effectively elicited individuals' decision policies with respect to new venture investment decisions.

Independent variables. Each opportunity profile was described in terms of three independent variables: (1) decision-making processes of the founder; (2) quality of the founder; and (3) economic quality of the opportunity. These three independent variables were selected because of their demonstrated relevance in venture evaluation (Shepherd and Zacharakis, 1999), and the levels were chosen to reflect the variation that is typical of venture capital environments (Shepherd, 1999; Shepherd et al., 2000). We developed our attributes and level descriptions by reviewing the extant literature on VC decision-making. In what follows, we describe how each of our decision criteria was operationalized in the context of the study.

Decision-making processes of the entrepreneur: In the conjoint instrument, we depicted the entrepreneur leading the venture investment opportunity as an individual who favoured either causal *or* effectual approaches as his/her dominant pattern of decision-making. These causal or effectual processes were conveyed through a short paragraph that described decision-making process relying primarily on predictive logic (causal decision-making process) or control logic (effectual decision-making process) as outlined by Sarasvathy (2001a). This strategy of using text to describe decision-making processes imitated the technique favoured by researchers studying the impact of regulatory fit in decision experiments (e.g. Camacho et al., 2003; Cesario et al., 2004). We drew directly from the work of Wiltbank et al. (2006) to label each description of the founders' decision-making processes as causal (*planning*) or effectual (*shaping*). The decision-making process of the founder in each scenario was contrast-coded as −1 (causal) or +1 (effectual) for analysis.

In an effort to confirm that our operationalizations of causal and effectual decision-making processes were valid, we conducted a separate study with 41 business executives enrolled in an executive MBA programme at a large US university. We provided this sample with definitions of causal and effectual logic (from Sarasvathy, 2001a) as well as the two paragraphs used to operationalize these different decision-making processes in our conjoint study. Each respondent was asked to indicate (on a 7-point Likert scale) the degree to which each paragraph exemplified (1) effectual decision-making, and (2) causal decision-making. We calculated the average response for all 41 participants. Our results demonstrate significant differences between the two paragraphs such that the paragraph labelled 'Shaping' (effectual) highly resembled effectual logic (mean = 5.98) and was significantly different from causal logic (mean difference = 3.90, $p < 0.001$). Furthermore, the paragraph labelled 'Planning' (causal) strongly resembled causal logic (mean = 6.05) and was significantly different from effectual logic (mean difference = 4.00, $p < 0.001$). The results of this manipulation check provide evidence that the paragraphs we used in the study distinctly characterize effectual and causal decision-making processes.

Decision-making processes of the investor (VC): We followed the same procedure and used the same scales originally developed by Wiltbank et al. (2008) to capture the decision-making-process preferences of the VCs participating in our study. These scales (shown in Appendix 3) describe a venture idea and then ask the subject to indicate their degree of

agreement or disagreement (on a 5-point Likert scale) with 14 separate statements (six causal items, eight effectual items). The subject's responses provide a score (an average of the scale items) depicting his/her tendency to employ causal or effectual decision-making processes when evaluating new ventures. This method is advantageous because it captures participants' 'in-use' decision-making-process preferences versus their espoused preferences. Participants' preference for effectual or causal decision-making processing can be deduced by their responses to the scale items.

Wiltbank et al. (2008) developed these causal and effectual scales through iterative testing with a sample of 200 entrepreneurs and early-stage investors. In our study, both the causal (Cronbach's alpha = 0.89) and the effectual (Cronbach's alpha = 0.91) scales demonstrated strong reliability. Confirmatory factor analysis verified that the two-factor structure was significantly better than a single-factor structure ($\Delta\chi^2 = 46.7$, Δd.f. = 1, $p < 0.01$).

Founder quality: The quality of the founder in our study was operationalized through a short paragraph describing his/her human (Becker, 1975) and social capital (Coleman, 1988; Matusik et al., 2006). In previous research, human capital has often been assessed empirically by analysing an individual's work experience (Castanias and Helfat, 2001), whereas social capital is often gauged by personal references (Carter et al., 2003). In our conjoint instrument, we conveyed founder quality by detailing how the founder was referred to the VC as well as the general industry and managerial experience of the founder. This variable was represented at two levels (low and high). We used two levels and presented both levels to all participants, so we could investigate how decision-making process information influences individuals' overall evaluations separately from cognitive-outcome information. The founder quality in each scenario presented to the participants was contrast-coded as −1 (low) or +1 (high) for analysis.

Economic quality. The economic quality of the venture opportunity in our study was operationalized through a short paragraph describing the associated market and financial characteristics (Hall and Hofer, 1993; MacMillan et al., 1985; Tyebjee and Bruno, 1984). This variable was represented at two levels (low and high). As mentioned above for the founder-quality variable, we manipulated economic quality at two levels to determine the effect of cognitive processes on decision-making separately from this cognitive outcome variable. The economic quality in each scenario presented to the participants was contrast-coded as −1 (low) or +1 (high) for analysis.

Appendix 1 summarizes the operationalizations described above. An example of how each opportunity profile was presented to the participants can be found in Appendix 2.

Dependent variable. The dependent variable is a three-item measure designed to capture the likelihood that the venture capitalist would evaluate the proposed opportunity positively and would subsequently invest in the 'deal'. We selected a three-item scale instead of a single question in order to increase reliability (Kerlinger and Lee, 2000). Following the literature on venture capital investing, our scale consisted of three items inquiring about (1) the probability the VC would be likely to invest in the opportunity (Riquelme and Rickards, 1992), (2) the amount of money the VC would be likely to invest (Elitzur and Gavious, 2003), and (3) how successful the VC thought the opportunity would be (Muzyka et al., 1996; Shepherd et al., 2000). After reading the

descriptions about the decision-making process of the founder and the founder-quality and economic-quality factors that characterize each nascent venture, the VCs were asked the three above questions to indicate their attraction to the venture. This scale demonstrated satisfactory reliability (Cronbach's alpha = 0.9). Inter-item correlations among all three of the questions composing our dependent variable were high, ranging from 0.817 to 0.821. Confirmatory factor analysis verified that one factor, versus three separate observed variables, was appropriate ($\Delta\chi^2 = 2350$, Δd.f. = 1, $p < 0.01$). Scale-item correlations were also high, ranging from 0.861 to 0.858 to 0.859 (for the three questions listed above, respectively).

Control variables. Several relevant control variables were captured and incorporated into our analysis to account for different sources of variation. Specifically, the respondents' gender, the data collection method used (paper versus electronic), each participant's years of experience working in the VC industry, and any previous experience working in an entrepreneurial venture were employed as controls.

Analytical Approach

Decision-making process of respondents (VCs). With respect to preferences for causal or effectual decision-making processes, the distribution of our sample was relatively even. In total, 28 per cent (n = 17) significantly preferred causal processes over effectual ones, 37 per cent (n = 22) significantly preferred effectual processes over causal ones, and 35 per cent (n = 21) exhibited no significant preference. Interestingly, for the latter group (the one with no significant preference), their average effectual and causal process scores were still high (above 3.5 on a 5-point scale). Taken together, this distribution of scores confirms that effectual and causal logic are acceptable operationalizations of decision-making processes in this study, as every respondent indicated a preference for using one or the other or both. Across the entire sample, the overall average effectual process score was 3.41 (SD = 0.95), while the average causal process score was 3.23 (SD = 0.99), as rated on a scale from 1 to 5.

We chose to operationalize the decision-making preferences of our respondents as a single variable (rather than as separate effectual and causal process variables) because this is consistent with both theory and our sample. Sarasvathy (2008) contends that even though it is possible for individuals to alternate between effectual logic and causal logic depending on the situation, expert entrepreneurs tend to prefer one type of logic predominantly. This is reinforced by our sample in which the high negative correlation between the effectual and causal scales (–0.70) indicates that respondents displayed a strong preference for either effectual or causal processes, but not both. Incidentally, this finding is consistent with that of Wiltbank et al. (2008), who similarly found a significant negative correlation (albeit not so large, –0.27) in their study of the decision-making preferences of 121 angel investors. The decision-making-process scores did not demonstrate a significant correlation with any of our other demographic control variables (i.e. age, sex, experience, etc.). Thus, this independent variable does not appear to be inherently biased.

Following the general approach of Smith and Tisak (1993), we operationalized respondents' decision-making-process preference as the Euclidean distance between

their average effectual and average causal score. This method created a single, continuous variable indicating the relative preference for causal or effectual decision-making processes. Larger numbers denote stronger preferences for either process, depending on the sign (positive or negative), whereas smaller numbers indicate a lack of relative preference. Importantly, we did not simply calculate the absolute value of the discrepancy between the scores (as is traditionally done in calculations of Euclidean distance) because we were not solely interested in the magnitude of the distance between the decision-making process scores, but we were also interested in the direction. Given our operationalization, a positive score indicated a preference for effectual processes, while a negative score indicated a preference for causal processes. This designation aligned our decision-process-preference scores for VCs with the contrast codes for the decision-making processes of the hypothetical founders (positive for effectual and negative for causal). Combining the coding schemes for both VCs and hypothetical founders in the analysis, positive coefficients indicated that similarity (whether it be for the effectual or causal dimensions) matters for decisions, while negative coefficients indicated that similarity does not matter for decisions (or, if significant, that lack of symmetry is important).

Empirical model. The data in our study were multilevel in nature. At one level, we asked each participant to evaluate 16 separate hypothetical ventures (opportunity profiles) and then manipulated the variables that described these ventures. At the next level, the variables that characterized participant preferences for decision-making processes were held constant for each participant. Given this nested multilevel data structure, we employed hierarchical linear modelling (HLM) (Hofmann, 1997; Hofmann et al., 2000; Raudenbush et al., 2005) as our primary analytical approach. Since the decision-making preferences of each participant were constant (i.e. we assumed that each respondent's preference for either causal or effectual decision-making did not change while participating in our study) while the decision-making processes of the hypothetical founders varied (across the 16 opportunity profiles evaluated by each participant), our hypotheses were modelled as cross-level interactions. In other words, the nested nature of our data required that the hypotheses be analysed as interactions between variables that were static (person-level attributes) and those that could vary (within-person manipulations in the scenarios). As Hofmann et al. (2003) highlight, HLM is particularly well suited for the evaluation of cross-level interactions. In this study, the intra-class correlation (0.34) represented the proportion of variance in investment decisions that was accounted for by different participants (n = 60).

To test our hypotheses, we constructed the following multi-level analytical models. First, we constructed the level-1 (within-individual) model for factors representing variables that were manipulated in each of the 16 hypothetical venture scenarios. This model is shown below:

$$\begin{aligned}\text{Level 1: VC Evaluation} = {} & \beta_0 + \beta_1(\text{Decision-Making Process of Founder}) \\ & + \beta_2(\text{Founder Quality}) + \beta_3(\text{Economic Quality}) \\ & + \beta_4(\text{Decision Process of Founder} \times \text{Founder Quality}) \\ & + \text{error}\end{aligned}$$

In the context of our study, statistically significant coefficients (β_x's) indicated that the associated variable played a significant role in the evaluation of the hypothetical venture. Next, we constructed a series of level-2 (between-individual) models to represent the effect (interaction) of the variables that were constant for each of our 60 participants (e.g. age, sex, preferred decision-making process). In accordance with Raudenbush and Bryk (2002), we constructed one level-2 model for every factor in the level-1 model (i.e. every β_x) to include the intercept (β_0). To illustrate, we show the level-2 equation used to evaluate Hypothesis 1: the effect of the similarity in the decision-making processes between the hypothetical founder (denoted by β_1) and the participant (denoted by γ_{11}).

$$\begin{aligned}\text{Level 2}: \beta_1 = {} & \gamma_{10} + \gamma_{11}(\text{VC Decision-Making Process}) + \gamma_{12}(\text{VC Sex}) \\ & + \gamma_{13}(\text{VC Experience}) + \gamma_{14}(\text{VC Experience in Start-Ups}) \\ & + \gamma_{15}(\text{Survey Type}) + \text{error}\end{aligned}$$

In the context of our study, statistically significant coefficients (γ_x's) indicated that the associated variable significantly interacts with the associated level-1 variable. So, to evaluate Hypothesis 1, we investigated the significance of coefficient γ_{11}. Similarly, to evaluate Hypothesis 2, we looked to a different equation (the one relating β_4 to all of the level-2 variables listed above) to test if the associated coefficient (γ_{41}) was significant in terms of its interaction with β_4.

RESULTS

Individual-Level Results

In all, 87 per cent (52 of 60) of the individual models of the VCs' evaluations explained a significant proportion of variance ($p < 0.05$) with a mean adjusted R^2 of 0.85. These results are consistent with those found in similar conjoint designs (Choi and Shepherd, 2004; Shepherd et al., 2000). This indicates that the independent variables (decision-making processes of the founder, founder quality, and economic quality) provided in the experimental design were the primary drivers of the investment decisions captured in the dependent variable. Further, the mean test–retest correlation for the dependent variable on the eight replicated profiles for all 60 VCs was 0.78 ($p < 0.01$). This significant correlation provides assurance that the conjoint task was performed consistently by the decision makers.

Aggregate Results

The experiment provides 960 total observations (16 observations per participant). Since the research design (full factorial conjoint) ensures that there is zero correlation between the independent variables, testing and subsequently reporting two models (main-effects and full) is neither necessary nor appropriate (Priem, 1994; Priem and Rosenstein, 2000). Thus, we report only the full model with the main and interaction effects shown together. This is consistent with other studies using orthogonal factorial designs for metric conjoint analyses (cf. Priem, 1994; Priem and Rosenstein, 2000). Table I contains the results of our analyses. The findings related to each specific hypothesis test are reported below.

Table I. Hierarchical linear modelling of venture capitalists' evaluations of opportunities

Evaluation variables	*Coefficient*	*Standard error*	*t-ratio*
Main effect of founder decision-making process	0.23	0.18	1.26
Main effect of founder quality	1.94	0.12	15.74***
Main effect of economic quality	0.88	0.10	9.00***
Hypothesis 1: Decision-making-process similarity (Level 2)	0.64	0.05	12.90***
Hypothesis 2: Founder quality × decision-making-process similarity (Level 2)	0.14	0.02	5.59***
Intercept	12.80	0.23	55.60***

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
n = 960 decisions nested within 60 venture capitalists.

As can be seen in Table I, two of the three main effects (founder quality and economic quality) were significant. These results were expected. Although not hypothesized, it is not surprising to see that in general, participants tended to indicate higher probabilities of investing in scenarios with more favourable economic conditions ($\beta = 0.88$, SE = 0.10, $p < 0.01$) and with founders that had more social and human capital ($\beta = 1.94$, SE = 0.12, $p < 0.01$). The fact that the main effect of decision-making-process similarity was not significant is important too. It indicates there is no statistical evidence that our participants preferred venture scenarios characterized by founders who employed effectual versus causal processes ($\beta = 0.23$, SE = 0.18, $p = 0.21$), suggesting that there was no normative bias in our experimental decision-making-process manipulation.

The positive, significant coefficient for decision-making-process similarity ($\beta = 0.64$, SE = 0.05, $p < 0.01$) indicates that when symmetry exists between the decision-making processes of the founder and the VC (whether it be effectual or causal), the VC's evaluation of the potential opportunity becomes more positive. This provides support for Hypothesis 1. The pseudo R^2 for this effect is 0.81. In addition, we hypothesized that the effect of founder quality on the evaluation process would be contingent on the presence or absence of decision-making process similarity. The positive, significant coefficient for the interaction between founder quality and decision-making-process similarity ($\beta = 0.14$, SE = 0.02, $p < 0.01$) indicates that symmetry in decision processes increases the importance of founder quality on evaluations. This provides support for Hypothesis 2. The pseudo R^2 for this effect is 0.64, and the significant cross-level interaction for Hypothesis 2 is depicted in Figure 1.

As with most conjoint studies, it is important to acknowledge that the effect size represented by the coefficient correlates to the impact on the decision-makers evaluation as captured on a 7-point Likert scale. As such, caution must be exercised when ascribing practical significance to these effects. We adopt the approach advocated by Aguinis and Harden (2009) and Cohen and Cohen (1983), and compare the effects reported here to those reported in similar studies. In doing so, we find the effects represented by these coefficients to be robust. The effect sizes observed in this study, when viewed against similar conjoint studies involving venture capitalists (Shepherd et al., 2000) and

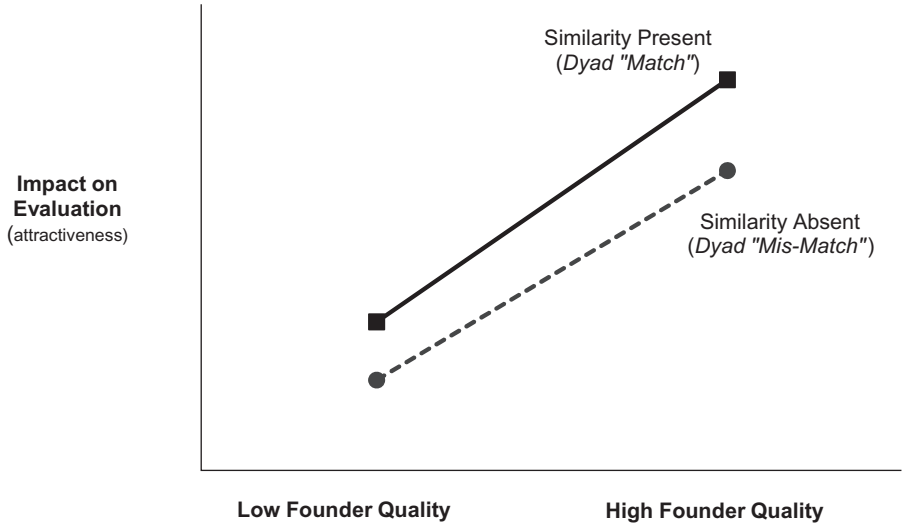

Figure 1. Decision-making-process similarity vs. founder-quality interaction

entrepreneurs (Haynie et al., 2009), compare favourably to or exceed those from other studies. Further, in an effort to be comprehensive with regard to our ability to ascribe significance to the effects observed and reported above, we conducted additional testing.

First, we tested a model where we added a level-1 (within-individual) dummy variable indicating the presence of a simple match or mismatch between the preferred decision-making processes (effectual or causal) of the respondent and the hypothetical founder depicted in the scenarios. This dummy variable was significant ($\beta = 1.00$, SE = 0.13, $p < 0.01$), providing further support for Hypothesis 1. Second, we tested whether or not operationalizing the decision-making process variable for the VCs into separate causal and effectual scores (versus combining them via the Euclidean distance approach) impacted our results. To this end, we entered both a causal and an effectual decision-making process score as separate variables for each respondent into our HLM model. With respect to the effect of decision-making process similarity on the overall venture evaluation (Hypothesis 1), there was no change. HLM revealed that decision-process similarities along both the effectual dimension ($\beta = 0.22$, SE = 0.10, $p < 0.05$) and the causal dimension ($\beta = 1.10$, SE = 0.12, $p < 0.01$) were significantly related to attraction towards the venture opportunity. This finding further bolsters our contention that similarity effects in decision-making processes play a significant role during venture evaluation. With respect to the effect of the interaction between decision-making process similarity and founder quality (Hypothesis 2), there was a slight change. HLM revealed that process similarity along the causal dimension ($\beta = 0.25$, SE = 0.11, $p < 0.05$) – but not the effectual dimension ($\beta = 0.03$, SE = 0.10, $p = 0.74$) – significantly moderated the effect of founder quality on attraction towards the venture opportunity. This finding poses interesting questions for future research, which we discuss in the next section.

Finally, in an attempt to investigate the role of decision-making process similarity in VC evaluations more fully, we analysed the self-reported importance of this factor

among our participants. Each VC was asked to rate the perceived importance of decision-making process similarity, founder quality, and economic quality during investment evaluations using a 7-point Likert scale. Paired samples *t*-tests between these responses (between decision-making process similarity and founder quality as well as between decision-making process similarity and economic quality) confirmed ($p < 0.01$) that the VCs in our sample rated decision-making process similarity as the least important factor among the three investment criteria (decision-making process similarity: $M = 3.71$, $SD = 1.54$; founder quality: $M = 5.03$, $SD = 1.29$; economic quality: $M = 5.31$, $SD = 0.91$). A paired samples *t*-test between the founder-quality and economic-quality factors found no significant difference ($p = 0.11$). This analysis was done to investigate how important VCs thought decision-making process similarity might be in venture evaluations when compared to other known significant factors, such as founder and economic quality.

DISCUSSION AND CONCLUSION

Similarity matters. Even in venture capital decisions in which observable characteristics, like personal experience, referrals, and economic factors, are suggested by both scholars and practitioners to overwhelm all other factors (Hall and Hofer, 1993; Zopounidis, 1994), we find that similarity in decision-making processes serves to bias venture capitalists' evaluations of opportunities significantly. Although the overwhelming majority of research on the similarity effect (especially in management) has focused on similarity across cognitive outcomes, like attitudes or judgments (Byrne, 1997; Ferris and Judge, 1991; Harrison et al., 1998), in this study we take a first step towards disentangling those outcomes from their underlying cognitive processes. A unique aspect of this investigation was our inclusion of *both* cognitive-outcome information as well as cognitive-process information in the evaluation of decision-making. Said otherwise, most studies analysing the importance of cognitive processes on decisions fail to control for the impact of cognitive outcomes (e.g. Higgins, 2000; Kirton, 1976, 1989). We do both, and our findings suggest that decision-making processes – as an evaluative criterion – serve as an independent effect (bias) on resulting decisions. In this study, we extend the research focused on similarity across outcomes and determine that similarity based on shared patterns of decision-making between two individuals will bias evaluations in a manner similar to that demonstrated for cognitive outcomes, like attitudes. Our findings suggest several important implications for advancing our understanding of new venture investment decision-making processes and their subsequent outcomes.

In this study, the similarity we address is not between what is readily observable – such as likeness based in education, age, gender, or industry – but is instead based on a more latent and fundamental similarity that has implications for how the investor and the entrepreneur will make decisions about building a new venture. What are the implications for the investor–entrepreneur dyad (and the venture) based on our finding that investors more favourably evaluate those entrepreneurs who 'think' like they do? Could this preference represent an impediment to the development of alternative and divergent solutions to problem-solving in the face of an uncertain entrepreneurial environment?

The VC plays a key role in the development and growth of the venture, and the notion of an interaction bias based on decision-process similarity might suggest the agglomeration of individuals who possess similar cognitive tendencies, and an associated lack of cognitive diversity. Previous research highlights the benefits of cognitive diversity on team performance (Kilduff et al., 2000), as variations in cognitive processes compensate for one another's weaknesses. Relating specifically to effectuation and causation, lack of cognitive diversity could create mental 'blind-spots' where the investor–entrepreneur dyad fails to notice important elements that employing the opposing cognitive process would resolve. For example, dyads of effectual decision-makers may suffer from their avoidance of prediction-oriented strategies that attempt to analyse and anticipate profitable market trends and the size and shape of future markets. Similarly, dyads of causal decision-makers may stumble from their failure to analyse key assumptions inherent in predictive logics, such as the ability to accumulate the means and resources necessary to achieve their goals. In both cases, adding cognitive diversity to either dyad increases the ability of the dyad to approach venture analyses with greater options. During her explication of effectual and causal decision-making processes, Sarasvathy (2001a) is quick to point out that both are valuable in the entrepreneurial context. We extend her reasoning here, and argue that dyads that rely on one process to the exclusion of the other may overlook important variables during the evaluation decision. Further, but in a related way, incorporating effectuation and causation into the conversation with regard to how investors and founders may jointly (or not) pursue opportunities could prove fruitful. For example, it may be particularly insightful to understand how a potential partnership, like that between an entrepreneur and a VC, might evolve differently given a shared emphasis on prediction- versus control-oriented efforts at growing the business (Wiltbank et al., 2006).

Next, only recently have scholars begun to investigate whether the traits or characteristics of individual founders may interact in ways that bias decisions unique to certain investor–entrepreneur dyads (Franke et al., 2006; Matusik et al., 2006). This study attempts to extend this nascent stream of research along a decision-making process dimension. Might an investor demonstrate a tendency – all else being equal – to evaluate a potential deal more positively if the entrepreneur and the investor are 'similar' in terms of how they think? Even more, might the similarity effect influence other factors representative of the deal in the context of the VCs evaluation? We find that the answer to both of these questions is 'yes'. We find that VCs do not evaluate investment opportunities uniformly; rather, their evaluations tend to be affected systematically in the direction of their similarities with others. Specifically, our finding that VCs tend to prefer individuals who think in manners similar to themselves is important not just because it impacts their decisions but because it influences their perceptions of other characteristics of the proposed investment. This finding provides further corroboration for the small, but growing, body of literature that contends that interaction biases are important considerations in decision-making (Franke et al., 2006, 2008; Matusik et al., 2006). In this paper, we only investigated the interaction effects of decision-making process similarity across individuals' evaluations of founder quality. It would be interesting to explore other contingent effects of broader cognitive-process similarities in a venture investment context.

Also noteworthy are the details for the effects of our three main variables on the probability of investing. Based on our reading of the VC literature, we expected decision-making process similarity to be overwhelmed by the founder-quality and economic-quality descriptions of the opportunities and thus considered the test of decision-making process similarity to be a 'high hurdle' in this setting. This reasoning was confirmed by the opinions of the VCs in our study, who, as a group, rated decision-making process similarity as the least important of the three investment criteria. The fact that decision-making process similarity significantly influenced the attractiveness of the investment opportunities while both the founder-quality and economic-quality factors were controlled for provides a fascinating point of embarkation for additional investigation. Although decision outcomes and observable characteristics of the founder are known to influence VC investment decisions (Franke et al., 2006; Shepherd and Zacharakis, 1999), we reveal the importance of similarity of decision-making processes between the VC and the founder. This research represents an important step towards advancing our understanding of the decision polices of VCs with regard to how (what impact) the attributes of a given investment opportunity relate to the likelihood of a positive investment decision (Mason and Harrison, 2002; Wiltbank, 2005).

Future Research

Generally, we suggest that our findings have implications for decision-making research across a myriad of settings and contexts, and point to promising avenues for future work. Even though the behavioural and decision-making implications of similarity based on shared characteristics, such as demographics, attitudes, education, and so forth, may already be well established (Franke et al., 2006; Harrison et al., 1998; Tsui and O'Reilly, 1989), our research highlights that in some situations 'process' similarities may represent powerful decision biases. However these process-type similarities are virtually un-studied in management and entrepreneurship and are much less-studied in the psychology literature. Further, we suggest that our non-significant finding with regard to the moderating influence of decision-making-process similarity (effectual) on the importance that the investors ascribed to founder quality represents a very compelling avenue for future research.

Specifically, in the post hoc analyses, we are puzzled as to why causal decision-making process similarity significantly moderated the effect of founder quality on the likelihood of investment, while effectual decision-making process similarity did not. Taken together, these findings suggest that even though the presence of decision-making process similarity across either dimension resulted in a more favourable outcome decision, decision-making process similarity along the causal dimension (rather than the effectual dimension) had a *greate*r moderating impact on the founder-quality variable relative to the decision to invest. Recall that effectual logic is based on conceptions of translating available means into something valuable; causal logic is based on goal-setting and the assumption that necessary 'means' can be acquired. As such, effectual processes focus more on controlling possible outcomes; causal ones attempt to predict them (Sarasvathy, 2001a). It could be that the psychological basis for satisfying the need for prediction is more salient or stronger than that for control. In the context of an investor–entrepreneur

dyad, it could be that two actors who both reason based on a 'control' motivation are inherently in conflict. Alternatively, a dyad based on an investor–entrepreneur pair whose reasoning is based on the need to predict the future is inherently 'more' complementary. This logic sets up an interesting match/mismatch asymmetry that should be the subject of future research; that is, even though we see a superficial match based on a preference for the same reasoning process (effectual), the underlying nature of 'what' is similar is inherently contradictory (two individuals whose reasoning is based on a control logic). This notion represents an interesting context for further exploration.

Of note, our study is one of only a small body of research that considers the dimensions of causation and effectuation empirically. In fact, we are aware of only one study that investigates these factors in the context of angel investors (Wiltbank et al., 2008), and no other study that considers the role of causal-effectual logics in the context of venture capital decision-making. As such, our finding that the distribution of preferences for decision-making processes (causal, effectual, none) is relatively 'even' across participants in this study, is interesting in light of Sarasvathy's (2001b) discovery that expert entrepreneurs overwhelmingly prefer effectuation. Further research is needed to determine whether these differences are robust across different experience levels or actors central to the entrepreneurial process (investors versus founders), and then what the implications of these differences might be.

Study Limitations

It is important to acknowledge the limitations of this study. Although we worked to minimize the impact of these limitations on our investigation, unfortunately, the nature of the experimental method (i.e. conjoint analysis) necessarily imposes certain restrictions.

First, it forces us to treat decision-making processes in the entrepreneurs, and thus similarity among the investor–entrepreneur dyad, as dichotomous rather than continuous (i.e. similarity is either present or it is not – there are no 'degrees' of similarity). We attempt to address this limitation in the post-hoc analyses (in which we free one-half of the dyad – the investor decision-making process – to be a continuous variable). The fact that the results in the post-hoc analyses resemble those of our main investigation provides evidence mitigating this limitation (and supports our overall hypotheses that similarity matters), but it still represents an avenue for future work. For example, it would be interesting to conduct another study, perhaps using observational data, to determine what degrees of similarity between the investor and the entrepreneur represent boundary conditions for the initial findings we report herein. Second, our experimental design sterilizes the investment evaluation event to a certain extent by using hypothetical ventures versus real ones. Shepherd et al. (2000) point out that even though this limitation is a concern, it is more likely to significantly affect novice decision makers rather than the more experienced VCs sampled in this study. Third, the possibility exists that respondents could place value on variables (like decision-making process similarity) simply because they are one of the three main independent variables presented in the experimental instrument. We consciously worked to address this limitation from the initial design of our investigation by making sure to include control variables for those factors known to be of paramount importance in VC

decision-making (i.e. founder and economic quality). In addition, we subjected our conjoint instrument to extensive pre-testing with VCs to ensure that face validity existed before proceeding to use it. Given that our hypotheses were supported, after accounting for the variance explained by the controls, we are confident that decision-making process similarity is a significant factor over and above other known variables. Fourth, we acknowledge that observing decision-making processes may be inherently difficult, even in 'real life'. That said, the quote presented earlier in our paper by the venture capitalist interviewed as part of our study indicates that investors do consider decision processes of founders during venture evaluations. Although our operationalization of decision-making processes in a text-based presentation format is somewhat artificial, it should be noted that this technique has been validated by psychologists studying the effects of regulatory fit on decision-making outcomes (Camacho et al., 2003; Cesario et al., 2004).

In summary, while many of the limitations cited above stem from the use of the conjoint analysis technique, the technique's value has been established across various disciplines, such as marketing, cognitive psychology, and organizational behaviour – and thus we contend that these limitations do not overcome the theoretical and empirical contributions of this study.

CONCLUSION

Only recently have scholars considered whether attributes of the entrepreneur might interact with those of the investor in ways that bias decisions unique to certain VC–entrepreneur dyads (Franke et al., 2006; Matusik et al., 2006). To that end, it was our aim to investigate how similarity based on reasoning processes might function as a form of interaction bias and subsequently influence new venture investment decisions. Our findings suggest that interaction biases likely play a significant role in the decision-making process. These findings have important implications for heightened insight into venture capital decision-making processes and outcomes and suggest a theoretical lens through which to consider how and why it is that specific investors might evaluate specific start-ups in a systematically different way.

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APPENDIX 1: ATTRIBUTE AND LEVEL DESCRIPTIONS AS PRESENTED TO PARTICIPANTS

Economics of the Opportunity (*Economic Quality*)

- Superior (*high*): This opportunity is in an industry with high growth potential (high relative to other investments currently in your portfolio) and strong profit margins.

The venture business plan is scalable and has a clear exit strategy. In addition, the competitive position appears very defensible.
- Solid (*low*): This opportunity is in an industry with significant growth potential and average profit margins (meaning this opportunity meets your minimum requirements). It is not entirely clear at the moment how this business will scale up and what the exit strategy is. In addition, it appears that there will be several legitimate competitors.

Personal Characteristics of the Entrepreneur (*Founder Quality*)

- Proven (*high*): This deal was referred to you by a trusted associate who has referred good prospects to you in the past. The entrepreneur seems extremely committed to the venture and has a reputation for unquestionable integrity and character. He has worked extensively in the industry of this new venture and has some experience managing a start-up firm.
- Developing (*low*): This deal evolved after you happened to meet the entrepreneur at a local networking event. The entrepreneur seems extremely committed to the venture and has worked extensively in the new venture's industry but has never worked in a start-up firm.

Entrepreneur's Thought Processes Concerning the Opportunity (*Cognitive Process*)

- Shaping (*effectual*): The entrepreneur began the business in cooperation with personal contacts, building it in relatively small steps. The current marketing approach for growing the business is based on his deep experience in this particular industry and imagining what will be most effective. Although the opportunity is still very uncertain, he is convinced that his business model creates value by exploiting that uncertainty and shaping the competitive landscape in a way that is favourable to his firm. Product development is guided by a combination of the entrepreneur's unique view of how this problem can be solved and collaboration with customers. The entrepreneur clearly understands the forecasts of where the market is heading and believes they are incomplete because they don't incorporate the impact of this firm's innovations.
- Planning (*causal*): After detailed research into the market and competition related to this opportunity, the entrepreneur has focused on an interesting position for the venture. His understanding of the market is deep as a result of this research. The marketing approach is primarily built around anticipating competitive responses in the market. Although the opportunity faces significant uncertainty, he believes his business model can accommodate several of the most likely scenarios for the future of the market. Product development efforts have achieved several important benchmarks vs. competing solutions, and a 'roadmap' is laid out for the next few years. He is convinced of his ability to plan for the multiple likely directions the market may take.

APPENDIX 2: SAMPLE INVESTMENT SCENARIO

Opportunity: PHQ

This investment opportunity is characterized as follows:

- *Economics of the Opportunity: SUPERIOR*. This opportunity is in an industry with *high growth* potential (high relative to other investments currently in your portfolio) and *strong profit* margins. The venture business plan is *scalable and has a clear exit strategy*. In addition, the *competitive position appears very defensible*.
- *Personal Characteristics of the Entrepreneur: PROVEN*. This deal was *referred* to you by a trusted associate who has referred good prospects to you in the past. The entrepreneur seems extremely committed to the venture and has a reputation for *unquestionable integrity and character*. He has worked *extensively in the industry* of this new venture and has some *experience managing a start-up* firm.
- *Entrepreneur's Thought Processes Concerning the Opportunity: SHAPING*. The entrepreneur began the business in *cooperation with personal contacts*, building it in relatively small steps. The current marketing approach for growing the business is based on his deep experience in this particular industry and *imagining* what will be most effective. Although the opportunity is still very uncertain, he is convinced that his business model creates value by *exploiting that uncertainty and shaping the competitive landscape* in a way that is favourable to his firm.

  Product development is guided by a combination of the entrepreneur's unique view of how this problem can be solved and *collaboration with customers*. The entrepreneur clearly understands the forecasts of where the market is heading and *believes they are incomplete* because they don't incorporate the impact of this firm's innovations.

The following table serves to summarize the description above:

Economics:	SUPERIOR
Personal Characteristics:	PROVEN
Thought Processes:	SHAPING

ASSESSMENT: (Please circle the number that best represents your response)

What is the probability that you would invest in this deal?

Low probability	1	2	3	4	5	6	7	High probability

If you were to invest in this deal, what is the likely amount you would invest?

Lowest possible amount	1	2	3	4	5	6	7	Highest possible amount

Whether you invest or not, how successful do you think this opportunity will be?

Low success	1	2	3	4	5	6	7	High success

APPENDIX 3: DECISION-MAKING PROCESS INSTRUMENT (EXAMPLE)

Please use your imagination to put yourself in the context of each scenario, answering questions as if you were in the situation. Your information will be kept strictly confidential and used only for academic research.

Situation 1: Wearable Computing

During your 12-year tenure as an engineer at a major computer manufacturer, you work on your own time to invent a device that recognizes and responds to eye movements. You imagine it might make a great alternative to the computer mouse. You can make it rest on the user's head much like headphones and set it up so that point-and-click navigation is accomplished with even the most minor head and eye movements. You are convinced there is a huge potential for change in the way things are currently done, but when you attempt to interest your current company in licensing the idea from you, they are uninterested. There are no firms currently offering anything close to this, and you possess all of the technical skills to create the product effectively and efficiently. You quit your job to further develop this idea.

1. As you assemble information, you will:

No *Somewhat* *Yes*

1 2 3 4 5 Talk with people you know to enlist their support in making this become a reality.
1 2 3 4 5 Study expert predictions of where the market is 'heading'.

2. As you develop a marketing approach you will:

1 2 3 4 5 Forecast which segments will be most valuable and focus on them.
1 2 3 4 5 Focus on customer segments you can reach through your existing relationships.

3. When you think about the uncertainty of the market, you move forward anyway because:

1 2 3 4 5 Your expertise allows you to influence that uncertainty.
1 2 3 4 5 Your actions can create a future you value.

4. As you manage product development, you will measure success against:

1 2 3 4 5 The performance of your competitors' products.
1 2 3 4 5 The vision you and partner businesses create for the product.

5. Predictions of trends and demand in this market are:

1 2 3 4 5 Useful to create forecasts of what your business might accomplish.
1 2 3 4 5 Misleading, as they do not incorporate the impact of your firm.

6. In situations like this, it is important to base strategy on:

1 2 3 4 5 Forecasts of customer demand.
1 2 3 4 5 What you are capable of.

7. As you learn about the expectations other people have for this industry, you:

1 2 3 4 5 Discount their projections, as they have not accounted for the impact of your venture.
1 2 3 4 5 Form updated predictions of likely outcomes for the business.

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