

Toward a Theory of Entrepreneurial Cognition: Rethinking the People Side of Entrepreneurship Research

Ronald K. Mitchell*
Lowell Busenitz
Theresa Lant
Patricia P. McDougall
Eric A. Morse
J. Brock Smith

The failure of past “entrepreneurial personality”—based research to clearly distinguish the unique contributions to the entrepreneurial process of entrepreneurs as people, has created a vacuum within the entrepreneurship literature that has been waiting to be filled. Recently, the application of ideas and concepts from cognitive science has gained currency within entrepreneurship research, as evidenced by the growing accumulation of successful studies framed in entrepreneurial cognition terms. In this article we reexamine “the people side of entrepreneurship” by summarizing the state of play within the entrepreneurial cognition research stream, and by integrating the five articles accepted for publication in this special issue into this ongoing narrative. We believe that the constructs, variables, and proposed relationships under development within the cognitive perspective offer research concepts and techniques that are well suited to the analysis of problems that require better explanations of the contributions to entrepreneurship that are distinctly human.

Introduction

Our task in this special issue on information processing and entrepreneurial cognition is to contribute to a multidisciplinary view of the entrepreneur (MacMillan & Katz, 1992) in an effort to synthesize and give insight into the function of this fundamental worker in the job of wealth creation. At present, there still does not appear to be a satis-

* Note: All coeditors following the lead editor are listed in alphabetical order. Please send all correspondence to: Ronald K. Mitchell, Faculty of Business, University of Victoria, PO Box 1700 STN CSC, Victoria, BC, Canada V8W ZY2. email: mitch@business.uvic.ca

factory answer to the question: Why are some people and not others able to discover and exploit particular entrepreneurial opportunities?

It has been asserted that two broad categories of factors influence the probability that particular people will discover particular opportunities: 1) the possession of the information necessary to identify an opportunity, and 2) the cognitive properties necessary to exploit it (Shane & Venkataraman, 2000). According to these criteria, then, research that contributes to a better understanding of information processing and entrepreneurial cognition has an important role to play in the development of the entrepreneurship literature. But as noted in our call for submissions for this special issue, we also believe that studies in entrepreneurship have not fully explored the possibilities that are offered by social cognition, managerial cognition, or information processing theory. Accordingly, our approach to fostering a multidisciplinary view in this special issue has been to try to select articles that effectively articulate the usefulness of these theories in explaining the function of entrepreneurs as key persons in the entrepreneurial process.

We believe that the works published within this special issue reflect remarkable progress in extending the study of the entrepreneur's role in new venture formation. And, as often occurs in the earlier stages of the development of a research stream, we find that this progress has now defined even more clearly the scope and breadth of a rather large undertaking. For example, we observe that the research accepted for publication in this special issue may be broadly grouped into 1) those articles that define and build upon the foundation of past entrepreneurship research, and 2) those articles that further delineate the outlines of the entrepreneurial cognition research horizon. And because the number of accepted articles justifies a two-volume series, we shall present them in these two groupings.

In this first volume of the special issue we report the first grouping: studies that define and build upon the foundation of past entrepreneurship research. Within the second volume will appear the second grouping: articles that seek to expand the research horizon and to help suggest a useful future research agenda for the entrepreneurial cognition research domain. Accordingly, in this introduction to Volume 1, we turn first to the research foundation upon which rests our present understanding of the function of the entrepreneur in new venture formation.

The Entrepreneur and New Venture Formation

Within the multidisciplinary tradition of entrepreneurship research, theory that attempts to explain the relationship between the entrepreneur and new venture formation stems from several fields: economics, personality psychology, and strategy. Each of these approaches makes its contribution, but each also has its shortcomings.

First, for example, economic theories of entrepreneurship view the contribution of the entrepreneur to be the creation of new enterprise (Low & MacMillan, 1988; Rumelt, 1987; Schumpeter, 1934), clearly establishing an outcome-based approach to understanding new venture formation. However, the economics stream continues to be in need of effective operationalization. For example, articles advocating economic theories of entrepreneurship often leave the empirical tests to future research (Baumol, 1993; Bull & Willard, 1993). And while economic theories have been useful in helping to identify what entrepreneurship is and when it occurs, they have been less beneficial in helping to explain the more micro questions of how and why.

Second, during the past 35 years, characteristics, or trait-based research (Coulton & Udell, 1976; McClelland, 1965; McClelland, 1968) has attempted to describe the entre-

preneurial personality as the key component in new venture formation, giving needed attention to the contributions of people themselves to the entrepreneurial process. But efforts to isolate psychological or demographic characteristics that are common to all entrepreneurs, or are unique to entrepreneurs, have generally met with failure due to weak, disconfirming, or nonsignificant results. At this point in time researchers contributing to the existing entrepreneurship literature have been unable to report a unique set of personality traits that characterize the entrepreneur (Brockhaus & Horowitz, 1986; Sexton & Bowman-Upton, 1991; Shaver, 1995).

Third, as an outgrowth of strategic management research, attention during the past 15 to 20 years has been focused on how the performance of the venture itself is influenced by the entrepreneur. This stream of research may be termed the new venture performance—based approach, and has been very useful in linking and demarcating entrepreneurship research relative to research in strategic management (Herron, 1990; Kunkel, 1991; McDougall, 1987; Sandberg, 1986; Shane & Venkataraman, 2000). However, until Herron (1990) demonstrated that entrepreneurial skill and skill propensity are related to new venture performance, the persistent attempts of researchers in the new venture performance stream to link the attributes of the entrepreneurial individual to performance (Cooper, Willard, & Woo, 1986; MacMillan & Day, 1987; Sandberg, 1986) met with little success.

Yet, despite these research challenges, practitioners and venture capitalists have continued to consider the individual who forms the venture to be critical to its success (Hall & Hofer, 1993; Herron, 1990; Sandberg, 1986; Shane & Venkataraman, 2000; Stuart & Abetti, 1990). Thus, actual practice within the entrepreneurship community has differed from much of the research reported to date, and therefore, new approaches that explain the contribution of the entrepreneur to new venture formation continue to be needed.

Enter Entrepreneurial Cognitions

The cognitive perspective provides us with some useful lenses with which to explore entrepreneur-related phenomena and to address some of the meaningful issues that to this point we have been largely ineffective in probing. As previously noted, despite researchers' disillusionment with the trait approach in entrepreneurship that began in the 1980s and continued throughout much of the 90s, the fundamental idea that entrepreneurs are members of a homogeneous group that is somehow unique, has not gone away. Entrepreneurs themselves, writers in the popular press, as well as those who have worked with entrepreneurs, persistently ignore the recent findings that disconfirm the trait approach and continue to openly assume and act upon the idea that there exists entrepreneurial uniqueness among individuals. And in our observation, until the cognition view emerged, it was somewhat ironic that entrepreneurship researchers could not clearly identify systematic (theoretical) reasons for the uniqueness of entrepreneurs, while those who were immersed within the entrepreneurship world *knew* that these people were somehow distinct.

The assertions of the cognitive view of entrepreneurship represent a refreshing change: the articulation of a theoretically rigorous and empirically testable approach that *does* systematically explain the role of the individual in the entrepreneurial process. Based upon the research that we have reviewed in preparing this special issue, we are pleased to report that the cognitive viewpoint may be seen to serve well as an effective tool in probing and explaining these previously unexplained phenomena within the entrepreneurship research domain.

The research reported in this special issue is therefore set within the context of past entrepreneurial cognition research, which has examined both problematic and positive

aspects of entrepreneurial cognitions. For example, some of the problematic consequences of entrepreneurial cognitions have been argued to occur in entrepreneurial environments characterized by information overload, high uncertainty or novelty, strong emotions, time pressure, and fatigue. These include counterfactual thinking, affect infusion, self-serving bias, planning fallacy, and self justification (Baron, 1998); overconfidence or representativeness errors (Busenitz & Barney, 1997); and overconfidence, illusion of control, and misguided belief in the law of small numbers (Simon, Houghton, & Aquino, 2000). Some of the positive consequences include making the venture creation decision using cognitive mechanisms, such as expert scripts (Mitchell et al., 2000).

Specifically, then, the entrepreneurial cognitions view offers to help us understand how entrepreneurs think and “why” they do some of the things they do, and in doing so, to provide a theoretically rigorous and testable argument for such distinctiveness. Stated differently, when one is interested in entrepreneurship-related phenomena, it now appears to be essential for researchers to credibly account for the role of the individual entrepreneur; and the cognitive view provides some of the necessary research machinery to do so. We therefore see entrepreneurial research with a cognitive foundation to be on the rise today, not because of some prior breakthroughs, but because there remains a huge void waiting to be filled that an extension of the multidisciplinary tradition in entrepreneurship research—utilizing the relevant tools from cognition-related disciplines (MacMillan & Katz, 1992)—can address.

Definitions for Entrepreneurial Cognition Research

Given relatively recent scholarly forays into understanding how entrepreneurs think and make decisions, there is a need for definitional development along with some discussion of relevant assumptions. In this volume of the special issue, we seek to define the term “entrepreneurial cognitions.” To arrive at the combined meaning of these two words, we consider the domain of each term separately.

Entrepreneurial. One way of conceptualizing entrepreneurship is to consider it to be an intersection or nexus of individuals or teams, opportunity, and modes of organizing (Busenitz et al., 2003). Entrepreneurship can be viewed in its essence to be individuals or teams, creating works, such as products and services, for other persons in a marketplace (Mitchell, 2002, pp. 179, 182). In other words, entrepreneurship is about individuals who create opportunities where others do not, and who attempt to exploit those opportunities through various modes of organizing, without regard to resources currently controlled (Stevenson & Jarillo, 1990).

Cognitions. Cognition and cognitive psychology concern themselves with the study of individual perceptions, memory, and thinking (Estes, 1975). Cognitions have been defined as all processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used (Neisser, 1967). As psychology scholars began to recognize the limitations of the earlier behaviorist approach (Skinner, 1953; Watson, 1924), cognitive psychology emerged to help explain the mental processes that occur within individuals as they interact with other people and the environment around them. The development of social cognition theory followed to specifically manage this subcategory of problems: those that require an explanation of individual behavior as it is shaped by

the person-environment interaction. Social cognition theory considers that individuals exist within a total situation or *configuration of forces* described by two pairs of factors: one being *cognition* and *motivation*, and the other being the *person* in the *situation* (emphasis in original) (Fiske & Taylor, 1984, pp. 4–5). Social cognition theory, for example, introduces the idea of knowledge structures: mental models (cognitions) that are ordered in such a way as to optimize personal effectiveness within given situations. Thus, where entrepreneurship consists of individuals and teams creating works for other persons within a market environment, the concepts developed in cognitive psychology are increasingly being found to be useful tools to help probe entrepreneurial-related phenomena.

Entrepreneurial Cognitions. Our definition of entrepreneurial cognitions builds from the previous research noted above. We define entrepreneurial cognitions as follows: *entrepreneurial cognitions are the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth.* In other words, research in entrepreneurial cognition is about understanding how entrepreneurs use simplifying mental models to piece together previously unconnected information that helps them to identify and invent new products or services, and to assemble the necessary resources to start and grow businesses. We offer this definition as a useful beginning point for further work in this field because it incorporates thinking and perception issues developed by cognitive psychologists, while comprehending the domain of entrepreneurship research.

The Present Context

The development of entrepreneurial cognition research has a relatively short history. But it is nevertheless within this context that the articles of this first special issue volume are set. In this section of our article we therefore summarize—from our nonexhaustive vantage point, we hasten to add—the present context as we see it. In the subsequent section, we then introduce the articles in Volume 1.

It was in the early to mid-1990s that the terms entrepreneurs' cognitions (Bird, 1992) and entrepreneurial cognition (Busenitz & Lau, 1996) began to gain currency, and entrepreneurial cognition research emerged. For example (according to our chronology, at least) some of the first direct work in entrepreneurial cognitions was done in the areas of cognitive biases and heuristics in strategic decision making (Busenitz, 1992), and in feasibility and desirability perception, planned behavior, and self-efficacy (Krueger, 1993; Krueger & Carsrud, 1993; Krueger & Dickson, 1994, respectively). Near this same time, entrepreneurial cognition-based constructs were first used to distinguish entrepreneurs from nonentrepreneurs (Mitchell, 1994). Then Palich and Bagby (1995) used cognitive theory to explain entrepreneurial risktaking, and Mitchell and Chesteen (1995) demonstrated how a cognition-based entrepreneurial instruction pedagogy was superior to the traditional "business plan only" approach to teaching entrepreneurial expertise.

The next wave of entrepreneurial cognition research was led by Baron (1998), who argued that consideration of several cognitive mechanisms such as counterfactual thinking, attributional style, the planning fallacy and self-justification, might have significant usefulness in explaining why entrepreneurs do the things that they do. Then McGrath (1999), and Simon, Houghton, and Aquino (2000) provided analyses of how cognitive

errors, such as overconfidence, illusion of control, and misguided belief in the law of small numbers, and so forth shape such phenomena as the creation of real options for entrepreneurs. Busenitz and colleagues (e.g., Wright et al., 2000; Alvarez & Busenitz, 2001) have now utilized cognitive models to explain how the heuristic-based logic that appears to be stronger in entrepreneurs, helps to explain how entrepreneurs think and make strategic decisions; and Mitchell et al. (2000) have utilized entrepreneurial cognition constructs to explain the venture creation decision in the cross cultural setting. Most recently, the use of cognitive constructs has been further extended to explain cognitive complexity in aboriginal economic development and in family business (Mitchell & Morse, 2002; Mitchell, Morse, & Sharma, forthcoming, 2003, respectively). It is therefore upon this foundation that the five articles accepted for publication in this special issue are placed.

Articles in This Issue

Submissions were received from authors, or author teams, in five countries. And forty-seven scholars accepted our invitation to serve as reviewers. We thank all who submitted and reviewed articles for this special issue. Articles accepted for this volume of the special issue underwent one or two rounds of revision, and then were further developed and refined at the Conference on Information Processing and Entrepreneurial Cognition, held at the University of Victoria's Dunsmuir Lodge in July of this year. Overall we received 26 submissions to the special issue, five of which appear in this volume. These are briefly introduced in the following paragraphs.

In the first article, "The Relationship Among Biases, Misperceptions, and the Introduction of Pioneering Products: Examining Differences in Venture Decision Contexts," Mark Simon and Susan Houghton provide an overview of the field as it applies to the decision to pioneer, and in doing so develop a conceptual model of hypotheses linking information context variables (firm age and pioneering product decision context) to information search process variables (the extent to which the decision-oriented search is external, active, and personal). Information search process characteristics are then linked to the cognitive biases of illusion of control, "belief in the law of small numbers," and reasoning by analogy. These biases are further linked to other biases thought to be directly linked to the decision to pioneer. These include overestimating demand, underestimating competitor response, and misjudging the need for complementary assets. While previous research has examined cognitive biases, it has not thoroughly detailed the relationships between certain of the specific entrepreneurial cognition constructs in a specific context, such as the decision to pioneer.

In the second article of this special issue, "Opportunity Evaluation Under Risky Conditions: The Cognitive Processes of Entrepreneurs," Hean Tat Keh, Maw Der Foo, and Boon Chong Lim, empirically examine the moderating effect of risk perception on the relationships among four cognitive bias constructs and opportunity evaluation. This study, a replication and extension of Simon, Houghton, and Aquino's (2000) article, uses regression analysis and a sample of 77 opportunistic (serial) entrepreneurs gained from a census of the top 500 small and medium-sized enterprises (SMEs) in Singapore. The cognitive bias "belief in the law of small numbers" is found to have a significant positive direct relationship to opportunity evaluation, while the significant positive effect of illusion of control is completely mediated by risk perception. These findings both support and extend previous empirical work conducted with an MBA student sample, further suggesting the need to examine entrepreneurial cognition in context.

In the third article, "Inventors and New Venture Formation: The Effects of General Self-Efficacy and Regretful Thinking," Gideon Markman, David Balkin, and Robert Baron report their empirical test of differences between technical entrepreneurs and technical nonentrepreneurs in general self-efficacy and regretful thinking. Employing a methodologically rigorous design, the authors use a random sample of 217 holders of surgical device patents issued in 1997 and 1998, to test their hypothesized relationships with a homogeneous group of entrepreneurs with a valid comparison group matched in technological domain, experience, and time. In Manova analysis, after controlling for age, formal education, and number of patents held, meaningful cognitive differences are observed in self-efficacy. Both quantitative and qualitative measures of regretful thinking are used, and while the total number of regrets are found to be consistent between the two groups, the nature and magnitude of the regrets are found to differ.

Dean Shepherd and Norris Krueger in the fourth article, "An Intentions-Based Model of Entrepreneurial Teams' Social Cognition," develop a conceptual model of corporate entrepreneurial intention based on Ajzen's Theory of Planned Behavior, which helps examine and interpret, from a social cognition perspective, key antecedents of corporate entrepreneurship, and opens to some extent the "black box" of intention antecedents. Building on Krueger's earlier work (e.g., Krueger, 1993) corporate entrepreneurial intention is posited to be a function of entrepreneurial feasibility and desirability. Entrepreneurial experiences provided by enactive mastery, feedback, training, and vicarious learning are proposed to effect collective (group) efficacy, a key consideration in feasibility assessments. This article helps extend the cognitive perspective of entrepreneurship to the team or group level of analysis, and in addition, gives thoughtful consideration to issues of anthropomorphism and measurement.

Finally in this volume, Elizabeth Gatewood, Kelly Shaver, Joshua Powers, and William Gartner in their article, "Entrepreneurial Expectancy, Task Effort, and Performance," utilize an internet-based experimental design involving undergraduate students to examine the effect of entrepreneurial performance expectancy on the motivation of persons to persevere with an entrepreneurial task. Feedback (positive or negative) on entrepreneurial ability given prior to an entrepreneurship case evaluation task was found not to affect objective measures of task effort or independent qualitative assessment of task performance—for men or women. Positive feedback was found, however, to affect expectancies for future business start-ups. In this case, lack of support for strong theory-based hypotheses is interesting in that the results are consistent with anecdotal evidence of strong perseverance in the face of considerable negative feedback in entrepreneurial practice.

Concluding Thoughts

Entrepreneurial cognition theory. Is there such a thing?

The editors of the ET&P Special Issue on Information Processing and Entrepreneurial Cognition set out to answer this question. Beginning with our call for submissions, we asked for articles that could help us expand our understanding of the manner in which cognition is associated with entrepreneurship, entrepreneurial performance, and the creation of economic independence by individuals, and within firms, industries, and economies.

Based on our reading of the submissions received, we observe significant progress toward the development of a cognitive perspective of entrepreneurship. However, compliance with accepted research practice suggests that for a theory *per se* to exist, there

must necessarily be a statement of relationships between units observed or approximated (variables or constructs) in the empirical world, that is bounded by assumptions about values, time, and space, which is both 1) falsifiable and 2) useful (Bacharach, 1989; Cohen, 1980; Dubin, 1969; Nagel, 1961).

In this regard, we believe that "entrepreneurial cognitions" as we have defined them in this article, qualify—for purposes of theory building—as units approximated in the empirical world. We note with satisfaction that the articles accepted for publication within this special issue contribute well to the specification of such constructs (e.g., cognitive biases, heuristics, opportunity evaluation); such variables (e.g., overconfidence, planning fallacy, general self-efficacy, regretful thinking, the entrepreneurial decision); and such proposed or hypothesized relationships among them (e.g., as in Markman et. al.: between level of regretful thinking and technology entrepreneurship/nonentrepreneurship). We will focus more attention upon the boundaries and assumptions that are necessary for effective theory building within Volume 2 of the special issue, as we look toward the future of research in the area of entrepreneurial cognition.

We also believe that the articles presented within this volume demonstrate both falsifiability—the possibility that the empirical scientific system (that is under construction within entrepreneurial cognition research) may be "refuted by experience" (Popper, 1959, p. 41)—and utility—the capability to both explain and predict (Bacharach, 1989, p. 501). In fact, as we have argued earlier, we believe the utility of the entrepreneurial cognition perspective to be sufficient to allow us to suggest that—after some period of scholarly frustration over the past three decades—there likely now exists, within entrepreneurial cognition research, sufficient technical machinery to give researchers the means to better define and measure the contribution of "entrepreneurial people" to the tasks of entrepreneurship: opportunity evaluation, venture creation, and wealth building in general.

What has yet to be done?

Certainly, as noted above, the boundary issues must be clarified. In addition, as editors working with reviewers, we have noted that the newness of the ideas and concepts being transferred from cognitive science into the domain of entrepreneurship has highlighted the need for a broader consensus among entrepreneurship researchers on the elements of theory that are germane (constructs, variables, and relationships), and on the methods that are acceptable (samples, measures, and analysis techniques). We believe that the articles in Volume 1 contribute well to building theory elements, using both theoretical and empirical analysis to do so. It is our intention in Volume 2 to round out the discussion of theory, and further, to tackle questions of methodology.

As an editorial team we are very grateful for the opportunity presented to us by ET&P to compile this special issue. We especially thank Ray Bagby for his early and enthusiastic support of this project. Within the two volumes of this special issue we have been able to assemble a high quality representation of the exciting research in this emerging area of study.

So we invite you to both "tune in," and "stay tuned," as the entrepreneurial cognition perspective continues to develop. Our impression at the Victoria Conference on Information Processing and Entrepreneurial Cognition was that the scholars, who have been steadily migrating toward this research approach from a variety of disciplines, are a highly inclusive and welcoming group. We do not think it to be inappropriate, therefore, to invite all who might be interested, to consider including the cognitive perspective within their own research, especially when attempting to capture and explain the portion of entrepreneurial variance that stems from entrepreneurial thinking: the "people" side of entrepreneurship research.

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Ronald K. Mitchell, jointly appointed Associate Professor, Faculty of Business, University of Victoria, and The Guanghua School of Management, Peking University

Lowell Busenitz, Associate Professor, University of Oklahoma

Theresa Lant, Associate Professor, Stern School of Business, New York University

Patricia P. McDougall, Professor, Kelley School of Business, Indiana University

Eric A. Morse, Assistant Professor, Richard Ivey School of Business, University of Western Ontario

J Brock Smith, Associate Professor, Faculty of Business, University of Victoria

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