

1042-2587
© 2007 by
Baylor University

The Central Question in Entrepreneurial Cognition Research 2007

Ronald K. Mitchell
Lowell W. Busenitz
and¹
Barbara Bird
Connie Marie Gaglio
Jeffery S. McMullen
Eric A. Morse
J. Brock Smith

In this article, we take note of advances in the entrepreneurial cognition research stream. In doing so, we bring increasing attention to the usefulness of entrepreneurial cognition research. First, we offer and develop a central research question to further enable entrepreneurial cognition inquiry. Second, we present the conceptual background and some representative approaches to entrepreneurial cognition research that form the context for this question. Third, we introduce the articles in this Special Issue as framed by the central question and approaches to entrepreneurial cognition research, and suggest how they further contribute to this developing stream. Finally, we offer our views concerning the challenges and opportunities that await the next generation of entrepreneurial cognition scholarship. We therefore invite (and seek to enable) the growing community of entrepreneurship researchers from across multiple disciplines to further develop the “thinking–doing” link in entrepreneurship research. It is our goal to offer colleagues an effective research staging point from which they may embark upon many additional research expeditions and investigations involving entrepreneurial cognition.

Introduction

Echoing Popper's (1959) notion that general knowledge growth is propelled by the growth of specialized knowledge, we focus this article on the progress of the emerging entrepreneurial cognition research stream as it contributes to overall knowledge growth in the field of entrepreneurship. Specifically, we take note of the flow of advances in the entrepreneurial cognition research stream and of how this stream is increasingly being recognized as a critical perspective for understanding entrepreneurship-related phenomena. The more recent advances consist of innovation that occurred earlier in this decade,

Please send correspondence to: Ronald K. Mitchell, tel.: (806) 742-1548; e-mail: ronald.mitchell@ttu.edu.

1. Associate editors are listed in alphabetical order.

as definitions were developed (e.g., Mitchell, Busenitz et al., 2002) and the boundaries and the exchanges of entrepreneurial cognition research with its contributing fields were made explicit (Mitchell et al., 2004). In this article, we commence a transition from innovation through diffusion toward legitimization (e.g., Lawrence, Winn, & Jennings, 2001) by identifying the central research question that emerges from work to date in entrepreneurial cognition. Hopefully this research question can provide a conceptual staging point from which researchers embark upon future explorations.

Although not exhaustive, our intensive editorial involvement in two conferences and three Special Issue (SI) volumes on entrepreneurial cognition has created within the Editorial Team a perspective that we believe will be constructive to building further research in the area. In this third SI article, we specifically address the development of research questions concerning entrepreneurial cognition inquiry. With this article and the other research articles presented within this SI volume, we therefore invite and seek to enable a growing community of entrepreneurship researchers from across multiple disciplines to further develop the “thinking–doing” link in entrepreneurship research.

One of the main activities of the Second Entrepreneurial Cognition Conference (the 2005 Conference held at the Ivey Business School at the University of Western Ontario) was to spend some time working on the central questions in entrepreneurial cognition research. A variety of possible questions were developed (Appendix A). Since the conference, the Editorial Team has continued to discuss and work on this issue. After an extensive dialogue, what has emerged is a central question in entrepreneurial cognition research.

This article proceeds in the following manner. First, we discuss the central research question to further enable entrepreneurial cognition inquiry. Second, we present the conceptual background and several representative approaches to entrepreneurial cognition research that form the context for this question. Third, we introduce the articles in this SI as framed by the central question and approaches to entrepreneurial cognition research and suggest how they further contribute to this developing stream. Finally, we offer our views concerning the challenges facing the next generation of entrepreneurial cognition scholarship.

The Central Research Question

Over the past 5 years, many scholars in the field of entrepreneurial cognition have been developing the research stream based upon a definition that is consistent with, and flows from, the previously noted beginnings. In our 2002 article, we defined entrepreneurial cognitions to be: *the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation and venture creation and growth* (Mitchell, Busenitz et al., 2002, p. 97). We note that in this definition, the key elements: knowledge structures (whether heuristical or scripted) and decision making (including assessment and judgment) are set within the larger context of entrepreneurship’s distinctive **and** inclusive domain/situation (Mitchell et al., 2004) of opportunity evaluation, venture creation, and growth.

At the Second Conference on Entrepreneurial Cognition at the Ivey Business School (fall 2005), we spent a substantial block of time discussing a variety of research questions that are germane to the area (Appendix A). Some of the questions generated were more extensive than others; but they all seem to further elaborate aspects of a simple four-word query: “*How do entrepreneurs think?*” Whether or not researchers are probing individual differences and why some people make better entrepreneurs than others, studying how

entrepreneurs develop unique knowledge structures and become experts in processing information, and/or examining individual contributions to the entrepreneurial function itself, it appears that such research emerges from the desire to better understand how entrepreneurs think. In Appendix A, we note and summarize the developmental discussions accomplished by our fellow scholars at the 2005 conference in pursuit of a better understanding of how entrepreneurs think. The integrated research question produced at the Ivey Business School conference served as our beginning point for the analysis undertaken in this article.

Accordingly, we seek to prompt and facilitate the development of additional research questions central to the study of entrepreneurial cognition. Baron (2004) noted that there are three basic questions that are central to the field of entrepreneurship. They are: (1) Why do some persons but not others choose to become entrepreneurs? (2) Why do some persons but not others recognize opportunities for new products or services that can be profitably exploited? (3) Why are some entrepreneurs so much more successful than others? In his article, Baron (2004) goes on to effectively argue that the cognitive perspective can make important contributions in helping to address all three of these questions.

Baron's (2004) conceptualization is very effective in helping entrepreneurial cognition researchers see how their efforts address vital entrepreneurship issues. We also recognize, however, that even greater clarity and focus can yet be brought to bear for the benefit of those who are seeking to better understand the mental processes of entrepreneurs. Thus, to stimulate the turning of research attention toward a better understanding of entrepreneurial mental processes, we argue here for questions in entrepreneurial cognition research that spring from a fundamental starting point: "*How do entrepreneurs think?*" (Note that this is distinct from the more general question of "How people think?" because we are concerned with how individuals create wealth through the identification and exploitation of market opportunities.) In the following section, we trace the conceptual foundations and approaches as a background for this inquiry.

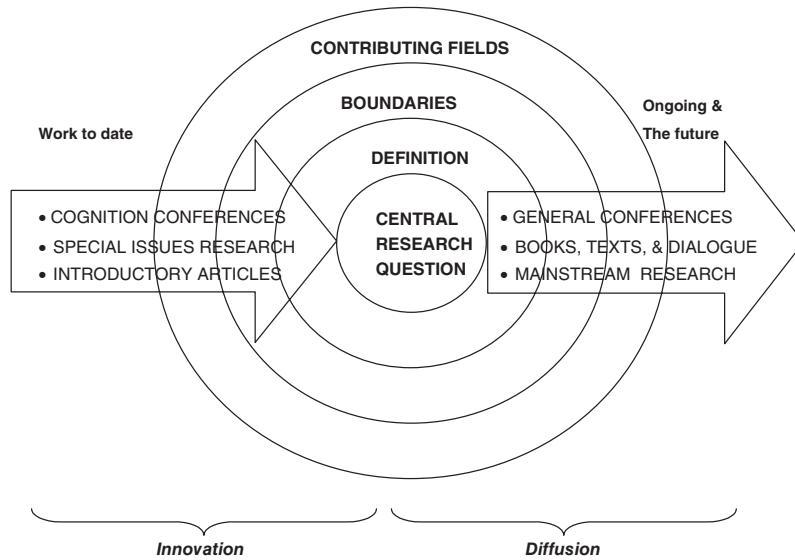
Conceptual Foundations and Approaches

A wide variety of issues, puzzles, and problems have prompted inquiry into, and as a result formed the research context for the area we now call entrepreneurial cognition research. Several such questions include the following: Why do some people become entrepreneurs while other equally (or more) talented people do not? Why is it that some people see opportunity while others, encountering the same experience and information, do not? Why do some people act and turn their ideas into business opportunities while others are satisfied to say that they had thought of that too? Why are some people content to stop after creating an invention while others cannot be content until their invention dominates the marketplace? What do entrepreneurs do? How do they do it? These questions address compelling issues that have long been central to scholars investigating entrepreneurship phenomena.

From our vantage point, we suggest that beneath each of the questions that have given rise to the study of entrepreneurial cognition lies an underlying assumption: that entrepreneurship concerns itself with distinctive ways of thinking and behaving. This is also consistent with many seminal theorists in the field (e.g., Kirzner, 1979; McClelland, 1976; Schumpeter, 1934). Presently, advances in social psychology and specifically in the area of social cognition as it might be applied to the study of how entrepreneurs think (Palich & Bagby, 1995; Shaver & Scott, 1991) now permit entrepreneurship investigators to address the thinking–doing connection of entrepreneurship more directly. This is in

Figure 1

Field Development in Entrepreneurial Cognition Research



contrast to using proxy variables that produced equivocal results in previous research (e.g., demographic differences, internal locus of control, need for achievement, or risk-taking propensity) that led to a hiatus in individual-level entrepreneurship research for more than a decade (early to mid-1980s to mid-1990s).

The scientific milestones that mark the path of innovation in entrepreneurial cognition research have been set in place according to a “boundaries and exchange” logic (Busenitz et al., 2003; Mitchell et al., 2004) beginning with concepts from contributing fields, marking the boundaries of the new field through a cross-disciplinary exchange, and proceeding to a working definition of the field. The process of resolving distinctive versus inclusive domain tensions that provides this dynamism thereby draws concepts from contributing fields (e.g., entrepreneurship research and cognition research) and establishes boundaries within which an exchange-based synthesis is invoked and a definition is induced as represented in Figure 1. As illustrated in Figure 1, the next step is, we believe, to focus on the central research questions that can serve as the pivot point that can rechannel outward research innovation energies that have more recently been directed inward. By “outward” we mean toward the coalescence of the entrepreneurial cognition research domain and toward a broader diffusion of entrepreneurial cognition work within the research community. Consequently, we again appeal to a boundaries and exchange logic “... to provide a helpful lens through which to understand the progress and legitimization of the entrepreneurial cognition domain” (Mitchell et al., 2004, p. 507).

In applying this logic, we first consider the conceptual foundations and then take note of several approaches that have been built upon them. In developing the fundamental conceptual cornerstones upon which central questions in entrepreneurial cognition research is based, we develop our explanation beginning with the more general and proceeding to the more specific: from articulating a foundation/general definition of cognitions toward our setting within this background, the definition of *entrepreneurial*

cognitions that we have previously offered (please see Mitchell, Busenitz et al., 2002). Our intention through this discussion is to provide a narrative from which readers can assess the developmental process of the field, and within it, also assess our later assertions regarding the centrality of certain research questions for the further enabling of entrepreneurial cognition research.

Foundations

We start with Neisser's (1967) widely recognized perspective, which defines cognition to be: *all processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used*. Because entrepreneurial cognition research concerns the foregoing processes as they occur within a socioeconomic setting, recent research has drawn heavily (but more often only implicitly) upon the field of social cognition. The social cognition literature assists in describing the conceptual locale inhabited by the study of entrepreneurial cognition such that useful further definition is enabled (Palich & Bagby, 1995). By way of illustration, one major social cognition perspective considers individuals to exist within a total situation—a psychological field or gestalt—which is a configuration of forces described by two pairs of factors: one being the *person* in the *situation*, and the other being *cognition* and *motivation* (emphasis in original) (Fiske & Taylor, 1984, pp. 4–5). A recent definition of social cognition as *the ways in which we interpret, analyze, remember, and use information about the social world* (Baron, Byrne, & Branscombe, 2005) supports the idea that models used to conceptualize individual entrepreneurial behavior should therefore approximate a comprehensive reality (the person-in-situation **and** cognition and motivation) as understood when information about these two factor pairs is processed by a given individual (Fiske & Taylor, 1984, pp. 5, 16). This gestalt-based conceptualization provides a means of comprehending both entrepreneurial cognition research to date and the future challenges for research as we attempt to articulate, justify, and further refine questions that are central to the progress of the entrepreneurial cognition research stream. Like Baron (2004), our assumption here is that the cognitive science literature has much to offer in terms of foundations and conceptual tools with which to explore entrepreneurship phenomena, and we very much endorse such exchanges. We also assume that there are boundaries and that entrepreneurship research has its own domain (Mitchell et al., 2004). Some of this domain is unique but some of it also overlaps with other parent disciplines such as cognitive psychology.

At first glance, it would seem that the central question of a cognitive approach to the study of entrepreneurship would lead us to simply ask “how do entrepreneurs think, reason, and behave?” However, being insufficiently bounded, this question provides little, if any, basis to suggest that entrepreneurs think, reason, and behave differently from others concerning (for example) taking a shower, eating, buying a house, coaching softball, and so forth. Thus, a more directed question founded in a social cognition-based (person IN situation) view might read: *“How do entrepreneurs think, reason, and behave such that they create value and wealth through the identification and implementation of market opportunities?”* Accordingly, when we offer (as we have in the previous discussions) the succinct question *“How do entrepreneurs think?”* it is within the context of new value creation as the focal situation/objective that we intend it to be applied.

Our paying attention to a focal objective provides a necessary point of convergence for theory and research in entrepreneurial cognition. This is because “focused-thinking”-type questions incorporate lessons cognitive psychologists have learned the hard way: that successful theory and research about cognition and cognitive processes requires investigators to pay strict attention to the tenets of human agency (e.g., even the wackiest, most

out-of-the-box creative thinker has a purpose: a problem to solve). Thus as a field, our discovery and our articulations concerning the patterns involved in any entrepreneurial person's perceptual and thinking processes make more sense in the context of a purpose or problem.² Accordingly, because explanations of behavior, especially cognitive behavior, are domain (context) specific, we can expect the patterns of entrepreneurial cognition that we study to vary depending on a person's purpose or problem.

To proceed to ground effectively questions that are central to research, we therefore rely upon the assumption of directed human agency as it is manifest in the study of human decision making under information limitation-induced uncertainty (e.g., Simon, 1979). This addition—of the element of information-starved responses to economic uncertainty—reflects the reality that many people engaged in entrepreneurial activities appear *not* to perform an elaborate, deliberative, thorough evaluation of the best way in which to describe a problem or decision, nor do they conduct meticulous cost-benefit analyses on all possible alternatives before choosing the option that produces the highest return on investment. In fact, some of the more recent approaches to the study of entrepreneurial cognitions (e.g., entrepreneurial heuristics theory [Busenitz & Barney, 1997], entrepreneurial alertness theory [Gaglio & Katz, 2001], entrepreneurial expertise/script theory [Mitchell, 1994; Mitchell, Smith, Seawright, & Morse, 2000], effectuation theory [Sarasvathy, 2001a; Sarasvathy & Simon, 2000]) consider the rational model to be compromised as entrepreneurs address this essential task: value creation-driven opportunity identification. We therefore examine each approach in more detail.

Approaches

We ask: If entrepreneurs do not follow the normative/rational model in their thinking, what are they following? What do their cognitive processes and cognitions look like, and how do these lead to the creation of value and wealth? As noted, several substreams of research have emerged to address these questions. Some of these approaches focus more on the cognitive shortcuts people use instead of using the logical-rational model. Sometimes these shortcuts (cognitive heuristics) can be beneficial and even produce superior results. Researchers exploring, for example, entrepreneurial alertness, expert-based scripts/schema/schemata, counterfactual thinking, mental simulations, cognitive style, and so forth have produced provocative models of the ways in which entrepreneurs use beneficial shortcuts to identify opportunities or to pursue venture start-up. In other situations, these shortcuts can lead to errors: erroneous evaluations and decisions. Further research will no doubt shed light on the relationship between cognition and (for example) why entrepreneurs attempt to preserve and hang on when, in fact, the situation calls for an efficient failure. Other approaches such as effectuation focus more on what the entrepreneur *does and how* the situation effects the entrepreneur's thinking.

We briefly summarize in the following discussion the entrepreneurial cognition approaches that have been developed to this point in time. We hasten to note that entrepreneurial cognition research is very much in the early stages of development. Our purpose in presenting these developing perspectives is to generate interest in testing and extending some of the theoretical models that have been developed to encourage interested scholars to rigorously replicate and build upon the seminal studies and to expand

2. Entrepreneurial cognition scholars have addressed this question in the examination of entrepreneurial intentions (e.g., Krueger & Carsrud, 1993); and in the examination of perceptual aspects such as self-efficacy, and feasibility and desirability perceptions (e.g., Krueger, 1993; Krueger & Dickson, 1993, 1994).

generally the further investigation of entrepreneurial cognitive dynamics and processes to all areas of the discipline's domain (e.g., new, small, and family businesses, corporate entrepreneurship, economic development, institutional entrepreneurship, etc.). Furthermore, we see complementarities among these various approaches for better understanding how entrepreneurs think.

Over the past decade, then, the entrepreneurial cognition literature has seen a substantial development in the study of thinking and decision making, especially in the examination of cognitions relating to *entrepreneurial* decision making. The perspectives that we address here include: (1) the use of heuristic-based logic (e.g., Baron, 1998; Busenitz & Barney, 1997; Simon, Houghton, & Aquino, 2000); (2) perceptual processes/entrepreneurial alertness (e.g., Gaglio & Katz, 2001; Kirzner, 1979, 1985); (3) the entrepreneurial information processing-based expertise approach (e.g., Gustavsson, 2004; Mitchell, 1994; Mitchell et al., 2000; Mitchell, Smith et al., 2002); and (4) the effectuation approach (Sarasvathy, 2001a, 2001b). In many ways, these explanations are complementary and spring from common roots.

Heuristics-Based Logic. "Heuristics" refers to simplifying strategies that individuals use to make decisions (Tversky & Kahneman, 1973, 1974). The heuristic-based logic approach argues that individuals and situations do vary in the extent to which these decision shortcuts are used (Busenitz & Barney, 1997). Furthermore, heuristics in general and entrepreneurial decision making specifically are often thought to be: (1) at least partially subjective; (2) influenced by beliefs with origins in specific methods for solving problems for which no formula exists; and (3) based on informal processes and experience (Busenitz & Barney, 1997; Busenitz & Lau, 1996; Simon & Houghton, 2002). The positive findings in this research stream (e.g., Busenitz, 1999; Busenitz & Barney, 1997; Simon et al., 2000), especially regarding decision-making differences between entrepreneurs and nonentrepreneurs, points toward this being a promising area of research (e.g., Miner & Raju, 2004). One line of an ongoing inquiry proposes that entrepreneurs may regularly find themselves in situations that tend to maximize the potential impact of a more heuristic-based logic (Alvarez & Busenitz, 2001; Baron, 1998, p. 278). For example, they may often make significant leaps in their thinking, leading to innovative ideas that are not always very linear and factually based. Furthermore, entrepreneurs not only decide to engage in entrepreneurship because of a greater use of heuristic-based logic (e.g., representativeness, affect infusion, planning fallacy, and illusion of control), but they also succeed because of reduced susceptibility to certain other cognitive biases (e.g., avoidance of sunk costs) (Baron, 2004, p. 237). A heuristic-based logic often enables entrepreneurs to make sense of uncertain and complex situations more quickly and, relative to more orthodox approaches to decision making, perhaps expedite learning. Research findings to date indicate that this is a fertile territory for further research.

Perceived Connections and Alertness. Developing new ideas and the realization that some people seem particularly alert to new opportunities has had a growing presence in entrepreneurship research in the last decade. Perceiving and interpreting information, and reaching some unique conclusions about entrepreneurial opportunities, seem to involve some unique mental processes. The idea of alertness was initiated by Kirzner (1979, 1985), who challenged the dominance of the normative model in economics and predates the literatures indicating the lack of an empirical support for such models. Alertness is about attentiveness to new opportunities, and at some level, it seeks to infer some unique thinking and reasoning. Unfortunately, empirical research on alertness is limited (see Kaish & Gilad, 1991 for an exception) and findings have raised some serious concerns

(Busenitz, 1996). In extending Kirzner's work on alertness (1979, 1985) into a social cognitive framework, Gaglio and Katz (2001) argued that alertness is very plausible, testable, and relevant as a model of the cognitive dynamics driving the opportunity-identification process. In his recent article, Baron (2006a) effectively argues that cognitive frameworks possessed by some individuals facilitate the connecting of dots between environmental changes, market trends, and customer niches. Such frameworks allow for leaps in logic that assist in the identification of new opportunities (Busenitz & Arthurs, 2007). In sum, it is becoming apparent that some frameworks involving alertness and perceived connections hold much potential for understanding the discovery of new opportunities.

Entrepreneurial Expertise. The development of research that uses expert information processing theory to examine differences in decision making between entrepreneurs and nonentrepreneurs traces its roots to the following idea: that because entrepreneurs develop unique knowledge structures and process information differently (they transform, store, recover, and use information differently than nonentrepreneurs [e.g., Mitchell, 1994; Mitchell et al., 2000]), entrepreneurs prevail in the face of bounded rationality due to their "entrepreneurial expertise" (Mitchell, 1994). Thus, according to the expert information processing theory explanation, entrepreneurs are experts in the entrepreneurial domain who possess *and can acquire through deliberate practice* (e.g., see Baron & Henry, 2006; Mitchell, 2005; Mitchell & Chesteen, 1995) entrepreneurial cognitions: scripts or knowledge structures that enable them to use information significantly better than nonexperts/nonentrepreneurs—i.e., at ≥ 2 standard deviations above the mean in the population at large (Ericsson, Krampe, & Tesch-Romer, 1993; Glaser, 1984; Leddo & Abelson, 1986; Lord & Maher, 1990; Mitchell et al., 2000; Read, 1987). Empirically, there is a growing evidence (e.g., Gustavsson, 2004; Mitchell et al., 2000; Mitchell, Smith et al., 2002) to support the idea that in entrepreneurship, cognitions in the form of expert scripts are related to decision making *despite* bounds to rationality: specifically, to making the venture creation decision (Busenitz & Lau, 1996; Mitchell, 1994; Mitchell et al., 2000). One possibility for the extension of this work—as suggested by McGrath and MacMillan (2000)—is that expert scripts in entrepreneurial decision making represent a more comprehensive entrepreneurial "mindset"—a global culture of entrepreneurship (Mitchell, Smith et al., 2002).

Effectuation. Decision making under uncertainty typically begins with determining the desired outcome or the probability that the outcome is likely to occur and then determining the best means to accomplish the outcome (e.g., Knight, 1921). This causal rationality typically involves the examination of multiple alternatives and then the determination of the optimal alternative. From this perspective, entrepreneurs are considered to be change agents who specialize in recognizing and exploiting opportunities available to them within the economic system (Shane & Stuart, 2002) as they consider alternative means to accomplishing venture success (causation). Distinct from the "causation"-based entrepreneurial processes, the "effectuation"-based perspective takes a set of means or tools as a given and focus on selecting among the possible effects that can be created with that set of means (Sarasvathy, 2001a, p. 245). The effectuation approach suggests that thinking and action proceed together in an attempt to create one of several possible outcomes. Effectuation assumes that the future is unpredictable but that entrepreneurs can control a value-creating part of it through the use of a given set of means available to them. In this sense, entrepreneurs can utilize the means at their disposal to influence their future without having to predict it (Sarasvathy, 2001a, 2001b). Stated differently, effectuation

represents a special case of expertise in that it assumes that a venture will develop along the lines of the means or expertise that are a part of the entrepreneur's personal repertoire, a part of the way they think and make sense of an evolving situation.

Additional Developments. Additional approaches to probing entrepreneurial cognition will continue to emerge over time, and some of them will no doubt replace existing approaches because they better explain various aspects of the entrepreneurial cognition phenomenon. We think that the approaches represented by two recent theory papers have the potential to become known in such a manner. Baron (2006b) recently presented a paper at the Academy of Management meetings on entrepreneurial affect. Also, McMullen and Shepherd's (2006) recent article specifically addresses entrepreneurial action. Although little empirical work yet exists to test these two approaches, we see the possibility for work to develop around these perspectives of entrepreneurial cognition (for example, see Gregoire, 2005), and accordingly we take note of them for the benefit of our readers and include a summary of these approaches in Appendix B.

It is clear from the foregoing discussion that the pathway from contributing fields, through boundary setting and exchange, toward definitional development, is becoming better marked and perhaps easier to travel. As you will see from the articles accepted for publication in this SI, interesting and helpful investigations and elaborations of questions central to entrepreneurial cognition research continue to emerge. It is our pleasure now to briefly introduce each article as set within the developing context of entrepreneurial cognition research.

Overview of Articles in the SI

Although we believe that each author or author team should ultimately position their work in the entrepreneurial cognition research firmament, we nevertheless cannot help but observe that—of the five articles presented in this SI—some tend to fit more within a “person-centered” approach (Fiske & Taylor, 1984), and others perhaps are more consistent with a “situation-centered” approach. We think that you will find within these articles a wealth of ideas that hopefully inform and illuminate a domain focused on the question “*How do entrepreneurs think?*” while they also stimulate and motivate further work.

Cognitive style is the focus of Keith Brigham, Julio De Castro, and Dean Shepherd's article “A Person-Organization Fit Model of Owner-Managers' Cognitive Style and Organizational Demands,” and these authors use the Allinson and Hayes (1996) measure of cognitive style along the intuition-analysis continuum. Consistent with Fiske and Taylor (1984), Brigham, De Castro, and Shepherd explicitly consider entrepreneurs' cognitions and their environment. The article addresses the research question “why do certain entrepreneurs behave differently from other entrepreneurs in a given situation?” and the authors suggest that the reason might be because they think differently. Using a sample of 159 owner-managers of small high-technology firms, they specifically examine the fit between the preferred decision-making style of owner-managers and the level of formal structure in their firms and the relationship of this fit to owner-manager satisfaction and their intentions to exit. This work brings to the entrepreneurship literature two streams of organization studies: person-organization fit and cognitive styles, and in doing so adds to the growing individual cognitive characteristics stream of research on entrepreneurial decision making.

Then, in their article “The Good, the Bad, and the Unfamiliar: The Challenges of Reputation Formation Facing New Firms,” Eileen Fischer and Becky Reuber consider

the development of group-level cognition, but as it relates to the process by which stakeholder groups develop reputational beliefs about new firms. Using the PayPal organization as an example, the authors place a multidisciplinary lens on the issue of how reputations are formed, drawing on social cognition theory, signaling theory, and concepts from organizational behavior and marketing to develop a conceptual insight into the cognitive structures underlying reputation. Fischer and Reuber identify three key implications of their work. One is that initial reputations are not necessarily a liability of newness, and new firms may enjoy a slight benefit from being included in a set of existing organizations with positive reputations. The second is that negative information may not be “sticky” if it does not contrast strongly with category-based evaluations (it does not stand out). Finally, they offer three explanations for why reputations vary considerably across stakeholder groups.

Next, the article by G. Page West, III, “Collective Cognition: When Entrepreneurial Teams, Not Individuals, Make Decisions,” extends the cognitive entrepreneurship research question from how do entrepreneurs think, or how do people think entrepreneurially, to how do people in new venture top management teams think collectively. Drawing on the organization behavior and strategy of top management team literatures, West argues that while teams do not have cognitions *per se*, team perspectives of appropriate action (schema) are significantly more than the compilation of individual perspectives, and that the *entrepreneurial team collective cognition* (ETCC) is what drives many new venture-strategy decisions. Using an exploratory, longitudinal sample of 22 technology venture top management teams, he finds that among new venture team members, too much or too little integration (highly consistent or highly inconsistent views) or too much or too little differentiation (identifying too many or too few options and alternatives) adversely affect new venture performance. These results and the development of a sociocognitive grid methodology for measuring ETCC provide a foundation for extending entrepreneurial cognition research to the team level of analysis.

The importance of understanding the cognitions of entrepreneurs within a situation is emphasized in Andrew Corbett and Keith Hmielecki’s article “The Conflicting Cognitions of Corporate Entrepreneurs.” This conceptual paper makes a contribution to the entrepreneurial expertise literature by extending the work of Mitchell et al. (2000) into the realm of corporate entrepreneurship. Specifically, the authors draw on situated learning (e.g., Billett, 1996) and social cognition theory (e.g., Bandura, 1986) to suggest that event schemas (active knowledge structures or scripts that guide task behavior) need to be understood in the context of role schemas (knowledge structures about role or job appropriate behaviors). They argue that because corporate entrepreneurs and entrepreneurs starting independent businesses have significantly different role schema, the salience or use of key event schema are likely to differ. This work reinforces the idea that context matters, and it opens the door to future explorations of cognitive constructs, not just in the corporate entrepreneurship context, but in other entrepreneurial contexts as well (e.g., women’s entrepreneurship, ethnic entrepreneurship, and other contexts involving ascribed or other roles.)

This SI volume concludes with an essay by Norris Krueger entitled “What Lies Beneath? The Experiential Essence of Entrepreneurial Thinking,” in which Professor Krueger links explanations of how entrepreneurs think to the cognitive developmental influences on the deep belief structures of human beings. Specifically, he suggests that entrepreneurial cognition research should explore: (1) the deeply seated beliefs and belief structures that ultimately anchor entrepreneurial thinking and (2) how such beliefs change as entrepreneurs move toward a more professional, expert mindset. As a bridge, from the foregoing articles, to what the future might hold for entrepreneurial cognition research, we

now offer our views concerning the possibilities and challenges facing what might be termed as the “next generation” of entrepreneurial scholarship.

Possibilities: Challenges for the Next Generation of Entrepreneurial Cognition Scholarship

We clearly recognize that the accomplishments made through the publication of three *ET&P* SIs on entrepreneurial cognition and through other related work on entrepreneurial cognition fit only the first pieces together in the assembling of a much larger puzzle. We therefore discuss next several directions that we believe offer particularly rich areas for future research into how entrepreneurs think. We observe that to some extent, these challenges fall under Fiske and Taylor’s (1984) major social cognitive categories: (1) person, (2) situation, (3) cognition, and (4) motivation, and have therefore used them as an organizing logic for our observations.

Person

Intermittently over the last half century, the question of whether behavior is to be explained by internal factors (the person) or by external factors (the environment) has captured attention in the field of psychology (Roberts & Pomerantz, 2004). In the field of entrepreneurship, the study of the role of individual differences, traits, etc., continues to be a key topic of investigation. Open questions concerning “person” in the field of entrepreneurial cognition, include:

- How do entrepreneurial individuals acquire (learn) their cognitive structures and contents?
- Is one method of learning better than another in developing the cognitions, attitudes, and intentions of entrepreneurship?
- Do entrepreneurs pursuing noneconomic values (instead or in addition to economic values) think about their contexts differently? Do they formulate attitudes and intentions differently?
- How does a prior/existing mental model of competition influence subsequent thoughts about the kind of venture to create? Attitudes toward venturing? Intentions to venture? Enactments of these thoughts, attitudes, and intentions?
- In looking at a particular venture (opportunity or growth of venture) what is the effect of different mind maps (mental models) on subsequent choices and venture outcomes?
- Under the transaction cognition theory (Mitchell, 2003) view of entrepreneurship (suggesting that entrepreneurship is a cross-level phenomenon that occurs within the socioeconomic space *between* the transaction and individual levels of analysis as entrepreneurs redirect social frictions through their use of planning, promise, and competition entrepreneurial cognitions), several new questions may be investigated, or investigated in a new light, such as: (1) How likely is it that the percentage of individuals who are known to act entrepreneurially may be much higher than what was previously documented? (2) How likely is it that entrepreneurial cognitions may be found to reduce socioeconomic entropy dramatically? and (3) How likely is it that both organizational and institutional entrepreneurship are commensurable according to new entrepreneurial cognition-based logics?
- How do the individuals in a venture team dynamically change their entrepreneurial cognitions, attitudes, and intentions?

- How and to what effect do “affective experiences” inject a high emotion into the entrepreneurial cognition gestalt? To what extent is affect in entrepreneurship subject to reflection/meditation (i.e., a cognitive appraisal) versus invoked with minimal stimulus (affect primacy)?

It is therefore our sense that the entrepreneurial cognition research stream provides a credible and effective means for the study of “person” (the individual entrepreneur) to continue its resurgence in the literature. Of course, given the social cognition gestalt, this resurgence appears not to occur in isolation, and that consideration of the role of situation is also necessary. We address this next.

Situation (The Context)

It is widely recognized that entrepreneurship invariably occurs within the context of change and high uncertainty. Many opportunities emerge out of environmental shifts and changes, where the established ways of doing things no longer work as effectively as they once did. Such environments are typically complex and highly uncertain (e.g., the future direction of the market tends to be relatively unpredictable). It can therefore be a substantial challenge for entrepreneurs to navigate amidst the turbulence and formulate the appropriate products and strategies to accommodate the changing marketplace. Such situations give rise to heuristic-, effectuation-, selection mechanism-, and action-based conceptualizations with their associated research possibilities.

As previously noted, we suspect that entrepreneurs tend to use heuristic-based rather than systematic procession logic to accomplish such tasks. Such logic provides a means for entrepreneurs to navigate through change and often leads to seeing things in new ways and to perceiving opportunities that have previously gone undetected. More objectively oriented logic builds from proven information and defensible assumptions. To progress with a new opportunity based on a more objective logic, the preponderance of information and evidence needs to be in support of the identified idea. However, new opportunities are much less likely to evolve from the minds of those who are more factually based. If one is too factually based in their processing of information, they can quickly become overwhelmed by the situation and by their limited information-processing capacity.

If instead, or in addition, individuals use effectuation logic in a situation, the perception of opportunity is more subjectively determined as individuals in unpredictable and dynamically changing environments recognize, attend to, and find differing values in the resources they control. To progress with a new opportunity based on this logic, individuals need not necessarily seek out new information, but find useful, effective, and novel (to them) ways to leverage and apply their human, social, and financial capital.

Alternatively to situations simply enabling or channeling cognitions is the view that environmental change serves as the selection mechanism by which individuals become entrepreneurs and/or succeed or fail. This view equates the situation with a benevolent or munificent environment and is highly reminiscent of evolutionary theories such as resource dependence theories, population ecology models, and other more deterministic explanations of human action. Although this view clearly has a role in entrepreneurship research (e.g., Aldrich, 1999), the limitations it places on individual agency make it relatively unappealing to researchers interested in entrepreneurial cognition—that is, unless they are primarily interested in studying the entrepreneurial thought process involved in determining optimal stopping points (e.g., Levesque & Schade, 2005).

Still, another position is highly consistent with the entrepreneurial action approach (Appendix B). According to this view, the research question of interest is not what individual difference leads a person to become an entrepreneur, nor whether the environment preordains who will succeed or fail, but rather how situational conditions can be manipulated through, for instance, governance mechanisms or incentive systems, to encourage people to become more sensitive to possible opportunities for profit and to act on these value propositions.

Despite the evidence that has accumulated for and against the explanatory power of, for example, personality traits, there remain unrefuted criticisms that trait-based models are static and lacking in dynamic qualities (e.g., Pervin, 1996), and their scientific utility has been questioned (e.g., Bandura, 1999). Thus, the study of entrepreneurial cognition has—using the social psychology lens—sought to move beyond the static, to invoke the “situation,” or the environment as a dynamism-creating factor.

This situation-centered focus leads to yet another set of open research questions and concerns that include:

- What cognitive difference enables some people but not others to notice personally advantageous changes in their environment? A quintessential example of this type of response would be Kirzner’s (1985) theory of entrepreneurial alertness, which has been augmented (e.g., Gaglio & Katz, 2001) or challenged (e.g., Busenitz, 1996) by various entrepreneurial cognition scholars.
- What cognitive differences and environments lead to heuristic-based logic and which lead to effectuation-based logic in identifying opportunity?
- What are the critical dimensions of environments and situations for the development of domain-specific expertise or heuristics? How do these dimensions differ across situations? How do these dimensions differ across learners?

As one might expect, the forgoing questions implicate cognitions, and accordingly, we turn to a discussion of more cognition-specific possibilities and challenges.

Cognition

The topic of cognition is, of course, central to our investigations and has a rich developmental history. The foundations of the field of cognitive psychology, the key “parent” field (Mitchell et al., 2004), include early works that: (1) addressed such topics as attention, filtering, imagery, memory, and reasoning (Bartlett, 1932; Broadbent, 1958; James, 1890; Miller, 1956), and (2) began a major shift toward the way that cognition is currently studied. During this period of relatively slow development (approximately 1940–1965), behaviorist theory (Skinner, 1953; Watson, 1924) tended to hold the attention of most experimental social psychologists (Walsh, 1995). It was not until Neisser (1967) wrote the book *Cognitive Psychology* that theoretical and empirical development in the field began to accelerate (Walsh, 1995, p. 281). And with the advent of social cognition theory (e.g., Fiske & Taylor, 1984), a theory necessary to make the socioeconomic linkage between “thinking” and “doing” that has been so necessary to the study of entrepreneurial cognitions has been made available. In this manner, the theoretical scaffolding needed for entrepreneurial cognition scholars to actualize James’s (1890, p. 290) vision:

The greatest discovery of my generation is that human beings can alter their lives by altering their attitudes of mind.

As we have previously noted (Mitchell et al., 2004, p. 508), research in entrepreneurial cognition has investigated topics such as: (1) whether or not entrepreneurs' thinking patterns differ from those of nonentrepreneurs (Busenitz & Barney, 1997; Gaglio & Katz, 2001; Mitchell et al., 2000; Mitchell, Smith et al., 2002); (2) the reasons that some individuals become entrepreneurs while others do not (Simon et al., 2000); (3) the issue of why opportunities are recognized by some individuals and not by others; and (4) the question of how entrepreneurs think and make strategic decisions (Busenitz & Barney, 1997; Mitchell et al., 2000; Mitchell, Smith et al., 2002). Each of these topics of investigation relates to the way that thinking affects entrepreneurial outcomes. Thus it appears (in the parlance of James, 1890) that individuals who understand the thinking patterns related to entrepreneurship—and desire to become entrepreneurs—can alter their own thinking patterns accordingly.

Herein we argue that possibilities for future research that further explore the thinking/doing nexus are broad because we—as a field—have adopted fairly universally Neisser's (1967) very broad definition of cognitions (as presented earlier herein): *all processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used.* This, we believe, encompasses the emerging study of metacognition and brain activity as well.

Metacognition refers to “thinking about thinking” (Jost, Kruglanski, & Nelson, 1998) and has been defined to be “the ability to reflect upon, understand, and control one’s learning” (Schraw & Dennison, 1994, p. 460). It includes: (1) metamemory, the knowledge about one’s memory systems and strategies for using memory effectively; (2) metacomprehension, the ability to monitor one’s understanding of information received and employ strategies to improve understanding; and (3) self-regulation, the ability to adjust one’s learning process in the face of feedback (Vockell, 2006). Metacognition thus includes both an awareness of cognition and an understanding of strategies to change cognitions. As previously noted, there is a reason to expect that deliberate interactions between prospective entrepreneurs and actual entrepreneurs can increase novices’ expertise (Mitchell & Chsteen, 1995). Mounting evidence in recent entrepreneurship research suggests that the path to becoming an entrepreneur is not itself special, but is in fact general—rooted in the cognitive systems created by deliberate practice (Baron & Henry, 2006; Charness, Krampe, & Mayer, 1996; Mitchell, 2005; Schneider, 1998). One area of potentially fruitful future research should further explore how metacognitive thinking can be deliberately practiced in an entrepreneurial context because of the appealing notion that such metacognitive thinking undertaken in an entrepreneurial context will lead to the creation of entrepreneurial expertise by facilitating the self-reflection, understanding, and control of one’s own entrepreneurial cognitions, thereby allowing individuals to, as James (1890) intimates, “alter their (entrepreneurial) lives.” Along with this, we offer person- and situation-anchored research questions such as:

- What role does self-monitoring play in the individual’s success in metacognitive practice toward entrepreneurial expertise?
- How does the entrepreneurial situation affect the ability of entrepreneurs to engage in metacognitive thinking?
- What opportunity-finding strategies and decision styles do metacognitively skilled entrepreneurs choose compared to those less skilled?
- (And echoing Krueger’s essay herein) How do deep-belief structures form and influence entrepreneurial thinking?

Furthermore, we suggest that the field is not far from gaining the ability to apply the emerging field of brain science to the opportunity discovery process. Positron emission tomography (PET) has been used in studies of adult normal psychology, including relationships with personality (Deckersbach et al., 2006), linked to attributions and intentions (Castelli, Happe, Frith, & Frith, 2005) and “emotionally valenced episodic memory” (Masaki et al., 2006). Clearly, these kinds of findings have a relevance to the study of alertness, decision-making logics, and expertise as well as situations that surround entrepreneurial action.

Motivation

Given the fear among entrepreneurship scholars of being labeled as a “traits” researcher during the hiatus in individual-level entrepreneurship research, which pervaded research in entrepreneurship until the late 1990s, the interface between motivational psychology research and entrepreneurship research has remained relatively underdeveloped. The volume of work that has occurred at the nexus of organizational behavior and entrepreneurship has therefore lagged considerably behind the quantity of work at the interface of strategy and entrepreneurship despite prominent scholars (e.g., Robert Baron, Bill Gartner, and Max Wortman) arguing that the study of entrepreneurship had much to contribute to organizational behavior and vice versa. The highly economic orientation of strategy research led many studies to equate entrepreneurial motive with the desire for profit (McMullen & Shepherd, 2006). Moreover, the heavy reliance on between-participant research designs often reinforced this limitation. However, as experiments using within-participant designs become commonplace within the entrepreneurship literature, we would expect that researchers will become increasingly interested in motive and its effect on cognition. Thus, we expect significant increases in the future in topics such as motivated reasoning, motivational orientations, and situated cognition, which, despite their relevance to entrepreneurial cognition, have gone relatively untouched by entrepreneurship researchers and offer significant opportunities for further exploration. Among others, these research questions may be addressed:

- How do individuals with personal motivations other than profit maximization perceive opportunity, apply decision logics, etc.? For example, using the typology developed by Cohen, Smith, and Mitchell (in press), how do entrepreneurs seeking a perpetuity-based performance (good also to the social and natural environments) perceive opportunity, apply decision logics, etc.?
- How do profit motives interact with other motives in perceiving opportunity, making decisions, etc.?
- How do changes in the environment impact on the relative importance of different motivations for recognizing and acting on opportunity?

Conclusion

We have suggested in Figure 1 that in the articulation of a central research question, entrepreneurial cognition research is now at the pivot point where innovation gives way to diffusion. The implication of our present circumstances (as represented in Figure 1) is that there now exists a fairly consistent set of definitions and boundaries within entrepreneurial

cognition research that are set to have an impact on contributing fields: through the diffusion apparatus that is inherent in the institutionalization process. We conclude our article with a discussion of the likely processes that will enable this process to proceed sooner versus later, and last longer versus shorter.

Lawrence et al. (2001) provide a conceptual framework that suggests how two key factors—pace and stability—affect the temporal dynamics of institutionalization processes. In brief, they assert that among four possible mechanisms of institutionalization—*influence, force, discipline, and domination*—both pace and stability may be achieved when influence and discipline are combined (pp. 638–639). This insight has implications for diffusion and institutionalization in the case of entrepreneurial cognition research. How does the development of definitions, boundaries, and a central research question lead to impacting contributing fields? We suggest that depending upon the effectiveness of influence mechanisms, discipline-creating mechanisms, and their combination, the diffusion of entrepreneurial cognition research to contributing disciplines will be more likely to proceed sooner and to last longer.

Influence Mechanisms. Lawrence et al. (2001) suggest that influence involves the projection of power. Etzioni (1964, p. 59) asserts that three types of power—*coercive* power, based on physical resources of violence or restraint; *utilitarian* power, based on material or financial resources; and *normative* power, based on symbolic resources—are the means whereby one actor convinces another actor to make particular choices. However, where the target group are “active subjects” (Lawrence et al., 2001, p. 633) such as is the case within our discipline and within contributing disciplines, it is likely that the necessity of interpersonal involvement in the influence-projecting process, plus the diversity of interests within a target group, would suggest influence mechanisms to be slow-diffusion.

In addition, as Hull (1952) demonstrated, the exercise of power in a simple stimulus-response situation might suggest that influence alone might also lack stability. Once reinforcements are removed, therefore, extinguishment is to be expected. Lawrence et al. (2001, p. 633) seem to agree with this notion, suggesting that “. . . diffusing an innovation through the use of influence likely will [require] an iterative and often experimental series of processes.” Thus, as we evaluate our expectations for the diffusion of entrepreneurial cognition research back into formerly contributing fields, it appears that we must expect that, for example, the holding of two conferences and the presentation of three SI volumes—while influential—might not be likely in themselves to result in either a rapid or a stable diffusion of this research.

Discipline-Creating Mechanisms. Foucault (1977) is cited by Lawrence et al. (2001) to suggest three discipline-creating mechanisms: (1) hierarchical observation, (2) normalizing judgment, (3) and examination, which (while slow) nevertheless result in stable diffusion processes. In the case of entrepreneurial cognition research, we, as the Editorial Team, are attuned to the possibility that our intensive involvement in innovation-stage processes in the development of this field might tend to cast us in discipline-creating roles. We have enthusiastically accepted this role during the past few years. However, our hope is that while we continue to foster, advocate, and participate in entrepreneurial cognition research as both creators and reviewers, we might also be successful in attracting many new scholars into research leadership roles in this field. When influence fades, we therefore hope that well-disciplined actors will have accommodated the demands of the influence/innovation process and have made them their

own (p. 636). In this manner, the necessary stability can be enabled *without* the too early creation of narrowly defined hierarchy, judgment, and examination processes, and, we believe, can result in an even more stable and lasting-effectiveness cadre of entrepreneurial cognition researchers.

The Future: Combining Influence and Discipline. Because the diffusion of entrepreneurial cognition research back into its many contributing disciplines requires the active involvement and complicity of the targeted actors (you, our colleagues), the choices and actions necessary suggest a *combination* of influence and discipline creation to create a faster and more stable diffusion process (Lawrence et al., 2001, p. 638). This is because the effect of combining influence and discipline on the pace of institutionalization is expected to be additive; and it is further to be expected that as actors build identities and support new institutions as they roll out, these actors will freely participate in a broadly diffused community of entrepreneurial cognition research without the need for the external incentives of influence (p. 639). What does this mean for the future?

Again we refer readers to Figure 1 where we suggest combination influence/discipline-creating activities such as general conferences, the production of books, texts, and regular dialogue,³ and the production of studies and articles for consumption in mainstream research domains, to be the natural next steps in the diffusion process. It is our hope that the invitation we extend is taken at face value: You are invited. This is a highly promising field, and we believe that there is room for all who wish, to contribute. We look forward to a remarkable future working together.

Appendix A: Ivey Conference Developmental Discussions

At the fall 2005 Ivey Conference on Entrepreneurial Cognition Research, attendees were divided into small groups for one session to develop and specify what they thought was the central research question for entrepreneurial cognition research. The groups were then reassembled with their various research questions presented to all attendees (see Table A-1 for a listing of the main research questions that were put forward). After a lively large group discussion, we tentatively settled on an integrated research question (IRQ-1): “How do entrepreneurial context and individual cognitive mechanisms interact to create entrepreneurial attitudes, intentions and behaviors that drive new means-ends relationships?” Subsequent to the conference, the editorial team further discussed and evaluated the direction of the proposed research question before arriving at the central research question put forth in this article. To accomplish this evaluation, we appealed to the “boundaries and exchange” logic as the basis for a sorting and evaluation technique. What is presented below is an outgrowth of this evaluation.

3. As we initially planned this article, it was our hope that we could create common websites, blogs, e-communities, etc., whereby the ongoing dialogue could be enjoined. We offer this idea to any who would take it on, as diffusion-enabling service to the field; and note that the digital video recording of almost all the verbal proceedings of the 2005 Ivey Conference is available for a limited time at <http://www.ronaldmitchell.org/ent-cog.htm>, along with written synopses of the 2002 Victoria Conference as well.

Table A-1

Summary of Ivey Conference Research Question Brainstorming Session

Included in the Discussion Possible Research Questions:

The following questions were explored in a wide-ranging discussion:

- How and why thinking affects value creation for _____.
- Concerning the phenomenon: The emergence of new value streams:
 - How?
 - Why?
 - Who?
 - When?
 - Where?
 - What?
- How is new value created in a marketplace?
 - How is discontinuous innovation related to new value creation?
 - What are the normative aspects that define “new value”?
 - What is new value at the individual, firm, and society level of analysis?
 - What are the negotiated/ voluntary elements?
 - How does cognition relate to social construction in negotiate/voluntary value creation?
 - What dynamic considerations bear upon the creation process?

Which, in turn, led to the Conference settling on the following:

Integrated Research Question Produced by the Ivey Conference (IRQ-1):

How do entrepreneurial context and individual cognitive mechanisms interact to create entrepreneurial attitudes, intentions, and behaviors that drive new means-ends relationships?

And is the beginning point of the analysis undertaken in the development of this article?

Question Challenges

As the Editorial Team further discussed the proposed research question, there were several concepts that did not appear to us to be fully enabling or clarifying, based upon an application of the criteria we developed to be—in our view—further enabling of the unfettered diffusion of entrepreneurial cognition research. In this further analysis, we have identified five terms in IRQ-1 that (in our view) are somewhat overly restrictive; and we therefore provide a summary of our reasoning to justify this assertion, to provide a basis for this assertion, and to invite and facilitate the advancement of differing views.

1. Entrepreneurial context. We agree that context is essential to represent the person-in-situation requirements of social cognition; but we argue that not all contexts that affect entrepreneurial cognition are themselves entrepreneurial. That is, there are contexts that may precede the discovery of opportunity, indeed that precede the motivation to search for opportunity and therefore affect the cognition of the nascent entrepreneur. Thus the set prescribed by the combined notion “entrepreneurial context” appears to us to be too restrictive.

2. Cognitive mechanisms. While cognition as a notion is obviously essential, the idea that we might only study “mechanisms” seems to us to be overly exclusionary. Little is YET known about the pathways of thought, the associations among discrete bits of long and short-term memories, retrieval processes, creativity, and “connecting the dots” (Baron, 2006a). The domain of cognition has attributes of systems, mechanisms and cybernetics but is also has attributes of complexity/chaos theory (Lichtenstein, 2000; Lichtenstein, Lumpkin, & Shrader, 2003). Furthermore, the dynamic capabilities that are needed to reconfigure resources with emerging and changing opportunities in the birth and growth of a new organization defy mechanistic explanation at this point in entrepreneurship theory and research. Finally, cognition is closely related to holistic and biological processes such as emotion (Goleman, 1995; Sternberg et al., 2000). Many of these

concepts are simply mischaracterized as “mechanisms,” which therefore limits usefulness in formulating central research questions.

3. Interaction. The notion of interaction is well accepted in the conceptual models of social science. Indeed, social science models regularly suggest theoretical antecedents to be associated with, be related to, and in some cases to “interact” with consequent constructs. But we believe it does the diffusion task little service to prescribe a particular type of relation within research questions; and we leave the study of particular interaction effects to the analyses where such study is appropriate.

4. Drive. The notion of “drives” has its own literature and place within the body of psychology research. For both the reasons noted in #3 (suggesting that narrow specifications—such as the notion of “drive” as an impetus—is overly prescriptive), we suggest that entrepreneurial cognition research avoid too narrowly construing the rationale for research relationships in the study of entrepreneurial cognition. Another reason for challenging this notion is that “drive” as used here is a motivation construct, but as developed in IRQ-1 was included in another form. Thus, while cognition is a driver (as we note in discussing motivation), the motivation to pursue new value *and values* is more than cognitive, and has a body of literature which includes rewards, punishments, needs, and more.

5. Means–ends relationships. Discussion of means–end relationships is common among more economically-inclined views of entrepreneurial cognition and action (Kirzner, 1997; Shane & Venkataraman, 2000). However, Lehmann (2005) argues that limiting the entrepreneurship domain only to phenomena in which the means and ends are novel may be overly constrictive. Other scholars (e.g., Sarasvathy, Dew, Velamuri, & Venkataraman, 2003) have made similar observations by arguing that entrepreneurial opportunity may involve novel means, novel ends, or both. In addition to these concerns is the inherently problematic notion of means–end relationship given the inherently hierarchical nature of human action (Greve, 2001). That is, every end can arguably be the means to some higher end until one reaches some “highest goal” whatever it may be for that individual (Ray, 2004). Thus, means–ends terminology is highly dependent upon an understanding of the goals of the individuals engaged in any action, entrepreneurial or otherwise. Although difficulty is not reason in and of itself to exclude an element of a research question if that element is integral, it offers a strong case against a seemingly unnecessary qualifying term.

Question Suggestions

Our further analysis suggests that several concepts might also be considered for addition to IRQ-1.

1. Motivation. Because the fundamentals of the Fiske & Taylor (1984) view suggest that social cognition is a “configuration of forces” that (in addition to person-in-situation and cognition) include motivation, we argue that adding motivation to the list of conceptual antecedents to be considered to be part of central questions in entrepreneurial cognition research is warranted. In particular, Baron (2004) points to research using regulatory focus theory to examine the entrepreneurial process (e.g., Brockner, Higgins, & Low, 2004; McMullen & Shepherd, 2006). Regulatory focus theory suggests that, depending on the salience of particular motives, individuals may experience a promotion focus which is a strategic orientation that seeks to ensure hits (true positives) and to avoid missed opportunities (false negatives). Or, they may experience prevention focus which seeks to ensure correct rejections (true negatives) and to avoid false alarms (false

positives) (Crowe & Higgins, 1997). Such tendencies would appear to have obvious implications for the study of opportunity recognition (Baron, 2004).

Furthermore, while motivation to pursue new value moves to energizing cognitions such as intention, we note that there are other motivations to consider. The pursuit of new value through entrepreneurship is motivated by expectations (this is a cognition about rewards and punishments), by fear (such as the fear of lost opportunity), social comparison (others are doing it), and by emotional attachment to a desired end state of existence or desired life style (Rokeach, 1973). Thus our suggesting the investigation of motivation as an important element in entrepreneurial cognition research questions contributes markedly, we believe, to reopening the field to the investigation of entrepreneurship at the individual level of analysis.

2. “Entrepreneurial cognition” versus the term “cognitive mechanisms.” Of course, it seems that since the focus of our field of study is entrepreneurial cognition, that (as previously noted) an exclusionary emphasis on “mechanisms” alone is unnecessarily and unhelpfully restrictive. We therefore suggest instead the well-defined notion of “entrepreneurial cognition,” which invokes the breadth intended in the definition (see Mitchell, Busenitz et al., 2002): knowledge structures in entrepreneurship; directed decision making and behavior.

3. Value creation. Because value creation arises in a multiplicity of ways, and because its study has been undertaken by a great variety of disciplines, we wish to employ this term as a means whereby many other researchers are invited to join in the explorations within the entrepreneurial cognition research stream. Whereas context, motivation, and individual entrepreneurial cognition address when/where, why, and who/how an entrepreneur acts, respectively, new value creation addresses “what” type of action the entrepreneur is contemplating. In essence, this is the subject of entrepreneurial cognition research, and it is core to the role that entrepreneurship has played when written large in society.

In this larger sense, value creation is a core construct of ethics, religion, aesthetics, and economics (Churchman, 1979). The pursuit of values is embedded in institutions and law (e.g., the U.S. Constitution), theories of the firm and theories of job design (Ray, 2004), and theories of competition (e.g., quality improvements, Demming, 1986). Value is an assumption in the various literatures on innovation where “novelty” is a value (Carter, Gartner, Shaver, & Gatewood, 2003; DeTienne & Chandler, 2004; Sadler-Smith & Badger, 1998). As we therefore consider the fundamental question of entrepreneurship to be anchored on value creation, we suggest that there are inherently entrepreneurial ways of thinking that enable new value creation in the domains that span a wide range of values (emphasis intended). Beyond economics and the creation of wealth and jobs, entrepreneurial cognition may contribute to solving social and global problems. In this spirit, and with the foregoing grounding, we are constrained to speculate in such a way as to further expand and diffuse entrepreneurial cognition research by asking: are there perhaps distinctly entrepreneurial ways to think about human rights, immigration, global peace, energy and water supply/ scarcity (Dean & McMullen, 2007)? And so it is from this expanded and somewhat vision-prompting vantage point that we invite the reader to encounter and engage the research reported in this Special Issue.

Appendix B: Emerging Approaches to Entrepreneurial Cognition Research

Emotion and Affect

Emotion is widely recognized as being an undeniable part of an entrepreneur’s life and decision making. This is not surprising given the commitment often associated

with starting new ventures, the level of individual resources that are commonly invested, the career reputations that are at stake, and the environmental turbulence that entrepreneurs typically operate in. Baron (2006b) has effectively argued that affect may be a particularly important component of the cognition of entrepreneurs in part because of research linking affect with creativity (Isen, 1993), and with working relationships (Harker & Keltner, 2001). For example, Baron (2006b) notes that positive affect increases the likelihood of engaging in mental short cuts or heuristics. Affect has also been found to influence memory, how stress and major life events are approached, and how the motives of others are interpreted (see Baron, 2006a, for an overview). In sum, while empirical research has yet to more fully explore the affect of entrepreneurs, it seems highly likely that affect influences a variety of entrepreneurial cognitions. We think that affect offers researchers an important tool with which to further probe the thought process involved in developing ideas and converting them into usable products for venture development. Furthermore, affect research from psychology offers us a strong foundation with which to explore some of the emotions that entrepreneurs often experience.

Entrepreneurial Action

Like the entrepreneurial heuristics approach and the entrepreneurial expertise approach, the entrepreneurial action approach views decision makers as “boundedly rational” rather than “substantively rational,” in the sense that they do not act on full information (Simon, 1983). However, because bounded rationality itself produces variance in who will and will not recognize and/ or exploit an opportunity, and because the occurrence of any form of human action requires motive, means (physical capital and human capital, such as knowledge or cognitive capabilities), and opportunity, the entrepreneurial action approach argues that each of these prerequisites must be concomitantly considered when studying the thought process responsible for entrepreneurial action (McMullen & Shepherd, 2006). And it is this notion of simultaneous cognitive consideration that situates the entrepreneurial action branch in entrepreneurial cognition research within the social cognition gestalt proposed by Fiske and Taylor (1984): wherein the cognitions of a person *in an entrepreneurial situation* combine with motivation to produce entrepreneurial cognitions.

The defining characteristic of the entrepreneurial action approach, therefore, is the *socioeconomic* component of new value creation. In resolving the tension between person and situation, the entrepreneurial action approach tends toward privileging the situation versus the person: the function of value creation rather than the individual whose cognitions guide the action. This approach introduces a subtle but distinctive transformation in the question of interest from “How do entrepreneurs think?” which tends to privilege the person, to “How does one think when acting as an entrepreneur?” or more simply, “How do people think entrepreneurially?” This shift does not necessarily preclude the possibility that some distinctive cognitive quality can be found which distinguishes individuals who will choose to act entrepreneurially from those who will not. However, it does broaden the notion of entrepreneurial cognitions, in requiring consideration of “entrepreneurial” aspects of cognition that tend to be situational in character and tied as much, if not more, to the nature of the activity as to the person who chooses to fill the entrepreneurial function.

Consequently, entrepreneurial action-based explanations suggest that individuals may become entrepreneurs simply by being the right person, in the right place, at the right time. Of course, consistent with the other branches of entrepreneurial cognition research, the probability of being “the right person” or being “in the right place at the right time” may

be heightened because decision making is heuristic (i.e., because of greater use of heuristics-based logic or reduced susceptibility to certain other cognitive biases), because it is expert (i.e., because effective entrepreneurial decision-making occurs *despite* bounds to rationality), or because of many other cognitive qualities (e.g., tolerance of ambiguity (Begley & Boyd, 1987) or entrepreneurial alertness (Kirzner, 1973).

REFERENCES

- Aldrich, H. (1999). *Organizations evolving*. Thousand Oaks, CA: Sage Publications.
- Allinson, C.W. & Hayes, J. (1996). The cognitive style index: A measure of intuition-analysis for organizational research. *Journal of Management Studies*, 33, 119–135.
- Alvarez, S.A. & Busenitz, L.W. (2001). The entrepreneurship of resource-based theory. *Journal of Management*, 27, 755–775.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Bandura, A. (1999). Social cognitive theory of personality. In L.A. Pervin & O.P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 154–196). New York: Guilford.
- Baron, R. (1998). Cognitive mechanisms in entrepreneurship: Why and when entrepreneurs think differently than other people. *Journal of Business Venturing*, 13, 275–294.
- Baron, R. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship's basic "why" questions. *Journal of Business Venturing*, 19, 221–239.
- Baron, R. (2006a). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. *Academy of Management Perspectives*, 20(1), 104–119.
- Baron, R. (2006b, August). *The role of affect in the entrepreneurial process*. Paper presented at the Academy of Management Meetings, Atlanta, GA.
- Baron, R., Byrne, D., & Branscombe, N.R. (2005). *Social psychology* (11th ed). Boston: Pearson Allyn & Bacon.
- Baron, R. & Henry, R.A. (2006, June). *Why do some entrepreneurs achieve extraordinary success? Insights from cognitive science research on exceptional performance*. Paper presented at the Babson Research Conference, Bloomington, IN.
- Bartlett, F.C. (1932). *Remembering: A study in experimental and social psychology*. New York: Macmillan.
- Begley, T. & Boyd, D. (1987). A comparison of entrepreneurs and managers of small business firms. *Journal of Management*, 13, 99–108.
- Billett, S. (1996). Situated learning: Bridging sociocultural and cognitive theorizing. *Learning and Instruction*, 6(3), 263–280.
- Broadbent, D.E. (1958). *Perception and communication*. London: Pergamon Press.
- Brockner, J., Higgins, E.T., & Low, M.B. (2004). Regulatory focus theory and the entrepreneurial process. *Journal of Business Venturing*, 19, 203–220.
- Busenitz, L.W. (1996). Research on entrepreneurial alertness. *Journal of Small Business Management*, 34, 35–44.

Busenitz, L.W. (1999). Entrepreneurial risk and strategic decision making. *Journal of Applied Behavioral Science*, 35, 325–340.

Busenitz, L.W. & Arthurs, J.D. (2007). Cognition and capabilities in entrepreneurial ventures. In J.R. Baum, M. Frese, & R. Baron (Eds.), *The psychology of entrepreneurship* (pp. 309–330). Mahwah, NJ: Lawrence Erlbaum Associates.

Busenitz, L.W. & Barney, J.B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, 12(1), 9–30.

Busenitz, L.W. & Lau, C.M. (1996). A cross-cultural cognitive model of new venture creation. *Entrepreneurship Theory and Practice*, 20(4), 25–39.

Busenitz, L.W., West, P., Shepherd, D., Nelson, T., Zacharakis, A., & Chandler, G. (2003). Entrepreneurship in emergence: Past trends and future directions. *Journal of Management*, 29(3), 285–308.

Carter, N., Gartner, W., Shaver, K., & Gatewood, E. (2003). The career reasons of nascent entrepreneurs. *Journal of Business Venturing*, 18, 13–39.

Castelli, F., Happe, F., Frith, U., & Frith, C. (2005). Movement and mind: A functional imaging study of perception and interpretation of complex intentional movement patterns. In J. Cacioppo & G. Berntson (Eds.), *Social neuroscience: Key readings* (pp. 155–169). New York: Psychology Press.

Charness, N., Krampe, R., & Mayer, U. (1996). The role of practice and coaching in entrepreneurial skill domains: An international comparison of life-span chess skill acquisition. In K.A. Ericsson (Ed.), *The road to excellence: The acquisition of expert performance in the arts and sciences, sports, and games* (pp. 51–80). Mahwah, NJ: Lawrence Erlbaum Associates.

Churchman, C.W. (1979). *The systems approach and its enemies*. New York: Basic Books.

Cohen, B., Smith, B., & Mitchell, R. (in press). Toward a sustainable conceptualization of dependent variables in entrepreneurship research. *Business Strategy and the Environment*.

Crowe, E. & Higgins, E.T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision making. *Organizational Behavior and Human Decision Processes*, 69(2), 117–132.

Dean, T.J. & McMullen, J.S. (2007). Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. *Journal of Business Venturing*, 22(1), 50–76.

Deckersbach, T., Miller, K., Klibanski, A., Fischman, A., Dougherty, D., Blais, Herzog, M., et al. (2006). Regional cerebral brain metabolism correlates of neuroticism and extraversion. *Depression and Anxiety*, 23(3), 133–138.

Demming, W.E. (1986). *Out of crisis*. Cambridge, MA: MIT Center for Advanced Engineering Study, January 1990 Revision.

DeTienne, D.R. & Chandler, G.N. (2004). Opportunity identification and its role in the entrepreneurial classroom: A pedagogical approach and empirical test. *Academy of Management Learning and Education*, 3(3), 242–257.

Ericsson, K.A., Krampe, R.T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100, 363–406.

Etzioni, A. (1964). *Modern organizations*. Englewood Cliffs, NJ: Prentice-Hall.

Fiske, S.T. & Taylor, S.E. (1984). *Social cognition*. Reading, MA: Addison-Wesley.

Foucault, M. (1977). *Discipline and punish: The birth of the prison*. New York: Vintage Books.

Gaglio, C.M. & Katz, J.A. (2001). The psychological basis of opportunity identification: Entrepreneurial alertness. *Small Business Economics*, 16(2), 95–111.

Glaser, R. (1984). Education and thinking. *American Psychologist*, 39, 93–104.

Goleman, D. (1995). *Emotional intelligence*. New York: Bantam.

Gregoire, D. (2005). *Opportunity acknowledgement as a cognitive process of pattern recognition and structural alignment*. Unpublished doctoral dissertation, University of Colorado.

Greve, W. (2001). Traps and gaps in action explanation: Theoretical problems of a psychology of human action. *Psychological Review*, 108(2), 435–451.

Gustavsson, V. (2004). *Entrepreneurial decision-making: Individuals, tasks and cognitions*. Jönköping, Sweden: Jönköping International Business School.

Harker, L. & Keltner, D. (2001). Expressions of positive emotions in women's college yearbook pictures and their relationships to personality and life outcomes across adulthood. *Journal of Personality and Social Psychology*, 80, 112–124.

Hull, C.L. (1952). *A behavior system*. New Haven: Yale University Press.

Isen, A.M. (1993). Positive affect and decision making. In M. Lewisk & J.M. Haviland-Jones (Eds.), *Handbook of emotions* (pp. 261–277). Chichester, U.K.: Wiley.

James, W. (1890). *The principles of psychology*. New York: Holt.

Jost, J.T., Kruglanski, A.W., & Nelson, T.O. (1998). Social metacognition: An expansionist review. *Personality and Social Psychology Review*, 2(2), 137–154.

Kaish, S. & Gilad, B. (1991). Characteristics of opportunities search of entrepreneurs versus executives: Sources, interests, general alertness. *Journal of Business Venturing*, 6, 45–61.

Kirzner, I. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35, 60–85.

Kirzner, I.M. (1973). *Competition & entrepreneurship*. Chicago: University of Chicago Press.

Kirzner, I.M. (1979). *Perception, opportunity and profit*. Chicago: University of Chicago Press.

Kirzner, I.M. (1985). *Discovery and the capitalist process*. Chicago: University of Chicago Press.

Knight, F.H. (1921). *Risk, uncertainty and profit*. Boston: Houghton Mifflin.

Krueger, N.F. (1993). The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability. *Entrepreneurship Theory and Practice*, 93(18), 5–21.

Krueger, N.F. & Carsrud, A.L. (1993). Entrepreneurial intentions: Applying the theory of planned behaviour. *Entrepreneurship and Regional Development*, 5, 315–330.

Krueger, N.F. & Dickson, P.R. (1993). Perceived self-efficacy and perceptions of opportunity and threat. *Psychological Reports*, 72, 1235–1240.

Krueger, N., Jr. & Dickson, P.R. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences*, 25(3), 385–400.

Lawrence, T.B., Winn, M.I., & Jennings, P.D. (2001). The temporal dynamics of institutionalization. *Academy of Management Review*, 26(4), 624–644.

Leddo, J. & Abelson, R.P. (1986). The nature of explanations. In J.A. Galambos, R.P. Abelson, & J.B. Black (Eds.), *Knowledge structures* (pp. 103–122). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Lehmann, F. (2005). *A peregrine inquiry on the existence of opportunity under the individual-opportunity-nexus framework*. Working paper presented at the Max Planck Institute, Jena, Germany.

Levesque, M. & Schade, C. (2005). Intuitive optimizing: Experimental findings on time allocation decisions with newly formed ventures. *Journal of Business Venturing*, 20(3), 313–342.

Lichtenstein, B. (2000). Self-organized transitions: A pattern amidst the “chaos” of transformative change. *Academy of Management Executive*, 14(4), 128–141.

Lichtenstein, B., Lumpkin, T., & Shrader, R. (2003). Organizational learning by new ventures: Concepts, strategies, and applications. In J.A. Katz & D.A. Shepherd (Eds.), *Advances in entrepreneurship, firm emergence and growth: Vol. 6. Cognitive approaches to entrepreneurship research* (pp. 11–36). Greenwich, CT: JAI Press.

Lord, R.G. & Maher, K.J. (1990). Alternative information-processing models and their implications for theory, research, and practice. *Academy of Management Review*, 15, 9–28.

Masaki, Y., Nishikawa, T., Ikejiri, Y., Tokunaga, H., Hatta, N., & Uema, T., et al. (2006). Neural substrates of emotionally valenced episodic memory: A PET study using film stimuli. *Psychiatry and Clinical Neurosciences*, 60(Suppl. 1), S46–S51.

McClelland, D.C. (1976). *The achieving society*. New York: Irvington Press.

McGrath, R.G. & MacMillan, I.C. (2000). *The entrepreneurial mindset*. Boston: Harvard Business School Press.

McMullen, J.S. & Shepherd, D.A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31(1), 132–152.

Miller, G.A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63, 81–97.

Miner, J.B. & Raju, N.S. (2004). Risk propensity differences between managers and entrepreneurs and between low- and high-growth entrepreneurs: A reply in a more conservative vein. *Journal of Applied Psychology*, 89, 3–13.

Mitchell, R. & Chesteen, S. (1995). Enhancing entrepreneurial expertise: Experiential pedagogy and the new venture expert script. *Simulation & Gaming*, 26(3), 288–306.

Mitchell, R.K. (1994). *The composition, classification, and creation of new venture formation expertise*. Unpublished doctoral dissertation, University of Utah.

Mitchell, R.K. (2003). A transaction cognition theory of global entrepreneurship. In J.A. Katz & D.A. Shepherd (Eds.), *Advances in entrepreneurship, firm emergence and growth: Vol. 6. Cognitive approaches to entrepreneurship research* (pp. 183–231). Greenwich, CT: JAI Press.

Mitchell, R.K. (2005). Tuning up the value creation engine: On the road to excellence in International Entrepreneurship Education. In J.A. Katz & D.A. Shepherd (Eds.), *Advances in entrepreneurship, firm emergence and growth: Vol. 8. Cognitive approaches to entrepreneurship research* (pp. 185–248). Greenwich, CT: JAI Press.

Mitchell, R.K., Busenitz, L., Lant, T., McDougall, P.P., Morse, E.A., & Smith, B. (2002). Entrepreneurial cognition theory: Rethinking the people side of entrepreneurship research. *Entrepreneurship Theory and Practice*, 27(2), 93–104.

Mitchell, R.K., Busenitz, L., Lant, T., McDougall, P.P., Morse, E.A., & Smith, B. (2004). The distinctive and inclusive domain of entrepreneurial cognition research. *Entrepreneurship Theory and Practice*, 28(6), 505–518.

Mitchell, R.K., Smith, B., Seawright, K.W., & Morse, E.A. (2000). Cross-cultural cognitions and the venture creation decision. *Academy of Management Journal*, 43(5), 974–993.

Mitchell, R.K., Smith, J.B., Morse, E.A., Seawright, K., Peredo, A.M., & McKenzie, B. (2002). Are entrepreneurial cognitions universal? Assessing entrepreneurial cognitions across cultures. *Entrepreneurship Theory and Practice*, 26(4), 9–32.

Neisser, U. (1967). *Cognitive psychology*. New York: Appleton-Century-Crafts.

Palich, L.E. & Bagby, D.R. (1995). Using cognitive theory to explain entrepreneurial risk-taking: Challenging conventional wisdom. *Journal of Business Venturing*, 10(6), 425–438.

Pervin, L.A. (1996). *The science of personality*. New York: Wiley.

Popper, K. (1959). *The logic of scientific discovery*. New York: Hutchison & Co.

Ray, M. (2004). *The highest goal: The secret that sustains you in every moment*. San Francisco: Berrett-Koehler Publishers, Inc.

Read, S.J. (1987). Constructing causal scenarios: A knowledge structure approach to causal reasoning. *Journal of Personality and Social Psychology*, 52, 288–302.

Roberts, B.W. & Pomerantz, E.M. (2004). On traits, situations, and their integration: A developmental perspective. *Personality and Social Psychology Review*, 8(4), 402–416.

Rokeach, M. (1973). *The nature of human values*. New York: The Free Press.

Sadler-Smith, E. & Badger, B. (1998). Cognitive style, learning and innovation. *Technology Analysis and Strategic Management*, 10(2), 247–265.

Sarasvathy, S.D. (2001a). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243–288.

Sarasvathy, S.D. (2001b). Entrepreneurship as economics with imagination. *Business Ethics Quarterly*. The Ruffin Series, 3, 95–112.

Sarasvathy, S.D. & Simon, H.A. (2000). *Effectuation, near-decomposability, and the creation and growth of entrepreneurial firms*. Paper presented at the First Annual Research Policy Technology Entrepreneurship Conference, University of Maryland.

Sarasvathy, S.D., Dew, N., Velamuri, S.R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In Z.J. Acs & D.B. Audretsch (Eds.), *Handbook of entrepreneurship research* (pp. 141–160). Norwell, MA: Kluwer Academic Publishers.

Schneider, W. (1998). Innate talent or deliberate practice as determinants of exceptional performance: Are we asking the right question? *Behavioral and Brain Sciences*, 21, 428–424.

Schraw, G. & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19(4), 460–475.

Schumpeter, J. (1934). *The theory of economic development*. Boston: Harvard University Press.

Shane, S. & Stuart, T. (2002). Organizational endowments and the performance of university start-ups. *Management Science*, 48(1), 154–170.

- Shane, S. & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217–226.
- Shaver, K.G. & Scott, L.R. (1991). Person, process, choice: The psychology of new venture creation. *Entrepreneurship Theory and Practice*, 16(2), 23–45.
- Simon, H.A. (1979). Information processing models of cognition. *Annual Review of Psychology*, 30, 363–396.
- Simon, H.A. (1983). *Reason in human affairs*. Oxford: Blackwell.
- Simon, M. & Houghton, S.M. (2002). The relationship among biases, misperceptions and introducing pioneering products: Examining differences in venture decision contexts. *Entrepreneurship Theory and Practice*, 27, 105–124.
- Simon, M., Houghton, S.M., & Aquino, K. (2000). Cognitive biases, risk perception, and venture formation: How individuals decide to start companies. *Journal of Business Venturing*, 15(2), 113–134.
- Skinner, B.F. (1953). *Science and human behavior*. New York: The Free Press.
- Sternberg, R., Forsythe, G.B., Hedlund, J., Horvath, J.A., Wagner, R., & Williams, W.M., et al. (2000). *Practical intelligence in everyday life*. New York: Cambridge University Press.
- Tversky, A. & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5, 207–232.
- Tversky, A. & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124–1131.
- Vockell, E. (2006). Educational psychology: A practical approach. Available at http://education.calumet.purdue.edu/vockell/EdPsyBook/Edpsy7/edpsy7_intro.htm, accessed 10 September 2006.
- Walsh, J.P. (1995). Managerial and organizational cognition: Notes from a trip down memory lane. *Organization Science*, 6(6), 280–321.
- Watson, J.B. (1924). *Behaviorism*. New York: Norton.
-

Ronald K. Mitchell is J.A. Bagley Regents Chair in Management and Professor of Entrepreneurship, in the Rawls College of Business at Texas Tech University.

Lowell W. Busenitz is McCasland Foundation Professor of American Free Enterprise and Academic Director of the Center for Entrepreneurship in the Michael F. Price College of Business at the University of Oklahoma.

Barbara Bird is an Associate Professor in the Kogod School of Business at American University.

Connie Marie Gaglio is an Associate Professor of Management in the College of Business at San Francisco State University.

Jeffery S. McMullen is an Assistant Professor of Management and Entrepreneurship in the Hankamer School of Business at Baylor University.

Eric A. Morse is the J.R. Shaw Professor of Entrepreneurship and Family Owned Business and the Director of the Pierre L. Morrisette Institute for Entrepreneurship at the Richard Ivey School of Business at the University of Western Ontario.

J. Brock Smith is Associate Professor and Entrepreneurship Area Champion in the Faculty of Business at the University of Victoria.