

**UNTANGLING THE INTUITION MESS:
INTUITION AS A CONSTRUCT IN ENTREPRENEURSHIP RESEARCH**

J. Robert Mitchell
Indiana University
1309 East Tenth Street, 650A
Bloomington, Indiana 47405-1701
Tel.: 812-855-8666
E-mail: jrmitch@indiana.edu

Paul N. Friga
Assistant Professor
Indiana University
1309 East Tenth Street
Bloomington, Indiana 47405-1701
Tel.: 812-855-2769

Ronald K. Mitchell
Winspear Chair in Public Policy and Business.
Professor, and Entrepreneurship Program Champion
Faculty of Business
PO Box 1700 STN CSC
The University of Victoria
Victoria, BC V8W 2Y2
Tel.: 250-721-6403

Resubmitted to *Entrepreneurship Theory & Practice*
October 15, 2004

{Do not reproduce or cite without written permission of the authors}

Keywords: Intuition, Opportunity Identification, Entrepreneurial Alertness, Entrepreneurial
Cognition, Entrepreneurship Distinctive Domain

UNTANGLING THE INTUITION MESS:

INTUITION AS A CONSTRUCT IN ENTREPRENEURSHIP RESEARCH

ABSTRACT

Entrepreneurs often use intuition to explain their actions. But because entrepreneurial intuition is poorly defined in the research literature: the “intuitive” is confused with the “innate,” what is systematic is overlooked, and unexplained variance in entrepreneurial behavior remains high. Herein we: (1) bound and define the construct of entrepreneurial intuition within the distinctive domain of entrepreneurship research; (2) apply a levels-of-consciousness logic and process dynamism approach to; (3) organize definitions, antecedents, and consequences, and (4) produce propositions that lead to a working definition of entrepreneurial intuition. Our analysis renders intuition more usable in entrepreneurship research, and more valuable in practice.

INTRODUCTION

Not so long ago an entrepreneur (m, 40)¹ sold his publishing business, considering it a failure.

When asked why, he explained:

When I sold out my business, it was umm . . . well we were pushing out a million and a half greeting cards a year, and it was pretty sizeable; but ah, I had burnt myself out, and so it was pretty grim for me personally; and so I sold out for less than I probably could of fetched . . . And now what I learned from that in retrospect, is that . . . the whole thing was built on that intuition, and gut-feel, and just kind of being in the middle of it. What I didn't have in place were systems, okay?

We bring up this event to make three points. The first two are noncontroversial. First, entrepreneurs use the concept of intuition to explain their actions. This is true not only for explaining buy/sell-type decisions as in the case just cited, but also for providing explanations for many other actions in the entrepreneurial domain, such as opportunity identification, the choice of partners, bankers, or investors, decisions on which markets to enter and which products to promote, etc. To a greater or lesser extent, people's understanding of the nature, use, and impact of entrepreneurial intuition tends to influence the nature of their entrepreneurial thinking and consequently their entrepreneurial behaviors (Busenitz & Lau, 1996; Mitchell, Smith, Seawright &

Morse, 2000; Mitchell, Smith, Morse, Seawright, Peredo & McKenzie, 2002b). And entrepreneurship practitioners consistently cite intuition as an important reason for their achievements (Agor, 1984; Block, 1990; Fox, 1981; Hayashi, 2001; Isaack, 1978; Klein, 2003; Lewis & Leyser, 2002; Lynch, 2002).

Second, as evidenced by the myriad textbooks available, there is a well-accepted role for the application of system in guiding action in both the entrepreneurship and management domains. The search for the development and teaching of new and better methods for venturing is founded on the idea that by identifying what is systematic in effective socioeconomic action, we will be better able to practice and teach it.

Perhaps more controversial is the third point, the one that is the focus of this article. Presently, because the construct of intuition is neither well defined nor clearly situated in either the applied or the research literature, people may fail to understand that what is intuitive is not necessarily innate (Locke, 1690), and therefore fail to adequately explore the connection between what is intuitive and what is systematic in entrepreneurship. But before the possibility of such connections can be explored, it will be necessary to refine the conceptual meaning of the construct of entrepreneurial intuition. Thus it might be said that there is a need within entrepreneurship research to “untangle the intuition mess,” if the concept of entrepreneurial intuition is to be used as a more credible construct within our studies and to be better utilized in practice. Our task in this article is therefore to bound and to define the construct of entrepreneurial intuition for further and more effective use in entrepreneurship research.

Bagozzi and Fornell (1982) suggest that the conceptual meaning of a construct is obtained through the specification of: (1) the definition of the construct, (2) the antecedents, determinants or

¹ Male, age 40 (This quotation is included by permission, with only minor editing to either ensure clarity, or to preserve anonymity).

causes of the construct, and (3) the consequences, implications or results of the construct (1982, p. 25). At present, however, we observe that: (1) there are multiple competing definitions of the construct of entrepreneurial intuition, which vary in scope, and level of contradiction with each other; (2) the antecedents of entrepreneurial intuition lack taxonomic order and are not clearly mapped to relevant definitions; and, (3) many of the multiple consequences thought to result from intuition appear to be unrelated to entrepreneurship. Within this article we therefore sort through these definitions, antecedents, and consequences of intuition and organize them according to criteria relevant to entrepreneurship research. Accordingly, in this article we proceed to: first, describe the theoretical foundations of entrepreneurial intuition as a construct in entrepreneurship research; second, specify and report our approach to refining the conceptual meaning of entrepreneurial intuition within which we introduce a logically-linked set of propositions that flow from the analysis and lead to a working definition of entrepreneurial intuition as a construct in entrepreneurship research; and third, discuss the likely implications for our field.

THEORETICAL FOUNDATIONS

It is well accepted that the role of theory in science is to help us to organize a complex empirical world (Bacharach, 1989, p. 496). In this respect, our research indicates that while there is a great deal of description of the empirical world in the case of entrepreneurial intuition as a construct in entrepreneurship research, there is very little theory that exists to organize it. We therefore take the first organizing step by providing a brief précis of the entrepreneurship research that we have found to be relevant to the task of properly situating the entrepreneurial intuition construct. In the second part of this section we then proceed to survey the literature to provide an also brief but hopefully sufficient sketch of the present status of the construct of intuition, which we believe clearly demonstrates why additional theoretical development is warranted and necessary for this construct to be productively employed in entrepreneurship research.

Entrepreneurship Research

In recent years there has been an increased focus on what Venkataraman (1997) suggests is the distinctive domain of entrepreneurship research. Specifically he argues that entrepreneurship researchers have as their primary charge to investigate how opportunities are identified, stating:

Our field is fundamentally concerned with understanding how, in the absence of current markets for future goods and services, these good and services manage to come into existence. Thus, entrepreneurship as a scholarly field *seeks to understand how opportunities to bring into existence “future” goods and services are discovered, created, and exploited, by whom, and with what consequence* (1997, p. 120).

In a later article, Shane and Venkataraman (2000) refine Venkataraman’s earlier work and identify two possible explanations for the key issue in opportunity identification research: why some individuals recognize opportunities while other do not. They suggest two necessary conditions: first, “the possession of the prior information necessary to identify an opportunity,” and second, “the cognitive properties necessary to value it” (2000, p. 222). This approach echoes Gaglio (1997) who suggests that opportunity identification will be better understood through the investigation of the schemas/ mental models used by individuals to process new information in search of opportunities. The entrepreneurial cognitions research stream has emerged to, in part, address such objectives (Mitchell, Busenitz, Lant, McDougall, Morse & Smith, 2002a). Thus, as we begin the task of bounding and defining that is central to our analysis, we situate the construct of entrepreneurial intuition within the opportunity identification-based distinctive domain of entrepreneurship research, and specifically within the entrepreneurial cognitions tributary of this stream. Additional cognitions-specific theoretical background supports this placement.

Cognitions have been defined as all processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used (Neisser, 1967). Entrepreneurial cognitions are defined to be: *the knowledge structures that people use to make assessments, judgments or*

decisions involving opportunity evaluation and venture creation and growth (Mitchell, et al., 2002a). In the case of opportunity identification, entrepreneurial cognitions are thought to involve the special set of knowledge structures that are termed entrepreneurial alertness cognitions (Gaglio & Katz, 2001). Entrepreneurial alertness is, in turn, defined to be the possession of a skill set, specifically: a distinctive set of perceptual and cognitive processing skills that direct the opportunity identification process (ibid.), and by virtue of this directing function, appear to operate at the more conscious executive level of mental processing (Gordon, 1992). In the case of entrepreneurial intuition, then, entrepreneurial alertness cognitions might be said to be part of a top-level/ executive-cognitions-based control system that enables the process whereby an individual becomes conscious of an opportunity. This accords with previous research which suggests that entrepreneurial alertness cognitions are the knowledge structures used to transform sensory inputs into consciousness of opportunity, which thereby enables the cumulating process of coming to opportunity consciousness (Kirzner, 1980; Long & McMullan, 1984; Mitchell, et. al., 2004, Manimala, 1992; Ronan, 1983). In the analysis section appearing later herein, we utilize this idea of: (1) “cumulation,” combining with (2) “coming to consciousness” to suggest that entrepreneurial intuition is a mental process rather than a mental property or attribute. To properly establish the foundation for this analysis, we next describe the present status of the construct in both the applied and research literatures.

The Intuition Construct: Present Status

The literature review we report in the following paragraphs suggests that the definitions, antecedents, and consequences of entrepreneurial intuition are insufficiently organized, which is one of the reasons why intuition as a construct in entrepreneurship research is inadequately specified. An examination of definitions, antecedents and consequences in turn, supports this assertion.

Definitions

Definitions of intuition appear in both the applied and the research literature. One recent summary of *applied* definitions of intuition presents many potentially contradictory faces of this construct. This recent summary reports that in the applied literature intuition is most often defined to be: a personality trait, an unconscious process, a set of explicit, observable, non-mystical actions used to define problems, the result of distilled experience, or a paranormal power (Behling & Eckle, 1991).

Within the *research* literature the definitions of intuition also vary widely. Intuition has at various times been defined to be: a cognitive conclusion that is based on previous experience and emotional inputs (Burke & Miller, 1999), a complex, quick, non-emotional and non-biased psychological process that is based on “chunking” that an expert hones over years of specific task experience (Khatri & Ng, 2000; Prietula & Simon, 1989, p. 59; Wierzbicki, 1997), a daring conclusive leap (Bennett, 1998), a decision making process that cannot be expressed in words (Barnard, 1938), a decision making rule or heuristic (Riquelme & Watson, 2002), a felt awareness for a situation as a whole (Bastick, 1982), a holistic mode of consciousness (Allinson, Chell, & Hayes, 2000; Shapiro & Spence, 1997), an ill-defined ability to spot problems or errors (Bunge, 1983), an integration of disparate information (Bastick, 1982), a knowledge gained without rational thought (Rowan, 1986), a physiological function which transmits perceptions in an unconscious way (Isaack, 1978), a process of pattern recognition (Crossan, Lane, & White, 1999), a rational, logical brain skill used to guide decision making (Agor, 1990), a right hemisphere brain skill (Lank & Lank, 1995; Olson, 1985), a smooth automatic performance of learned behavior sequences (Isenberg, 1984), a subconscious form of intelligence not accessible through rational thought (Khatri & Ng, 2000; Parikh, 1994; Wierzbicki, 1997), a subjective feeling rooted in past experience (Covin, Slevin, & Heeley, 2001), or a synthetic psychological process that comprehends the totality of a given

situation (Vaughan, 1990). Given the number, scope and possibilities for potential contradictions among the above definitions, it is our view that the task of defining intuition as a construct in entrepreneurship research remains unfinished.

Antecedents

A wide variety of possible antecedents to the construct of intuition exist. For example, intuition is thought to arise from such antecedents as: brain organization (Isaack, 1978), the environment (Allinson, Chell, & Hayes), the existence of implicit theories (Riquelme & Watson, 2002), experience training and practice (Bennett, 1998; Chandler & Jansen, 1992; Covin, Slevin, & Heeley, 2001; Khatri & Ng, 2000, Harper, 1990), expert knowledge structures/ decision scripts (Neisser, 1976; Simon, 1987), formal knowledge or beliefs (Barnard, 1938), immersion in a problem (Koestler, 1976), individual perception (Clarke & Mackaness, 2001), the observation of experts (Burke & Miller, 1999), painstaking practice (Isenberg, 1984), the physical and social environment leading to physiological conditioning (Barnard, 1938), problem sensing, gestation, deliberation, and analysis (Wierzbicki, 1997), situational decision ambiguity (Burke & Miller, 1999), or the unconscious (Crossan, Lane, & White, 1999; Shapiro & Spence, 1997). Presently, this variety of intuition antecedents limits the effective use of intuition as an entrepreneurship research construct due to the added complexity and possible confusion arising from the unclear linkages among multiple antecedents and the many competing definitions.

Consequences

There are also many consequences/ outcomes of entrepreneurial intuition that are of interest to practitioners and researchers. From *applied* articles in the popular press, for example, we find that the presence or use of intuition has been thought to lead to a wide variety of phenomena, which include creativity (Hunter, 2002), successful goal attainment (Williams, 2002), effective management

decision making (Gonzales, 2001), prescient market reactions (Tazzia, 2001), and better sales forecasting (Krieger, 2002).

Within the *research* literature generally, as well as in the entrepreneurship literature specifically, intuition as a construct is suggested to be associated (nonexhaustively) with such outcomes as: the beginning of new market learning or the drawing of unique conclusions about markets and the ability of venture managers (Crossan, Lane, & White, 1999; Hisrich & Jankowicz, 1990), creativity and innovation (Isaack, 1978; Olson, 1985), the discerning of necessary entrepreneurial inputs (Alvarez & Busenitz, 2001; Mosakowski, 1998), the improvement of competitiveness (Behling & Eckel, 1991; Lank & Lank, 1995), opportunity recognition (Allinson, Chell, & Hayes, 2000; Chandler & Jansen, 1992), improved organizational performance (Covin, Slevin, & Heeley, 2001; Khatri & Ng, 2000), and rapid or more efficient decision making (Allinson, Chell, & Hayes, 2000; Bennett, 1998; Burke & Miller, 1999; Simon, 1987). Indeed, the multiple consequences thought to result from entrepreneurial intuition further confirm the necessity for bounding and better defining entrepreneurial intuition as a construct, if it is to be of more use within entrepreneurship research.

In summary, then, a review of the literature: (1) suggests the concept of opportunity identification to be a likely notion that can contribute to our task of bounding and defining intuition as a construct in entrepreneurship research, and (2) confirms a complexity in the empirical world surrounding the construct of entrepreneurial intuition that additional theoretical development might help to organize. In the following section we therefore proceed to introduce an analytical approach to accomplish this task.

ANALYSIS

We take a four-part approach to improving the usability of entrepreneurial intuition as a construct in entrepreneurship research, developing as we go the theoretical propositions necessary to

accomplish our overall bounding and defining objectives. In the *first* part we focus on the outcomes/ consequences of interest. In the *second*, we specify and utilize theoretically sound criteria to sort through the various definitions and antecedents of intuition to organize them, and to justify their further inclusion in the analysis. In the *third* part of our analysis we assess the validity of the construct using generally accepted standards. In the *fourth* part we provide a working definition of entrepreneurial intuition for further use in entrepreneurship research.

Outcomes/ Consequences

While various authors in the research literature associate intuition with a wide variety of economic outcomes, several outcomes surface as particularly relevant in the entrepreneurship research domain. For instance, creativity and innovation (Isaack, 1978; Olson, 1985), the discerning of necessary entrepreneurial inputs (Alvarez & Busenitz, 2001; Mosakowski, 1998), and opportunity recognition (Allinson, Chell, & Hayes, 2000; Chandler & Jansen, 1992), are important consequences in entrepreneurship research. As previously noted, however, the last of these consequences—opportunity recognition, or more generally, opportunity identification—is at the *core* of the distinctive domain of entrepreneurship research, focusing on “... how, in the absence of current markets for future goods and services, these goods and services manage to come into existence” (Venkataraman, 1997, p. 120). It is within this context that we therefore draw the first line bounding the construct of intuition for use in entrepreneurship research. Accordingly we suggest,

Proposition 1: Definitions, antecedents, and consequences of intuition that do not comport with opportunity identification as part of the distinctive domain of entrepreneurship research, should be excluded from the construct of entrepreneurial intuition.

We believe that our viewing opportunity identification as the central consequence of entrepreneurial intuition is particularly useful because, in focusing on opportunity identification, we concentrate specifically upon cognitive processes, and in focusing on cognitive processes we are able

to bring to bear the insights from a highly productive and thus far fruitful theoretical frame of entrepreneurial cognition research (Mitchell, et. al., 2002a). This boundary setting decision provides further assistance in the task of effectively distinguishing entrepreneurial intuition as a research construct, because it also narrows the list of antecedents and definitions to concentrate upon only those that are germane to opportunity identification. Accordingly, we proceed next to evaluate the remaining antecedents and definitions of entrepreneurial intuition within the context of opportunity identification using the notion of proximity to consciousness, as more fully specified, as the sorting criterion.

Sorting and Organizing

Practically speaking (and as previously noted) our analytical approach requires us to identify the analytical machinery necessary to sort and link both antecedents and definitions to the cognitive consequence: opportunity identification. Various analyses of the opportunity identification process suggest that conscious reasoning drives it. For example, Kirzner (1979, 1985) suggests that the essence of entrepreneurial “alertness” is the capability to break the means-ends framework in thinking about the way that things are done (products produced, services rendered, etc.) (Gaglio, 1997). And since the field of entrepreneurship is distinctively concerned with understanding how entrepreneurship enables future goods and services to come into existence (Venkataraman, 1997, p. 120), it seems logical to suggest that this enabling process occurs due to conscious human actions (e.g., making observations, decision making, etc.), rather than through human action that is based in less-conscious mechanisms (e.g., breathing, digestion, etc.). Furthermore, Gaglio (1997) suggests that the opportunity identification process depends upon elaborate cognitive activity, and in particular, depends upon those cognitive mechanisms associated with consciously undoing and redoing representations of information or knowledge.

As noted in our review of the literature, we found two mechanisms to be serviceable in the task of sorting and linking antecedents and definitions related to opportunity identification: (1) the notion of “proximity to consciousness” to assist with the sorting task, and (2) the idea of viewing entrepreneurial intuition as a dynamic process v. as a static property, to assist with the linking task. Thus, in the following paragraphs we shall proceed to describe these two mechanisms.

Proximity to Consciousness

Our first step in describing the proximity-to-consciousness mechanism we use to sort and link the antecedents and definitions of intuition requires us to clarify our use of the term *consciousness*. As a construct in psychology research, consciousness is seen as one of the more difficult terms to define (Baars, 1992; Carlson, 1992; Schacter, 1989). Consistent with previous scholarship that has suggested a more pragmatic approach (Schacter, 1989) we therefore only *describe our use* of the term consciousness rather than attempt to define it as a construct. Schacter (1989) suggests two “uses” of the term consciousness that we find helpful. One use of the term suggests “deliberate or intentional initiation of information retrieval” (1989, p. 373), while a second use of the term suggests “phenomenal awareness” (1989, p. 356). We employ these distinct, but related, uses of the consciousness notion to further assist in bounding and defining intuition as a construct for use in entrepreneurship research.

Our second step in describing the proximity-to-consciousness mechanism introduces the “proximity” idea in combination with consciousness. By the term proximity, we mean to convey a nearer/ farther notion. The resulting notion of proximity to consciousness is a concept that is both germane to the distinctive domain of entrepreneurship research, and useful in the analysis of the antecedents and definitions of entrepreneurial intuition. Several proximity-to-consciousness models exist within the cognitive science literature (e.g. Moscovitch, 1989; Schacter, 1989; Schneider &

Detweiler, 1987). One of the later and more useful models for our analytical purposes is suggested by Gordon (1992), which we have reproduced as Figure 1.

{Insert Figure 1 about here}

Figure 1 illustrates the organization of cognitive processes on the basis of the proximity to consciousness notion, from closest to consciousness (i.e., Level 4: the executive mental system), to farthest from consciousness (i.e., Level 1: the non-conscious procedural system). The four levels illustrated in Figure 1 provide a convenient means to analyze and to organize the various definitions and antecedents of intuition—from most to least conscious—as follows: Level 4: the executive and control system, Level 3: declarative systems, Level 2: response systems, Level 1: non-conscious procedural system.

Level 4, the executive and control system, mediates and organizes information flow to both working memory and the declarative and response systems (1992, p. 108). For example, expert scripts are thought to function as an executive system, because they control information processing that is top-down, i.e., guided² by an executive function (Abelson & Black, 1986; Walsh, 1995). It is the Level 4 executive system that is roughly consistent with what other researchers refer to as the Supervisory Attentional System (Norman & Shallice, 1986), which “is involved in intentional or deliberate control of action” (Schacter, 1989, p. 374). Thus, Level 4 consciousness appeals to the first usage of the term consciousness outlined previously: *deliberate or intentional initiation of information retrieval*. Examples of executive tasks include those which require self-initiated responses, active planning, sequential organization, or task monitoring (ibid.). However, the executive control system does have its limitations: it can only bring certain types of information into

² The notion of guidance in this context is important to our later discussion of expertise because the executive control system accomplishes two tasks: (1) it invokes less conscious systems (Gordon, 1992), and (2) it is also a means through which expertise is created (Glaser, 1984).

awareness (e.g., verbal or symbolic information, images, feelings, etc.); it cannot bring procedural knowledge into conscious awareness (Gordon, 1992, p. 109).

Level 3 declarative systems are based in explicit memory. Declarative memory is the type of memory that is impaired, for example, in amnesia: “memory that is directly accessible to conscious recollection. It can be declared. It deals with facts and data” (Squire, 1987, p. 152). Further, declarative memory is divided into episodic memory (memory of events) and semantic memory (attributed meanings) (Gordon, 1992, p. 107, parenthetical emphasis added), which interfaces with both working memory and with executive and control systems. Working memory is similar to what Schacter (1989) describes as the Conscious Awareness System (CAS). The distinction between the CAS and the executive system is that: “CAS is not itself an executive system, but it outputs the kind of information that can be used by executive systems” (1989, p. 365). In addition, Schacter identifies “CAS with one particular function: phenomenal awareness of ongoing activity” (1989, p. 369). Thus, Level 3 consciousness—particularly as it relates to working memory—is similar to the second usage of the term consciousness outlined previously: *phenomenal awareness*. In answer to the question, “why is Level 3 *less* conscious than Level 4,” we suggest that because one of the functions of the executive control system is to mediate and organize the information flow to the declarative systems (Gordon, 1992, p. 108), use of declarative knowledge is thereby considered to be subordinate to, and in that sense at least one step distant from, the executive control system.

Level 2 response systems include cognitive subsystems that are based in certain human senses or in a situational context. As illustrated in Figure 1, response systems include lexical, visual, auditory, affect, and temporal context subsystems (1992, p. 108). We note that the output of these subsystems is brought into working memory by the executive system (*ibid.*).

Level 1, the non-conscious procedural system, refers to the memory system that “includes motor skills, cognitive skills, simple classical conditioning, habituation, sensitization, perceptual

after-effects, and other automatic associative phenomena (sic)” (1992, p. 107). Rather than being a unitary system, non-conscious procedural systems are thought to be a “collection of different abilities, each dependent on its own specialized processing system” (Squire, 1987, p. 164). As depicted in Figure 1 the procedural/ habit system is thought not to have connections with the CAS, but neither is it isolated because it is possible to voluntarily *initiate* certain acquired skills/ procedures (Gordon, 1992; Schacter, 1989).

Thus, at higher levels of consciousness (e.g., Level 4) the individual has greater ongoing awareness of specific mental activity than at lower levels of consciousness (e.g., Level 1) (Schacter, 1989). As noted in the literature review, in the case of entrepreneurial intuition as it relates to opportunity identification, entrepreneurial alertness cognitions appear to be part of a Level-4 executive-cognitions-based control system that enables the process whereby an individual comes to consciousness of an opportunity. Accordingly we further suggest,

Proposition 2: Entrepreneurial intuition as a construct in entrepreneurship research is more likely to be observed where intuition is conceptualized as a Level-4 executive control system.

Proposition 3: The proximity to consciousness of entrepreneurial intuition antecedents and definitions is associated with their relevance to the distinctive domain of entrepreneurship research.

Proposition 3a: The antecedents of entrepreneurial intuition may be ordered according to proximity to consciousness.

Proposition 3b: The definitions of entrepreneurial intuition may be ordered according to proximity to consciousness.

On the basis of the boundaries set by the foregoing propositions, we sorted both the antecedents and the definitions of intuition remaining in the analysis (i.e., remaining because of their

association with the focal consequence: opportunity identification). The results of this analysis appear in Table 1 (Antecedents) and Table 2 (Definitions).

{Insert Tables 1 & 2 about here}

Our next task is now to explain linkages among these elements.

Linkage: Dynamic Process v. Static Property

We found that in our analysis, as we organized the antecedents shown in Table 1 according to proximity to consciousness, that we could not observe nor could we construct logical reasons to justify why a less-conscious antecedent might be more or less applicable to intuition or to opportunity identification in general, than would a more-conscious antecedent. This observation suggested a dynamic process, in that an antecedent from any level might be expected to influence intuition at any of the consciousness levels.

Therefore, based upon these preliminary analytical steps: (1) the evaluation of these classification results relative to the Level-4-related distinctive domain of entrepreneurship research, and (2) the classification of both definitions and antecedents according to proximity to consciousness, we then found it to be a natural next step to survey the literature to identify instances in which these Level-4 definitions and multiple-level antecedents have been linked—both implicitly and explicitly. The results of this analysis (which also preserves proximity to consciousness ordering for use in further analysis) are shown in Table 3.

{Insert Table 3 about here}

Once Table 3 is constructed, it becomes possible to identify the underlying relationships that are revealed by this analytical framing³. The reader will no doubt notice, as we have, that

³ We hasten to note that our analysis has been exploratory in that we did not, for example, assign definitions or antecedents to consciousness levels with a specific object in mind. Accordingly, the propositions that have resulted from our research stem from the steps taken in construct development, rather than from our taking or attempting to

approximately two thirds of the antecedents of the most-conscious type of intuition constructs also operate at the most-conscious level. This observation suggests the following proposition:

Proposition 4: Entrepreneurial intuition as a construct in entrepreneurship research is more likely to be the result of more-conscious v. less-conscious antecedents.

Another observation, as it applies to the less-conscious antecedents of most-conscious level intuition, is that these less conscious antecedents are likely to impact high-consciousness intuition in unsystematic and perhaps even unpredictable ways. Thus we suggest that,

Proposition 5: Explanations of variance in entrepreneurial intuition when used as a variable in entrepreneurship research will not be complete (unexplained variance will be relatively higher) without controlling for less-conscious antecedents such as (level 1) base levels of cognitive skills, classical conditioning, habituation, sensitization, perceptual effects, and other automatic associative phenomena, (level 2) level of immersion in a problem and situational ambiguity, and (level 3) level of formal knowledge.

With these propositions now stated, we are then able to observe that our establishing linkage among the elements in a model might also assist in the articulation of the level of dynamism to be expected. We reason: where there is little linkage, feedback, and/ or bidirectionality, then the construct being modeled might be considered to be more static. Where extensive linkage, feedback, and/ or bidirectionality is conceptualized, then the focal construct might be considered to be dynamic. Assessing this distinction is important, because, depending upon this assessment, the conceptualization of the construct can vary from being considered a static property, to being considered a dynamic process.

justify a particular position as to the “actual” nature of intuition, which of course we hope will be a more testable question given the specifications provided by this analysis.

Our resolving this question is useful in the conceptualizing entrepreneurial intuition because it is at this point in the analysis that the next boundary decision must be made. To conceptualize entrepreneurial intuition as a static property would result in the application of intuition as a construct in entrepreneurship research that investigates traits and attributes-based questions. To conceptualize entrepreneurial intuition as a dynamic process, would suggest its application to questions that focus on understanding the individual's role in the entrepreneurial process, which itself may involve various processes and sub processes.

Based on our research and theoretical analysis, we tend toward taking the dynamic viewpoint for two reasons. First, the questions that are presently under consideration within entrepreneurship research deal more with the dynamic. v. the static view (e.g., toward understanding processes of opportunity identification) (Shane & Venkataraman, 2000; Harvey & Evans, 1995). And second, once one conceptualizes entrepreneurial intuition as a cognitive construct, the application of cognitive science to research problems becomes essential, and to some extent guiding. Thus, for example, the model shown in Figure 1 as reproduced from Gordon (1992) represents cognition as a multi-level extensively-linked, high-feedback, high-bidirectionality model. Furthermore, as established previously in the literature review, entrepreneurial alertness cognitions are the Level-4, executive-system knowledge structures used to transform sensory inputs into consciousness of opportunity, which thereby enables a cumulating process of coming to opportunity consciousness (Kirzner, 1980; Long & McMullan, 1984; Manimala, 1992; Ronan, 1983). Accordingly in our analysis we suggest that:

Proposition 6: Entrepreneurial intuition is a dynamic process v. a static property.

Proposition 7: Entrepreneurial alertness cognitions comprise key elements of the executive control system, which acts to cumulate toward consciousness the effects of antecedents to

entrepreneurial intuition from all four levels of consciousness to result in the identification of an opportunity.

Therefore with intuition thus conceptualized we present a picture of intuition as a systematic, somewhat unidirectional process: cumulating across levels to consciousness.

Alas, explanations are not so simple.

Within the literature is described another element of the process that produces dynamism in the opposite direction: effecting changes to the level of consciousness at which entrepreneurial intuition might be expected to operate. In their analysis, Crossan et al. (1999) note an interesting quality of what they refer to as expert intuition⁴. They suggest that:

(Something) seems to happen on the way to expertise. What once required conscious, deliberate, and explicit thought no longer does. What once would have taken much deliberation and planning becomes the obvious thing to do (p. 526).

Herein, Crossan, Lane and White (1999) seem to suggest that as expert intuition increases, higher-level cognitive processes give way to lower level cognitive processes. As we have developed and described the dynamic approach suggested above, we have arrived at a similar conclusion. Although we note within Proposition 4 that more conscious antecedents are likely to be more relevant to entrepreneurial intuition than less conscious antecedents, we can refine this understanding using Gordon's (1992) suggestion that:

People becoming competent in a given domain move away from the use of symbolic or declarative knowledge and toward a reliance on perceptual, nonverbalizable procedural knowledge (1992, p. 101).

This suggestion echoes previous researchers (e.g., Chi, Glaser, & Rees, 1982; de Jong & Ferguson-Hessler, 1986) who assert that experts utilize procedural knowledge more than novices do.

⁴ While these authors also employ the term "entrepreneurial intuition," it appears that their intended usage applies to a restricted subset of phenomena. It is the purpose of the analysis in our article, in bounding and defining the notion of entrepreneurial intuition for further use in entrepreneurship research, to subject all relevant cases of such limited usage to a credibly defined and defended set of organizing criteria, this usage included. Herein, however, we do utilize their concept of expert intuition as a notion helpful to the bounding and defining task.

Thus, increased competence in a given domain⁵ (hereinafter referred to as domain competence) suggests the increased importance of less conscious processes, which we term proceduralization. In other words, as an individual's competence in a given domain increases, the relevant functional level of consciousness of that individual decreases—again suggesting process dynamism. We are now, however, faced with a potential paradox. As described previously, the executive control system (a key part of the intentional or deliberate control of action) is unable to bring procedural knowledge into conscious awareness; yet as competence increases use of procedural knowledge also increases. Do the highly competent therefore cease to act on the knowledge they possess? A deeper analysis of the relationship between domain competence and knowledge type (i.e., declarative v. procedural) reconciles this potential conflict.

Differences in the nature of the problem solving situation explain how procedural knowledge applies case-by-case. Novel problem-solving or decision-making situations require declarative knowledge, whereas familiar problem-solving situations require procedural knowledge (Gordon, 1992). In the case of experts, Gordon describes the implications that stem from the domain competence/ knowledge relationship as follows:

In [both novel and familiar problem-solving], the expert has access only to the information that comes into working memory, and that information is declarative in nature. The major implication of this view is that by definition procedural knowledge *cannot* be directly verbalized. It is therefore counterproductive to ask an expert *how* he or she made a decision or solved a problem. The best that the expert can do is verbalize the thoughts that came to working memory as a product of the procedures and use declarative knowledge to conjecture what those procedures must have been (1992, p. 110).

⁵ Within the more general “distinctive” domain of entrepreneurship are many sub-domains within which opportunity identification might occur. For example, a person who is deeply inculcated within a culture is expected to be highly competent with regard to behaviors, norms and cultural expectations. This same expectation might also occur in the case of a particular industry, a specific circumstance such as needing a particular product or service (e.g. a diabetic needing a new or improved insulin delivery system), or in the case of a particular technology. In our use of the term, domain competence suggests the ability to function at a high level of capability within such specific settings.

Thus, Level 3 consciousness operates to manage the procedural knowledge interface with other levels. Verbalized Level-3 declarative system information is the critical output for the action-oriented Level-4 executive control system. Accordingly we suggest,

Proposition 8: Individuals recognize opportunities differentially depending on their level of personal competence within an opportunity domain, but communicate them similarly regardless of such competence.

Proposition 8a: Individuals with low domain competence rely primarily on more conscious mechanisms (i.e., Levels 3 and 4) to recognize entrepreneurial opportunities.

Proposition 8b: Individuals with high domain competence rely primarily on less conscious mechanisms (i.e., Levels 1 and 2) to recognize entrepreneurial opportunities.

Proposition 8c: Higher levels of consciousness (i.e., Levels 3 and 4) are required to communicate recognized opportunities regardless of an individual's domain competence level.

Proposition 9: Entrepreneurial intuition is subject to proceduralization effects based on the domain-competence level possessed by an individual with respect to a specific situation.

Propositions sets 8 and 9 suggest that intuition is not a unidirectional process of coming to consciousness, but is instead a dynamic process that initially (as it is developing) involves an explicit awareness of the coming-to-consciousness process, and which is subsequently experienced as “having a hunch” or “just knowing” something is an opportunity. This is where so-called “frame-breaking” (consciously undoing and redoing representations of information or knowledge) becomes a part of a more comprehensive notion of the opportunity identification process that results in both intuitional and deliberately-crafted opportunities (Gaglio, 1997). Hence, entrepreneurs should not be

expected to rely only upon intuition. These propositions also suggests the existence of opportunities that may be formative in the less-conscious mind but not yet be consciously recognized.

Furthermore, Proposition 9 also leads us to expect that conscious interventions—to overcome the consciousness-diminishing effects of the countervailing tendency toward proceduralization—are indicated, and that entrepreneurial alertness cognitions are likely to include more cognitions than are strictly necessary for the operation of entrepreneurial intuition.

In summary then, during the first part of the analysis we have utilized theoretically relevant criteria to sort and place into order the various antecedents and definitions of entrepreneurial intuition. In the next part of this section we assess construct validity according to generally accepted criteria.

Assessing Construct Validity

For intuition to be a useful concept in entrepreneurship research, it must be a valid construct. Numerous authors in a variety of research domains describe the construct validation process (Bagozzi & Fornell, 1982; Campbell & Fiske, 1959; Churchill, 1979; Cook & Campbell, 1979; Peter, 1981; Schwab, 1980). Bagozzi and Fornell (1982) propose that researchers (1) seek conceptual meaning through explanation of the theoretical underpinnings of constructs, (2) seek empirical meaning through specification of the relationships between theoretical constructs and their observable measures, and (3) seek spurious meaning using various analytical approaches directed at understanding potential biases that originate from procedural methodologies used. A clear understanding of these three types of meaning—conceptual, empirical and spurious—allows researchers to infer the validity of a construct by controlling for potential confounds (Cook & Campbell, 1979). There is a clear order to understanding the meaning of a construct—beginning with conceptual meaning. Cook and Campbell (1979) suggest that conceptual meaning is established through adequate preoperational theoretical explication of the construct. We therefore explain how

two complementary techniques for obtaining conceptual meaning have assisted in the current endeavor to “untangle the intuition mess.”

First, effective pre-operational specification of construct meaning stems from a clear understanding of the definitions, antecedents, and consequences of the focal construct (Bagozzi & Fornell, 1982), which then makes it possible to (2) establish the construct domain (Churchill, 1979) for use within a particular research domain. These two steps form a set of refining processes that systematically reduce construct complexity and the potential for error in its use. Within the previous sections of this article we first appeal to the distinctive domain of entrepreneurship (Venkataraman, 1997) to relate the consequences of intuition to opportunity identification, which allows us to follow the sorting logic of information processing theory to organize and analyze definitions and antecedents according to “proximity to consciousness.” We then extend the analysis to address the static v. dynamic properties of entrepreneurial intuition, thereby establishing the construct domain of intuition as it might be productively used in entrepreneurship research. Throughout, we present likely propositions for operationalization that have emerged from the analysis. On this basis, and according to these criteria, we believe that we are now able to present herein a working definition that can serve as a construct in entrepreneurship research that is sufficiently valid to warrant empirical testing. This definition follows.

A Working Definition of Entrepreneurial Intuition

We are now positioned in the analysis to clearly and succinctly specify a working definition of entrepreneurial intuition. This definition is based upon a more organized concept of entrepreneurial intuition in light of its current definitions, antecedents, and consequences. From this ordering process emerged a set of propositions that allow for a clearer conceptualization of intuition in entrepreneurship research. Based upon the theoretical boundaries established by the foregoing propositions, we define entrepreneurial intuition (as a construct for research within opportunity

identification as a part of the distinctive domain of entrepreneurship) to be: *the dynamic process by which entrepreneurial alertness cognitions interact with domain competence (e.g., culture, industry, specific circumstances, technology, etc.) to bring to consciousness an opportunity to create new value.* We now complete the definitional process by addressing the implications of our analysis.

DISCUSSION AND IMPLICATIONS

We live at a time when the notion of intuition is used to evoke mystical but little-understood properties in both products and services. Put the word intuition into “Google” and your web search will associate intuition with fragrances, clothing, books, music, personal care products, jewelry, movies, and more; resulting in possibilities for intuitive parenting, psychic spying, intuitive tarot reading, remote viewing intuitively, intuitive feng shui, living intuitively, building magical business success by unlocking intuitive powers, finding ultimate truth through intuitive spiritual oracles, etc., etc. It is therefore not surprising that the overpowering linkage of intuition to mystery and myth that pervades our social space should, often unsolicited, predispose even entrepreneurship researchers to expect intuition to be a construct in entrepreneurship research that cannot be well understood, if understood at all.

Nevertheless, our task in this article has been to bound and to define the construct of intuition for further and more effective use in entrepreneurship research. The approach we have taken to accomplish this task has consisted of systematically cataloging, analyzing, and defining intuition, and has resulted in a definition of entrepreneurial intuition that is somewhat distant from the mysterious. On the other hand, our analysis has also resulted in limitations in meaning, because the boundaries that we have suggested to enable the serviceability of intuition as a construct in entrepreneurship research, also constrain its use—as it turns out, even within entrepreneurship research itself. Therefore, it is unlikely for the application of our proposed working definition to be efficacious in addressing questions or problems that: (1) are distant from opportunity identification as part of the

distinctive domain of entrepreneurship research, (2) are not formulated with some level of acceptance that entrepreneurship involves at least partially cognitive phenomena, (3) have little to do with entrepreneurial phenomena at the individual level of analysis, and (4) do not concern socioeconomic behaviors. Accordingly, we freely admit that the techniques and concepts that we have utilized to enable us to more effectively bound and to define the construct of intuition for further and more effective use in entrepreneurship research have very tightly bounded our result. But notwithstanding these limitations, we are pleased to report that the derivation of a working definition of entrepreneurial intuition that covers a useful and still-extensive conceptual domain has been possible, and we therefore desire to briefly discuss in the paragraphs that follow the implications of this achievement for research, practice, teaching, and public policy.

Implications for Research

Our approach to improving the utility of entrepreneurial intuition as a research construct has been shaped by Bacharach's (1989) idea that the role of theory in science is to help us to organize a complex empirical world. This is accomplished through conceptual, empirical, and application/ "in use" development.

Conceptual Development

To improve, through better conceptual development, the utility of entrepreneurial intuition as a research construct, we have sorted through the many definitions, antecedents, and consequences of intuition (Bagozzi & Fornell, 1982) and have organized them to improve the conceptual meaning of this construct through improving its specification. Thus, where there have heretofore been multiple competing definitions of the construct of entrepreneurial intuition, which have varied in scope and extent of contradiction with each other, we have winnowed these definitions down to one. Where the antecedents of entrepreneurial intuition have lacked taxonomic order (e.g., not being clearly mapped to relevant definitions), we have provided analyses as summarized in our tables to provide

the needed organization. And, by constraining our investigation to the distinctive domain of entrepreneurship research (opportunity identification), we have managed to eliminate the many multiple consequences thought to result from intuition, but which are in fact unrelated to entrepreneurship as more tightly bounded by our analysis.

As we have considered what this might mean for conceptual development in entrepreneurship research, we note that several possibilities for research progress that were previously closed now appear to be open. For example, we now see it to be possible for prior studies that have used or encountered entrepreneurial intuition as a construct to be reexamined, empirically tested, or re-tested, as applicable. Additionally, we believe that entrepreneurship researchers are now enabled to envision and to include in their research designs entrepreneurial intuition as a control, moderating, or mediating variable, as warranted by the necessities imposed by various research questions. Furthermore, we can now envision, and encourage fellow researchers to utilize the theoretical framing offered herein to operationalize entrepreneurial intuition as a research variable, perhaps using the linkages of antecedents, the idea of proximity to consciousness, and the specification of entrepreneurial intuition as a dynamic process, as the basis for the development of questionnaire items or for resolving other measurement issues.

By more clearly bounding the definition of entrepreneurial intuition, we therefore hope to have established the conceptual meaning of entrepreneurial intuition as a construct in entrepreneurship research. The establishment of such conceptual meaning is essential to the establishment of empirical meaning (Bagozzi & Fornell, 1982; Cook & Campbell, 1979). Within this research, we have therefore provided a working definition of entrepreneurial intuition that should better allow for future work developing the empirical meaning of entrepreneurial intuition, opening up the possibilities for better methods, and especially offering new measurement possibilities.

Empirical Development

As noted previously, the establishment of concept alone is not sufficient for the development of theory; rather, concepts must be coupled with observation for theory to advance (Bagozzi & Fornell, 1982). In the case of entrepreneurial intuition, the coupling of concept with observation presents its own set of operationalization tasks. As we have delved more deeply into the research methods made more operational through our analysis, we have focused particularly on the measurement task, because in many respects theory progresses no faster than its susceptibility to measurement (Nunnally, 1978). The companion tasks of data gathering and data analysis are either enabled or constrained by the specifications that flow from the job of measurement.

And, in our view, the measurement tasks themselves must also respond to the nature and attributes of the theory that calls them forth. In this respect, we see three subtasks that should be taken into account as researchers attempt to measure the construct of entrepreneurial intuition as defined herein. First, measurement of entrepreneurial intuition as we have conceptualized it must capture the process dynamism that we suggest exists within the interaction of entrepreneurial alertness cognitions and domain competence. Second, measurement of entrepreneurial intuition must accommodate the investigation of both conscious *and* unconscious processes. Third, the techniques utilized for measurement of entrepreneurial intuition should also apply to the multiple sub-domains within which an opportunity can be identified (see footnote 5). As shaped by these parameters we see the measurement of entrepreneurial intuition to be a reachable empirical goal.

Several measurement techniques appear to be appropriate to the investigation of entrepreneurial intuition. For instance, verbal protocols (both think-aloud and retrospective) give insight into the mind of a respondent through the verbalization of thoughts, which thoughts are recorded and subsequently analyzed to identify the cognitive processes of the respondent (Gordon, 1992). Cognitive mapping is another technique with potential for measuring entrepreneurial

intuition. Cognitive maps are “graphic representations that locate people in relation to their information environments. [They] provide a framework for what is known and believed . . . [and] exhibit the reasoning behind purposeful actions” (Fiol & Huff, 1992, p. 267). Conjoint analysis is a third possible approach to measuring entrepreneurial intuition. In entrepreneurial cognition research, conjoint analysis has been defined as a “technique that requires respondents to make a series of judgments based on a set of attributes (cues) from which the underlying structure of their cognitive system can be investigated” (Shepherd & Zacharakis, 1997, p. 211). Within the entrepreneurial intuition context, conjoint analysis is appealing as a measurement technique that is both straightforward in its ease of use, and amenable to the parameters of the measurement task noted above (dynamic, conscious-capturing, and domain-transferable). We therefore explore its use briefly, but in somewhat more depth.

Recent research in entrepreneurial decision-making using conjoint analysis illustrates the benefits of this technique (e.g., Choi & Shepherd, 2004; Shepherd, Zacharakis, & Baron, 2003; Shepherd & Zacharakis, 1997). One specific benefit of conjoint analysis is the ability of the researcher to obtain a real time (v. post hoc) assessment of a respondent’s cognitive system. This ability is particularly advantageous in attending to our first measurement subtask: the measurement of entrepreneurial intuition as a dynamic process. Measurement of process dynamism using conjoint analysis can be done in two ways. First, using conjoint analysis a researcher can, in real time, capture contingent relationships (two-way interactions between criteria) within a respondent’s cognitive system. Conjoint analysis can also be used to capture a second type of process dynamism: dynamism across time. That is, a researcher can employ multiple conjoint studies—manipulating independent variables between studies—thereby allowing for a comparison of cognitive systems prior to and following the manipulation.

Use of conjoint analysis also addresses our second measurement subtask: the need to accommodate the investigation of both conscious *and* unconscious processes. While measuring the observable features of a cognitive system is relatively straightforward and can be done using traditional self-report techniques, capturing the underlying structure of a cognitive system is more challenging because cognitions are not directly observable themselves (Posner, 1973, pp. 92-93). Because conjoint analysis allows a research to uncover the underlying structure of an individual's cognitive system based on a person's response to a particular set of cues (Shepherd & Zacharakis, 1997), we see it as a promising way to capture the less conscious cognitive mechanisms that are often more difficult to directly observe.

Lastly, measurement of entrepreneurial intuition should be capable of generalization to multiple domains within which an opportunity can be identified. In conjoint analysis, the underlying structure of a person's cognitive system is based on that individual's response to a set of cues. As such, it is reasonable to suggest that specific cues can be created to measure variables within the multiplicity of different domains (e.g., culture, industry, specific circumstances, technology, etc.) within which an opportunity can be identified. Additionally, while using conjoint analysis a researcher can hold constant a specific set of cues while varying the setting—thus testing for differences between settings. Consequently we see conjoint analysis to be one example of an effective and practical technique for use in future work aimed at developing the empirical meaning of entrepreneurial intuition.

In-use Development

One final implication of the above-proposed definition of entrepreneurial intuition is the way in which it positions entrepreneurial intuition within the distinctive domain of entrepreneurship research (Venkataraman, 1997). Combined with a better operational understanding of entrepreneurial intuition—v. a black box understanding—the positioning of entrepreneurial intuition

within the distinctive domain of entrepreneurship affords intuition a more permanent place in our models of entrepreneurship as a research phenomenon.

Implications for Practice

Whereas in the field of design, “form follows function”; in entrepreneurship, theory follows practice. Granted, we begin research with theory; but it is a strange world indeed where theory survives for long when too distant from practice. Thus rise our hopes for the better utilization of a more refined conceptualization of entrepreneurial intuition within entrepreneurship practice.

The notion that entrepreneurial intuition is relevant would not have long survived without some basis in the life experiences of entrepreneurs and ventures. The key, therefore, is not “introducing” the idea of intuition into practice; but rather “improving” upon the use of entrepreneurial intuition by entrepreneur-practitioners, and by those upon whom such practitioners rely. Accordingly, where entrepreneurial intuition is defined to be *the dynamic process by which entrepreneurial alertness cognitions interact with domain competence (e.g., culture, industry, specific circumstances, technology, etc.) to bring to consciousness an opportunity to create new value*, the better utilization of intuition within entrepreneurship practice appears to begin with the systematic enhancement of entrepreneurial alertness cognitions. Gaglio and Katz (2001) offer guidance in how this might be done. In proposing a research agenda for future study of entrepreneurial alertness, they present hypotheses that distinguish between entrepreneurially alert and entrepreneurially non-alert individuals. Important factors in differentiating between such individuals include sensitivity to macroeconomic changes and possession of relevant cognitive heuristics (i.e., changing category labels, using analogies, looking for the counterintuitive, engaging in counterfactual thinking, and running mental simulations). Accordingly, entrepreneurial intuition may be better utilized in practice via training activities that increase sensitivity to market changes and the use of the aforementioned heuristics.

In addition our analysis herein suggests that, as a developmental process in entrepreneurship practice, entrepreneurial intuition no longer needs to be viewed as a binary phenomenon. That is, the idea that one person possesses entrepreneurial intuition while another person does not, no longer makes sense under the assumptions of continuous variability and process dynamism. Rather, individuals may now be viewed to possess varying “degrees” of entrepreneurial intuition. We envision that future research will eventually enable the present bounding of the definition of entrepreneurial intuition to provide a standard by which degrees of entrepreneurial intuition possessed by a wide variety of individuals can be assessed, thereby producing additional benefits to practice.

Moreover, our viewing entrepreneurial intuition as the interaction between entrepreneurial alertness cognitions and domain competence also suggests that the domain in which specific antecedents are enacted could play a role in our being able to make qualitative, practical distinctions among many different types of entrepreneurial intuition. That is, in accordance with Proposition sets 7, 8 and 9, entrepreneurially alert individuals who participate in more-conscious activities⁶ (Level 4, Table 1) to increase competence within a given area of specialization (domain) will actually gain greater levels of entrepreneurial intuition in that area of specialization, while not in other areas of specialization. This is clearly relevant to both the potential entrepreneur and those individuals who fund such entrepreneurs.

Also, our viewing entrepreneurial intuition as a developmental process that can be fostered within specific domains allows practitioners to adopt a life-long-learning approach to entrepreneurial intuition. Steps might therefore be taken by individuals and their employers to enact programs that enhance entrepreneurial intuition at the individual level of analysis. Furthermore, the implications of

⁶ These activities may include getting an education, gaining experience, or observing experts in a field.

Proposition sets 8 and 9 suggest that, in fact, intuitional performance is likely to be enhanced by the periodic re-sensitizing of individuals to intuition-consciousness-surfacing cues.

Lastly, and on a somewhat lighter note, we have also considered the possibility that given the difficulty of eliminating mystical assumptions from a population that loves and carefully tends to the mysterious, that certain enterprising practitioners might—through more clearly understanding the operation of entrepreneurial intuition as a cumulating, coming-to-consciousness-based process—be enabled to identify, create, and market many new business intuition products that possess not only a mystical aura (making them attractive): but which actually work (making them useful)!

Implications for Teaching

Notwithstanding the pervasiveness of entrepreneurship classes in almost every post-secondary business school, the too-frequently debated issue in entrepreneurship in our view is the perennial question of whether individuals can really be taught to be entrepreneurs (v. merely being taught about entrepreneurship). Our observations related to Proposition sets 4, 6, 7 and 8 shed some light on this never far-distant question within entrepreneurship research into the psychology of the entrepreneur: are entrepreneurs born or made? These propositions suggest that there will likely exist a substantial proportion of “made” elements in the intuitive thinking patterns of entrepreneurs—that improving the utilization of entrepreneurial intuition might fact be a process that is teachable.

Given the above propositions and the supporting logic we provide, we are led to suggest that educational attention in the teaching of entrepreneurial intuition should be weighted toward more-conscious activities (Tables 1 and 3). Accordingly, we suggest that an individual who desires to learn or to enhance her/ his entrepreneurial intuition should emphasize activities that: 1) enhance entrepreneurial alertness cognitions (e.g., training activities that increase use of cognitive heuristics relevant to entrepreneurial alertness (see Gaglio & Katz, 2001)), and 2) increase competence in a given domain (e.g., education and training in that domain).

An additional implication (and possibly an added benefit) to shifting the educational focus of entrepreneurial intuition toward a focus on higher-level antecedents (level 4 v. level 1, Table 1) as suggested by our analysis, are the benefits that appear likely to accrue where students of intuition are longitudinally tracked as to which higher-level antecedents they utilize to improve their intuition. By so doing, interested educators can gauge the effectiveness of various level 4 antecedents upon the entrepreneurial intuition enhancement process, and systematically structure and refine entrepreneurial curriculum accordingly.

Implications for Public Policy

Within this analysis, the antecedents and consequences of entrepreneurial intuition have been discussed at the individual level of analysis. While the individual level of analysis has been the focal level in this article, it is not the only relevant level of analysis. Thus, while we have conservatively limited our theory proposed herein to the individual level of analysis, we nevertheless would concede that our theoretical observations might have implications for other more-aggregated levels of analysis, and therefore for public policy.

For instance one might argue that increased understanding of entrepreneurial intuition can benefit the corporate entrepreneur. One might then assert that improvements in the entrepreneurial intuition of corporate entrepreneurs would in turn increase the likelihood that these improvements might benefit the firm through the influence of the corporate entrepreneur within an existing organization. An argument using similar logic might then be made at the regional economy or national economy level of analysis, since a number of countries (e.g., Malaysia) seek out policies that could increase national levels of entrepreneurship (Bargen, Freedman, & Pages, 2003; Yunus, 2002). Therefore, when considering that entrepreneurship is at least a cross-level phenomenon (where an entrepreneurial individual affects a firm, or an economy), the view that entrepreneurial intuition is a developmental process has potential public policy implications as well: those who seek to increase

the incidence of entrepreneurship, might look to increasing the incidence of entrepreneurial intuition, where increasing entrepreneurial intuition is defined as we do herein, as increasing entrepreneurial alertness, domain competence, and ultimately the addition of new value.

Conclusion

In the year 1714 the philosopher Leibniz stated in connection with human perception:

Moreover, it must be confessed that *perception* and that which depends upon it are *inexplicable on mechanical grounds*, that is to say, by means of figures and motions. And supposing there were a machine, so constructed as to think, feel, and have perception, it might be conceived as increased in size, while keeping the same proportions, so that one might go into it as into a mill. That being so, we should, on examining its interior, find only parts which work one upon another, and never anything by which to explain a perception. Thus it is in a simple substance, and not in a compound or in a machine, that perception must be sought for.

In our analysis we have sought to explain entrepreneurial intuition by more than mechanical means, but nevertheless using the machinery of cognitive science to pry our way into this ostensibly intractable construct. The “simple substance” that we have identified is in a process of the human mind: one which is cumulative and dynamic across levels of consciousness, and which, when subjected to taxonomic tools, yields an underlying order that is relevant to the distinctive domain of entrepreneurship. Is there therefore a connection between what is intuitive and what is systematic in entrepreneurship that is consistent with the distinctive domain of entrepreneurship research as suggested by Venkataraman (1997)? Based on our analysis, we think there is reason to expect that the answer will be yes.

We hazard this claim, because we believe that in building our analysis from well-accepted philosophy-of-science foundations, our contribution can be assessed both through use of the common currency of accepted research terminology, and through the compatibility of the notions we suggest with parallel work in the field of entrepreneurial cognition. Thus, in our approach to the analysis of the antecedents and consequences of entrepreneurial intuition to more usefully define it as

a research construct, we have been philosophically consistent with both Hobbes' (1651) axiomatic method, in which it is argued that "if we want to 'know' anything, we must construct it from its ultimate parts," the most basic of which is its definition (Bronowski & Mazlish, 1960, p. 198), but also consistent with the foundations of empiricism as articulated by Locke (1690), where our approach to laying a predicate for empirical research, and our theoretical development, are informed and animated by the Lockian notion that rejects the innate as a source of entrepreneurial intuition, and embraces the idea that intuition rests on the occurrence of the self-evident—another way of saying that we "come to the consciousness or realization" that there exists a certain connection/ correspondence, or agreement between elements (e.g., intentions and expectations (Hayek, 1945, p. 44)) within some domain. This idea—that there exists a process of coming to the consciousness of counterintuitive correspondence/ agreement—is, we believe, an idea that is at the core of certain companion processes that are presently developing in the literature, such as effectuation (Sarasvathy, 2001), entrepreneurial social surface design (Mitchell, 2001, 2003), and real options reasoning (McGrath, 1999).

Hopefully, for entrepreneurship research at least, our analysis has made some headway in "untangling the intuition mess": proposing theory to organize our approach to studying this complex phenomenon, to make progress in the explanation of entrepreneurial intuition-based variance, but, we also admit, without as yet removing all vestiges of mystery. Much is yet to be learned in the study of this fascinating phenomenon.

REFERENCES

- Abelson, R. P. & Black, J. B. (1986). Introduction. In J. A. Galambos & R. P. Abelson & J. B. Black (Eds.), *Knowledge Structures*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Agor, W. H. (1984). Using intuition to manage organizations in the future. *Business Horizons*, 27(5), 49-54.
- Agor, W. H. (1990). Introduction. In W. H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications.
- Allinson, C. W., Chell, E., & Hayes, J. (2000). Intuition and entrepreneurial behaviour. *European Journal of Work and Organizational Psychology*, 9, 31-43.
- Alvarez, S., & Busenitz, L. (2001). The Entrepreneurship of Resource-Based Theory. *Journal of Management*, 27, 755-775.
- Baars, B. J. (1992). A plea for simplicity. *American Journal of Psychology*, 105(4), 591-597.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4), 496-515.
- Bagozzi, R. P. & Fornell, C. (1982). Theoretical concepts, measurement, and meaning. In C. Fornell (Ed.), *A second generation of multivariate analysis*, Vol. 2: 24-38. New York: Praeger.
- Bargen, P. V., Freedman, D., & Pages, E. R. (2003). The Rise of the Entrepreneurial Society. *Economic Development Quarterly*, 17(4), 315-324.
- Barnard, C. (1938). *The Functions of the Executive*: Harvard University Press, Cambridge, MA. In Bennett, R. H. (1998). The importance of tacit knowledge in strategic deliberations and decisions. *Management Decision*, 36, 589-597.
- Bastick, T. (1982). *Intuition, how we think and act*. Toronto: John Wiley & Sons.
- Behling, O. & Eckel, H. (1991). Making sense out of intuition. *Academy of Management Executive*, 5, 46-54.
- Bennett, R. H. (1998). The importance of tacit knowledge in strategic deliberations and decisions. *Management Decision*, 36, 589-597.
- Block, B. (1990). Intuition creeps out of the closet and into the boardroom. *Management Review*, 79(5), 58-60.
- Bronowski, J., & Mazlish, B. (1960). *The Western intellectual tradition: From Leonardo to Hegel*. New York: Harper Torchbooks.
- Bunge, M. A. (1983). *Exploring the world: Epistemology & methodology (treatise on basic philosophy)*. Dordrecht: D. Reidel. In Sadler-Smith, E. (1999). Intuition-analysis cognitive style and learning preferences of business and management students. *Journal of Managerial Psychology*, 14, 26-39.
- Burke, L. A. & Miller, M. K. (1999). Taking the mystery out of intuitive decision making. *Academy of Management Executive*, 13, 91-99.
- Busenitz, L. & Lau, C. (1996). A cross-cultural cognitive model of new venture creation. *Entrepreneurship Theory & Practice*, 20(4), 25-39.
- Campbell, D. T. & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-105.

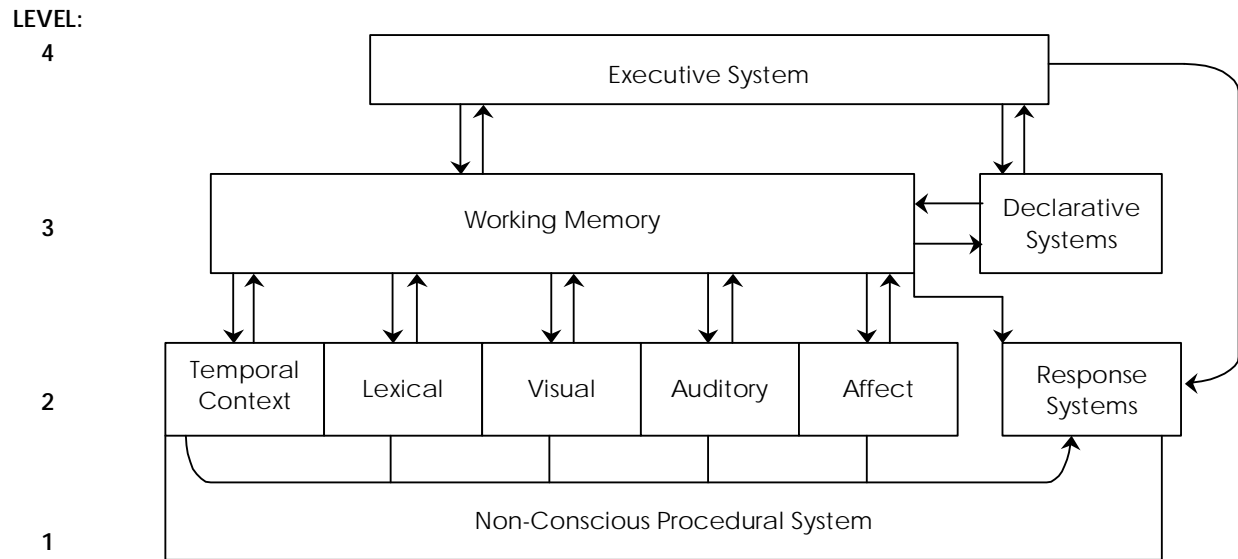
- Carlson, R. A. (1992). Starting with consciousness. *American Journal of Psychology*, 105(4), 598-604.
- Chandler, G. N. & Jansen, E. (1992). The founders self-assessed competence and venture performance. *Journal of Business Venturing*, 7, 223-236.
- Chi, M. T. H., Glaser, R., & Rees, E. (1982). Expertise in problem solving. In R. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 1, pp. 17-76). Hillsdale, NJ: Erlbaum.
- Choi, Y. R., & Shepherd, D. A. (2004). Entrepreneurs' Decisions to Exploit Opportunities. *Journal of Management*, 30(3), 377-395.
- Churchill, G. A., Jr. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16, 64-73.
- Clarke, I. & Mackaness, W. (2001). Management 'intuition': An interpretative account of structure and content of decision schemas using cognitive maps. *Journal of Management Studies*, 38, 147-172.
- Cook, T. D. & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Boston: Houghton Mifflin Company.
- Covin, J. G., Slevin, D. P., & Heeley, M. B. (2001). Strategic decision making in an intuitive vs. technocratic mode: Structural and environmental considerations. *Journal of Business Research*, 52, 51-67.
- Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, 24, 522-537.
- de Jong, T., & Ferguson-Hessler, M. G. M. (1986). Cognitive structures of good and poor novice problem solvers in physics. *Journal of Educational Psychology*, 78, 279-288.
- Fiol, C. M., & Huff, A. S. (1992). Maps for managers: Where are we? Where do we go from here? *Journal of Management Studies*, 29(3), 267-285.
- Fox, H. W. (1981). The frontiers of strategic planning: Intuition or formal models. *Management Review*, 70(4), 8-14.
- Gaglio, C.M. (1997). Opportunity identification: Review, critique and suggested research directions. In J.A. Katz, (Ed.), *Advances in entrepreneurship, firm emergence and growth* (Volume 3, pp. 139-202). Greenwich, CT: JAI Press.
- 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.
- Gonzales, A. (2001). How to use your intuition to make good business decisions. *The Business Journal*, 22(9), 33.
- Gordon, S. E. (1992). Implications of Cognitive theory for knowledge acquisition. In Robert R. Hoffman (Ed.) *The Psychology of Expertise: Cognitive Research and Empirical AI*: 99-120. New York: Springer-Verlag New York, Inc.
- Harper, S. C. (1990). Intuition: What separates executives from managers. In W. H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications.

- Harvey, M. & Evans, R. (1995). Strategic windows in the entrepreneurial process. *Journal of Business Venturing*, 10(5), 331-347.
- Hayashi, A. M. (2001). When to trust your gut. *Harvard Business Review*, 79(2), 59-65.
- Hayek, F. A. v. 1945. The use of knowledge in society. *The American Economic Review*, 35(September): 519-520.
- Hisrich, R. D. & Jankowicz, A. D. (1990). Intuition in venture capital decisions: An exploratory study using a new technique. *Journal of Business Venturing*, 5, 49-62.
- Hobbes, T. (1651). *Leviathan*. In Bronowski, J., & Mazlish, B. (1960). *The Western intellectual tradition: From Leonardo to Hegel*. New York: Harper Torchbooks.
- Hunter, I. (2002). Leveraging creativity, *Executive Excellence*, 19, 16.
- Isaack, T. S. (1978). Intuition: An ignored dimension of management. *Academy of Management Review*, 3, 917-922.
- Isenberg, D. J. (1984). How senior managers think. *Harvard Business Review*, 62(6), 81-90.
- Khatri, N. & Ng, A. (2000). The role of intuition in strategic decision making. *Human Relations*, 53, 57-86.
- Kirzner, I. (1979). *Perception, opportunity, and profit*. Chicago: University of Chicago Press.
- Kirzner, I. M. (1980). The primacy of entrepreneurial discovery. In I. Kirzner, et al. (Ed.), *Prime mover of progress: The entrepreneur in capitalism and socialism*, Vol. 23: 3-28. London: The Institute of Economic Affairs.
- Kirzner, I. (1985). *Discovery and the capitalist process*. Chicago: University of Chicago Press.
- Klein, G. A. (2003). *Intuition at work : Why developing your gut instincts will make you better at what you do*. New York: Currency/Doubleday.
- Koestler, A. (1976). *The act of creation*. London: Hutchinson.
- Krieger, M. (2002). St. Paul, Minn., Small Retailers Rely on Instincts for Crucial Holiday Sales, *Knight Ridder Tribune Business News*. Washington.
- Lank, A. G. & Lank, E. A. (1995). Legitimizing the gut feel: The role of intuition in business. *Journal of Managerial Psychology*, 10, 18-23.
- Leibniz, Gottfried Wilhelm von. (1714). *Monadology*, paragraph 17 (Latta translation).
- Lewis, D. & Leyser, K. (2002). Unlocking the magic of your mind - using intuition to make important management decisions, *The British Journal of Administrative Management*, Sep/Oct, 12-15.
- Locke, J. (1979 [1690]) *Essay concerning human understanding*. Oxford: Oxford University Press.
- Long, W., & McMullan, W. E. (1984). Mapping the new venture opportunity identification process. In J. A. Hornaday, F. A. Tardley, J. A. Timmons, & K. A. Vesper (Eds.), *Frontiers of entrepreneurship research*. Wellesley, MA: Babson College.
- Lynch, M. (2002). Intuition, management skills, fun: recipe for success, keynote speaker says, *Northern Ontario Business*, 22, 6B.
- Manimala, M. J. (1992). Entrepreneurial heuristics: A comparison between high PI (pioneering-innovative) and low PI ventures. *Journal of Business Venturing*, 7, 477-504.

- McGrath, R. G. 1999. Falling forward: Real options reasoning and entrepreneurial failure. *Academy of Management Review*, 24(1): 13-30.
- Mitchell, R. K. (2001). *Transaction cognition theory and high performance economic results* (First ed.). Victoria, BC: International Centre for Venture Expertise, <http://www.ronaldmitchell.org/publications.htm>.
- 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: Cognitive Approaches to Entrepreneurship Research*. Greenwich, Connecticut: JAI Press.
- Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., & Smith, B. (2002a). Entrepreneurial cognition theory: Rethinking the people side of entrepreneurship research. *Entrepreneurship: Theory & 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 & Practice*, 28(6), 505-517.
- 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. W., Peredo, A. M., & McKenzie, B. (2002b). Are entrepreneurial cognitions universal? Assessing entrepreneurial cognitions across cultures. *Entrepreneurship Theory & Practice*, 26(4), 9-32.
- Mosakowski, E. (1998). Entrepreneurial resources, organizational choices, and competitive outcomes. *Organization Science: A Journal of the Institute of Management Sciences*, 9(6), 25-43.
- Moscovitch, M. (1989). Confabulation and the frontal systems: Strategic versus associated retrieval in neuropsychological theories of memory. In H. L. Roediger & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving*: 133-161. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Neisser, U. (1976). *Cognition and Reality*. San Francisco: Free Press.
- Norman, D. A., & Shallice, T. (1986). Attention to action. Willed and automatic control of behavior. In R. J. Davidson, G. E. Schwartz & D. Shapiro (Eds.), *Consciousness and self-regulation* (Vol. 4, pp. 1-18). New York: Plenum Press.
- Nunnally, J. C. (1978). *Psychometric Theory* (Second Edition ed.). New York: McGraw-Hill.
- Olson, P. D. (1985). Entrepreneurship: Process and abilities. *American Journal of Small Business*, 10, 25-31.
- Parikh, J. (1994). *Intuition: The New frontier of management*. Oxford: Blackwell.
- Peter, J. P. (1981). Construct validity: A review of basic issues and marketing practices. *Journal of Marketing Research*, 18, 133-145.
- Posner, M. I. 1973. *Cognitions: An introduction*. Glenview, Ill.: Scott, Foresman and Company.
- Prietula, M. J. & Simon, H. A. (1989). The experts in your midst. *Harvard Business Review*, 67(1), 120-124.
- Riquelme, H. & Watson, J. 2002. Do venture capitalists' implicit theories on new business success/failure have empirical validity? *International Small Business Journal*, 20, 395-418.

- Ronan, J. (1983). *Entrepreneurship*. Lexington, MA: Lexington Books.
- Rowan, R. (1986). *The intuitive manager*. Boston, Toronto: Little, Brown and Company.
- Sarasvathy, S. D. 2001. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2): 243-264.
- Schacter, D. L. (1989). On the relation between memory and consciousness: Dissociable interactions and conscious experience. In H. L. Roediger & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving*: 355-389. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Schneider, W. & Detweiler, M. (1987). Connectionist/control architecture for working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation*, Vol. 21: 53-119. San Diego, CA: Academic Press.
- Schwab, D. P. (1980). Construct validity in organizational behavior. In L. L. Cummings & B. Staw (Eds.), *Research in organizational behavior*, Vol. 2: 3-44. Greenwich, CT: JAI Press.
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217-226.
- Shapiro, S., & Spence, M. T. (1997). Managerial intuition: A conceptual and operational framework. *Business Horizons*, 40(1), 63-68.
- Shepherd, D. A., Zacharakis, A., & Baron, R. A. (2003). VCs' decision processes: Evidence suggesting more experience may not always be better. *Journal of Business Venturing*, 18(3), 381-401.
- Shepherd, D. A., & Zacharakis, A. L. (1997). Conjoint analysis: A window of opportunity for entrepreneurship research. In J. A. Katz (Ed.), *Advances in Entrepreneurship, Firm Emergence and Growth* (Vol. 3, pp. 203-248). Greenwich, CT: JAI Press.
- Simon, H. A. (1987). Making management decisions: The role of intuition and emotion. *Academy of Management Executive*, 1, 57-64.
- Squire, L. M. (1987). *Memory and brain*. New York: Oxford University Press.
- Tazzia, E. (2001). Nurturing your natural talents, *Advertising Age (Midwest Region Edition)*, 72, 20.
- Vaughan, F. E. (1990). Varieties of intuitive experience. In W. H. Agor (Ed.), *Intuition in organizations*: 40-61. Newbury Park, CA: Sage Publications.
- Venkataraman, S. (1997). The distinctive domain of entrepreneurship research. In J. Katz (Ed.), *Advances in entrepreneurship, firm emergence and growth* (Vol. 3, pp. 119-138): JAI Press.
- Walsh, J. P. (1995). Managerial and organizational cognition: Notes from a trip down memory lane. *Organization Science*, 6(6), 280-321.
- Wierzbicki, A. P. (1997). On the Role of Intuition in Decision Making and Some Ways of Multicriteria Aid of Intuition. *Journal of Multi-Criteria Decision Analysis*, 6, 65-76.
- Williams, C. (2002). Your road map to success, *Broker World*, 22, 66-68.
- Yunos, M. G. M. (2002). Building an innovation-based economy: The Malaysian technology business incubator experience. *Journal of Change Management*, 3(2), 177-188.

FIGURE 1
A System/mode Model of Learning and Memory



Source: Gordon, 1992: 108

TABLE 1
Antecedents of Intuition Ordered by
Proximity to Consciousness

Level	Antecedent
Level Four: Executive Control Systems	<ul style="list-style-type: none"> • Experience, training and practice (Agor, 1990; Barnard, 1938; Burke & Miller, 1999; Chandler & Jansen, 1992; Covin, Slevin, & Heeley, 2001; Harper, 1990; Khatri & Ng, 2000); Painstaking practice (Isenberg, 1984); Education and Training (Bennett, 1998) • Expert knowledge structures/ decision scripts (Neisser, 1976; Simon, 1987) • Observation of experts (Burke & Miller, 1999) • Problem deliberation and analysis (Wierzbicki, 1997)
Level Three: Declarative	<ul style="list-style-type: none"> • Formal knowledge or beliefs (Barnard, 1938)
Level Two: Response Systems	<ul style="list-style-type: none"> • The environment (Allinson, Chell, & Hayes) • Immersion in a problem (Koestler, 1976) • Individual perception (Clarke & Mackaness, 2001) • Physical and social environment (Barnard, 1938) • Situation decision ambiguity (Burke & Miller, 1999)
Level One: Nonconscious Systems	<ul style="list-style-type: none"> • Right hemisphere processes (Isaack, 1978) • Existence of implicit theories (Riquelme & Watson, 2002) • Physiological conditioning (Barnard, 1938) • Problem sensing and gestation (Wierzbicki, 1997) • The unconscious (Crossan, Lane, & White, 1999; Shapiro & Spence, 1997)

TABLE 2
Definitions of Intuition Ordered by
Proximity to Consciousness

Level	Definition
Level Four: Executive Control Systems	<ul style="list-style-type: none"> • A cognitive conclusion that is based on previous experience and emotional inputs (Burke & Miller, 1999) • A complex, quick, non-emotional and non-biased psychological process that is based on “chunking” that an expert hones over years of specific task experience (Khatri & Ng, 2000; Prietula & Simon, 1989, p. 59; Wierzbicki, 1997) • A daring conclusive leap (Bennett, 1998) • A decision making rule or heuristic (Riquelme & Watson, 2002) • A process of pattern recognition (Crossan, Lane, & White, 1999) • A rational, logical skill used to guide decision making (Agor, 1990) • A synthetic psychological process that comprehends the totality of a given situation (Vaughan, 1990)
Level Three: Declarative	<ul style="list-style-type: none"> • An ill-defined ability to spot problems or errors (Bunge, 1983)
Level Two: Response Systems	<ul style="list-style-type: none"> • A felt awareness for a situation as a whole (Bastick, 1982) • A holistic mode of consciousness (Allinson, Chell, & Hayes, 2000; Shapiro & Spence, 1997) • An integration of disparate information (Bastick, 1982) • A knowledge gained without rational thought (Rowan, 1986) • A subjective feelings rooted in past experience (Covin, Slevin, & Heeley, 2001)
Level One: Nonconscious Systems	<ul style="list-style-type: none"> • A decision making process that cannot be expressed in words (Barnard, 1938) • A physiological function which transmits perceptions in an unconscious way (Isaack, 1978) • A right hemisphere brain skill (Lank & Lank, 1995; Olson, 1985) • A smooth automatic performance of learned behavior sequences (Isenberg, 1984) • A subconscious form of intelligence not accessible through rational thought (Khatri & Ng, 2000; Parikh, 1994; Wierzbicki, 1997)

TABLE 3
Multiple-level Antecedents Related to
Level Four/ Decision-making Definitions

Level	Antecedent	Level	Definition
4	Observation of experts (Burke & Miller, 1999)	4	A cognitive conclusion that is based on previous experience and emotional inputs (Burke & Miller, 1999)
4	Experience (Burke & Miller, 1999)		
2	Situation decision ambiguity (Burke & Miller, 1999)		
4	Experience, training and practice (Khatri & Ng, 2000)	4	A complex, quick, non-emotional and non-biased psychological process that is based on “chunking” that an expert hones over years of specific task experience (Khatri & Ng, 2000; Prietula & Simon, 1989, p. 59; Wierzbicki, 1997)
4	Painstaking practice (Isenberg, 1984)		
4	Problem deliberation and analysis (Wierzbicki, 1997)		
4	Experience, training and practice (Bennett, 1998)	4	Daring conclusive leaps (Bennett, 1998)
1	Existence of implicit theories (Riquelme & Watson, 2002)	4	A decision making rule or heuristic (Riquelme & Watson, 2002)
1	The unconscious (Crossan, Lane, & White, 1999)	4	Processes of pattern recognition (Crossan, Lane, & White, 1999)
4	Expert knowledge structures/ Decision scripts (Neisser, 1976; Simon, 1987)		
4	Practice (Agor, 1990)	4	Rational, logical brain skill used to guide decision making (Agor, 1990)
2	Individual perception (Clarke & Mackness, 2001)	4	A synthetic psychological process that comprehends the totality of a given situation (Vaughan, 1990)
2	Immersion in a problem (Koestler, 1976)		