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Entrepreneurship Research on Intuition: A Critical Analysis and Research Agenda

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Abstract

Intuition is a way of processing information that is largely unconscious, associative, fast, and contextually dependent. As part of the growing cognition-oriented research agenda in the entrepreneurship field, the specific cognitive construct of intuition has attracted relatively little attention. We find this position surprising, particularly since some entrepreneurship scholars have described intuition as the seed of entrepreneurial activity. In this review, we examine the small but rapidly growing literature at the intersection of intuition and entrepreneurship. In critically analyzing this body of work, we reveal a number of areas that warrant further attention if scholars wish to enhance academic understanding of the role of intuition in the entrepreneurial process. From our review, we develop an agenda to help guide scholars of entrepreneurial cognition with a specific interest in intuition in their future research. In doing so, we address a gap in the entrepreneurial cognition literature which currently lacks a clear view of the value of entrepreneurship research on intuition and of how it should be conducted.

Entrepreneurship Research on Intuition: A Critical Analysis and Research Agenda

Intuitions are “affectively charged judgments that arise through rapid, non-conscious, and holistic associations” (Dane and Pratt, 2007, p. 40). Although some scholars claim that intuition is “the seed of any entrepreneurial action” (Dutta and Crossan, 2005, p. 436), there has been limited attention devoted to studying the role of intuition in the entrepreneurial process. This might be partly due to the non-conscious nature of intuition, which makes it difficult for entrepreneurs to reliably report their use of intuition. As Blume and Covin (2011) remarked, “if intuition is appropriately conceived of as a subconscious reasoning process, how can we consciously ‘know’ that intuition was involved as a decision driver?” (p. 139).

Despite its somewhat elusive nature, intuition has captured the interest of a growing number of scholars. Our systematic review of the literature revealed 25 publications related to entrepreneurs’ use of intuition, half of which were published since 2008. This is indicative of a promising and emerging research area. However prior reviews and our own analyses revealed that entrepreneurship research on intuition is not located in one single field of research, but is fragmented across entrepreneurship, general management, organization studies and psychology journals. Furthermore, scholars have explored a large number of research questions, relied on contradictory theories of information processing (i.e., unitary versus dual-process views), and deployed a wide range of techniques to measure intuition (e.g., preference for intuition versus actual use of intuition). The dispersion of publications in cognate yet distinct fields, together with the diversity of research questions, theoretical orientations and methodological approaches, makes it difficult to understand when, why, where, and how entrepreneurs use intuition, and with what effects.

We believe that a systematic review is therefore needed to make sense of the entrepreneurship research on intuition and to define a clear research agenda. Like Walsh

(1995), we see the value of a systematic review stemming from the ability to “question our accumulated wisdom and push ourselves to build an even more rigorous and relevant program” (p. 302). The broader psychology and management literatures indicate that intuition is more prevalent and more effective in uncertain environments (Covin, Slevin and Heeley, 1999; Sadler-Smith and Shefy, 2007; Khatri and Ng, 2000). Entrepreneurs operate in environments characterised by high levels of risk, time pressure, intense personal commitment and deep emotional involvement (Baron, 2008), and they make judgments and decisions under conditions of uncertainty (McMullen and Shepherd, 2006). As a result, one would expect intuition to play an important role in entrepreneurship. However entrepreneurship scholars lack a clear view of the role of intuition in their field, and of how it should be researched. Although a review of intuition research has been recently conducted for the cognate field of management (Akinci and Sadler-Smith, 2012), there has been no attempt to make sense of the entrepreneurship literature on intuition.

Our review addresses this gap by conducting a systematic analysis of entrepreneurship research on intuition. In doing so, we provide conceptual, methodological and thematic guidance for scholars interested in studying intuition as it relates to entrepreneurial environments, processes and activities. Contrary to Armstrong, Cools and Sadler-Smith (2012), we do not limit our review to cognitive style,¹ as entrepreneurship research has been concerned not only with the preference for intuition, but also with entrepreneurs’ attributions to and actual use of intuition, as well as with its antecedents and outcomes. We seek to identify and question the assumptions of the work to date, and to identify its strengths and limitations. We then use our analysis of the literature to develop an agenda for future entrepreneurship research on intuition.

¹ *Insert Footnote 1 here*

WHAT IS INTUITION?

The concept of intuition has been studied from many different perspectives, including psychology, philosophy, and management. As a result, “intuition has been given so many different meanings...that it makes one wonder whether the term has any meaning at all” (Epstein, 2008, p. 23). Nonetheless it is possible to identify commonalities between the many existing definitions. Broadly speaking, intuition is a source of knowledge distinct from a more logical, analytical or rational mode of reasoning, and which “involves immediate apprehension in the absence of reasoning” (Evans, 2010, p. 313). A systematic analysis of the many definitions of intuition enables us to refine this lay definition, and makes clear that intuition is associated with four specific characteristics.²

First, most definitions consider intuition to originate beyond conscious thought, and therefore, leads to a sense of “‘knowing’ without knowing why” (Hodgkinson, Sadler-Smith, Burke, Claxton and Sparrow, 2009a, p. 279). For instance Hogarth (2001) suggests that “the essence of intuition or intuitive responses is that they are reached with little apparent effort, and typically without conscious awareness. They involve little or no conscious deliberation” (p. 14).

Second, it is now widely accepted that in contrast to analytical processes that are rule-based, intuitive processes are associative and holistic. This holistic dimension links intuition to perception and pattern recognition. For scholars following a connectionist perspective,³ intuition processes are “sensitive to the holistic aspect of the information sample, namely, the coherence in the pattern” (Betsch and Glöckner, 2010, p. 284), and are closely related to associative learning. However the holistic/associative characteristic of intuition is not the prerogative of connectionists alone as it is present in many definitions of intuition. For instance Bowers, Regehr, Balthazard and Parker (1990) depict intuition as a preliminary

² *Insert Footnote 2 here*

³ *Insert Footnote 3 here*

perception of coherence (pattern, meaning, structure) and explicitly link intuition to pattern recognition, while Glöckner and Witteman (2010) view intuition as resulting from association learning, leading them to introduce the label “associative intuition”.

Third, feelings, emotions and affect are also said to play a key role in intuitive processes (Epstein, 2010; Sinclair, 2010; Sinclair and Ashkanasy, 2005). The term “gut feelings” is sometimes used to refer to intuition (Agor, 1989; Barnard, 1938; Hayashi, 2001) and clearly points to a link between intuition and affect. Similarly, Dane and Pratt (2009) depict intuition as “affectively-charged judgments” (p. 40).

Finally, many scholars of intuition insist that experience and expertise⁴ play a vital role in intuitive processing and link intuition to domain-specific experience and expertise (see Epstein, 2010). In an effort to differentiate between forms of intuition, Miller and Ireland (2005) focus on one form of intuition, which they have labeled “automated expertise” and which they describe as involving “... the straightforward but partially subconscious application of previous learning related to that situation” (p. 21). Similarly, Sadler-Smith and Shefy (2004) argue that over time, experience and analysis become “frozen ... into familiar routines and habitual responses” and form the basis of “intuition-as-expertise” (p. 82).

The above indicates that although scholars have proposed definitions of intuition from multiple perspectives, they have reached a consensual agreement concerning the characteristics of intuition and how it should be defined (Blume and Covin, 2011).

THE SCOPE OF THE REVIEW

We pursue two objectives in this review: (i) to identify the key research themes to date and the challenges for future entrepreneurship researchers interested in intuition; and (ii) to develop an agenda that addresses the identified challenges and opens up new opportunities for entrepreneurship research on intuition. Guided by best practice (Macpherson and Jones,

⁴ *Insert Footnote 4 here*

2010; Tranfield, Denyer and Smart, 2003), we followed a multi-stage method to conduct our review.

First, in order to identify the relevant research, we systematically searched the electronic databases Business Source Premier, Science Direct and Wiley Online Library, for the Boolean search term *intuit** in the Abstracts field, and then for *intuit* AND entrepreneur** in the Full Text fields of peer-reviewed journals. The systematic searches returned 1062 and 2806 papers respectively.

Second, we stipulated our inclusion/exclusion criteria in line with our research objectives in order to determine whether or not the papers should be retained for further analysis. The inclusion criterion was that intuition was a clearly identifiable construct that was studied in relation to entrepreneurship, even if intuition was not the main focus of the study. This choice led us to include in our review papers that were not published in entrepreneurship journals, but nonetheless studied intuition as it relates to entrepreneurs and/or entrepreneurial activity. We excluded all the papers on intuition that were unrelated to entrepreneurship, as well as book reviews and abstracts which contained the terms *intuition/intuitive/intuitively* in their common use (e.g., ‘it makes intuitive sense’), rather than as a key concept in the research. This process yielded 22 papers.

Third, we examined the reference lists of the selected articles to identify additional work that may warrant inclusion in our review. This led to the inclusion of two doctoral dissertations (Baldacchino, 2013; Gustafsson, 2006) and a book chapter in an annual book series (Dane and Pratt, 2009) to the sample of literature for review. In doing so we were able to explore the ‘grey literature’, which tends to be difficult to access as it is not controlled by commercial publishers (Briner and Denyer, 2012), and allowed for a more balanced and comprehensive review of entrepreneurship research on intuition.

The final body of work thus contains 25 publications, which arguably represents the entire population of entrepreneurship research on intuition in the databases we searched. If systematic reviews often include more publications, this is because they usually focus on more mature fields of research, whereas we focus on an emerging (but growing) sub-field. The oldest paper we identified dates from the late 1990s (Mosakowski, 1998), and only three papers were published on this topic before 2002. Since 2003, however, we observe a steady growth in entrepreneurship research on intuition, with nine papers published between 2003 and 2007, and 13 between 2008 and 2012.

Although our review is based on a relatively small body of literature, we do not feel that this is problematic.⁵ What matters most is whether the topic is likely to be of interest to the field, the rigor of the search criteria in ensuring that the work is relevant and focused, and the scientific quality of the outputs identified. We are confident that the publications we have identified are of high quality, as 21 of the 22 articles we review were published in journals ranked at Grades 3, 4 and 4* in the Association of Business Schools (ABS) list (Harvey, Kelly, Morris and Rowlinson, 2010). The blind peer review process that precedes publication in the ABS-listed academic journals provides a “stamp of quality”, which renders them “one of the most important means of publishing and disseminating the results of academic research and scholarship” (Harvey et al., 2010, pp. 1-2).

Table 1 provides information about the 25 publications identified. It shows that most entrepreneurship research on intuition (15 articles) has been published in three specialist entrepreneurship journals, namely *Entrepreneurship Theory and Practice* (eight articles), the *Journal of Business Venturing* (six articles) and *Strategic Entrepreneurship Journal* (one article). All but one of the remaining papers were published in management journals (e.g., *Academy of Management Review*, *Organization Science*). Only one paper was published in a

⁵ *Insert Footnote 5 here*

psychology journal, the European Journal of Work and Organizational Psychology. The majority (17 papers) are empirical in nature, with eight publications classified as conceptual.

--- INSERT TABLE 1 ABOUT HERE ---

We adopted a narrative synthesis approach to our review, taking the collection of studies that address different aspects of the phenomenon of interest and synthesizing them into a bigger picture, map, or mosaic (Hammersley, 2001). In doing so, our aim was to explain how a collection of studies fits together within an analytical framework (Hart, 1998). We were guided by Bagozzi and Fornell (1982) who argued that the conceptual understanding of a construct is obtained through specification of the definition of the construct; the antecedents, determinants, or causes of the construct; and the consequences, implications, or results of the construct. The analytical framework underpinning our review of entrepreneurship research on intuition thus involved three components, namely: (1) the attributes and characteristics of intuition as it relates to entrepreneurial action, including definitions, theoretical underpinnings and the operationalization of intuition; (2) the origins and antecedents of intuition; and (3) the outcomes and consequences of intuition. Similar analytical frameworks have been adopted by authors of other review pieces on cognitive constructs (e.g., Walsh [1995] on knowledge structures; Grégoire, Corbett and McMullen [2011] on entrepreneurial cognition).

AN ANALYSIS OF ENTREPRENEURSHIP RESEARCH ON INTUITION

In the sections that follow, we present our critical review of extant entrepreneurship research on intuition as guided by our analytical framework. A summary of all 25 publications in this review is available upon request to the first author.

The Nature of Intuition

In this section we begin by exploring how scholars who conducted entrepreneurship research on intuition have defined, conceptualized and operationalized intuition.

Defining Intuition

Table 2 indicates that entrepreneurship research on intuition can be clustered into four categories with respect to how intuition is defined. First, a large proportion of work (11 of 25 publications) have adopted what we label a “universal” definition of intuition, that is, a definition that is in line with definitions adopted in the psychology and management literatures and which reflects all (or some) of the four features of intuition we outlined earlier (i.e., intuition originates beyond conscious thought; includes holistic associations; results in affectively charged judgments; and is based on domain-specific experience/expertise). For instance one popular universal definition of intuition that has been adopted is as “affectively charged judgments that arise through rapid, non-conscious, and holistic associations” (Dane and Pratt, 2007, p. 40).

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Second, the seven publications listed in the second column of Table 2 have adopted a “universal” definition of intuition, but they have also adhered to the view that intuition refers to the construct of cognitive style. In so doing, they have considered that intuition refers to a stable preference for a way of processing information, which could be described as “divergent, simultaneous, feeling and holistic” (Sadler-Smith, 2004, p. 161), and which is distinct from a more analytical way of processing information. Studies that adhere to the cognitive style view of intuition are often interested in studying individual differences, focusing on whether the cognitive style of entrepreneurs differs from that of non-entrepreneurs (Allinson, Chell and Hayes, 2000; Groves, Vance and Choi, 2011).

Third, a relatively small but important set of six publications have considered the possibility that intuition may involve different functions, and thus present specific types of intuition. Of particular interest to this review are the concepts of “creative intuition” (Dane and Pratt, 2009) and “entrepreneurial intuition” (Blume and Covin, 2011; Crossan, Lane and

White, 1999; Dutta and Crossan, 2005; Mitchell, Friga and Mitchell, 2005). Due to the central importance of these two concepts for research on specific types of intuition, we briefly review their similarities and differences below.

Dane and Pratt (2009) introduced the concept of creative intuition as “a creative act of synthesis in which disparate elements are fused together in novel combinations” (p. 9). The authors, however, have also explained that their concept of creative intuition is “akin to” (p. 10) the concept of entrepreneurial intuition as referred to by Crossan et al. (1999) and Dutta and Crossan (2005).

Crossan and colleagues introduced the concept of entrepreneurial intuition to refer to a type of intuition that involves fusing disparate elements and knowledge to create novel combinations (Crossan et al., 1999; Dane and Pratt, 2009). The authors insist that this type of intuition “relies less on the knowledge base of the individual [than] on their creative capacity to recognize gaps and to identify possibilities” (Dutta and Crossan, 2005, p. 436). Thus for Crossan and colleagues, entrepreneurial intuition captures a form of intuition that is different from what they call “expert intuition”⁶ and which “emphasizes the complex knowledge base of the individual as being the primary means by which patterns are recognized” (Dutta and Crossan, 2005, p. 436). Crossan and colleagues have labeled this type of intuition entrepreneurial intuition because they argue that it is particularly useful in situations involving the identification of entrepreneurial ideas and opportunities (Dutta and Crossan, 2005), especially where there are few or no precedents upon which to model one’s decisions (Dane and Pratt, 2009). Blume and Covin (2011) also use the term entrepreneurial intuition, defining it as “intuition involving entrepreneurial process-related matters” (p. 138) but do not elaborate much further.

⁶ *Insert Footnote 6 here*

Among the six papers that have advanced specific definitions, Mitchell et al.'s (2005) paper is, without doubt, the one that provides the most elaborate definition of entrepreneurial intuition. Interestingly, and unlike the above, Mitchell et al. (2005) do not situate their definition within a more universal definition of intuition. Rather, they view entrepreneurial intuition as a construct situated within the distinct domain of entrepreneurship. For Mitchell et al. (2005), "entrepreneurial intuition" is inherently linked to opportunity identification; it is "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" (p. 667).

Mitchell et al.'s definition of entrepreneurial intuition was adopted by Tang, Kacmar and Busenitz (2012), who sought to develop a measure of entrepreneurial alertness, with intuition representing one component within it. Tang et al. (2012) measured entrepreneurial intuition by adapting Khatri and Ng's (2000) scale, which is rooted in a universal definition of intuition. It is not clear how Tang et al. adapted Khatri and Ng's intuition scale to reflect Mitchell et al.'s definition of entrepreneurial intuition. Thus, whilst promising, Mitchell et al.'s idea that entrepreneurial intuition is a distinct construct from intuition generally is yet to be empirically validated.

In summary, we see that the majority of studies (18 of the 25) adopt a universal definition of intuition, drawing on the broader psychology and management literatures (including cognitive style). Only a small sub-set of studies (6 of 25) refers to intuition as specific to entrepreneurship and defines it as such, but within this subset of studies, there is no consensus as to what exactly entrepreneurial intuition is.

Conceptualization of Intuition

Broadly speaking, psychology research on information processing falls into one of two camps: the unitary view and the dual-process view. The unitary view suggests that people

perceive information and make decisions by relying on one single (bipolar) psychological process (Allinson and Hayes, 1996; Hayes, Allinson, Hudson and Keasey, 2003). An example of this is Hammond's Cognitive Continuum Theory (CCT: see Hammond, 2000), which suggests that human cognition lies "on a continuum along which all degrees of style are possible" (Allinson and Hayes, 1996, p. 123).

Since the mid-1980s, several dual-process theories of human cognition have been developed in various streams of psychology research (see Evans, 2010 for a review). These theories all share the assumption that individuals rely on two distinct but complementary cognitive systems to process information (Evans, 2010). One system is associated with processes that are "unconscious, rapid, automatic, and high capacity", whereas the other system relies on processes that are "conscious, slow, and deliberative" (Evans, 2010, p. 7). For instance, the Cognitive-Experiential Self-Theory (CEST) proposed by Epstein and colleagues in the mid-1990s posits two systems: the Experiential (or intuitive) system and the Rational (or analytical) system (Epstein, 2003, 2010; Epstein, Pacini, Denes-Raj and Heider, 1996; Pacini and Epstein, 1999). Dual-process theories have gained considerable legitimacy in social psychology and cognitive science since the millennium, and are supported by neuroscience research which has identified two neurological systems (Lieberman, 2007).

In most cases, it was relatively straightforward to identify the underlying theory of information processing (or absence thereof) in the papers we reviewed. As Table 3 shows, our review identified five studies situating intuition within a unitary view of information processing and six studies situating it within dual-process views. We also noted that a significant number of publications (eight) did not have an explicit theory of intuition underpinning their work, but some of these placed intuition within a broader multidimensional framework or construct such as latent enterprise potential (Athayde, 2009),

metacognitive experience (Haynie and Shepherd, 2009), (organizational) learning (Crossan et al., 1999; Dimov, 2007a, 2007b), and entrepreneurial alertness (Tang et al., 2012).

--- INSERT TABLE 3 ABOUT HERE ---

The task of identifying the underlying theory adopted by the six papers in the third column of Table 3 was more challenging, but careful reading of these papers convinced us that these authors implicitly subscribe to a dual-process view of information processing. Crossan et al., (1999), Dimov (2007a, 2007b) and Dutta and Crossan (2005) recognize that organizational learning and entrepreneurship require intuiting as well as more analytical processes such as interpreting and integrating. Mitchell et al. (2005) suggest that entrepreneurial intuition involves an interaction between conscious (i.e., more analytical) and non-conscious (i.e., more intuitive) forms of information processing. Last, Vaghely and Julien's (2010) model suggests that entrepreneurs can process information by means of algorithmic (pattern-recognition) or heuristic (trial and error) processes, both of which involve intuition as well as other analytical processes such as formulae and interpretation.

The above indicates that a more explicit positioning within existing theories of information processing could help entrepreneurship scholars identify research gaps that are aligned with their chosen theory, because the manner in which intuition is conceptualized has important implications for how intuition is or should be operationalized.

Operationalization of Intuition

Our review revealed that entrepreneurship research on intuition has largely operationalized intuition by relying on self-report measures (15 of the 17 empirical studies). As shown in Table 4 and discussed further below, these studies can be further sub-divided into those that have adopted the view that intuition refers to a cognitive style and have studied intuition by measuring individual preferences for intuitive thinking (8 of 17 studies), and those that have measured attributions to intuition, a phrase coined by Blume and Covin

(2011) (7 of 17 studies). Interestingly, only three studies captured the actual use of intuition by entrepreneurs when making decisions. In doing so, these studies subscribe to the view that intuition is a cognitive strategy; i.e., an information processing approach employed by individuals “in response to circumstantial demands” (Hodgkinson and Clarke, 2007, p. 245).

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Preference for Intuition

The preference for intuition is typically measured by using psychometric tools developed to assess people’s preferred ways of processing information (also known as cognitive or thinking styles). Among the eight studies that have captured a preference for intuition, seven used psychometric tools developed to assess cognitive styles. The most popular psychometric tools are the Cognitive Style Index (CSI) which was used by three studies, and the Rational-Experiential Inventory (REI) which was used by two studies. The CSI was developed by Allison and Hayes (1996) and is based on a unitary conception of the cognitive style construct. The REI was developed by Epstein and colleagues and is based on a dual-process theory called the Cognitive-Experiential Self-Theory (CEST: Epstein et al. 1996; Epstein and Pacini, 1999), which treats intuition and analysis as two independent systems. Two other studies used less popular measures, namely the GDMS (Sadler-Smith, 2004) and the LNTSP (Groves et al., 2011), and one study relied on interviews.

With respect to the use of such cognitive style instruments, Hodgkinson and colleagues have performed a detailed comparative analysis of their theoretical and psychometric properties (Hodgkinson, Sadler-Smith, Sinclair and Ashkanasy, 2009b; and Hodgkinson and Sadler-Smith, 2014). Based on these analyses, which show that the REI has better psychometric properties than the CSI and LNTSP, these authors have advocated the use of the REI for those subscribing to a dual-process view and who wish to capture a preference for

modes of information processing (see Hodgkinson et al., 2009b, and Hodgkinson and Sadler-Smith, 2014 for further details).

Attribution to Intuition

Seven of the 17 empirical studies we reviewed relied on measures that capture respondents' attribution to their use of intuition. Not all these studies are alike, and it is possible to distinguish two groups of studies. In the first group, Athayde (2009), Haynie and Shepherd (2009), and Tang et al. (2012) used survey instruments to measure respondents' attributions to intuition. The quality of the survey measures is questionable however, as the authors did not rely on well-established psychometric scales and sometimes confused intuition with other concepts which have been explicitly dissociated from intuition. For example Athayde (2009) asked for responses to items such as "I'll have a guess at a solution to a problem rather than give up" (p. 486), which clearly suggests a link between intuition and guessing. However guessing has not been established as being a facet of intuition, with authors such as Dane and Pratt (2007, 2009) explicitly stating that intuition is not the same as guessing. In the second group of studies (Baron and Ensley, 2006; Dew, Read, Sarasvathy and Wiltbank, 2009; Ravasi and Turati, 2005; and Vaghely and Julien, 2010), researchers reported the extent to which respondents referred to their intuition in a variety of tasks or decision-making processes. For example Dew et al. (2009) reported the number of times respondents referred to their intuition or gut feeling during a protocol analysis task involving a hypothetical business decision scenario. Baron and Ensley (2006) adopted a similar type of measure (number of times intuition or gut feeling is mentioned), but did so in interviews in which respondents were asked to describe the idea on which their new venture was based and to state why they felt it was worth pursuing.

Measures relying on individuals' attributions to intuition are questionable because individuals' beliefs that their decisions are driven by intuition may be mistaken (Blume and

Covin, 2011). Furthermore, and unlike preference for intuition measures (including measures of cognitive style), these measures are not situated within a broader information-processing framework. Intuitive processing is therefore not considered alongside other forms of information processing such as analysis (with the one exception of Vaghely and Julien, 2010). Nonetheless, Blume and Covin (2011) argue that attributions to intuition may still be an important theoretical construct because they can reflect one's personal beliefs about the effects of intuition on the decision-making process. In turn, these beliefs may affect certain decisions such as whether or not to carry out formal analysis or deciding whether or not to exploit a speculative opportunity.

Use of Intuition

Three studies sought to capture the actual use of intuition. In the first of these studies, Dimov (2007a) deployed an experimental design to explore the transition from intuiting to interpreting. Individuals who undertook activities associated with seeking further interpretation and clarification of their initial business ideas were considered to have made the transition from intuiting to interpreting (the latter being a more analytical process). We suggest that such an approach represents an indirect measure of intuition.

In the other two studies (Baldacchino, 2013; Gustafsson, 2006), intuition was captured by means of a think-aloud verbal protocol method (Baldacchino, Ucbasaran, Lockett and Cabantous, 2014; Ericsson and Simon, 1993) during opportunity identification tasks. Despite their apparent similarity, there are two important differences between these two studies.

First, Baldacchino (2013) adopted a multi-method approach which captured not only the *actual use of intuition* (cognitive strategy) via the protocol analysis task (like Gustafsson, 2006) but also the dispositional *preference for intuition* and analysis (cognitive style) via a survey using the REI. Her analyses revealed no significant relationships between cognitive

style and cognitive strategy, contradicting what has often been indicated in the broader psychology and management literatures (e.g., Evans, 2010; Sinclair and Ashkanasy, 2005).

Second, Gustafsson (2006) adopted a unitary view of information processing, whereas Baldacchino (2013) adopted a dual-process view. As a result, Gustafsson's study regards intuition and analysis as two opposite ends of the same bipolar construct, thus excluding the possibility that the intuitive and analytical modes could be highly activated at the same time. Conversely, Baldacchino (2013) explored intuition alongside analysis within a dual-process framework of cognitive strategy, where individuals can be categorized as engaging in high levels of both intuition and analysis when performing a particular task. In doing so, she demonstrated that intuition does not operate in isolation, but is positioned firmly alongside analysis within an overarching dual-process framework of human cognition.

In summary, our reading of the literature leads us to suggest that entrepreneurship research on intuition would benefit from a greater consideration of the definitions, theories and measures that are adopted, to ensure they are aligned and appropriate. We return to this issue when developing our agenda for future research.

Antecedents of Intuition

Scholars have sought to identify factors influencing the use of intuitive processing when making entrepreneurial decisions. As shown in Table 5, two sets of antecedents of intuition have been studied: (i) experience and expertise (four studies); and (ii) the level of uncertainty associated with the task (two studies). We summarize below the key findings emerging from these two sets of studies.

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Do Experience and Expertise Trigger Intuition among Entrepreneurs?

Four studies have investigated the role of experience and expertise on intuition by comparing the extent to which expert and non-expert entrepreneurs rely on intuition when

making entrepreneurial decisions. These studies, however, have yielded mixed results. We suggest that the mixed results may stem from the different ways of operationalizing intuition and the entrepreneurial tasks used, as we explain below.

Two studies question the findings from the broader intuition literature that experience and expertise are antecedents of intuition (Epstein, 2010): Baron and Ensley (2006) found that novice entrepreneurs were significantly more likely to refer to intuition to explain their decisions than their experienced counterparts, whereas Dew et al. (2009) reported no significant differences between experts and novices with respect to the number of times they referred to intuition or gut feel. We believe it is difficult to derive definitive conclusions from these studies because their results rely on simply counting the number of times that respondents referred to their intuition or gut feelings during their decision-making. It is questionable, therefore, whether the authors have captured the actual use of intuition or attribution to intuition.

In contrast, the two studies that specifically measured the actual use of intuition found support for the view that experience and expertise are antecedents of intuition. Gustafsson (2006) found that while novice entrepreneurs did not appear to have an ability to engage in intuitive processing when identifying opportunities, expert entrepreneurs were able to engage in intuitive processing when the opportunity identification task involved greater uncertainty. Gustafsson's (2006) findings are supported by Baldacchino's (2013) study of technology-entrepreneurs using a similar method. Baldacchino (2013) found that entrepreneurs with prior experience of starting up businesses in a familiar industry engaged in a greater amount of intuitive processing than their novice counterparts with no such experience. Yet, a key finding of this study was that these experienced entrepreneurs did not use intuition in isolation, but rather complemented intuition with analysis, thus using a versatile cognitive

strategy. Cognitive versatility is characterized by high levels of intuition and analysis, as well as an ability to switch between them as needed (Hodgkinson and Clarke, 2007).

It is important to note that Baldacchino (2013) explored different kinds of experience and expertise (including the number of years of business ownership experience, the number of businesses owned, and the extent to which her research participants engaged in deliberate practice). Among the various experience measures, the number of businesses owned in the same industry was the strongest predictor of intuition and cognitive versatility. This measure of experience is a useful proxy for domain specific experience since it captures experience with the entrepreneurial process within the same industry setting. Learning from experience may be far more challenging when each experience is highly heterogeneous (e.g., multiple business ownership experiences in multiple industries). Similarly, the number of years of experience may not be appropriate in the entrepreneurial setting since within the same number of years, an entrepreneur may have created a single business or multiple businesses. It is also worth noting that Baldacchino (2013) found the use of deliberate practice (a key feature of expertise) to also be a significant positive predictor of intuition and cognitive versatility, lending support to the notion that deliberate practice leads to enhancements in basic cognitive resources including intuition (Baron and Henry, 2010). We return to the issue of deliberate practice in our agenda for future research.

In summary, our review suggests that studies relying on methods that capture attributions to intuition fail to support the view that experience and expertise trigger intuitive processing. In contrast, studies deploying methods that capture the *actual* use of intuition by entrepreneurs when performing opportunity identification tasks reported a significant and positive relationship between domain-specific experience and intuition. As the entrepreneurs in the latter group of studies were performing tasks requiring creativity and creating novel combinations, their findings question the validity of ‘inexperienced’ forms of intuition such

as the entrepreneurial intuition suggested by Crossan et al. (1999) and Dutta and Crossan (2005). We return to the issue of whether and to what extent experience and expertise are antecedents of intuitive processing in our discussion of future research opportunities.

Does Uncertainty Trigger Intuition?

The broader intuition literature reports that tasks involving high levels of uncertainty and the absence of information can trigger intuitive processing (Agor, 1986; Burke and Miller, 1999; Elbanna, Child and Braga Rodriguez, 2010). Gustafsson (2006) demonstrated that intuitive processing is more likely to be used by entrepreneurs when making decisions in the context of higher rather than lower uncertainty. In the latter context, analytical processing was more likely to be deployed. It is worth noting, however, that the ability to switch between intuitive and analytical processing depending on the level of uncertainty was observed only among expert entrepreneurs and not among novices. Baldacchino (2013), in contrast, found that experienced entrepreneurs were more intuitive and more cognitively versatile (i.e., scoring high on both intuition and analysis) than their less experienced counterparts, regardless of the level of uncertainty associated with the task.

Our review shows that two sets of antecedents of intuition in entrepreneurial decision-making have been studied to date: experience/expertise, and the degree of uncertainty associated with the entrepreneurial task. Although the study of the antecedents of intuitive processing in entrepreneurship is still in its infancy, we believe that the extant evidence points to an interesting potential three-way relationship between experience, uncertainty and intuition. We return to this issue when discussing future research opportunities.

Outcomes of Intuition

What, if any, are the effects of intuitive processing on entrepreneurship? Of the 25 publications we reviewed, 12 (three conceptual and nine empirical) were concerned with this question (See Table 5). Three groups of outcomes have attracted attention: (i) entrepreneurial

process outcomes, largely in the form of opportunity identification (seven studies); (ii) entrepreneur-level outcomes (three studies); and (iii) firm-level outcomes (two studies).

Entrepreneurial Process Outcomes

The first group of publications is concerned with the effect of intuition on the early stages of the entrepreneurial process, namely opportunity identification. Within this group, numerous scholars have suggested that business opportunities originate from an intuition about an unmet need, coupled with a vague idea of how it could be met (Dutta and Crossan, 2005; Dimov, 2007a, 2007b; Ravasi and Turati, 2005; and Vaghely and Julien, 2010). These scholars suggest that intuition may trigger a range of processes through which the initial ideas are refined into more coherent business opportunities. Vaghely and Julien (2010), for example, propose that entrepreneurs rely on algorithmic and heuristic information processing, both of which involve intuition. Furthermore, Dimov showed that intuition is the trigger of initial business ideas and that these are then developed in a learning process, driven by intentionality and shaped by prior knowledge (Dimov, 2007a) and contextual influences (Dimov, 2007b). Baldacchino (2013) found that intuition was positively related to the number and innovativeness of opportunities identified, but also that the identification of highly innovative opportunities required a versatile cognitive strategy comprising analytical processing as well as intuition. Collectively, these studies attest to interesting emergent findings surrounding the relationship between intuition and other cognitive processes required in the entrepreneurial process. We see this as an area worthy of further exploration in the future.

Entrepreneur-level Outcomes

The second group of studies is concerned with the effect of intuition on individual-level outcomes. We observed that scholars have looked past mere individual-level financial outcomes, which we attribute to two main reasons. First, entrepreneurs are motivated to

embark upon entrepreneurship for a wide variety of reasons, many of which are non-financial (Rindova, Barry and Ketchen, 2009). Second, individual-level financial outcomes may only be clear in the medium to long term and are influenced by a whole range of individual, team and venture-based factors, making the identification of direct cause and effect with an individual's intuition problematic.

One important outcome of entrepreneurship relates to the extent to which the entrepreneur feels a sense of 'fit' and satisfaction with their chosen entrepreneurial activity. Is it possible that entrepreneurs who rely on intuition are more satisfied than those who do not? Brigham, De Castro and Shepherd (2007) investigated the effect of a preference for intuition on job satisfaction, finding that intuitive owner-managers were more satisfied when they work in unstructured environments, whereas those who were more analytical preferred to work in structured environments. Brigham et al.'s work points to the importance of fit between the individual and his/her venture's work environment. Following a similar line of argument, Kickul, Gundry, Barbosa and Whitcanack (2009) report that intuitive entrepreneurs were more likely to have high self-efficacy in the early stages of a new venture creation process (opportunity identification), whereas those who were predominantly analytical were more likely to have higher self-efficacy in the later stages of a new venture creation process (opportunity evaluation and exploitation). These two studies thus suggest that more intuitive entrepreneurs may experience a better sense of fit in entrepreneurial environments and activities that involve greater levels of uncertainty. These findings are consistent with work referred to earlier, which suggests that intuitive processing is more likely when individuals are performing tasks involving higher levels of uncertainty.

Dutta and Thornhill (2008) investigated how entrepreneurs' preference for intuition (i.e., intuitive cognitive style) influenced the growth intentions they had for their ventures. Their study revealed that the nature of the relationship between entrepreneurs' perceptions of

their environment and their growth intentions was contingent on their cognitive style. Specifically, intuitive entrepreneurs were found to revise their growth intentions upwards when they perceived the competitive environment as being more benign than they had initially foreseen, and downwards when more hostile. Conversely, analytical entrepreneurs' growth intentions were largely invariant to changing perceptions of their competitive environment. However in adopting a unitary view of cognitive style, this study did not explore the potential interaction between intuition and analysis in shaping growth intentions.

Firm-level Outcomes

The third group of studies explored firm-level outcomes of intuition. Sadler-Smith (2004) investigated the effects of cognitive style on the performance of small businesses and reported a significant positive relationship between entrepreneurs' preference for intuition and financial performance as defined by the percentage of sales growth during the past year. Building on this study, Chaston and Sadler-Smith (2012) hypothesized that an entrepreneur's preference for intuition might lead to a firm developing a greater entrepreneurial orientation (i.e., the tendency of decision makers to take business-related risks, favor change and innovation, and compete aggressively) and entrepreneurial capability (i.e., the "bundles of skills and knowledge" necessary to enable entrepreneurs to make the best use of business assets) (Chaston and Sadler-Smith, 2012, p. 420). The authors found that an entrepreneur's preference for intuition significantly enhanced the firm's entrepreneurial capability, but only in intensely competitive markets. This again suggests that intuitive entrepreneurs are better suited to higher levels of uncertainty than their analytical counterparts.

Our review of research exploring the relationship between intuition and various outcomes shows that most of the papers have concentrated on outcomes associated with the earlier stages of the entrepreneurial process, namely opportunity identification. The effects of the use of intuition on outcomes associated with the later stages of the entrepreneurial process

(e.g., opportunity evaluation and decisions relating to opportunity exploitation) have yet to be explored. We also noted that scholars have explored a range of individual and firm-level outcomes, which collectively suggest that entrepreneurs with a preference for intuition may be better suited to entrepreneurial activity involving greater levels of uncertainty vis-à-vis individuals with a preference for analysis. By and large, however, this body of work has tended to take a unitary view of cognitive style. To date, we do not know how the preference for intuition interacts with a preference for analysis in producing the entrepreneurship outcomes reviewed above. Furthermore, and as noted in other sections of our review, a preference for intuition/analysis does not necessarily translate into the actual use of intuition/analysis. Finally, the extant research lacks a clear framework linking intuition to all its potential entrepreneurship outcomes.

A PROSPECTIVE AGENDA FOR FUTURE RESEARCH

We now build on our review and analysis to identify opportunities to advance entrepreneurship research on intuition. We organize these opportunities around the three dimensions of our analytical framework (i.e., the nature, the antecedents, and the outcomes of intuition). Guided by the strengths and weaknesses of the research in each of these areas, we pose a series of questions and make a set of theoretical, methodological and thematic recommendations for future researchers to consider (see Table 6 for a summary).

--- INSERT TABLE 6 ABOUT HERE ---

The Nature of Intuition

Is “entrepreneurial intuition” a specific type of intuition? If so, what exactly is it?

Although our review made clear that the majority of studies we reviewed adopted a universal definition of intuition (i.e., aligned with definitions used in the wider management and psychology literatures), it showed that a sub-set of scholars have been interested in what they label entrepreneurial intuition. Interest in entrepreneurial cognition is not surprising,

given the importance of the notion in the field of entrepreneurship that entrepreneurs' cognition differs from non-entrepreneurs' cognition (Mitchell et al., 2002, 2004, 2007). We have no doubt that the concept of entrepreneurial intuition warrants scholarly interest. The empirical validity of such a specific form of intuition is yet to be established, which represents an important research opportunity. We suggest that there is a need for entrepreneurship scholars to design studies that address questions such as: *To what extent is intuition different when it is used in the process of entrepreneurial opportunity identification?* as the work of Mitchell et al. (2005) suggests; or *To what extent can intuition be used in the absence of domain specific experience?* as advocated by Crossan et al. (1999) when introducing the concept of entrepreneurial intuition.

In addition to addressing these questions, scholars could design studies to refine the concept of entrepreneurial intuition and make clear whether it refers to a stable preference for intuitive processing, and/or whether it refers to a specific cognitive strategy that entrepreneurs deploy when solving specific entrepreneurial tasks (perhaps in conjunction with a more analytical strategy). Testing the assumption that entrepreneurial intuition refers to a stable preference for intuitive processing requires a systematic comparison of the cognitive style of entrepreneurs and non-entrepreneurs. Although a limited number of studies have started this work (e.g., Allinson et al., 2000; Groves et al., 2011), there remains an opportunity for scholars to revisit these questions using instruments rooted in dual-process views of information processing (e.g., REI), or at the very least by consistently aligning the instrument they use with their underlying theory of cognition.

Conceptualizing Entrepreneurs' Intuition as both Cognitive Style and Cognitive Strategy

Although cognitive style captures an enduring preference for intuition/analysis, such preferences are not necessarily analogous to the actual use of intuition/analysis (Blume and Covin, 2011; Hodgkinson and Sadler-Smith, 2011). Our review revealed only one study that

conjointly studied intuition as a cognitive style and intuition as a cognitive strategy (Baldacchino, 2013). Studies that employ a combination of measures that capture the preference for intuition (and analysis) and the actual use of intuition (and analysis) would be a useful development. Such studies could make a valuable contribution in helping to resolve one of the conundrums in entrepreneurial cognition research, namely whether entrepreneurial activity leads to the development of certain cognitive characteristics or whether entrepreneurs have particular cognitive characteristics that attract them to the entrepreneurship context in the first place (see Grégoire et al., 2011, p. 1457).

With respect to the study of intuition as a cognitive strategy, we identified only three studies that captured the actual use of intuition. We suggest that entrepreneurship researchers need to embrace the idea that intuition can refer to a cognitive strategy and that it can operate in parallel to analytical processing, consistent with dual-process theories of human cognition. Studying the use of intuition alongside analysis will shed light on the ways in which these two modes of processing interact with one another.

Such an approach would be of interest not only to entrepreneurship scholars interested in intuition, but also to psychologists and cognitive scientists who have yet to address questions such as: *Do intuition and analysis operate in parallel, interacting with one another on a moment-to-moment basis, or do decision-makers begin with intuition, and then switch to the analytical mode of processing when the need arises?* (Glöckner and Ebert, 2010); or *What happens when there is a conflict between what entrepreneurs feel (intuition) and what they deduce from the information they have available (analysis)?* In relation to the latter question, Hodgkinson and Healey (2011) argue that “when individuals’ reasoned reflective responses and visceral reflexive reactions are discordant... resolution of the disequilibria” (p. 1504) is required. Little is known, however, about how this resolution occurs. We suggest that the cognitive demands imposed on entrepreneurs as a result of engaging in highly uncertain,

varied and complex entrepreneurial activity offers a unique opportunity to explore these more fundamental questions about the role of intuition and analysis in human cognition.

Entrepreneurship scholars' interest in addressing these issues can, in addition to moving the field of entrepreneurial cognition field forward, contribute to the broader cognitive research agenda in psychology and management.

Methodological Considerations for Entrepreneurship Research on Intuition

Our next recommendation points to the value of moving away from the widely used self-report measures of intuition towards more sophisticated instruments such as cognitive mapping, eye-tracking tools and physiological measures (for further details about these methods see Glöckner and Witteman, 2010; Hodgkinson and Sadler-Smith, 2011; Maule, Hodgkinson and Bown, 2003; Sinclair, 2014). In addition, methods deployed by neuroscientists may help scholars understand entrepreneurs' use of intuition and associated implicit attitudes. Neuroscientists have identified a subset of brain regions whose activity likely reflects the automatic expression, detection, and cognitive regulation of implicit attitudes (Stanley, Phelps and Banaji, 2008). In imaging different parts of entrepreneurs' brains that relate to intuitive or analytical processing, neuroscience holds the potential to definitively assess the primacy of the unitary versus dual-process views of cognition, and also how the two elements interact with each other (i.e., sequentially or concurrently when performing a particular task).

In summary, we make four recommendations with respect to studying the nature of intuition. First, we encourage entrepreneurship scholars to establish the (discriminant) validity of the "entrepreneurial intuition" construct. Second, we invite scholars interested in better understanding the role of intuition in entrepreneurial activity to concurrently consider a preference for information processing (i.e., cognitive style) with the actual use of information processing (i.e., cognitive strategy). Third, we recommend scholars investigate the use of

intuition alongside the use of analysis in entrepreneurial tasks. Fourth, we encourage entrepreneurship scholars to be more inventive in their research design and to rely on a larger range of instruments and methods to capture information processing. Having discussed our recommendations for future research on the nature of intuition, we now turn to the antecedents of intuition.

Antecedents of Intuition

Our review showed that extant entrepreneurship research on intuition has studied two types of antecedents, experience/expertise and uncertainty (as a characteristic of the task or decision-making context). Based on our assessment of the literature, we suggest three lines of enquiry to augment academic understanding of intuition's role in entrepreneurship.

Studying the Relationship between Intuition and Different Forms of Experience

Although the dominant view is that intuition is associated with domain-specific experience and expertise, some scholars have advanced the idea that some forms of intuition do not require such experience. For instance Dane and Pratt (2009) describe creative intuition as “based on integration of knowledge across different domains” (p. 5), suggesting that instead of deep domain-specific experience, creative intuition requires more diverse experience (see also the concept of “entrepreneurial intuition” by Crossan et al., 1999). We suggest that it would be interesting to explore the relationship between different forms of experience (e.g., the amount and nature of entrepreneurial and sector experience) and its relationship with the alternative forms of intuition as proposed by Crossan et al., (1999) and Dane and Pratt (2009), assuming that a sensible means of operationalizing these forms can be established. This line of enquiry might also prove useful in assessing the conceptual and construct validity of the different types of intuition we have explored in this review.

Studying Intuition in relation to Expertise and Deliberate Practice

In our review we highlighted a number of studies that have explored the relationship between experience and the use of intuition, but the relationship between these two concepts and the related concept of expertise is not yet fully understood. Therefore there is scope for further unpacking the construct of experience and its relationship with expertise.

Many scholars who have studied entrepreneurs' experience and expertise as antecedents of intuition have adopted a definition of expertise which suggests that a minimum of 10 years' experience are required for the acquisition of expertise in a given domain (Weisberg, 1999). Within the expertise literature, however, some scholars have distinguished experience from expertise. Whereas the former is associated with repeated feedback, the latter requires decision-makers to have a conceptual understanding and awareness of decision-making processes (Ericsson, 2006). If experience differs from expertise, then more work is needed to understand how entrepreneurs develop expertise from experience (Ucbasaran, Baldacchino and Lockett, 2014), and how intuition is affected in this process.

The literature suggests that the development of expertise requires deliberate practice (Ericsson, 2006; Baron and Henry, 2010). Importantly for our argument, participation in deliberate practice has also been shown to generate additional cognitive resources, such as enhanced perception, memory, metacognition, and also intuition (Feltovich, Prietula and Ericsson, 2006). Although we identified one study that reported a significant relationship between deliberate practice and intuition (Baldacchino, 2013), there is a clear need for further research to understand how deliberate practice interacts with intuition to contribute to superior performance in entrepreneurship (Baron and Henry, 2010).

Developing Elaborate Models of the Antecedents of Intuition

Finally, we suggest that future entrepreneurship research on the antecedents of intuition could systematically seek to understand how the use of intuitive processing is influenced by both individual level variables (experience) and contextual variables such as uncertainty. Furthermore, we encourage scholars to consider the inter-relationships among different antecedents. In doing so, we believe that scholars will be well-placed to contribute to a number of fundamental debates taking place in the area of entrepreneurial cognition, particularly those relating to the sources of entrepreneurs' potential cognitive distinctiveness (Grégoire et al., 2011).

More generally, existing research indicates that entrepreneurs and senior managers may share similar thinking styles (Allinson et al., 2000; Groves et al., 2011). Such findings suggest that the work role performed by an individual (i.e., the nature of the task context) may influence the extent to which they engage in intuitive reasoning. While (domain specific) experience facilitates intuitive reasoning, greater levels of experience may also increase the likelihood that individuals are promoted (in the case of senior management) or self-select into positions (such as deciding to create a new venture) that require a greater level of intuitive processing. Future research might benefit from systematically exploring the interrelationships between intuition (as a preference for information processing and a cognitive strategy), experience, and various features of the context (e.g., uncertainty, time pressure, resource constraints, or other characteristics common in entrepreneurship).

Our key recommendations to scholars studying the antecedents of intuition are, therefore, threefold. First, we invite scholars to examine the relationship between intuition and the different forms of experience more closely. Second, we suggest that an interesting research opportunity lies in the study of the relationship between experience, expertise, and intuition, through the concept of deliberate practice. Third, we call for more complex models

of the antecedents of entrepreneurs' reliance on intuition. The heterogeneous nature of entrepreneurial activities (including opportunity identification, evaluation and exploitation) and their differing task characteristics (e.g., in terms of levels of uncertainty, affect and time pressures) provide a very rich opportunity to explore the three-way relationship between context, experience and intuition.

Outcomes of Intuition

Our analysis of the entrepreneurship research on intuition showed that a fair amount of attention has been devoted to the outcomes of intuition (12 of 25 publications). However it also highlighted two important research gaps, as we discuss below.

A Systematic Analysis of the Role of Intuition along all the Primary Activities associated with Entrepreneurship

For those who believe opportunity identification is the core of the distinct domain of entrepreneurship (Mitchell et al., 2005), the interest in the impact of intuitive processing on opportunity identification will come as no surprise. Although we agree that opportunity identification is a necessary step, it is not sufficient for entrepreneurship. Entrepreneurs must make a variety of decisions relating to the entrepreneurial process including opportunity assessment decisions, entrepreneurial entry decisions, decisions about exploiting opportunities and entrepreneurial exit decisions (Shepherd, Williams and Patzelt, 2014), and they must also take action (McMullen and Shepherd, 2006). The role of intuition (and analysis) in making these decisions and taking action, however, has been largely ignored. We know little about how entrepreneurs' cognitive processes may vary along the entrepreneurial journey and the venture's life cycle and with what effects. We might expect that as the business develops and systems and processes become more elaborated, the balance between entrepreneurs' use of intuitive and analytical processing may vary over time. Therefore we suggest that scholars could explore questions such as: *What is the role of intuition in the*

evaluation and exploitation of opportunities? Is a versatile cognitive strategy as beneficial for the evaluation and exploitation of opportunities as it is for their identification? What role does intuition and analysis play in business closure and sale decisions (i.e., exit decisions)? To what extent does the role of intuition and analysis vary as a new venture grows?

Developing Comprehensive Models of the Outcomes of Intuition

Beyond outcomes associated with the entrepreneurial process, there are a range of individual-level outcomes (such as well-being and happiness) and firm-level outcomes (such as financial and non-financial performance) that may be affected by entrepreneurs' cognitive preferences and strategies. For example we know very little about the relationship between entrepreneurs' cognitive preferences and strategies, and venture outcomes such as survival, growth and performance. To address such an issue, scholars could focus on the following question: *Do entrepreneurs with greater cognitive versatility exhibit superior venture outcomes if they are able to adapt their cognitive processing to a range of situational demands?*

It is worth noting that scholars have explored the possible outcomes of intuition with no overarching framework. This has led to the study of the effects of intuition on a proliferation of outcomes, which perhaps reflects the ongoing debate surrounding the nature and boundaries of the field of entrepreneurship (for illustrative examples of this debate see Gartner, 2001; Shane and Venkataraman, 2000; Shane, 2012; Venkataraman, Sarasvathy, Dew and Forster, 2012). Although we do not wish to be prescriptive by imposing restrictions about the outcomes of intuition that scholars should focus on, we would encourage scholars to show greater care when theorizing and testing the relationship between intuition and various outcomes. In particular, care is needed when conducting any analysis involving different units/levels of analysis because this has important implications for the appropriateness of using different theories as well as the leveraging of consequent research designs (Davidsson

and Wiklund, 2001; Grégoire and Schurer Lambert, 2014). For example, it may be difficult to theorize certain relationships between intuition and firm-level outcomes by relying on individual level theories of cognition.

Our two key recommendations for scholars exploring the impact of intuition on outcomes, therefore, are as follows. First, we recommend that scholars consider increasing their attention towards a wider range of activities involved in entrepreneurship (beyond opportunity identification). Second, we suggest that scholars show great care when studying the effects of intuition on outcomes at different levels of analysis, as this has implications for their choice of theory and study design.

CONCLUSION

The aim of our review was to contribute to the literature on entrepreneurial cognition by undertaking a critical analysis of the entrepreneurship research on intuition. Based on the analysis, we then formulated an agenda for future entrepreneurship research on intuition, allowing us to make a number of theoretical, methodological and thematic recommendations.

From a theoretical standpoint, we see an opportunity for entrepreneurship scholars to resolve the ambiguity that remains within the broader intuition literature in terms of how intuition relates to a more conscious, deliberate and analytical mode of information processing (Sinclair, 2010). The opportunity presents itself because entrepreneurs need to engage in both intuitive processing (due to high uncertainty, time pressure, or deep emotional involvement, cf. Baron, 2008) and analytical reasoning (because they have to justify decisions to investors, partners or employees).

From a methodological perspective, our analysis of the literature reveals that entrepreneurship researchers on intuition have been somewhat slow at keeping up with the methodological developments taking place in the wider field of cognitive science and sub-field of intuition. We encourage researchers to not only align their theoretical position with

the measurement techniques they employ, but to also ensure that they clearly delineate between a dispositional preference for intuition, an attribution to intuition, and the actual use of intuition whilst engaged in entrepreneurial activity. Such a development can have important implications for resolving key debates surrounding the origins of entrepreneurial cognition.

Finally, we suggest that there is a need to broaden the themes that entrepreneurship researchers on intuition have explored to include the full range of activities associated with entrepreneurship (e.g., opportunity identification, entry decisions, exploitation decisions, exit decisions, etc.) (Shepherd et al., 2014). In expanding the themes to encompass a greater number of dimensions of the entrepreneurial process, we anticipate that future work will be able to help further our understanding of the boundaries and robustness of dual-process theories, as well as to assess their usefulness (Zahra and Newey, 2009).

Hogarth (2001) wrote: “We experience feelings about what is or is not the right decision, but the reasons that underlie these feelings escape us. We know but we cannot explain why. It seems as though we have an intuition or sixth sense that is beyond our own comprehension” (p. 4). Yet, our review suggests the study of intuition need not be beyond our comprehension. In this paper we have reviewed a small but rapidly growing body of entrepreneurship research on intuition, indicative of a fertile research territory. Although our review shows that significant advances have been made in our understanding of what intuition is and is not, many questions remain unanswered about its role in entrepreneurship and about its antecedents and consequences. We therefore invite scholars to join us on this exciting journey of discovery.

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FOOTNOTES

- (1) Cognitive style refers to enduring overarching preferences in information processing approaches (Hodgkinson and Clarke, 2007).
- (2) Blume and Covin (2011) observed three elements that are common to the majority of definitions of intuition, namely: 1) intuition originates beyond conscious thought, 2) it involves holistic associations, and 3) it results in affectively charged judgements. To these we add a fourth, namely that intuition is often linked to domain-specific experience and expertise.
- (3) A central tenet of the connectionist approach is that the brain and any mental phenomena can be described by interconnected networks of simple units. From this perspective, “processing is characterized by patterns of activation across simple processing units connected together into complex networks. Knowledge is stored in the strength of the connections between units” (Thomas and McClelland, 2008, p. 1).
- (4) Expertise is related but not analogous to experience, as the former requires extensive deliberate practice – which refers to prolonged and highly focused effort – as well as mere participation or engagement in a given domain for any number of years (Baron and Henry, 2010).
- (5) Some Cochrane reviews, which are internationally recognized systematic reviews of primary research in human health care and health policy, conduct the synthesis on a small number of studies when they use tightly defined inclusion/exclusion criteria and/or due to a paucity of research exploring the phenomenon of interest (<http://www.cochrane.org/cochrane-reviews>). In the field of management, Briner and Denyer (2012) provide examples of systematic literature reviews performed on studies that were 16 and less.
- (6) Dane and Pratt (2009) use the term *problem solving intuition* to refer to what Crossan et al. (1999) call *expert intuition*.

TABLE 1
Summary of Literature Search Results – Number of Publications per Source

Source	Empirical	Conceptual	Total
Journals			
Entrepreneurship Theory and Practice	5	3	8
Journal of Business Venturing	5	1	6
Journal of Small Business Management	1	0	1
Organizational Studies	1	0	1
British Journal of Management	1	0	1
European Journal of Work and Organizational Psychology	1	0	1
Management Science	1	0	1
Strategic Entrepreneurship Journal	0	1	1
Organization Science	0	1	1
Academy of Management Review	0	1	1
Others			
Doctoral Dissertations	2	0	2
International Review of Industrial and Organizational Psychology	0	1	1
OVERALL TOTAL	17	8	25

TABLE 2
Classification of Publications according to their Definition of Intuition

Universal Definition of Intuition	Definition of Intuition within Cognitive Style	Specific Types of Intuition	No Definition
1. Mosakowski (1998)	1. Allinson et al. (2000)	1. Crossan et al. (1999)*	1. Ravasi & Turati (2005)
2. Crossan et al. (1999)*	2. Sadler-Smith (2004)	2. Dutta & Crossan (2005)*	2. Baron & Ensley (2006)
3. Dutta & Crossan (2005)*	3. Brigham et al. (2007)	3. Mitchell et al. (2005)	3. Athayde (2009)
4. Gustafsson (2006)	4. Dutta & Thornhill (2008)	4. Dane & Pratt (2009)*	4. Haynie & Shepherd (2009)
5. Dimov (2007a)	5. Kickul et al. (2009)	5. Blume & Covin (2011)*	5. Dew et al. (2009)
6. Dimov (2007b)	6. Groves et al. (2011)	6. Tang et al. (2012)	
7. Dane & Pratt (2009)*	7. Chaston & Sadler-Smith (2012)		
8. Baron & Henry (2010)			
9. Vaghely & Julien (2010)			
10. Blume & Covin (2011)*			
11. Baldacchino (2013)			

Note: Studies marked with an * include both universal and specific definitions of intuition

TABLE 3
Classification of Publications according to their Conceptualization of Intuition

Unitary Theory	Dual-Process Theory	Implicitly Dual-Process Theory	No Theory of Intuition Specified
1. Allinson et al. (2000) (E)	1. Sadler-Smith (2004) (E)	1. Crossan et al. (1999) (C)	1. Mosakowski (1998) (C)
2. Gustafsson (2006) (E)	2. Dane & Pratt (2009) (C)	2. Dutta & Crossan (2005) (C)	2. Ravasi & Turati (2005) (E)
3. Brigham et al. (2007) (E)	3. Blume & Covin (2011) (C)	3. Mitchell et al. (2005) (C)	3. Baron & Ensley (2006) (E)
4. Dutta & Thornhill (2008) (E)	4. Groves et al. (2011) (E)	4. Dimov (2007a) (E)	4. Athayde (2009) (E)
5. Kickul et al. (2009) (E)	5. Chaston & Sadler-Smith (2012) (E)	5. Dimov (2007b) (C)	5. Haynie & Shepherd (2009) (E)
	6. Baldacchino (2013) (E)	6. Vaghely & Julien (2010) (E)	6. Dew et al. (2009) (E)
			7. Baron & Henry (2010) (C)
			8. Tang et al. (2012) (E)

Note: (E) = Empirical, (C) = Conceptual

TABLE 4
Classification of Publications according to their Operationalization of Intuition

	Cognitive Style Instruments	Other survey measures	Interviews	Experimental	Protocol Analysis
Preference for intuition	<i>CSI</i> 1. Allinson et al. (2000) 2. Brigham et al. (2007) 3. Kickul et al. (2009) <i>GDMS</i> 4. Sadler-Smith (2004) <i>LNSTP</i> 5. Groves et al. (2011) <i>REI</i> 6. Chaston & Sadler-Smith (2012) 7. Baldacchino (2013)*		1. Dutta & Thornhill (2008)		
Attribution to intuition		1. Athayde (2009) 2. Haynie & Shepherd (2009) 3. Tang et al. (2012)	1. Ravasi & Turati (2005) 2. Baron & Ensley (2006) 3. Vaghely & Julien (2010)		1. Dew et al. (2009)
Actual use of intuition				1. Dimov (2007a)	1. Gustafsson (2006) 2. Baldacchino (2013)*

Note: The study marked with an * was multi-method and therefore appears in two places

TABLE 5
Classification of Publications according to the Antecedents and Outcomes of Intuition

Antecedents of Intuition		Outcomes of Intuition		
<i>Experience and Expertise</i>	<i>Task Uncertainty</i>	<i>Entrepreneurial Process Outcomes</i>	<i>Entrepreneur-Level Outcomes</i>	<i>Firm-Level Outcomes</i>
1. Baron & Ensley (2006) 2. Gustafsson (2006) 3. Dew et al. (2009) 4. Baldacchino (2013)	1. Gustafsson (2006) 2. Baldacchino (2013)	<i>Opportunity Identification</i> 1. Baldacchino (2013) 2. Crossan et al. (1999) 3. Dutta & Crossan (2005) 4. Dimov (2007a) 5. Dimov (2007b) 6. Ravasi & Turati (2005) 7. Vaghely & Julien (2010)	<i>Job satisfaction</i> 1. Brigham et al. (2007) <i>Growth intentions</i> 2. Dutta & Thornhill (2008) <i>Self-efficacy</i> 3. Kickul et al. (2009)	<i>Financial performance</i> 1. Sadler-Smith (2004) <i>Firm capability</i> 2. Chaston & Sadler-Smith (2012)

TABLE 6
Prospective Agenda for Future Research

Antecedents of Intuition	Nature of Intuition	Outcomes of Intuition
1. Examine the relationship between intuition and different forms of experience and expertise 2. Study the relationship between experience, expertise and intuition through deliberate practice 3. Explore complex models of antecedents of intuition in entrepreneurship, including individual-level variables, contextual variables and the interactions between them	1. Establish the value of “entrepreneurial intuition” as a construct – is it a specific type of intuition? If so, what is it? 2. Complement the study of intuition as a cognitive style with the study of intuition as a cognitive strategy 3. Investigate the use of intuition alongside the use of analysis in entrepreneurial tasks 4. Rely on a larger range of instruments and methods to capture intuition (and analysis), using research designs that are consistent with underlying definitions and theories	1. Pay attention to a wide range of decisions and activities involved in entrepreneurship (beyond opportunity identification) 2. Develop comprehensive models of the outcomes of intuition, including individual-level variables, firm-level variables, and the interactions between them