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The Role of Affect in the Creation and Intentional Pursuit of Entrepreneurial Ideas

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The creation and intentional pursuit of entrepreneurial ideas lies at the core of the domain of entrepreneurship. Recent empirical work in a number of diverse fields such as cognitive psychology, social cognition, neuroscience, and neurophysiology all suggest that dual processes involving affect and cognition have a significant impact on judgment and decision making. Existing cognitive models ignore this significant role. In this article we develop a framework for understanding the role of affect on idea perception and the intention to develop the entrepreneurial idea. We present a set of testable propositions that link affect to entrepreneurial idea perception through its influence on attention, memory, and creativity. A second set of propositions links affect to the intention to pursue these ideas further. We explore the boundary conditions and moderators of the proposed relationships, and discuss the implications of this framework for existing cognitive and psychological perspectives on entrepreneurship.

The emergence of entrepreneurial opportunities represents the core of the phenomenon of entrepreneurship (e.g., Kirzner, 1979; Shane & Venkataraman, 2000; Venkataraman, 1997). From the perspective of the potential entrepreneur, the process begins with an idea. It continues with a range of actions including determining whether the idea is attractive and feasible enough to warrant further attention, gathering information to reduce uncertainties related to the value and feasibility of the idea, and perhaps adapting the original idea to meet newly discovered facts (e.g., Dimov, 2007a, 2010; Haynie, Shepherd, & McMullen, 2009; McMullen & Shepherd, 2006; Sarasvathy, 2001, 2007; Shane, 2003). Understanding these processes requires examination of the microprocesses by which entrepreneurial ideas and intentions are represented and interpreted in the minds of those who develop them (Gaglio, 2004; Gaglio & Katz, 2001; Mitchell, Smith, Seawright, & Morse, 2000; Shaver & Scott, 1991). Studying the cognitive processes of entrepreneurs has shed a great deal of light on the ways in which entrepreneurs frame their world, learn from it, and think differently about economic opportunity from non-entrepreneurs (e.g., Baron, 1998, 2004; Busenitz & Arthurs, 2007; Corbett, 2007; Gaglio; Gaglio & Katz; Krueger, 2007; Mitchell et al.). For example, entrepreneurs tend to be more optimistic and

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overconfident, they frame risk in quite different ways from non-entrepreneurs, rely upon heuristic thinking more readily, and tend to be more able to adapt their cognitive schemata in ways that support entrepreneurial actions (e.g., Busenitz & Barney, 1997; Gaglio; Gaglio & Katz; Hmieleski & Baron, 2009; Sarasvathy, Simon, & Lave, 1998; Simon & Houghton, 1999). While the growing body of knowledge concerning entrepreneurial cognition has led to significant advances, focusing on cognitive processes presents an incomplete picture of the functioning of the entrepreneurial mind (Baron, 2008; Camerer, Loewenstein & Prelec, 2005; Cohen, 2005).

In addition to cognition, affective processes exert significant influence on judgment and behavior (e.g., Cohen, 2005; Libet, 1985; Zajonc, 1980, 1984). Affect is a broad term that includes emotions and moods, such has happiness, sadness, fear, and anger, and more fundamental homeostatic drives such as hunger and thirst. Recent neuroscientific evidence has made it clear that cognition and affect are two distinct but closely intertwined processes that involve the activation of different parts of the brain (e.g., Cohen). It is now understood that affective states exert a significant influence on decision making and behavior (e.g., Bechara & Damasio, 2005; Camerer et al., 2005; Cohen; Damasio, 1994). Affect may be of particular relevance for understanding entrepreneurial judgments, decisions, and actions as these occur under conditions of elevated risk and uncertainty (e.g., Baron, 2008), involve social cognitions (e.g., Krueger, 2007), and often require entrepreneurs to make judgments and decisions about complex matters, with limited time or information (Busenitz & Barney, 1997). These are those conditions under which affective states are expected to have the greatest impact on entrepreneurial cognition (Baron, 1998, 2008; Forgas, 1995).

Several pieces of empirical evidence suggest that affective processes and states are relevant to the study of the psychology of entrepreneurship. First, recent evidence from brain imaging studies suggest that these are conditions under which emotional processes are more likely to be activated (e.g., Schultz et al., 2008). As uncertainty increases, so does the arousal of the brain's emotional centers (Schultz et al.), increasing the relevance of affective states for entrepreneurial alertness and decision making. Second, social cognitions such as recognizing faces and expressions of affective states by others, involve the activation of parts of the brain associated with affective process, such as the amygdala (e.g., Baron-Cohen et al., 1999). Social cognition is clearly an essential element of the entrepreneurial process (e.g., Baron & Markman, 2000, 2003). Third, there is evidence that affect influences perceptions, intentions, and behaviors through unconscious processes, by priming access to and retrieval of memories (e.g., Bower, 1991). In general, affective states have been consistently found to exert a significant influence on judgment, negotiation, social relations, and decision-making behaviors (Forgas, 1995; Forgas & George, 2001). In sum, the accumulated research on affect suggests that it will impact the effectiveness with which individuals execute important entrepreneurial tasks, including the generation and pursuit of entrepreneurial ideas (Baron, 1998, 2008).

The significance of affect has not gone unnoticed by entrepreneurship scholars. In addition to Baron's recent review (Baron, 2008) of the potential that various streams of research into affect have for informing the field, several scholars have begun to apply affect and constructs pertaining to affect to understanding entrepreneurial phenomena. For example, recent studies have examined the significance of affective states for entrepreneurial motivation (e.g., Cardon, 2008; Cardon, Wincent, Singh, & Drnovsek, 2009; Cardon, Zietsma, Saparito, Matherne, & Davis, 2005; Foo, Uy, & Baron, 2009), and differences with respect to emotional self-management and their consequences for entrepreneurial behavior (e.g., Rhee & White, 2007; Shepherd, 2003, 2009). With respect to the influence of emotions upon entrepreneurial motivation, Foo et al. presented evidence of

the significance of affective states for entrepreneurial decisions about levels of effort. Similarly, Cardon and colleagues have argued convincingly for the significance of passion, a state of intense positive affect, for entrepreneurial action (Cardon; Cardon et al.). With respect to the importance of emotional self-management, Shepherd and colleagues have examined the cognitive strategies and personal traits associated with the management of negative emotions experienced as a result of the challenges associated with inherently uncertain entrepreneurial activities (Shepherd; Shepherd & Cardon, 2009). Rhee and White provide further evidence that entrepreneurs may possess different capabilities with respect to emotional self-management. These streams emphasize the significant role that affect can play in influencing entrepreneurial action. At present, however, the role of affect in the core entrepreneurial processes of the development and pursuit of entrepreneurial ideas has not received a detailed examination.

Given the significance of affect for judgment and decision making, it is important to understand how affect may influence the generation of entrepreneurial ideas, and intentions to pursue these ideas. In this article, we develop a framework that integrates research and theories of affective processes with the cognitive perspective on entrepreneurship (Mitchell et al., 2007). We draw on several streams of research in cognitive psychology, social cognition, neuroscience, and neurophysiology, as well as extant research in the field of entrepreneurship. Although several scholars have identified affect as worthy of exploration in the entrepreneurial context (Baron, 1998, 2008), attention has been on all aspects of the entrepreneurial process rather than being focused upon the influence of affect on the generation and pursuit of entrepreneurial ideas. We build on earlier work first by connecting the affect infusion model (AIM; Forgas, 1995) to existing explanations of the behavioral intentions of entrepreneurs. We then extend earlier reviews (e.g., Baron) by specifying a set of testable propositions. This set of propositions is supplemented with the specification of boundary conditions for the impact of affective processes that have to date not been identified. Furthermore, drawing upon prior empirical evidence we are able to identify important moderators of the influence of affective processes on these key entrepreneurial processes.

A dominant theme within cognitive frameworks explaining entrepreneurial intentions is that intentions are preceded by attitudes and perceptions toward entrepreneurship. One limitation of these models is that they do not explain the emergence of the idea itself, only the beliefs and intentions with respect to starting a new venture or being an entrepreneur (Dimov, 2007b). Examining how affect influences the perception and development of entrepreneurial ideas as opposed to the decision to be an entrepreneur supports calls for closer examination of the micro-level processes of entrepreneurship and is intended to contribute to a more precise portrayal of entrepreneurial emergence (Dimov, 2007a; Rauch & Frese, 2007).

A second limitation of existing cognitive frameworks is the absence of an examination of the source of attitudes and perceptions about entrepreneurial opportunities. Affective processes are often initiated prior to conscious processes (Libet, 1985; Zajonc, 1980, 1998) and influence attention, temporal focus, motivation, memory storage and retrieval, and creativity, all of which are salient to economic decision making (e.g., Camerer et al., 2005). Therefore, affective states may represent important explanations of entrepreneurial beliefs, perceptions, and intentions. Yet these sources of beliefs, perceptions, and intentions are not captured in existing models of the process (e.g., Bird, 1988; Krueger, 2007). We propose that affect represents a significant source of attitudes and perceptions of entrepreneurial ideas that may explain variation in how entrepreneurs *feel* about specific ideas and therefore influence whether or not they develop intentions to continue to develop those ideas. Such continued action to develop potential entrepreneurial ideas is the

essence of moving from being a potential entrepreneur to becoming a nascent entrepreneur. The literature currently lacks explanations of this process that incorporate both affective and cognitive processes.

We take the perspective that a theory of entrepreneurial feeling can complement existing knowledge about entrepreneurial thinking (Baron, 2008; Mitchell et al., 2007). Theories of decision making that ignore the significant role of affect will inevitably be poorly specified (Camerer et al., 2005; Cohen, 2005). However, cognitive theories that explain entrepreneurial decision making have met with considerable empirical success (Busenitz & Arthurs, 2007; Krueger, 2007; Mitchell et al.). Therefore, we seek to integrate knowledge concerning the influence of affective states with cognitive frameworks already used to understand entrepreneurial decision making. We integrate evidence concerning the role of affect in influencing attention, memory, and creativity with existing models of entrepreneurial intention formation (e.g., Krueger; McMullen & Shepherd, 2006; Mitchell et al.). At the same time, we refocus models of behavioral intention to the development of the entrepreneurial idea and away from global intentions concerning entrepreneurship.

We next review the literature, beginning with an overview of affect and its relevance to the psychology of entrepreneurship. We then briefly outline the cognitive frameworks through which we propose to integrate research and propositions concerning affect with our understanding of entrepreneurial judgments. Following this review, we develop a set of specific, testable propositions concerning connections between affect, the perception of entrepreneurial ideas, and the intention to pursue those ideas. We also identify significant moderators of the role of affect in this aspect of entrepreneurial judgment. We conclude with a discussion of the theoretical implications of our framework, empirical considerations, and future research directions.

Affect and the Entrepreneurial Heart

The affective processing system of the brain involves the production of basic drives (hunger, sexual desire), emotions (fear, anger, happiness), moods, and feelings. What these affective states have in common is that they all involve valence (positive or negative), and influence approach and avoidance motivations, which serve the function of preserving the organism (Camerer et al., 2005; Zajonc, 1998). Sometimes affective states reach the level of conscious awareness in the form of subjective feelings, but more often they remain an unconscious influence.

Affect is a broad conceptual category that includes both emotions and moods. Emotions and moods differ in their specificity, intensity, and duration. While moods tend to be "low-intensity, diffuse, and relatively enduring affective states without a salient antecedent cause" emotions are "more intense, short-lived, and usually have a definite cause and clear cognitive content" (Forgas, 1992, p. 230). Research into the role of affect on judgment and decision making has included study of both moods and emotions. While the influence of moods is more "enduring, subtle, and insidious" (Forgas, 1995, p. 41), both emotions and moods are hypothesized to impact cognitive processes according to the same basic mechanisms. We will use the term affect to refer to both forms, and will specify moods or emotions where appropriate.

Positive and negative affect are usually considered to fall along two independent dimensions (Tellegen, Watson, & Clark, 1999; Watson & Tellegen, 1985). As suggested by the evolutionary and psychobiological interpretations of affective regulation processes, negative affect is associated with behavioral inhibition (avoidance or prevention focus) and positive affect is associated with behavioral facilitation (approach or promotion

focus) (Watson, Wiese, Vaidya, & Tellegen, 1999). Although there is a moderate negative correlation between the two dimensions of affect, low scores on positive affect are not the same as negative affect. The influence of affect on judgment has often been found to be asymmetrical: the impact of the two dimensions of affect on judgment and behavior is not a mirror image.

The affective processing system is considered analytically distinct from, but interdependent with, the cognitive processing system. Affective and cognitive processes are associated with the arousal of different parts of the brain (e.g., Cohen, 2005; LeDoux, 1996). However, the two systems are closely connected, with each influencing the other. Sometimes affect and cognition work together, but quite frequently, affective drives may override cognitive processes so that behavior can appear irrational (Camerer et al., 2005; Cohen).

A powerful illustration of the significance of affective states for economic decision making is found in research by Sanfey and colleagues (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003), who report the results of experiments using the "ultimatum" game. Here two people must divide an arbitrary sum (e.g., $10). The whole amount is given to one person, who is instructed to choose how much to share with the other person (the subject). The subject may choose either to accept or reject the offer. A rational choice would require that the subject accept any positive offer, as he or she will be better off. However, evidence shows that a significant proportion of subjects refuse any offer below $5, and most refuse offers below $3. What is interesting in this research is that there is a correlation between the rejection of offers and the amount of brain activity in the emotion centers of the brain, indicating that affective processes are overriding rational cognitive processes (Cohen, 2005; Sanfey et al.). This research is indicative of an emerging paradigm in psychology, neuroscience, and the emerging field of neuroeconomics, which focuses on the interdependence of affective and cognitive systems, and the implications of this interdependence for judgment and behavior. This raises the question of how might affective states and processes influence the emergence and pursuit of entrepreneurial ideas? Prior to considering the role of affect it is important to define what we mean by "entrepreneurial ideas," and how the underlying cognitive processes are conceptualized.

The Entrepreneurial Idea

Using a cognitive lens to understand the entrepreneurial process places certain restrictions on how we can conceive entrepreneurial opportunities (Dimov, 2007a, 2007b). As noted by Dimov (2011) formal economic analysis requires that entrepreneurial opportunities exist in order to make statements about their role in restoring or disrupting market equilibrium (Kirzner, 1979; Schumpeter, 1934). However, a cognitive lens requires that we take an "entrepreneur's eye view" where the individual is observed creating opportunities through actions (Alvarez & Barney, 2007; Companys & McMullen, 2007; Sarasvathy, 2001). The individual rarely perceives an opportunity in the formal economic sense, fully formed, with a unique combination of resources, ready to disrupt or restore an equilibrium. For the individual seeking to identify or create a new entrepreneurial opportunity, initially there is an idea and a great deal of uncertainty (Dimov; McMullen & Shepherd, 2006). Until some action is taken to further develop the idea and to reduce the associated uncertainties, it remains only an idea (Dimov). Over time, the idea may be developed and refined into an opportunity that is exploited, or it may not. If an idea is not developed, it never becomes an opportunity in the formal sense. So the idea is not the same thing as the opportunity. However, without the idea, the opportunity could never be brought into existence.

McMullen and Shepherd (2006) distinguish two forms of uncertainty that are connected with the entrepreneurial idea: uncertainty over the accuracy of information about the idea and uncertainty over the perceptions of desirability and feasibility of the idea. A defining characteristic of entrepreneurship is taking action to reduce one or both of these forms of uncertainty (Alvarez & Barney, 2007; McMullen & Shepherd). While an entrepreneurial opportunity may not exist in any objective sense unless in retrospect, an entrepreneurial idea is something that can lead to the next important element of the entrepreneurial process: entrepreneurial action.

Entrepreneurial intention represents an important intermediate construct in the process of moving from entrepreneurial idea to entrepreneurial action (Dimov, 2007b; Sarason, Dean, & Dillard, 2006). However, rather than consider entrepreneurial intention as the intention to initiate a business or become an entrepreneur (e.g., Bird, 1988; Krueger, 1993, 2007), intention is also required to take action to reduce uncertainty over the accuracy, desirability, and feasibility of the idea (Dimov; McMullen & Shepherd, 2006). If we assume that entrepreneurial action to reduce uncertainty is a form of reasoned or planned behavior (Krueger), then this is preceded by intention (Ajzen, 1991). In the case of the entrepreneurial idea, the intention is to gather further information, which in turn may allow the individual to determine either whether there is a valid idea worth further consideration (Does the technology really work? Is there really a market?), or whether the idea is attractive to potential customers, for finding possible partners, or for seeking financial support (Dimov).

Thus according to this perspective on opportunity emergence, the process involves an iterative cycle of development rather than a single insight (Dimov, 2007a). It begins with an idea, followed by a desire to reduce uncertainty, followed by actions such as information seeking, interpretation, and possibly adaptation of the idea. At the very least, there will be one round of ideation and intention formation to resolve uncertainty. This is implicit in contemporary models of entrepreneurial intention (e.g., Krueger, 2007). It is more likely that this process will go through repeated iterations as the initial idea evolves to fit a more sophisticated understanding of the reality faced by the individual as they move from being a potential to a nascent entrepreneur (Dimov, 2007b; Sarasvathy, 2001).

This depiction of opportunity emergence is well suited to modeling entrepreneurial cognition because it looks at the emerging opportunity from the entrepreneur's perspective. The idea formation–idea examination–intention cycle creates an iterated process of entrepreneurial opportunity development that more aptly describes the reality that is faced by an individual entrepreneur: the opportunity as such does not exist, and must be searched for, studied, formed, or evolved. We propose that affective states will influence both entrepreneurial *perception* and *entrepreneurial intention* (with respect to pursuing the idea), and to the extent this iterative cycle is repeated, affect can continue to influence the results in nontrivial ways.

The AIM

The most thoroughly developed framework for understanding the role of affect in decision making is the AIM (Baron, 2008; Forgas, 1995). The AIM synthesizes a wide range of findings about the role of affect in the process of judgment. The model incorporates the multiple information processing strategies that are a part of normal cognition. These can be classified as either reconstructive, or constructive, processing. The former refers to the matching of information to preexisting categories (e.g., stereotyping) and the latter refers to the combined evaluation of the various attributes of the judgment target, the situation, and personal resources to reach a conclusion. Within the category of

constructive processing, the AIM further distinguishes heuristic processing and substantive processing. Heuristic processing involves the use of mental shortcuts such as representativeness, availability, and anchoring heuristics in the evaluation of attributes. Substantive processing relies upon the elaboration of the various features and attributes of the decision target.

According to AIM, affect influences judgment through two mechanisms. The first mechanism involves the influence of subjective feelings (the conscious markers of affective states) about the decision judgment. In this case, individuals use affective information as a heuristic to speed up the judgment process (Forgas, 1995). The second source of affective influence is through priming of attention, the storage and retrieval of information, and the combination of that information. A central tenet of AIM is that the influence of affect on judgment increases as processing mechanisms move from reconstructive to constructive, and within the two constructive modes, from heuristic processing (affect as information) to substantive processing (affect priming).

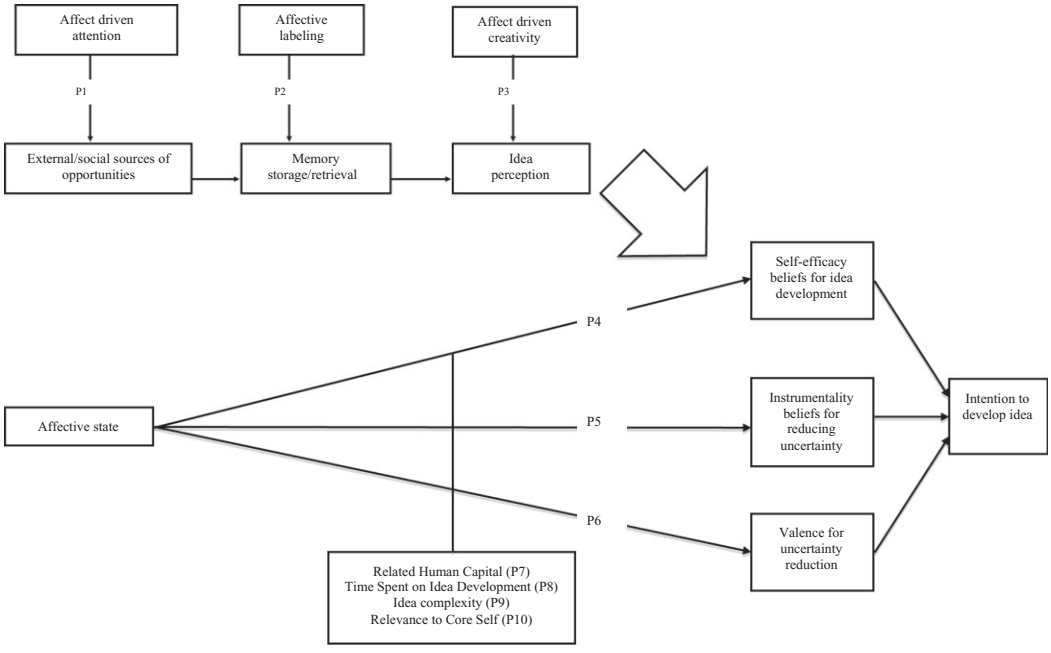
It is reasonable to assume that entrepreneurial idea development involves significant constructive rather than reconstructive processing. The development of entrepreneurial ideas requires overcoming uncertainty about the nature of the idea and one's potential for understanding and eventually exploiting the idea (McMullen & Shepherd, 2006). Therefore the development of entrepreneurial ideas typically occurs in a context where it is necessary to go beyond the information that is given and to make inferences about information that is not directly observable. Such judgments demand high-level cognitive processes, in contrast to the perception of objects, simple observations, classification, or recall processes. In such settings, the information required must be selected, interpreted, imputed, and constructed by an individual (Forgas, 1995). In sum, entrepreneurial idea development demands constructive cognitive processing strategies and therefore affective influence on judgment is expected to occur.

In the following sections, we first describe how affect influences entrepreneurial idea generation and the intent to continue to pursue the idea. We then consider moderators of the impact of affect on these entrepreneurial judgments. It is important to be clear about the boundary conditions for the propositions to be presented. First, the frameworks describe expected behavior of the normal (i.e., nonpathological) population. It includes, but is not restricted to those who are already entrepreneurs and may include any individuals who have ideas that may lead to consideration of entrepreneurial opportunities. We propose that our analysis applies to all economic contexts and not only developed economies. Only about 4% of variation in the capacity to experience positive and negative affective states is influenced by economic circumstances (e.g., Inglehart, 1990; Myers & Diener, 1995), with genetics accounting for a far more significant proportion (e.g., Lykken & Tellegen, 1996).

Furthermore, in our discussion of affect we are not referring to extremes of positive or negative affect, but rather normal and often modest variations. The literature typically examines affective states produced by relatively mild inductions (e.g., Greene & Noice, 1988; Isen, Daubman, & Nowicki, 1987; Staw & Barsade, 1993). For example, providing subjects with a bag of sweets/candies, providing a free lunch, watching a short film (pleasant/unpleasant/neutral), or performing simple tasks such as "word jumbles" with positive or negatively valenced words. Even quite mild inductions of affect have been found to exert significant influences on judgment and behavior (e.g., Staw & Barsade). While it is clear that extremely positive or negative affect can have a potentially disruptive impact on entrepreneurial behavior (e.g., Hmieleski & Baron, 2009), it is equally important to understand how everyday affective states can impact entrepreneurial decision making.

Figure 1

The Influence of Affective Processes on the Perception and Intention to Pursue Entrepreneurial Ideas



Finally, our propositions are restricted to two very specific, but essential aspects of the entrepreneurial process. In order to understand the psychological micro-processes of entrepreneurial action, it has been suggested that it is desirable to distinguish the processes of entrepreneurial emergence from those of entrepreneurial success and that it is necessary to identify more proximal and mediating predictors of specific entrepreneurial behaviors (e.g., Dimov, 2007a; Rauch & Frese, 2000; Stewart & Roth, 2001). Consistent with this view, we restrict our analysis to entrepreneurial idea perception and the intention to continue to explore the idea that is perceived (Dimov, 2007b, 2010). The role of affect in each of these two processes is described in Figure 1. The upper half of Figure 1 depicts graphically the role of affect in idea perception, whereas the lower half of the figure depicts the role of affect in the formation of intentions.

Affect and Entrepreneurial Idea Perception

Understanding the role of affect with respect to the perception of an entrepreneurial idea requires consideration of at least three related processes: attention to the external environment; storage and retrieval of information from memory; and the ability to creatively combine and recombine material stored in memory and possibly to connect with information from the external environment (e.g., Baron, 1998). The external environment includes numerous sources of relevant information such as changing technologies, markets, and the social, legal, and regulatory environment (e.g., Drucker, 1985; Shane, 2003). It is a long-held tenet of entrepreneurship research that individuals differ in the

degree to which they are alert to such information (Kirzner, 1979). Scholars have identified a number of variables that influence entrepreneurial alertness, in particular human capital in the form of specific and general knowledge and education (e.g., Ardichvili, Cardozo, & Ray, 2003; Davidsson & Honig, 2003; Shane, 2000), social capital (e.g., Aldrich & Zimmer, 1986; Davidsson & Honig), and the possession of entrepreneurial expertise in the form of mental schemata and scripts that facilitate the acquisition and transformation of information (e.g., Gaglio & Katz, 2001; Mitchell et al., 2000). Each of these factors has been hypothesized to increase exposure, access, framing, or understanding of information in the external environment that may represent an opportunity. From the importance of access and exposure to information, it follows that individual breadth of attention will influence opportunity recognition. There is extensive evidence that affective states, in the form of both moods and emotions, influence the breadth or focus of attention (e.g., Fredrickson, 2001; Isen, 2000).

Whether naturally incurring or induced states, short-lived emotions or moods of longer duration, one of the most consistent findings within the affect literature is that positive affect widens the scope of attention, while negative affect leads to a narrowing of attention (e.g., Fredrickson, 2001; Isen, 2000). According to the "action-tendency" perspective, negative affective states are associated with a narrowing of attention to actions that facilitate organismic preservation: fear is associated with a focus of attention on escape, anger leads to a focus on attack, and disgust leads to a strong urge to expel or repel the object of that emotion (e.g., Frijda, 1986; Lazarus, 1991). In contrast, the experience of positive emotions has been found to broaden, rather than narrow, the focus of attention and the repertoire of possible actions (e.g., Fredrickson). In experimental research, the induction of positive emotional states has been shown to be associated with greater openness to information and stronger preferences for variety (Estrada, Isen, & Young, 1997; Kahn & Isen, 1993). Experimental studies using visual processing paradigms also provide evidence that visual attention narrows significantly when negative emotions are experienced, whereas attention broadens with the experience of positive emotional states (Basso, Schefft, Ris, & Dember, 1996; Derryberry & Tucker, 1994). In general, whether emotions are assessed in terms of physiological reactions (electromyographic signals from facial muscles), or by self-report, it has been consistently found that positive affective states are associated with expanded attention.

The research reviewed earlier suggests that in addition to prior knowledge, education, and experience, affective states in the form of emotions and moods will exert a significant influence on whether information in the external environment that may form the basis for entrepreneurial ideas is perceived. Holding constant factors such as human capital, social capital, and entrepreneurial expertise, by broadening attention, positive affective states increase the probability that information that provides the stimulus for entrepreneurial ideas will be perceived. Similarly, negative affective states narrow focus, thereby reducing the likelihood that such information will be attended to.

> **Proposition 1:** Positive affective states increase the probability while negative affective states decrease the probability that entrepreneurial idea-stimulating information will be perceived.

Emotional states also influence the results of both passive and active search processes through the priming of memory storage and memory retrieval (Baron, 2008). The level and nature of an individual's knowledge and experience has been established as an important influence on their ability to recognize opportunities in their environment (e.g., Davidsson & Honig, 2003; Shane, 2000). Research in cognitive psychology suggests that affect may magnify or inhibit the benefits of human capital through its influence on

memory. Specifically, positive affect serves to cue the information in memory so that cognitive elements with a neutral and positive valence are more likely to be recalled while in a positive affective state (e.g., Isen, Shalker, Clark, & Karp, 1978; Nasby & Yando, 1982; Teasdale & Fogarty, 1979). From the perspective of neurophysiology, positive affect is associated with the release of dopamine into the pre-frontal cortex increasing working memory (Ashby, Valentin, & Turken, 2002). Interestingly, the influence of affect appears to be asymmetrical, in that access to positive and neutral material is promoted by positive affect, but access to negatively valenced information is not consistently promoted by negative (or positive) affect (Ashby, Isen, & Turken, 1999).

The influence of positive affect on memory and recall is consistent with Damasio's somatic marker hypothesis, which suggests that experiences and ideas stored in memory are "tagged" with somatic labels that serve an important role in the organization and retrieval of information from memory (Damasio, 1994). According to the somatic marker hypothesis, emotions play a very important role in human decision making, especially in the context of high uncertainty and ambiguity. The mechanism operates both on a conscious and nonconscious level, and it involves basic instinctive drives, as well as subjective experiences, recalled from memory. The somatic/emotional state, when encoded at the cortical level (e.g., the insular cortex), represents a consciously perceived *gut feeling* of liking or aversion to a stimulus (Naqvi, Shiv, & Bechara, 2006). The nonconscious aspect of somatic labeling, which is operating on the subcortical level within the dopamine system, suggests that decisions can also be influenced by affect even without conscious awareness of the rationale for doing so (Naqvi et al.).

The somatic marker hypothesis suggests that the brain's emotional centers exert two influences on memory processes. First, when a memory is associated with particularly intense affective states, then it is more likely to be retrieved. For instance, Packard, Cahill, and McGaugh (1994) have discussed the role of the amygdala in certain cognitive processes, such as the modulation of explicit and declarative memories for emotionally arousing stimuli and events (see also Cahill & McGaugh, 1998). Second, a person's current affective state serves as an important cue for what material is most likely to be retrieved from memory. As LeDoux (2000) has proposed, the amygdala plays an important role during learning and conditioning. Once it is activated by a certain sensory event, the amygdala becomes actively involved in the regulation of the cortical areas that project to it, in particular with respect to processing negative stimuli (LeDoux). An important implication is therefore the moderating role of the relatedness of an emotional experience to the present task (Bechara & Damasio, 2005). If the emotional state has a direct relevance to the decision at hand, it has a positive influence on the recall of relevant material from memory. In sum, research within neurophysiology presents neurological evidence that is consistent with the propositions and empirical findings from experimental psychology: positive affective states exert a significant influence on the storage and retrieval of material in memory, and facilitate the performance of working memory.

Taken together, research on the influence of affect upon memory storage and retrieval suggests that positive affect while exposed to ideas or information that may contribute to the formation of entrepreneurial ideas will increase the probability that this information will be stored and later retrieved. Second, positive affective states will cue the recall of material from memory, increasing the probability of recalling information relevant to the creation of entrepreneurial ideas. This leads us to the following propositions:

Proposition 2a: Affect increases the function of working memory so that information contributing to the formation of entrepreneurial ideas will be stored and subsequently retrieved more readily under positive affective states.

Proposition 2b: Affect serves to cue memory recall so that more information and ideas will be accessible to be incorporated in entrepreneurial ideas under positive affective states.

A third pathway through which affect is expected to exert a significant influence on opportunity recognition is through increasing creativity (Baron, 2008). Entrepreneurial alertness to opportunities involves looking at the world in new ways and noticing ideas, applications, and markets that others have not noticed, or that may be served in ways not currently thought of (Kirzner, 1979; McMullen & Shepherd, 2006; Shane, 2003). There is consistent evidence that positive affective states are associated with superior performance on creative tasks (Ashby et al., 1999; Ashby et al., 2002; Estrada et al., 1997; Isen, 2000; Isen et al., 1987). Cognitive theories of creative performance suggest that novelty, a defining feature of creativity, is the result of increased levels of variation of ideas, and this is a function of the number, and range, of cognitive "elements" that are available (Amabile, Barsade, Mueller, & Staw, 2005; Simonton, 1999). According to this perspective, positive affect increases cognitive performance, expanding the number and range of cognitive elements that are considered, and therefore creative performance (Amabile et al.).

The positive influence of affect on creative performance has been well supported empirically both in experimental and field settings (e.g., Amabile et al., 2005; Estrada et al., 1997; Isen et al., 1987). For example, Isen et al. present experimental evidence that subjects experiencing positive affective states present more novel and diverse responses in a word association test, suggesting greater creativity. In the same study, Isen et al. used the Remote Associates Test, which tests creativity by presenting subjects with a series of sets of three cue words (e.g., mower, atomic, foreign) and asks them to identify a fourth that connects the cue words (e.g., power). Positive affect has been found to be positively associated with performance on the Remote Associates Test for samples of students and physicians (Estrada et al.; Isen et al.).

Positive affect is associated with more flexible categorization of information, and greater ability to categorize nontypical information (e.g., Isen & Daubman, 1984; Isen, Niedenthal, & Cantor, 1992; Kahn & Isen, 1993). This is illustrated by research using Duncker's (1945) candle task, where participants are given a candle, a box of tacks, and a book of matches, and are instructed to fasten the candle to the wall so that it will burn without dripping wax on the floor or table (Greene & Noice, 1988; Isen et al., 1987). The solution of the problem requires that subjects empty out the box of tacks, fasten the empty box to the wall using a tack, and place the candle in the box. This solution involves overcoming the cognitive barriers caused by the well-known uses or functions of the items—the successful subjects are able to break through this "functional fixedness" (Duncker) and find new ways of using the objects. This suggests that positive affect may exert an important influence on the openness of individuals to restructuring schemata, engaging in creative cognition, and thereby identifying new opportunities (Gaglio & Katz, 2001). Furthermore, the research reviewed above suggests that the sources of opportunities might be a person's existing knowledge base (e.g., words in a word association test) or objects or ideas in the external environment (e.g., objects in the candle problem). Finally, it suggests that affect influences the generation of entrepreneurial ideas by increasing specific types of cognitive performance. This leads to the following proposition:

Proposition 3: Positive affective states increase the probability that information in working memory will be combined in novel and creative ways to produce an entrepreneurial idea.

Taken together, the research reviewed above suggests a number of pathways through which affective states exert influence on attention, memory, and creative cognition. These

influences individually and in combination are expected to powerfully influence the likelihood that any individual will recognize information pertaining to entrepreneurial ideas, store that information, and be able to creatively combine different pieces of information to produce a cognition of a entrepreneurial idea. We now turn to the question of how affect influences the intention to develop an entrepreneurial idea.

Affect and Entrepreneurial Intention

In order to explain the influence of an individual's affective state upon their intention to continue to explore an entrepreneurial idea we draw upon Valence Instrumentality Expectancy theory (VIE; Vroom, 1964) and the Theory of Planned Behavior (TPB; Ajzen, 1991). Numerous scholars examining entrepreneurship from a cognitive perspective have identified the significance of the twin perceptions of feasibility and desirability as being primary drivers of entrepreneurial intentions (e.g., Krueger, 1993, 2007; Krueger & Brazeal, 1994; Shane, 2003). VIE theory also directs attention to the importance of personal beliefs regarding both feasibility and desirability of an entrepreneurial idea or action in determining intentions to take that action. Drawing on both theories we can identify three specific beliefs that are expected to influence entrepreneurial intention to continue to pursue an entrepreneurial idea. As depicted in the lower half of Figure 1, the process by which affect is proposed to influence intention is nested within, but distinct from the process by which affect is proposed to influence the perception of entrepreneurial ideas. It is nested in the sense that an idea must be perceived before beliefs about that idea can be developed or reflected upon. Furthermore, as will become clear, the same priming and infusion processes described previously will apply with respect to the formation of beliefs about that idea.

The first driver is the expectancy that one's effort will be associated with a level of performance. This is equivalent to the concept of self-efficacy beliefs with respect to the goal in the TPB. The question of interest is whether one should continue to direct one's resources such as time, effort, and money, into exploring a given idea. The objective is the reduction in uncertainty over whether or not the idea is something that the potential entrepreneur might exploit. Therefore we are interested in the extent to which the potential entrepreneur believes that efforts expended to gather further information would result in the generation of information that can inform further decision making about the idea. In other words, if I try to obtain information about this idea, will I succeed? Consider two alternative scenarios faced by a university professor thinking about a possible entrepreneurial idea. The idea is the result of an observation that the dogs in his neighborhood continually foul the street and in particular urinate on the corner of the houses. He has seen his neighbors try a range of remedies. He has also observed doormen in the city where he works having to clear the steps and sides of the buildings daily, in order to treat the same problem. This has resulted in the perception of what might eventually become an opportunity (Dimov, 2007a, 2007b, 2010). Does he go further? The next step would be to begin some research into the market, but perhaps more importantly, into methods of alleviating this problem. This would help reduce uncertainty both over the question of whether there really is an opportunity "out there" and also whether that opportunity is also one in terms of the first person, the professor (McMullen & Shepherd, 2006). This is the decision point at which the potential entrepreneur finds himself.

According to the VIE framework, the first influence on this judgment is whether our potential entrepreneur believes he has the capacity to generate the needed information to reduce uncertainty. On the one hand, he feels confident that he can learn about the market and possible customers. Perhaps he can even discover the information needed to produce

a solution that is either mechanical or chemical. Where his self-belief wanes is in being able to discover a technology for preventing the fouling behavior. As a result of this low expectancy that his search will lead to the needed information, he abandons the idea immediately. Had this idea occurred to another person, perhaps with some knowledge of chemistry or zoology, her expectancy concerning further search might be higher, and this would then increase the probability that this person would then develop positive intentions toward further idea exploration. It is worth emphasizing how this analysis differs from existing microapproaches to explaining entrepreneurial action. The question that is being asked is not whether he can develop a product or run a business. It is more likely that the specific business cannot even be conceived at this earliest stage of entrepreneurial idea formation (Dimov, 2007a). This model directs us to more proximate predictors of specific entrepreneurial actions (Rauch & Frese, 2007; Stewart & Roth, 2001).

Expectancy involves perceptions concerning means–end relationships between the two constructs: the idea represented as a source of uncertainty, and the actions perceived as necessary to reduce uncertainty. This perception is influenced by cognitive organization (Erez & Isen, 2002) meaning the number and range of means–end relationships that are being considered by the potential entrepreneur. Therefore, the expectancy concerning the perceived strength of the relationship between action and outcome will be strengthened by factors influencing cognitive organization in ways that lead to more, and novel perceived connections (Erez & Isen; Gaglio & Katz, 2001). The evidence is now quite strong that individuals experiencing positive affect expand the range of means–end relationships that they are able to identify. This is because affect priming leads to enhancements in the functioning of working memory (Greene & Noice, 1988; Isen, Johnson, Mertz, & Robinson, 1985; Isen et al., 1987). For example, in experimental settings Isen et al. (1985) report that subjects with induced positive affect are able to identify a broader and more diverse range of responses in a word-association task. Erez and Isen provide evidence that positive affect induced in subjects increases their self-reported expectancy in the form of the strength of relationship between different effort levels and different levels of performance on two experimental tasks.

Expectancy beliefs, the subjective probability of successfully performing a particular task, are closely associated with the concept of self-efficacy. For example, in a study of students conducting simple coding and negotiation tasks Baron (1990) found positive affect to be associated with higher levels of self-efficacy. Within the entrepreneurship literature, general and task-specific self-efficacy are among the most consistently supported dispositional variables (e.g., Boyd & Vozikis, 1994; Rauch & Frese, 2007). We suggest that underlying these dispositional effects on entrepreneurial behavior are the cognitive processing benefits that result from the priming of attention, the enhancement of short-term memory, and creative capacity that happen from moment to moment in accordance with affective states in the form of emotions and moods.

The evidence suggests that for an entrepreneur faced with the decision about continued development of an idea, a positive affective state will be associated with the consideration of a wider range of information search and idea testing actions that may be undertaken to reduce uncertainty (more means–end relationships). This will be coupled with more ways in which the entrepreneur might find access to sources of uncertainty-reducing information. For example, through internet, market research firms, university connections, the broader social network. Perceptions of broader range of options in turn are expected to enhance the perceived subjective probability that effort applied to continued development of the idea will result in obtaining and comprehending new information pertaining to the idea. This information may be about the idea itself, related technologies, the context, or oneself. It is the expectancy that the individual will be able to access,

generate, and assimilate any knowledge that he or she believes is relevant to better understanding the idea and its associated uncertainties. This suggests the following proposition:

> **Proposition 4:** Positive affect will increase expectancy beliefs in the relationship between seeking and obtaining knowledge or information that will reduce uncertainty by increasing the number of means–end connections that are perceived, relative to neutral or negative affect.

The second driver in the framework is belief in the instrumentality that success in seeking new information will have for actually reducing uncertainty about the idea. According to the VIE theory, behavioral intentions are influenced significantly by instrumentality beliefs that if a particular level of performance is achieved on a given task, then a range of secondary outcomes will result. They are secondary in the sense that they result from the primary outcome of task success. In the case of the continued pursuit of an entrepreneurial idea, secondary outcomes revolve around the reduction in uncertainty (McMullen & Shepherd, 2006): e.g., the feeling of security that arises from increasing knowledge of both feasibility and desirability of the idea; being in a better position to succeed as a result of having more information about the idea; and the corollary of having greater confidence in making a decision to pursue or not pursue the idea (Dimov, 2010). All things equal, to the extent that a potential entrepreneur believes that these secondary outcomes will result, this increases the intention to continue exploring the idea.

We suggest that affect will influence instrumentality beliefs in the same way that it is proposed to influence expectancy beliefs: by priming attention, memory, and creative combination, and as a result expanding the means–end connections that are perceived by the individual. Positive affect means that when considering whether it is worth further pursuing the development of an idea, the potential entrepreneur is able to think of more ways in which the new information could reduce uncertainty. This may be because of new knowledge about technologies, markets, personal capabilities, other players in the industry for example. When in a positive affective state, the potential entrepreneur sees more aspects of his own uncertainty that must be addressed (more ends), more possible information sources that may be accessible to answer questions (more means), as well as to see more ways in which a given information source may help (more means–end relationships). This suggests the following proposition:

> **Proposition 5:** Positive affect will increase the perceived instrumentality of the continued pursuit of an entrepreneurial idea for producing secondary outcomes associated with the reduction of uncertainty.

The third driver of behavioral intentions suggested by VIE theory is the valence of the rewards resulting from uncertainty-reducing actions. If a person does not place any value on reducing the uncertainty around the idea, then this will limit the intention to further develop the idea. This may well be the case in the example of our academic entrepreneur, who, while perceiving numerous social problems for which entrepreneurial solutions might exist, places only limited personal value on developing those solutions himself.

In the VIE theory, valence represents the sum of all positive and negative utilities obtained from secondary outcomes perceived to be associated with the performance of a particular task or behavior. In this case, we are concerned with the valence placed upon reduction of uncertainty about the accuracy of the perception itself as well as uncertainty over feasibility and desirability of finding a solution (McMullen & Shepherd, 2006). In other words the valence that will result from further exploration of the entrepreneurial idea.

Positive affect is expected to exert a significant influence upon valence beliefs through its impact upon the extent and value of information being considered while making judgments (Erez & Isen, 2002; George & Brief, 1996). When a potential entrepreneur is in a positive affective state, this will: (1) increase the number and diversity of pieces of information that are considered when thinking about how information search may reduce uncertainty, and (2) increase the total valence of that information by cuing material from memory that is either neutral or positive in valence. Affect has been consistently found to increase the number and variety of cognitive elements retrieved from memory (e.g., Isen et al., 1978, 1985; Kahn & Isen, 1993; Teasdale & Fogarty, 1979). Several studies have examined the influence of positive affect upon attractiveness of a variety of objects or outcomes, such as task outcomes (Erez & Isen), task variety (Kraiger, Billings, & Isen, 1989), and product variety (Kahn & Isen). Erez and Isen provide evidence that induced positive affect is associated with higher levels of reported valence for outcomes associated with performing two experimental tasks.

For the entrepreneurial academic in our example, this implies that when the individual is experiencing a positive affective state, this will increase the number and range of sources of uncertainty reduction that are anticipated to result from future efforts to develop the idea. All else equal, the more sources of uncertainty reduction considered, the higher the total valence associated with uncertainty-reducing actions. Positive affect, for example in the form of an optimistic mood, could lead to expectations that efforts to gather information will help resolve uncertainty over whether the problem of dogs urinating on buildings is extensive, whether his negative feelings about dog fouling are widely shared, and whether he may in fact be able to identify a technical solution to the problem. Furthermore, the valence applied to each secondary outcome will be estimated as being higher as a result of positive mood (Erez & Isen, 2002). This suggests the following proposition:

> **Proposition 6:** Positive affect will increase the range of secondary outcomes considered, and their average valence, resulting in higher levels of perceived valence for continued development of the entrepreneurial idea than under conditions of neutral or negative affect.

There are a number of potential moderators of the influence of affect on the cognitive process described here that are suggested by research on the role of affect in judgment. These include the nature of the entrepreneurial idea, as well as the potential entrepreneur's personal characteristics, and certain situational factors. Perhaps the most important factor determining the influence of affect will be the familiarity of the idea to the potential entrepreneur. The AIM suggests that familiarity determines whether constructive versus reconstructive processing strategies are used. As familiar targets lead to use of reconstructive processing strategies (Forgas, 1995), affect has little or no impact on judgments about familiar targets (Srull, 1983, 1984). Only for unfamiliar targets do judges resort to constructive strategies. Familiarity here is in the sense that the potential entrepreneur has developed an extensive understanding of the idea, and not simply having been exposed to the idea. Prior relevant technical knowledge will increase the probability of familiarity with a given idea. This in turn suggests one way in which human capital may improve the performance of entrepreneurs: by reducing the influence of affect while developing and making decisions about the pursuit of ideas. It also suggests that as familiarity with an idea increases, perhaps as a result of the iterative development of the idea, then the influence of affect can be expected to decline. This means that we can expect the impact of affect to decline as the potential entrepreneur progresses through the development of the idea over time.

Proposition 7: The influence of affect on entrepreneurial idea development is lower for individuals with specific human capital that is related to the idea.

Proposition 8: As familiarity with an entrepreneurial idea increases over time, the influence of affect is expected to be reduced.

The complexity and typicality of the idea are also expected to be significant moderators for the influence of affect on entrepreneurial idea development. This is because for both more complex and more atypical ideas, more extensive cognitive processing is required. More search, storage, retrieval, and combination of cognitive material are necessary. More information, for example about the technology, the customer, the competitive environment, the regulatory environment, must be sought, acquired, and interpreted to reduce the initial uncertainties of complex or unusual ideas. During any given iteration in the idea development process, the more time spent examining a particular idea, the more extensive the cognitive processing, the greater the expected influence of affect on the judgment process (Forgas, 1995). Since affect influences performance on tasks using working memory, then for more complex or unusual entrepreneurial ideas affect will have a more significant effect than for simple or typical ideas. This suggests that affect will be more important for highly innovative ideas, and ideas involving high technology versus ideas that are either low technology or that do not involve significant innovations.

Proposition 9: The influence of affect on entrepreneurial idea development will be greater for complex and unusual ideas.

The characteristics of the individual making the judgment are also important. When judgments are relevant to the core self-identity, cognitive processing tends toward a "direct-access" (reconstructive) strategy rather than using substantive processing (Sedikides, 1994). As processing moves from automatic, reconstructive to substantive and constructive, affective states have an increasing impact on judgment (Forgas, 1995). Therefore, an important moderator is the extent to which the idea being examined relates to the individual's core self-identity. In practice, the extent to which an individual holds an idea as a part of their core self-identity may be associated with their prior experience. For example, individuals with a specific technical or professional background who are pursuing an idea that is drawn from that background (e.g., chefs and restaurants, computer programmers, and an internet startup) would be more likely to experience the idea as relevant to their core self-identity. For the example used previously, the academic entrepreneur with no relevant technical experience is less likely to hold the idea as being a part of self-concept, and thus more likely to be influenced by his affective state in evaluating whether to continue to pursue the idea.

Proposition 10: The influence of affect will be greater when the idea is not closely associated with core self-identity of the potential entrepreneur.

Discussion

Recently scholars have advocated a consideration of affect and economic decision making (e.g., Camerer et al., 2005; Cohen, 2005) and it has been argued that the field of entrepreneurship could also benefit from the inclusion of affect in its models of the psychology of the entrepreneur (e.g., Baron, 1998, 2008; Mitchell et al., 2007). While early reviews effectively highlighted the opportunity for new research, research has only recently begun specifying the mechanisms through which affect might impact

entrepreneurial behaviors (e.g., Cardon et al., 2009; Foo et al., 2009; Hmieleski & Baron, 2009; Rhee & White, 2007; Shepherd, 2009). In this article we have developed a framework linking entrepreneurial affect and cognition. We have focused upon the problem of understanding how the affective state of individuals is expected to influence the perception of new entrepreneurial ideas, and the intention to engage in uncertainty-reducing actions.

By framing the initial entrepreneurial challenge as one in which idea perception must be followed by intention to reduce uncertainty, we adopt an entrepreneur's-eye view on the phenomenon (Dimov, 2007a, 2007b; McMullen & Shepherd, 2006; Sarasvathy, 2007). This approach implies that while ideas may be perceived that could have entrepreneurial potential, an intention to act is required to reduce uncertainty associated with the feasibility and desirability of the idea. However, the intention to reduce uncertainty is not conditioned by beliefs about the feasibility and desirability of the idea itself, but by beliefs about the individual's ability to reduce uncertainty associated with the idea (Dimov; McMullen & Shepherd).

Our analysis has focused on affective states rather than dispositional affect. Individuals vary in their affective dispositions (Staw, Bell & Clausen, 1986) meaning, a tendency toward a particular affective state. However, regardless of their dispositional affect levels, individuals can still experience nontypical affective states. Dispositionally unhappy people can experience positive affect, albeit more rarely than dispositionally positive people. Similarly, dispositionally positive people are still able to experience negative affective states. Our framework suggests that regardless of disposition, positive affective states (moods and emotions) will exert a positive influence on the perception of entrepreneurial ideas.

This analysis also suggests why we observe that entrepreneurs have apparently higher than average levels of positive dispositional affect (e.g., Hmieleski & Baron, 2009). It follows from our propositions that those with a positive dispositional affect will be more likely to experience entrepreneurial ideas than those with negative dispositional affect. At any given time, an individual with higher levels of positive dispositional affect will be more likely to be in a positive affective state. Therefore, exposure to information, or the need to recall or combine information, will be more likely to occur while in a positive dispositional state. The disposition also increases the probability that at any point in the iterative cycle of idea development as described here, the individual will benefit from the influence of positive affect. Research on the closely associated concept of dispositional optimism (Forgas, 1995) supports this: on average entrepreneurs appear to have high levels of dispositional optimism (Fraser & Greene, 2006; Lowe & Ziedonis, 2006; Simon, Houghton & Aquino, 2000) and dispositional optimism is positively associated with the tendency to "see new opportunities everywhere they look" (Hmieleski & Baron, p. 475; Segerstrom & Solberg Nes, 2006).

There may be a concern that what we are proposing is that more happiness is always good for entrepreneurs. Staw and Barsade (1993) tested the competing hypotheses of "sadder-but-wider" versus "happier-but-smarter" with respect to managerial performance and found that positive dispositional affect was associated with superior performance on decision tasks and interpersonal tasks. In contrast, Hmieleski and Baron (2009) report evidence that dispositional optimism is negatively related to performance of a sample of entrepreneurs. One reason for the observed negative association in Hmieleski and Baron's study may be that their sample was only entrepreneurs, and they reported a very high level of positive dispositional optimism. Therefore, as noted by Hmieleski and Baron, at very high levels of dispositional optimism significant negative performance consequences might be expected. These two studies also provide some insight into some of the challenges of making broad statements concerning the implications of affect. First, it is

important to differentiate the type of outcome that is being considered. Entrepreneurial emergence and entrepreneurial performance are distinct phenomena. Although the influence of affect (state and dispositional) on performance is important, an understanding of the entrepreneurial process is not possible without an explanation of how any individual might: (1) become a potential entrepreneur (i.e., have an entrepreneurial idea); and (2) how potential entrepreneurs transition to nascent entrepreneurial status (i.e., through the intention to explore or develop an idea).

Our analysis of affect may also be connected with other cognitive perspectives on entrepreneurship. This model identifies the points of influence of affect on the perception of new ideas, and is relevant to both active and passive search processes. Gaglio and Katz (2001, p. 97) state:

> [The] alert individual or entrepreneur must perceive the market environment correctly (veridical perception); identify the true driving forces and critical factors; and infer the real relational dynamics among these elements (veridical interpretation). Veridical perception and interpretation enables entrepreneurs to discern when the existing way of producing or distributing goods and services or indeed the products and services themselves may no longer work because of significant market or social changes.

Drawing on Dimov's (2007a, 2007b) framing of opportunity development as an iterative cycle of perception, development, and interpretation of ideas, our framework suggests that veridical perception and interpretation of environmental information will be influenced by the affective state of the individual. Through broadening of attention, positive affect may increase the probability that unusual or anomalous events in the environment are noticed, activating an alertness schema (Gaglio & Katz, 2001).

A second component of the alertness schema proposed by Gaglio and Katz (2001) involves being able and willing to challenge assumptions, and engage in cognitive recategorization. Drawing on empirical evidence from experimental psychology, we have noted that positive affect will increase the extent to which individuals are willing to engage in such cognitive recategorization. Therefore, we expect that positive affect will increase the probability that this aspect of the alertness schema is activated, thereby stimulating counterfactual thinking and mental simulation.

Finally, positive affect exerts a significant influence on the categorization and retrieval of cognitive material. Thus affect influences the identification of links and cross-links between ideas and information, leading to the creation of richer, more complex schemata concerning markets, industries, and their ever-changing circumstances. When considered from this perspective, our framework implies several ways in which affect may enhance veridical perception and therefore entrepreneurial alertness through its impact on the formation and activation of an alertness schema. We could benefit from further empirical research that specifically examines the role of affect in the context of entrepreneurial tasks in order to understand its influence in the development and activation of entrepreneurial schemata.

Future Research

A number of further questions, beyond the scope of the present work, remain to be examined. The most intriguing of these is how affect might influence the application of heuristic thinking in entrepreneurial decision making. Recent work in the field of behavioral and neuroeconomics suggests that affective processing plays a significant role in decision making and this influence may occur through the priming of heuristic thinking

(e.g., Camerer et al., 2005; Cohen, 2005; Sanfey et al., 2003). Similarly, work in the field of consumer behavior suggests that the application of heuristic thinking by consumers choosing among products is significantly influenced by the extent to which a situation leads to the priming of affective states (e.g., Saini, 2006). As has been identified by several scholars, entrepreneurs may use heuristic thinking at times when others do not (e.g., Busenitz & Barney, 1997; Sarasvathy, 2007). Therefore, research is needed that explores how affective states influence the priming of heuristic thinking, such as representativeness bias, the availability heuristic, and the more general bias of optimism that has been observed to be more common among entrepreneurs in contrast to non-entrepreneurs.

Research on affect may also be relevant to a different aspect of the opportunity recognition puzzle not considered in the present models: access to information. Scholars have argued that individual access to information from the environment may be just as important as individual differences and attributes (e.g., Aldrich & Zimmer, 1986). Research on affect may offer an avenue for integrating this perspective. Specifically, research on affect and emotional self-management suggests that positive affect may enhance the ability to develop rewarding social exchange relationships. Since social networks and social capital offer an important source of information for the purpose of opportunity recognition (Aldrich & Zimmer; Davidsson & Honig, 2003), forces that increase or decrease an individual's capacity for forming or participating productively in social exchange networks will also be relevant to understanding access to information (Baron & Markman, 2000, 2003). Therefore, affect may not only influence opportunity idea development directly through individual cognitive processes, but also more indirectly through its influence on developing channels through which opportunity relevant information may be accessed.

Methodological Considerations

The possibility of the unconscious role of affect is one that presents significant methodological challenges for researchers seeking to examine these forces at work. The ability to detect, comprehend, and accurately describe one's emotional states is an individual characteristic that varies throughout the population (e.g., Zeidner, Roberts, & Matthews, 2008). For example, Shepherd and Cardon (2009) have argued that differences in emotional awareness (mindfulness) and self-regulation can significantly influence individual reactions to events leading to negative emotions, and to personal responses to the experience of those emotions. Considering the possibility that some entrepreneurs may be more aware of their own affective states than others leads to the inevitable problem of operationalization. This is a situation where experimental manipulation of affect may be the best solution. Experimental inducement of affect has been used consistently and effectively in laboratory settings for a number of years (e.g., Erez & Isen, 2002; Isen et al., 1985; Sanfey et al., 2003), for example through the use of small, noncontingent rewards (e.g., bags of candy), tasks that cue affective states, or through the use of still pictures or video vignettes. Manipulation checks assess whether affect is successfully induced and overcome the problem of individual differences in sensitivity by examining group mean differences between treatment and control groups.

Experimental settings also allow much greater control over the measurement of dependent variables by using simple, but representative experimental tasks, such as illustrated in Corbett's (2007) quasi-experimental analysis of entrepreneurial learning styles. The use of carefully controlled experimental research designs becomes most beneficial when we wish to identify the contributions of affect to cognitive subprocesses

such as attention, memory, and creativity, which are distinct but closely related aspects of the idea development process.

An experimental approach would be highly appropriate for testing the propositions developed in the present article. The random assignment of subjects to treatment groups allows control over extraneous variation caused by individual differences in attitudes, values, abilities, and other characteristics. Treatments would involve the inducement of temporary affective states. Stimulus conditions for testing propositions 1 to 3 might include the provision of descriptive text, audio, or video vignettes containing varying quantities of information that might be used in the creation of novel entrepreneurial ideas. Measures of outcomes might include counts of observations made by subjects of relevant information in the stimulus (proposition 1), the recall of information from the stimulus over varying time periods (proposition 2), and qualitative and quantitative evaluation of entrepreneurial ideas generated by subjects from the stimulus (proposition 3).

With respect to propositions 4 through 6, a similar experimental structure would involve random assignment of subjects to treatment groups; again with the treatment involving inducement of affective states. In this case the stimulus may include the presentation of a series of vignettes containing potential entrepreneurial ideas. Measurement of expectancy, instrumentality, and valence beliefs associated with idea development and uncertainty reduction actions would represent potential dependent variables, along with the more distal intention to develop the idea. The moderating influence of relevant human capital (proposition 7) could readily be assessed as a covariate in a simple single factor design. Experience with an idea (proposition 8) could be assessed by utilizing a multi-stage experimental design in which subjects are asked to think through developmental steps over different time periods: in effect modeling the iterative development of entrepreneurial ideas. Such tests of the influence of time and experience with an idea might involve experiential periods ranging from a few minutes to several days. Testing the moderating effect of idea complexity (proposition 9) and the relevance of an idea to core self-identity (proposition 10) could be accomplished by adding a factor to the experimental design for each of these additional variables, which are then directly manipulated through the design of the stimulus material. For example, in a sample of electrical engineers, vignettes based upon ideas from that field could be contrasted with vignettes drawn from entirely different domains such as entertainment or the hospitality industry. Similarly, complexity can be manipulated by contrasting simple and complex entrepreneurial idea stimuli. In addition to treatment groups for affective inducements, idea complexity, and relevance to core self-identity become additional factors in the experimental design.

A significant challenge for research in this domain is in the internal differentiation of the construct of affect. Within the domain of affective states we find emotions, moods, and feelings, each of which is a distinct and meaningful construct on its own. Even though there is limited consensus on the exact differences among emotions, feelings, and moods, evidence from psychological, physiological, and neurobiological research has shown that each of these three components are distinct (e.g., Frijda, Manstead, & Fischer, 2004; Scherer, 2004). Yet frequently, authors refer to the constructs of affect, emotions, feelings, and moods without clearly differentiating among them, and sometimes even using them interchangeably (Frijda et al.; Scherer, 2005). While emotions are targeted at a certain object and represent action tendencies toward it, moods have a much longer duration and may not necessarily have reference to any specific event or object. Being of longer duration, moods are responsible for engaging the person in more general approach versus avoidance or withdrawal behaviors (e.g., Lang, 1995), and are considered more likely to bias cognition rather than behavior (Davidson, 1994). In comparison to emotions, feelings are our mental representations of the physiological responses that we have during an

emotional experience (Damasio, 1994, p. 52), or as the person's *subjective* emotional experiences (Scherer). Although feelings are clearly related to emotions, they are not equivalent, and may better be considered as the tip of the iceberg of affective states, rather than being equated with them (e.g., Scherer). This suggests the need for caution with respect to both conceptualization and operationalization of these constructs.

It is possible that the influence of emotions, moods, and feelings may vary according to the nature of the phenomenon being investigated. For phenomena occurring on a relatively brief time frame such as a few seconds or minutes, such as the recognition of specific information from the environment, emotional states may be quite relevant. In contrast, when a phenomenon occurs over a longer time frame, such as over several hours or more (perhaps in the case of opportunity evaluation), then short-term emotions become less salient and moods may be a more appropriate focus. As time frames extend further still, it becomes necessary to consider affect in dispositional terms rather than in terms of emotions and moods. In sum, the conceptualization and operationalization of affective states require careful consideration of context and object in order to accurately test propositions, such as elaborated earlier, with respect to the role of affect in entrepreneurial cognition and decision making.

Conclusion

Understanding the forces that support and inhibit opportunity recognition is a central concern of the field of entrepreneurship. We have argued that the role of affect has so far been largely overlooked, at least with respect to the generation and development of entrepreneurial ideas. Entrepreneurs constantly face situations that are uncertain, full of pressure, and in which action must be taken very quickly. Situations such as these are emotionally charged and expected to exert a significant force on entrepreneurial behaviors (Baron, 2008; Shepherd & Cardon, 2009). We have suggested that the role of affect can be placed within the broader view of entrepreneurial cognition so that affect, typically seen as a force for irrationality, can be integrated as a part of a more complete view of entrepreneurial rationality.

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