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Environmental effects on the cognitions of corporate and independent entrepreneurs

Robert P. Garrett Jr. · Daniel V. Holland

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Abstract Economic theories of entrepreneurship propose elements that enhance or hinder entrepreneurial action on a macroeconomic level, while individual-level approaches seek to explain why some individuals are more likely than others to engage in entrepreneurship. However, recent theorizing by scholars has introduced a more integrated approach to entrepreneurial behavior that relates both external and internal factors to entrepreneurial action by considering how uncertainty and motivation affect entrepreneurial attention and evaluation. In this paper, we consider how environmental uncertainty and complexity differentially affect the motivations of independent entrepreneurs and corporate entrepreneurs to engage in entrepreneurial action. While examining how uncertainty and complexity affect macro-level entrepreneurship, we also explore how individual differences between corporate entrepreneurs and independent entrepreneurs affect entrepreneurial decision-making. By examining the role schemas of entrepreneurs, we construct a theoretical framework to explain why corporate entrepreneurs may behave differently than independent entrepreneurs under the same set of environmental conditions. Important implications are outlined for researchers, entrepreneurs, and policy makers.

Keywords Entrepreneurial cognition · Corporate entrepreneurship · Entrepreneurial attention

JEL Classifications L25 · L26 · M13

R. P. Garrett Jr. (✉)
College of Business, University of Louisville, Louisville, KY 40292, USA
e-mail: robert.garrett@louisville.edu

D. V. Holland
Jon M. Huntsman School of Business, Utah State University, Logan, UT 84322, USA
e-mail: daniel.holland@usu.edu

1 Introduction

Corporate entrepreneurship plays a key role in firm performance (Ireland et al. 2006; Morris et al. 2011). Facing increasingly turbulent external environments, companies are continually forced to adapt, adjust, and redefine their value propositions (Morris et al. 2011). Accordingly, central topics in entrepreneurship research have included determining factors that lead individuals within corporations to recognize entrepreneurial opportunities and the drivers that lead them to engage in entrepreneurial action (e.g., Hornsby et al. 2009; Morris et al. 2011; Zahra et al. 1999). Research in managerial cognition has been particularly useful in this regard because it provides insights into how environmental changes can trigger entrepreneurial efforts as corporate managers respond to external stimuli (Daft and Weick 1984).

De Carolis and Saparito (2006) asserted that individual cognition is important in understanding

entrepreneurial behavior. If entrepreneurship is "…the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals" (Shane and Venkataraman 2000: 218), then as the number of entrepreneurial opportunities in a system increases, the likelihood of entrepreneurial behavior should also increase, but only if individuals are inclined toward entrepreneurial behavior (Burt 1992; De Carolis and Saparito 2006). Early entrepreneurship literature proposed that psychological variables, demographic factors, and personality traits might determine entrepreneurial activity, though the results were equivocal (Brockhaus and Horowitz 1986; Low and MacMillan 1988; Shaver and Scott 1991). More recently, cognition has emerged as an important perspective for understanding and explaining human behavior (Wofford and Goodwin 1990). The central premise of the cognitive perspective as it applies to entrepreneurial action is that entrepreneurial action is emergent and results from an entrepreneur's underlying cognitive processes (Mitchell et al. 2002).

Phan et al. (2009) called for corporate entrepreneurship scholars to investigate the role of cognitive factors in a firm's entrepreneurial actions. Our paper takes a step to answering this call by using the social cognition arguments developed by Corbett and Hmieleski (2007) that demonstrated how corporate entrepreneurs think differently than independent entrepreneurs. Specifically, Corbett and Hmieleski (2007) argue that the difference in cognition between these two groups is attributable to a difference in entrepreneurial context (i.e., belonging to a larger corporation or working independently for oneself) and the demands of different entrepreneurial roles that engage distinct role schemas. We build on their framework by developing arguments regarding how external environmental contingencies differentially affect the role schemas of corporate entrepreneurs versus independent entrepreneurs. Specifically, we examine environmental uncertainty and environmental complexity to develop propositions regarding entrepreneurial attention and entrepreneurial action among corporate entrepreneurs and independent entrepreneurs. We propose that both environmental uncertainty and complexity have deleterious effects on opportunity recognition and exploitation, but that independent entrepreneurs—due to the role schemas they employ—are less negatively affected by environmental uncertainty in their abilities to recognize and exploit entrepreneurial opportunities than are corporate entrepreneurs. On the other hand, corporate entrepreneurs are less negatively affected by environmental complexity. Our propositions predict that corporate entrepreneurs may notice and take action regarding new business opportunities in manners quite different from independent entrepreneurs, depending on the environment. These differences may be attributable to schemas developed in their respective roles, formed by the organizational environment in which these individuals function. We believe the propositions developed from our conceptual narrative are important to both makers of policy and researchers in entrepreneurial cognition.

2 Differing cognitions between corporate and independent entrepreneurs

Recent research has significantly increased our understanding of the role of individual cognitions in entrepreneurship (Ardichvilli et al. 2003; Baron 1998; Busenitz and Barney 1997; Corbett 2005, 2007; Corbett and Hmieleski 2007; Shane 2000; Shapero 1984; Venkataraman 1997; Ward 2004). Mitchell et al. (2002: 97) define entrepreneurial cognitions as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth." Baron and Markman (2003: 43) describe cognitive biases as "the way in which entrepreneurs think, reason, and reach decisions." Cognitions and biases may vary between different populations of entrepreneurs (Stewart and Roth 2001, 2004), or they may change as a result of different types of experience (Sitkin and Weingart 1995). For example, small business owners may differ in their risk-taking propensity from those with high-growth aspirations (Stewart and Roth 2001, 2004). Also, entrepreneurs who have experienced success may be less inclined to take risks because they have more to lose (Stewart and Roth 2004).

As people cultivate expertise in certain tasks, they develop mental schemas regarding roles and events that can be used to perform future similar tasks (Lord and Maher 1990). A role schema is a cognitive structure or mental framework relating to how an individual's knowledge is organized regarding the set of behaviors expected of a person in a certain job, function, or role (Abelson 1981). An event schema is a

mental road map that describes the appropriate sequence of events in a well-known situation (Abelson 1981). The position advanced by Corbett and Hmieleski (2007) is that because corporate entrepreneurs find themselves in a different contextual role than independent entrepreneurs they therefore engage different schemas regarding entrepreneurial opportunities, venture creation, and growth. Corbett and Hmieleski (2007) argue that the corporate context facilitates the development of norms for individual behavior (i.e., role schemas) that conflict with the event schemas commonly used by independent entrepreneurs. Because the roles of prospective corporate entrepreneurs are quite different than the roles of prospective independent entrepreneurs, it is likely that they develop different types of cognitive schemas and that they use the schemas in different ways (Corbett and Hmieleski 2007).

Schemas are useful when individuals are faced with complex situations in which they can make a decision based on past, though relevant, experiences (Mitchell et al. 2002). Entrepreneurs are faced with much uncertainty as they explore new markets and technologies, often exemplified by unknown demand for their product and unpredictable operating costs (De Carolis and Saparito 2006). They may not possess all the information needed to make an informed decision, nor may they have the resources needed to collect more information, and so they rely on small, nonrandom samples and personal experiences as they make decisions (Busenitz and Barney 1997). Schemas from past experiences provide entrepreneurs with a simple heuristic by which they can more quickly make decisions in uncertain and turbulent environments (Mitchell et al. 2002).

Due to the differences in their experiences, corporate entrepreneurs and independent entrepreneurs may develop distinct schemas that are associated with their unique roles. The contextual differences between new start-ups and existing organizations have been discussed in the innovation literature (Burns and Stalker 1961; Guth and Ginsberg 1990; Leifer et al. 2000). In general, this stream of research suggests that smaller firms innovate with greater facility as they take advantage of their organic forms, while large organizations tend to struggle with innovation due to their greater bureaucracy. Additionally, studies drawn from economics demonstrate that managers and entrepreneurs think differently, and this is explained using the logic that individuals behave differently depending on whether or not they have personal assets to protect (Thaler 1991). The corporate entrepreneur is a steward of corporate resources rather than personal resources, and so he or she may behave differently than an independent entrepreneur who has placed his/her own assets at risk. Finally, research on situated learning explains that corporate entrepreneurs and independent entrepreneurs have different role schemas because corporations are more familiar with mature markets while independent entrepreneurs are focused on new markets (Markides and Geroski 2004). Typically, individuals gain expertise in only one of these contexts and crossing over to a different context can be challenging (Billet 1996). In sum, corporate ventures and independent ventures face quite different obstacles (Shrader and Simon 1997), so individuals working in corporations will be less likely to develop the role schemas that are aligned with the event schemas best suited for independent new venture creation (Mitchell et al. 2000).

The differences in context between corporate entrepreneurship and independent entrepreneurship may cause individuals to adopt different cognitive styles, and cognitive style can have a direct impact on an individual's decision-making (Dutta and Thornhill 2008). For example, Dutta and Thornhill (2008) differentiate between entrepreneurs who have developed an "analytic" cognitive style from those who have a "holistic" cognitive style. Analytic entrepreneurs are comparatively risk-averse, rely more on prevailing norms and frameworks, engage in greater conformity, and approach problem-solving and decision-making in a more incremental fashion. On the other hand, holistic individuals are less risk-averse, break or go beyond norms and frameworks, engage in less conformity, and approach problem-solving and decision-making with a more quantum approach. Corporate entrepreneurs, having functioned in a context of asset preservation, organizational frameworks and norms, and conformity, may be more likely to have developed a cognitive style more consistent with an analytical approach. Similarly, independent entrepreneurs who often face more personal risk of their own assets, and are tasked with breaking prevailing norms of markets and/or industries may have developed a cognitive style more consistent with a holistic approach. These differences in cognitive styles may differentially affect the decisions of

corporate entrepreneurs versus independent entrepreneurs when faced with similar environments.

Social cognitive theory also implies an interaction between cognitive learning processes and social learning processes (Corbett and Hmieleski 2007). Because social cognitive theory explains how a person's context may affect his/her schemas and behaviors (Bandura 1977, 1986), it is particularly useful for investigating how the context of varying environmental factors may differentially affect behaviors of corporate entrepreneurs and independent entrepreneurs. Social cognitive theory claims that behavior is a function of the person (an individual's cognitive and personal factors) and the environment. For the purposes of this paper, the reciprocally deterministic nature of these factors is particularly salient because we propose that the context of corporate entrepreneurship influences the development of domain-specific knowledge structures and mental schemas, which leads to differing decisions regarding entrepreneurial actions. In other words, because of the role context, corporate entrepreneurs exhibit different personal and cognitive factors than independent entrepreneurs. We argue that these personal differences have a profound influence on the entrepreneurial choices that are made by individuals when faced with external environmental stimuli.

Consistent with previous research examining the differences between independent entrepreneurs and corporate entrepreneurs/managers (Corbett and Hmieleski 2007; Hornsby et al. 2009; Morris et al. 2011), we strictly distinguish between the two. As such, we do not consider the case of a corporate entrepreneur who may have previously worked as an independent entrepreneur, nor are independent entrepreneurs who have experience as corporate managers within the scope of our examination. Neither do we distinguish among corporate entrepreneurs working within different corporate contexts, examining the differences among individuals employed by different types of corporations. We therefore dichotomize between corporate entrepreneurs as those "charged with the *efficient* and *effective* utilization of resources under their control" (Morris et al. 2011: 13) and independent entrepreneurs as those who envision the future and exploit opportunities regardless of resources controlled (Morris et al. 2011).

Thus, we build upon the work of Corbett and Hmieleski (2007) by exploring how an external environmental factor may interact with the role context of corporate and independent entrepreneurs, resulting in differential effects on entrepreneurial decision-making. For example, Corbett and Hmieleski (2007: 111) suggest that "due to a difference in context, individuals considering independent new ventures are more likely than their corporate entrepreneur counterparts to take actions to start a new venture." While such a proposition is likely to be generally accurate, we argue that it may vary significantly depending on how external environmental variables interact with the role schemas developed in the individual and the corporate entrepreneurial context.

3 Effects of environmental turbulence on entrepreneurship

The environment of an organization is often described using two aspects: the internal environment and the external environment. The external environment consists of everything outside a company, including its competitors, customers, suppliers, regulating agencies, etc. On the other hand, the internal environment includes the systems, structures, processes, and culture within the organization (Morris et al. 2011). We argue in this paper that the cognitions and schemas employed in the internal environments of corporations are fundamentally different from those found in independent entrepreneurial organizations, and these differences cause corporate and individual entrepreneurs to respond differently to their external environments in terms of opportunity recognition and exploitation.

It is widely recognized that the external environment is becoming increasingly turbulent (Morris et al. 2011). Turbulence is defined by Merriam-Webster as "a state of confusion, violence, or disorder." Turbulence is used to describe systems that are chaotic and are thought to be stochastic (Davidson 2004). Thus, turbulence is typically described by two characteristics: uncertainty and complexity. Turbulent systems are uncertain because they are highly irregular and are often treated statistically, rather than deterministically. They are unsteady and difficult to predict. Turbulent systems are also described as complex because they contain many different elements that interact with each other in unpredictable ways.

We choose to focus on the uncertainty and complexity of the external environment not only

because these two characteristics are representative of turbulent systems, but also because they are conceptually consistent with other paradigms of the environment historically used in research on organizational strategy. First, environmental dynamism deals with the frequency of change in the external environment and the ease with which future changes are predicted (Miller and Friesen 1982). Hmieleski and Baron (2009) identified dynamism as a key environmental variable that affects entrepreneurs. Unpredictability and rapid changes are characteristic of dynamic environments, increasing uncertainty for the firms and individuals that operate within them (Dess and Beard 1984). Dynamic environments are unsteady and difficult to predict, making our choice to study uncertain environments closely analogous to prior research on dynamic environments. Second, environmental complexity is based on the number of elements in an organization's environment—i.e. competitors, customers, and suppliers, etc.—and the organization's knowledge of those components (McArthur and Nystrom 1991). Environmental complexity is also included in McArthur and Nystrom's (1991) nomological network, and is a familiar construct used by scholars of organizational strategy.

3.1 Environmental uncertainty

To explore the effect of uncertainty on entrepreneurs, we adopt Milliken's (1987) framework of distinct types of uncertainty. Milliken proposes that there are three types of uncertainty: state, effect, and response. First, state uncertainty denotes the perception that the environment is unpredictable, and elicits the question from prospective actors of "What's happening out there?" (McMullen and Shepherd 2006: 135). Second, Milliken describes effect uncertainty as "an inability to predict what the nature of the impact of a future state of the environment or environmental change will be to the organization" (Milliken 1987: 137). This has been paraphrased by McMullen and Shepherd (2006: 135) as the question "How will it impact me?" Finally, Milliken presents response uncertainty as "an inability to predict the likely consequences of a response choice," that becomes particularly salient when a "pending event or change is perceived to pose a threat or to provide some unique opportunity to the organization (Milliken 1987: 137). Response uncertainty, as summarized by McMullen and Shepherd (2006: 135) elicits the question "What am I going to do about it?" Thus, response uncertainty provokes role engagement of an actor along with uncertainty regarding how efficacious that role will be in the given circumstances.

McMullen and Shepherd (2006) conceptualized entrepreneurial action in two stages: attention and evaluation. The first of these—attention—deals with whether people acknowledge opportunities brought about by changes in their environment, or if they do not. The acknowledgement of an opportunity is predicated on an individual's domain-specific knowledge and the motivation to engage in search of an opportunity. Individuals with greater motivation to find opportunities, and with greater knowledge, will be more likely to recognize entrepreneurial opportunities. The effect of environmental uncertainty is such that it diminishes an individual's knowledge of what is going on in the environment. While it may not affect the motivation of a person to search for opportunities, it will reduce their knowledge of the environment in such a way as to diminish the overall likelihood that entrepreneurial opportunities will be recognized. In short, entrepreneurs in uncertain environments often face unusually heavy information processing burdens (Chandler et al. 2005), and so they may be less cognitively able to recognize opportunities. Thus, we propose:

Proposition 1 *Environmental uncertainty has a detrimental effect on entrepreneurial opportunity recognition.*

McMullen and Shepherd's (2006) second stage of entrepreneurial action is evaluation. In this stage, the prospective entrepreneur determines whether or not an opportunity that has been recognized represents an attractive avenue for action for one's self. If the entrepreneur is able to overcome doubt, then evaluation results in the exploitation of the opportunity. Uncertainty at this stage affects the classic risk/return dilemma in such a way that the perceived uncertainty associated with an opportunity increases the risk necessary to attain the reward and the doubt surrounding the likelihood of the desired outcome. Thus, we hypothesize that environmental uncertainty decreases the number of entrepreneurial opportunities exploited.

Proposition 2 *Environmental uncertainty has a detrimental effect on entrepreneurial opportunity exploitation.*

While we propose that environmental uncertainty will depress entrepreneurial activity through the mechanisms of opportunity recognition and exploitation, we are most interested in how uncertainty will differentially affect corporate entrepreneurs versus independent entrepreneurs. To examine this effect, we turn to the use of entrepreneurial schemas outlined by Mitchell et al. (2000) and Mitchell et al. (2002) to develop propositions regarding entrepreneurial behaviors under conditions of environmental uncertainty.

Willingness scripts are knowledge structures that support an individual's commitment to search for an opportunity and to start a new venture (Mitchell et al. 2000). Mitchell et al. (2000) argued that willingness scripts are geared toward action and comprise of cognitions related to opportunity seeking, commitment tolerance, and venture opportunity pursuit. These scripts are associated with actively seeking out new possibilities, being willing to assume risk, and moving forward with an opportunity. In other words, willingness scripts are the knowledge structures that are the basis for motivation to act entrepreneurially.

Corbett and Hmieleski (2007) use self-efficacy theory to argue that independent entrepreneurs are more likely to develop and execute willingness scripts than corporate entrepreneurs, and are therefore more likely to take actions to start new ventures. In general, it is believed that most corporations lack the competencies and structures needed to develop and execute successful venturing activities (Miles and Covin 2002). This can affect the self-efficacy of corporate employees with respect to entrepreneurial efforts. Self-efficacy is the belief in one's own capability to organize and execute the actions required to manage prospective situations (Bandura 1986). High self-efficacy promotes the setting of challenging goals and the persistence toward the achievement of those goals, even under challenging circumstances (Bandura 1997). The entrepreneurship literature has shown that individuals with high self-efficacy perceive entrepreneurial opportunities where others do not (Krueger and Dickson 1994) and have higher intentions to start new ventures (Markman et al. 2002; Zhao and Seibert 2005). Since corporate entrepreneurs are more likely to have lower entrepreneurial self-efficacy than independent entrepreneurs, they are less likely to develop and enact willingness scripts that would result in starting a new venture (Corbett and Hmieleski 2007).

Additionally, uncertainty will differentially affect independent and corporate entrepreneurs because of the general difference in the strategic focus between the two groups. Specifically, strategic focus—either a prevention focus or a promotion focus—influences the types of outcomes that are most relevant to the entrepreneur. A prevention focus is typified by a primary interest in protection, safety, and responsibility, whereas a promotion focus is characterized by interest in advancement, growth, and accomplishment (Brockner et al. 2004; Higgins 1998). Individuals with a prevention focus are most concerned with making correct rejections of false opportunities. On the other hand, individuals with a promotion focus are more interested in recognizing and exploiting true opportunities.

McMullen and Shepherd (2002) examined differences between nascent entrepreneurs and non-entrepreneurs, and found that entrepreneurs have much higher levels of promotion focus than non-entrepreneurs. However, other research has also shown that differences in context can activate either a prevention focus or a promotion focus, independent of the chronic focus of the individual (Brendl et al. 1995; Crowe and Higgins 1997). This is particularly salient to our argument because Corbett and Hmieleski (2007) identified corporate entrepreneurs as being more likely to maintain a prevention focus due to their work within a corporate structure, while independent entrepreneurs tend to have a stronger promotion focus. We believe that the difference in focus for these two groups will affect how they respond under conditions of environmental uncertainty. An entrepreneur with a prevention focus is likely to be more affected by uncertainty because individuals with a prevention focus typically strive to accomplish tasks that are viewed as relatively necessary or relatively assured (Shah and Higgins 1997). This will attract the corporate entrepreneur's attention away from recognizing new opportunities and instead focus attention on the current business of the corporation. Thus, environmental uncertainty will have a stronger effect on opportunity recognition by corporate entrepreneurs than by independent entrepreneurs.

Proposition 3 *Environmental uncertainty will have a more negative effect on entrepreneurial opportunity recognition among corporate entrepreneurs than among independent entrepreneurs.*

Instrumentality is an important factor that influences the desirability of starting a new venture (Vroom 1964). Instrumentality refers to whether one perceives that performance will lead to particular outcomes, such as rewards or punishments (McAllister et al. 2007). Environmental uncertainty will have a negative impact on the perceptions of instrumentality of new venture creation. Uncertainty reduces instrumentality because entrepreneurs are unable to predict the future environmental contingencies and, consequently, they are unable to predict the magnitude of potential rewards that would result from entrepreneurial performance. As instrumentality decreases, the overall desirability of acting on the new venture decreases. Due to the tendency of having a prevention focus, corporate entrepreneurs would be much more likely to err on the side of safety by attempting to reject false positive opportunities rather than pursuing opportunity exploitation. On the other hand, because an independent entrepreneur is typified by a promotion focus, the uncertain environment will have a smaller effect on his/her entrepreneurial willingness schemas, because he/she would place more emphasis on ideals, goals and aspirations over security. As stated by McMullen and Shepherd (2006: 141), the decision to engage in entrepreneurial action is "dependent upon whether an individual is motivated enough to act given the uncertainty that he or she expects to encounter" while pursuing an opportunity.

Research has also shown that entrepreneurs may be more susceptible to overconfidence than other individuals (Busenitz and Barney 1997) and are more optimistic about business situations (Cooper et al. 1988). With this overconfidence comes the tendency to neglect further tests of initial assumptions (De Carolis and Saparito 2006). An alternative view on this is that entrepreneurs perceive less risk than others and are thus more likely to enter business ventures because they estimate that the chance and level of financial loss is less than others may estimate it to be. Corporate entrepreneurs, acting as stewards of firm assets, are less likely to engage the willingness scripts outlined by Mitchell et al. (2000) than independent entrepreneurs, because independent entrepreneurs are more likely to be susceptible to overconfidence and optimism, even when faced with environmental uncertainty. Thus, consistent with our earlier arguments, we propose that the independent entrepreneur will be less affected by environmental uncertainty than the corporate entrepreneur regarding entrepreneurial opportunity exploitation.

Proposition 4 *Environmental uncertainty will have a more negative effect on entrepreneurial opportunity exploitation among corporate entrepreneurs than among independent entrepreneurs.*

3.2 Environmental complexity

In order for a prospective entrepreneur to recognize the possibility for action, a certain degree of domain-specific knowledge is required (McMullen and Shepherd 2006). Environmental complexity increases the amount of knowledge required and simultaneously makes it more difficult to acquire that knowledge. First, heightened complexity can overwhelm a prospective entrepreneur's knowledge, making that individual less likely to discern opportunities. Second, the very process of generating new knowledge may be rendered more difficult by the complexities of the environment. Entrepreneurs rarely possess the resources required to collect all the information they need in complex environments (De Carolis and Saparito 2006). Thus, we propose that environmental complexity reduces entrepreneurial opportunity recognition.

Proposition 5 *Environmental complexity will have a detrimental effect on entrepreneurial opportunity recognition.*

McMullen and Shepherd's (2006) evaluation stage is rooted in the arguments of expectancy and value. Expectancy-value theories propose that individual action is a function of desirability and feasibility. First, a potential actor must desire a certain outcome. Second, the actor must believe that if action is taken, the desired outcome will occur. Neither desirability nor feasibility alone is sufficient to generate action, but rather action is the result of a composite between the two. Environmental complexity obscures the evaluation of the feasibility that a desired outcome will result from action. Essentially, high complexity makes the prospective entrepreneur unsure of what the effects of the environment will be on entrepreneurial action, and whether or not the prospective entrepreneur possesses the relevant skills and capabilities to deal with the complexities of the external environment. It follows that complexity discourages entrepreneurs from starting a new venture.

Proposition 6 *Environmental complexity will have a detrimental effect on entrepreneurial opportunity exploitation.*

Mitchell et al. (2000) describe arrangement scripts as the knowledge structures entrepreneurs have at their disposal (e.g., tools, contracts, relationships, resources, and assets) that are required to start a new venture. Arrangement scripts, particularly related to networks and resources, are likely to be prominent in the cognitions of entrepreneurs as they consider environmental complexity. When facing complexity, entrepreneurs will consider the financial, social, and human capital that is available to confront the issue. Corbett and Hmieleski (2007) argue that corporate entrepreneurs are more likely to develop and use network and resource arrangement scripts than independent entrepreneurs. Corporate entrepreneurs, due to their greater and more specialized resources (Bhide 2000), are likely to have greater ability to recognize potential new opportunities for the corporation while navigating complex environments. Independent entrepreneurs, on the other hand, will have limited networks and resources to help them understand complex environments, and thus may feel frustrated in their abilities to recognize new opportunities. They are more likely to rely on small, nonrandom examples and personal experiences in their own decision-making (Busenitz and Barney 1997). Because corporate entrepreneurs will be better able to collect more information and engage in more sophisticated decision-making than their independent counterparts, corporate entrepreneurs will be less affected than independent entrepreneurs by environmental complexity regarding opportunity recognition.

Proposition 7 *Environmental complexity will have a more negative effect on entrepreneurial opportunity recognition among independent entrepreneurs than among corporate entrepreneurs.*

Mitchell et al. (2000) also discuss ability scripts as essential for entrepreneurial decision-making. Ability scripts are the knowledge structures individuals have regarding the skills, capabilities, and attitudes required for running an entrepreneurial venture. Mitchell et al. (2000) suggest that ability scripts consist of venture diagnostic scripts, situational knowledge scripts and ability–opportunity scripts. Venture diagnostic scripts are related to the assessment of entrepreneurial opportunities and the understanding of what needs to happen to exploit such opportunities. Situational knowledge scripts draw on past experiences to develop solutions for current specific situations. Entrepreneurs use ability–opportunity scripts as they devise ways to create value through new combinations of resources.

Ability scripts have to do with an individual's ability to learn from a wide range of experiences and put what was learned to use in new situations (Cooper and Dunkelberg 1987; Stuart and Abetti 1990). Corporate entrepreneurs have more resources and are able to learn from the experiences of the larger corporation (Burgelman 1984). They can learn from established best practices (Christmann 2000; Szulanski 1996), benefitting not only from their own learning, but also from group learning and organizational learning (Crossan et al. 1999). In general, independent entrepreneurs have fewer options and must improvise and make quick decisions with few best practices and limited organizational learning from which to benefit (Baker et al. 2003; Hmieleski and Corbett 2006). They are not as likely as corporate entrepreneurs to have the ability scripts needed to overcome environmental complexity.

Arrangement scripts, as previously discussed, are also useful in explaining potential differences between corporate entrepreneurs and independent entrepreneurs regarding how they respond to environmental complexity. Due to the larger size and scale of their organizations, corporate entrepreneurs often have greater and easier access to human and physical resources than independent entrepreneurs (Bhide 2000). Because of this, corporate entrepreneurs are better able to develop and enact detailed processes and strategic plans related to new venture creation (Meyer and Heppard 2000), whereas independent entrepreneurs often have to make do with what is at hand (Baker et al. 2003). Therefore, corporate entrepreneurs' use of role schemas should be enhanced because they have more abundant control of resources and network connections. Thus, we propose:

Proposition 8 *Environmental complexity will have a more negative effect on entrepreneurial opportunity exploitation among independent entrepreneurs than among corporate entrepreneurs.*

4 Discussion

The propositions developed in this paper indicate that turbulent environments may distort entrepreneurial

decisions among corporate entrepreneurs and independent entrepreneurs differently. By contrasting the mental models of these two types of entrepreneurs, we have argued that environmental context—in this case, environmental uncertainty and complexity—can prompt the cognitive schemas of entrepreneurs to be enacted in manners different than generally expected.

A general question left unaddressed in prior literature and in this manuscript is what effects might there be among independent entrepreneurs who used to be corporate entrepreneurs. How might they fit into these schemas? Perhaps, some independent entrepreneurs left corporate environments after not having their ideas sufficiently promoted, and they retain some of the cognitive schemas developed while working within a corporation. Alternatively, if cognitive schemas, once developed, can persist in new contexts, then perhaps corporations looking to adopt schemas more representative of traditional entrepreneurship will look to independent entrepreneurs as a useful pool from which to draw. Corporate managers could seek to hire entrepreneurs or acquire new startups with entrepreneurial founders. Could it be that individuals that were originally independent entrepreneurs might continue to think more like independent entrepreneurs when they are subsumed into a corporate context?

Future research of interest may include designing a study to investigate empirically the propositions developed herein. Corbett and Hmieleski (2007) suggested subtle changes to the measures used in the Mitchell et al. (2000) study that would account for the difference in context between corporate entrepreneurs and independent entrepreneurs. These measures would help researchers identify the schemas employed by entrepreneurs. An effective study might engage two sets of subjects—one set consisting of corporate managers, and the other set consisting of independent entrepreneurs—to determine the differential effects of environmental factors on their assessments of attractiveness of possible opportunities and the likelihood that they would pursue those opportunities. Such a design, if it consisted of other factors in addition to environmental characteristics, would also provide insight regarding the relative importance of environment versus opportunity characteristics such as economic conditions, market size, product feasibility, or labor pool characteristics. Conjoint analysis has been successfully used in decision-making studies in the entrepreneurship literature to uncover the decision rules of entrepreneurs (Lohrke et al. 2010), and it may be similarly useful in this research. While conjoint analysis does not employ experimental manipulations in its method, it might be equally interesting to design an experiment to investigate the same propositions. This might consist of using a manipulation to prompt corporate versus independent entrepreneurial thinking in subjects and then reverting to conjoint analysis to present the subjects with scenarios for entrepreneurial decisions. This would not only provide insight into the research questions we have proposed, but would also shed light onto whether or not a lasting effect can be had from prompting/educating individuals to engage role schemas typical of corporate entrepreneurs or independent entrepreneurs.

An interesting question implied by our propositions that should be studied in future research is: what happens in environments that are both uncertain and complex, or alternatively, are certain and simple? We have argued that environmental uncertainty has a more negative effect on opportunity recognition and subsequent exploitation among corporate entrepreneurs than it does among independent entrepreneurs. However, complex environments have a more negative effect on independent entrepreneurs' behaviors than on those of corporate entrepreneurs. When both uncertainty and complexity are high, or when both are low, what would be expected? Future research may be able to discern if one has a stronger effect than the other, or if there is a three-way interaction effect. There is much to explore regarding the environmental characteristics in which both independent and corporate entrepreneurs may be most likely to flourish.

4.1 Suggestions for practitioners

The propositions in this research also suggest implications for practitioners regarding how cognition may affect entrepreneurs' responses to environmental turbulence. Working from the premise that corporate entrepreneurs think differently than independent entrepreneurs, it may be difficult to get them to think more like the other when the environmental context calls for it. For example, when uncertainty in the environment prompts a corporate entrepreneur to enact his/her prevention focus, they may mistakenly fail to exploit true entrepreneurial opportunities. Similarly, independent entrepreneurs may fail to exploit opportunities when faced with environmental

complexity—a situation that can be remedied through diligent effort or external resource appropriation. Corporate and independent entrepreneurs alike need to be able to adjust their role schemas as the situation demands. Perhaps, this is achieved through education. Top managers in large organizations should be careful not to reinforce the development of firm-specific role schemas without also introducing other appropriate schemas that may be useful in new venture creation.

Recent empirical research has suggested that for organizations interested in promoting entrepreneurial behavior, managers should identify individuals who are ready to embrace uncertainty and whom can be mentored to develop their entrepreneurial efforts (De Carolis et al. 2009). As our propositions indicate, individuals who have developed role schemas consistent with corporate behavior may not be fully prepared to engage in new business initiatives facing the uncertainty and complexity typical of entrepreneurial environments. Thus, organizations may need to consider the appropriateness of identifying and mentoring individuals for whom those firms have plans to enact entrepreneurial roles before those individuals adopt corporate schemas.

4.2 Suggestions for policy makers

Many state and local governments have recently focused on creating policies to promote entrepreneurial activity. This has been done because entrepreneurial activity has long been associated with economic progress and growth. However, policy makers need to take great care when "pulling the levers" they believe will promote economic development. Unintended economic distortions may result as governments change their policies. As we have put forward in this paper, corporate entrepreneurs and independent entrepreneurs may respond differently under conditions of environmental uncertainty and complexity. For example, when inadvertently causing uncertainty and complexity by adjusting tax policies, governments may not actually be promoting or discouraging entrepreneurship in general, but rather promoting or discouraging a specific type of entrepreneurship (corporate vs. independent).

In light of this, policy makers may have more to consider regarding whether their tax system is harmful or helpful to various manifestations of entrepreneurship. Typically, the risks associated with a tax policy are aggregate, not idiosyncratic (Alvarez et al. 1998), but they may affect corporate entrepreneurs differently than independent entrepreneurs. An uncertain tax policy future may "tip the scales" in favor of independent entrepreneurs rather than corporate entrepreneurs in terms of new start-ups, while overly complex policies may result in more entrepreneurial behavior from corporate entrepreneurs than from independent entrepreneurs. Depending on what type of entrepreneurship is most prevalent in a governmental region, or what manifestation of entrepreneurship a government most wants to promote, tax policy makers may adopt quite different strategies.

There has been a recent flurry of empirical research on the effects of taxes on entrepreneurial activity (Bruce and Deskins 2006). Much of this research comes from the economics literature and primarily investigates the effects of tax policies on aggregate entrepreneurial activity (Aizenman and Marion 1993; Alvarez et al. 1998; Bruce and Deskins 2006). However, there has been a lack of research investigating how tax policy might affect corporate entrepreneurs and independent entrepreneurs differently. The extent to which tax policies affect different types of entrepreneurial activity deserves exploration. Certain tax policies may have a much greater impact on independent entrepreneurial activity than corporate entrepreneurial activity or vice versa. A greater understanding of such consequences would enable policy makers to more effectively design tax code that would achieve desired changes, or eliminate unwanted outcomes, in entrepreneurial activity.

5 Conclusion

Our primary contribution has been to build on the work of Corbett and Hmieleski (2007) to demonstrate that, while corporate entrepreneurs and independent entrepreneurs may think differently, environmental conditions may further prompt differences in their cognitions and behaviors that can also be explained by social cognition theory. Specifically, we explored how environmental turbulence affects how corporate entrepreneurs versus independent entrepreneurs engage in opportunity recognition and exploitation. Understanding how entrepreneurs respond to these distortions can better inform policy makers regarding how to craft policy and also help entrepreneurs to prepare themselves better for how to respond to such conditions.

Once developed, cognitive style remains relatively stable over time (Hayes and Allinson 1994), and so we might expect that individuals trained as corporate entrepreneurs behave differently if they enter the context of individual entrepreneurship, and vice versa. Future research may consider what happens when an individual leaves his or her corporate position to engage in independent entrepreneurship. Due to role schemas developed as corporate employees, do they take entrepreneurial actions or engage in entrepreneurial decision-making that is different from entrepreneurs that have not been trained by corporations? Alternatively, do programs of corporate entrepreneurship perform better when they recruit or train individuals to behave using schemas typical of independent entrepreneurs?

An avenue for future research following from our paper might be to consider how much difference there is among different types of corporations. Corporate entrepreneurs may see vastly different contexts depending on the corporation by which they are employed. Perhaps additional perspectives could be integrated into the conversation. Insights from organization theory, human resource management, or culture may be useful when examining the various contexts under which corporate entrepreneurs may operate. A deeper understanding of corporate entrepreneurship may develop as researchers address the complexities and varieties of real-world organizations, rather than simplifying our classification of entrepreneurs to the dichotomy of corporate versus independent.

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