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ENTREPRENEURS AS THEORISTS: ON THE ORIGINS OF COLLECTIVE BELIEFS AND NOVEL STRATEGIES

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What are the origins of entrepreneurial beliefs about new opportunities and the value of resources? In this article, we outline a theory and model of the emergence of entrepreneurial beliefs and novel strategies. We first summarize extant literature by highlighting both the experiential and perceptual (or observational) origins of entrepreneurial beliefs and strategies. Thereafter we carefully explicate the role that entrepreneurial theorizing plays in the emergence of novel beliefs about new opportunities and make links with experiential and perceptual arguments. We specifically discuss three key mechanisms of entrepreneurial theorizing, namely: (1) the triggering role of experiential and observational fragments; (2) the imagination of possibilities; and (3) reasoning and justification. Importantly, we also explicate the social mechanisms of entrepreneurial theorizing and the emergence of entrepreneurial beliefs and novel strategies, specifically by discussing the role of social interaction and self-selection in entrepreneurial activity. Copyright © 2009 Strategic Management Society.

INTRODUCTION

Heterogeneous beliefs and expectations are central to the strategy and entrepreneurship literatures. In the strategy literature, differing beliefs and expectations about the value-generating capacity of particular resources or resource combinations drive a firm's decisions to acquire and assemble resources in pursuit of competitive advantage (Barney, 1986; Foss, 2007). In the entrepreneurship literature, differing beliefs about the value of resources and resource combinations prompt the decisions and actions that define entrepreneurship (Hayek, 1945; also see Shepherd *et al.*, 2007; also see McMullen and Shepherd, 2006). Indeed, entrepreneurship itself is commonly defined as discovering and exploiting opportunities based on an entrepreneur's judgment, beliefs, and expectations (Shane, 2003; cf. Foss *et al.*, 2007). However, our understanding of the origins of these heterogeneous beliefs and expectations at the individual and organizational levels remains underdeveloped.

One common explanation for the origin of beliefs lies in accumulated experience and history (Dierickx and Cool, 1989; Levitt and March, 1988; Shane, 2003; Zollo and Winter, 2002). However, novel strategies and entrepreneurial opportunities routinely extend beyond individuals' and organizations' (or society's for that matter) prior experience. Furthermore, particularly for new organizations, the problem with experience as the source of novel beliefs is that experience is inherently in short supply (March *et al.*, 1991). Despite their meager experience and resources, nascent organizations nonetheless create disproportionate amounts of value (Baumol, 2002; also see Bhide, 2000; Rosenbloom and Christensen, 1994), suggesting that they are somehow able to develop more accurate beliefs and perceptions about opportunities in the environment than organizations with more experience. A key question, then, is:

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Where do novel entrepreneurial beliefs, expectations, and associated strategies come from? Given the meager resources and experiences of nascent organizations, how are beliefs and novel strategies bootstrapped?

In this article we specifically seek to further open this *black box* of entrepreneurial belief formation, explicating both individual-level and social aspects. To do so, we argue that *entrepreneurial theorizing* provides a key mechanism, and we define a process through which novel beliefs about future entrepreneurial possibilities and strategies emerge. Theoretically, our arguments build on foundational work in psychology and philosophy that partly critiques the historically dominant emphasis on experience and perception or observation as sources of beliefs. We highlight the important role that theorizing and imagination play in generating novel beliefs about new opportunities and beliefs about the environment (e.g., Gopnik, 1996; Gopnik and Meltzoff, 1997; Harris, 2000; Peirce, 1957; Rosenberg, 1995; Spelke *et al.*, 1992). We see natural links, analogies, and extensions between a particular strand of research in developmental learning psychology and the *problem* of how entrepreneurs and nascent organizations form novel beliefs about opportunities and their environments. Specifically, we highlight how theorizing, triggered by mere fragments of observation and experience (cf. March *et al.*, 1991), allows both entrepreneurs and children alike to learn and create far more than the direct application of their limited experience and observations should empirically permit (Spelke, *et al.*, 1992; cf. Gopnik and Schulz, 2004). We not only explicate the individual-level factors related to entrepreneurial theorizing, but also the social mechanisms that necessarily shape the emergence and potential realization of entrepreneurial beliefs and novel organizational strategies. We discuss how entrepreneurial beliefs are, in essence, aggregated and assembled within collective contexts via social interaction and self-selection. In sum, the goal of this article is to develop a model of the emergence of entrepreneurial beliefs, explicating the key individual and social mechanisms and explaining the formation of beliefs that guide novel entrepreneurial decision-making and organizational strategy.[1]

[1] While extant work in both entrepreneurship and strategy informs our efforts, our theoretical contributions are distinct in several ways. *First*, while our theory is cognitive in nature (for recent overviews on entrepreneurial cognition see Baron, 2004; Baron and Ward, 2004; Mitchell *et al.*, 2007; cf. Walsh, 1995), we focus on a very specific strand of research in psychology and philosophy—a strand of work upon which the entrepreneurship and strategy literatures have not directly built (Chomsky, 1959, 2003; Gopnik, 1996; Spelke *et al.*, 1992). *Second*, since our theoretical focus is on the origin of *novel* beliefs about opportunities, we are essentially interested in opportunities that are *created* rather than *discovered* or perceived (Alvarez and Barney, 2007). Our theory focuses on opportunities and entrepreneurial possibilities that are *theorized* and created in the *mind's eye*. However, that said, the somewhat artificial dichotomy between the creation and discovery of opportunities is partly also resolved by our theory, specifically as we emphasize how environmental inputs (in the form of experiences and observations) play a central role in the entrepreneurial theorizing process. *Third* and finally, our goal in this article is to explicate both the individual *and* social mechanisms that form beliefs that lead to entrepreneurial action.

ORGANIZATIONAL BELIEFS AND THEIR ORIGINS: A REVIEW AND PROBLEM

Beliefs and expectations are central to strategy and entrepreneurship. Entrepreneurs and organizations develop beliefs and expectations about courses of action (Simon, 1964), about the shape of the environment (Gavetti and Levinthal, 2000), about the potential value of resources (Barney, 1986), about which capabilities to acquire (Makadok, 2001), or about the opportunities that might be to pursued (Shane and Venkataraman, 2000; cf. Shephard *et al.*, 2007). Beliefs and expectations, then, essentially are the upstream antecedents of organizational decision-making (Cyert and March, 1963), resource acquisition (Barney, 1986), action, and behavior and, thus, competitive advantage.

Where do beliefs come from?

But, where do heterogeneous individual and organizational beliefs come from? How do these beliefs originate and change?[2] Broadly, extant literature

[2] The importance of beliefs and expectations as antecedents of action and behavior has been underscored in psychology. For example, behavioral psychologists highlight the role that individual beliefs and expectations play in shaping individual behavior and associated choices (e.g., Ajzen, 1991; Bratman, 1987; Ajzen and Fishbein, 1980). Specifically, individuals have *behavioral beliefs*—subjective plans or anticipations about the potential consequences associated with particular actions, decisions, and behaviors. Individuals, in essence, assign probabilities to the consequences of certain behaviors—assessing the potential benefits of various alternatives—and based on this analysis, they develop a belief (cf. Goldman, 1994; Horgan and Woodward, 1985). These beliefs embody a choice and intention to take certain actions to actualize their belief. Put differently, 'what explains [an] action is the person's desires together with his *beliefs* about opportunities' (Elster, 1989: 20; cf. Davidson, 1963). Individuals then, in essence, decide and choose to actualize a particular belief, to *test* whether a

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suggests that beliefs—again, beliefs that guide and determine an organization's decisions and actions—emerge from two sources: experience and perception (or observation). While the literatures on these two sources of belief overlap heavily at a broad conceptual level—for example, as experience itself is clearly tied to what has been observed, seen, and perceived in the past—nonetheless they represent distinct streams of research. On the one hand, experiential mechanisms of belief formation have largely originated from the organizational learning and capabilities literature (cf. Levitt and March, 1988; Zollo and Winter, 2002), while the entrepreneurship literature, on the other hand, has emphasized various perceptual and observational aspects of the origins of beliefs (Shepard *et al.*, 2007; Shane and Venkataraman, 2000). We briefly review each literature, highlighting the experiential and perceptual origins of beliefs and the links between the two. Thereafter we highlight how experience and perception are central in belief formation, but how additional mechanisms are necessarily required to explain the origin of *novel* entrepreneurial beliefs. We discuss how entrepreneurial theorizing offers a unique, though complementary, perspective for understanding the origin of novel entrepreneurial beliefs and associated strategies.

Before proceeding, we note that the mechanisms of belief formation reviewed here are relatively independent of focal level, whether at the individual or organizational level. That is, extant organizational theories largely borrow theoretical constructs and mechanisms from the individual to the organizational level on a one-to-one basis (for a recent review, see Whetten *et al.*, 2009). For example, literature on individual learning from psychology has been directly applied to the organizational level (Argote, 1999). Justification for theorizing in this fashion, where theories are directly borrowed from another level of analysis, is provided by the *functional equivalence* that is noted in the underlying mechanisms at two different levels (see Morgeson and Hofmann, 1999). Thus, our review of the literature on where beliefs come from covers both the individual and organizational levels, though in our own theoretical development we also make key distinctions and links between the individual and social aspects of entrepreneurial belief formation.

particular belief leads to anticipated outcomes (Ajzen and Fishbein, 1980) — Bratman's (1987) *belief-desire-intention* model, in part, also captures this intuition.

Experience as a source of beliefs

Organizational learning scholars have defined learning as synonymous with beliefs—specifically, as a change in an organization's beliefs (see March, 1991: 74; cf. Levitt and March, 1988).[3] Individuals and organizations have beliefs about cause and effect relationships, the nature of the environment, reality and possibilities, and the consequences of future actions (see Fiol and Lyles, 1985; Gavetti and Levinthal, 2000; Huber, 1991; March *et al.*, 1991). Importantly, these beliefs guide, inform, and determine an organization's decisions, behavior, and actions (Gavetti and Levinthal, 2000 Levitt and March, 1988).[4]

Experience and various experiential mechanisms have been highlighted as some of the key antecedents of individual belief formation and learning (cf. Bandura, 1986; Schwartz, 1978) and these experiential mechanisms of learning are also central in Cyert and March's (1963) classic behavioral theory of the firm. Organizations take actions and receive feedback on the efficacy of that action from the environment, leading to an adjustment in the organization's expectations and understanding of what is feasible and valuable. In essence, experience and observation change the beliefs and expectations of the organization about what future actions are possible, desirable, and valuable (cf. Greve, 2003). In other words, an organization's history allows an organization to draw inferences about what the environment is like and helps define actions that might benefit the organization (Levitt and March, 1988).

The focus on experience and an organization's history as sources of beliefs and learning has also been central in the organizational capabilities literature (Zollo and Winter, 2002). Specifically, an organization's history provides lessons that are encoded

[3] Organizational learning and capabilities-based scholars have largely borrowed their theoretical arguments from how individuals learn (Argote, 1999) and, thus, the theoretical mechanisms are essentially the same (for a recent discussion of theory borrowing between levels of analysis, see Whetten *et al.*, 2009). In other words, the argument is that belief formation and learning at the individual and organizational levels have some of the same *functional equivalents* (Morgeson and Hofmann, 1999).

[4] While some view learning as necessitating changes in *actual* behavior, we concur with and build on others who have noted that organizational learning also implies that the 'range of *potential* behaviors is changed' (Huber, 1991: 89; also see March *et al.*, 1991: 2). The distinction between actual and potential behaviors is central to our arguments.

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in routines (Nelson and Winter, 1982) or in an organization's memory (Walsh and Ungson, 1991). Organizations may also engage in retrospective counterfactual reasoning (*what if we had done x*, for example in the case of errors), which promotes learning and changes in beliefs (Morris and Moore, 2000). More generally, the 'experiential lessons of history' and associated past observations (Levitt and March, 1988: 320), in effect, provide organizations with *data* and *facts* which result in beliefs about what actions an organization might take in the future. Path-dependent experiences also give an organization its continued identity. These experiences may indeed embody the most critical assets of the organization as they accumulate over time in path-dependent fashion (Dierickx and Cool, 1989). Thus, organizations specifically learn by associating past experiences and successes in problem solving with current problem-solving situations (cf. Cohen *et al.*, 1972). Other experiential mechanisms of belief formation have included vicarious learning (Denrell, 2003; cf. Bandura, 1986), learning by doing (Argote, 1999), and learning by analogy or association (e.g., Gavetti *et al.*, 2005). Even notions such as absorptive capacity—the extent to which an organization is able to glean information from the environment—are heavily rooted in experiential antecedents in the psychology literature (see Cohen and Levinthal, 1990).

Perception as a source of beliefs

Individuals and organizations also form beliefs and learn through observation and various perceptual mechanisms. In fact, extant theories of entrepreneurship—as they relate to the emergence of beliefs about opportunities (or the likelihood of discovering them)—have focused heavily on various individual-level, experiential, and in particular, perceptual and cognitive aspects of belief formation. While entrepreneurship scholars have also focused on experience as a source of beliefs (see Corbett, 2005)—for example, by showing how individuals bring with them important knowledge and skills from incumbent organizations (Shane, 2000)—the bulk of the literature has emphasized various perceptual and cognitive mechanisms. In fact, the language used by much of the entrepreneurship literature is instructive with its emphasis on perception: opportunities are *recognized, identified, found, or discovered* (for an overview, see Baron, 2004; Mitchell *et al.*, 2007). In other words, opportunities objectively exist in the environment (Alvarez and Barney, 2007), and the entrepreneur's job is to find, see, observe, and perceive them. Scholars point to entrepreneurs possessing 'an orientation toward *seeing* opportunities' (Krueger, 2003: 105, italics added) and refer to entrepreneurs as 'opportunity *finders*' (Gaglio, 2004: 536). Others also reinforce the importance of perception by highlighting entrepreneurial alertness (cf. Kirzner, 1985; Gaglio and Katz, 2001), though alertness has also been treated as a process (see Ireland, Hitt, and Sirmon, 2003). Overall, then, entrepreneurs possess these types of perceptual skills in trait-like fashion, more so than non-entrepreneurs (Mitchell *et al.*, 2007). Alternatively, entrepreneurs develop, via experience or educational background (Shane, 2000; Shane, 2003), perceptual capabilities and alertness that make them more prone to recognize and discover opportunities.

The key theoretical foundations of much of the opportunity recognition literature lay in a specific strand of theory in cognition—particularly the information processing theory (Neisser, 1976 Simon, 1979)—as well as Kolb's (1984) experiential models of learning. This theory broadly suggests that entrepreneurs essentially store information (observations, experiences, and perceptions), gleaned from the environment, in their memory (or other repositories), and with this information they then interact with the current environment in discovering and recognizing opportunities (Baron and Ward, 2004; cf. Simon, 1979). The emphasis in this literature clearly remains on the perception of opportunities based on observations and experience.

This emphasis on perception is certainly warranted and provides a contribution to our understanding of entrepreneurship; nonetheless the capacity to see, recognize, and find (or even create) opportunities remains a black box theoretically. A focus on perception, observation, and experience provides a less than complete story since—as recently noted in psychology—beliefs, expectations, and learning clearly extend beyond one's experience and observations (see Chomsky, 1986, 2003; Gopnik and Wellman, 1992 Spelke *et al.*, 1992). While both experiential and perceptual mechanisms are quite feasible explanations for the emergence of beliefs about new opportunities, they provide only a partial explanation. In sum, while experience and perception are undoubtedly important, they are (in some part) underdetermined and incomplete, as they cannot completely explain the origins of radically new beliefs.

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The underdetermination of experience and perception

The underdetermination of experience and perception as the source of entrepreneurial beliefs, learning, and capability is aptly illustrated by building on insights from cognitive psychology, philosophy, and learning theory. Specifically, cognitive psychologists and philosophers have similarly wondered how—*despite* rather fragmented experience and limited perception and observation—children not only learn to talk, but learn to talk grammatically and with infinite creativity in syntax (Chomsky, 1986). Moreover, children also manifest remarkable *a priori* capability and expectations in understanding their environment—a capability that cannot, as empirically shown by Spelke and colleagues (1992), be completely explained with reference to experience, observation, or perception alone. Chomsky (1975: 179, italics added), in discussing a child's learning of language—foreshadowing arguments on which we will theoretically build—succinctly explicates this experience-learning underdetermination (or incompleteness) as follows:

> 'One can describe the child's acquisition of knowledge of language as a kind of *theory construction*. Presented with highly *restricted data*, he *constructs a theory* of language of which this data is a sample (and, in fact, a *highly degenerate sample*, in the sense that much of it must be excluded as irrelevant and incorrect—thus the child learns rules of grammar that identify much of what he has heard as ill-formed, inaccurate, and inappropriate). The child's ultimate knowledge of language obviously extends far *beyond the data* presented to him. In other words, the *theory* he has in some way developed has a predictive scope of which the *data* on which it is based constitute a *negligible part*. The normal use of language characteristically involves *new* sentences, sentences that bear *no* point-by-point resemblance or analogy to those in the *child's experience*.'

Organizational scholars have, in fact, recently highlighted this exact point; namely, that experience and perception—whether vicarious or one's own—are often highly degenerate and fragmented (see March *et al.*, 1991) and experience and observation also provide a biased and rather limited sample of *data* and *facts* from which one might learn and form beliefs about the future and the environment (see Denrell, 2003; Denrell and March, 2001; Fang, 2003). In sum, experiences, observations, and perceptions represent only a small sample of actual—or for that matter, *feasible or imagined*—possibilities for courses of future action (cf. March *et al.*, 1991) and thus additional mechanisms for explaining entrepreneurial activity and novel organizational courses of action need to be sought.

THEORIZING AS A SOURCE OF ENTREPRENEURIAL BELIEFS

We argue that a process of theorizing explains the emergence of novel, entrepreneurial beliefs and strategies. The process of entrepreneurial theorizing consists of three key conceptual elements: (1) the triggering role of experiential and observational fragments; (2) the imagination of possibilities; and (3) the process of reasoning and justification. We discuss these elements of entrepreneurial theorizing in sequential fashion as they partly suggest a natural, though idealized, temporal ordering of how novel entrepreneurial beliefs emerge: from imagined latent ideas and possibilities, seeded or triggered by fragmented experience and observation, to more full-fledged conjectures, hypotheses, and models about courses of future action that are reasoned and justified—all eventually leading to a collective or shared belief and an intention to, in effect, experiment and *test* the validity of an entrepreneurial theory (see Figure 1 for an overview).

We begin with the premise that entrepreneurs engage in cognitive activities in some of the same ways as children or even scientists. We may even think of *entrepreneurs as scientists*, just as some have labeled *children as scientists* (Gopnik and Meltzoff, 1997). Both engage in theory development about possibilities and associated theory testing. Whether speaking of entrepreneurs, scientists, or children, we can hardly explain novel beliefs and learning and progress without reference to mechanisms beyond experience and observation (Peirce, 1957; Spelke *et al.*, 1992).[5] Clearly this metaphor between entrepreneurs, entrepreneurial firms, and children may be pushed too far. Our goal, however,

[5] Naturally the theorizing efforts of entrepreneurs differ from those of scientists. For example, entrepreneurs may not have the time to fully vet the implications of their theories given the need for action. But on the whole, similar theorizing processes are evident, though perhaps in *lower-order* form given issues of timing and uncertainty.

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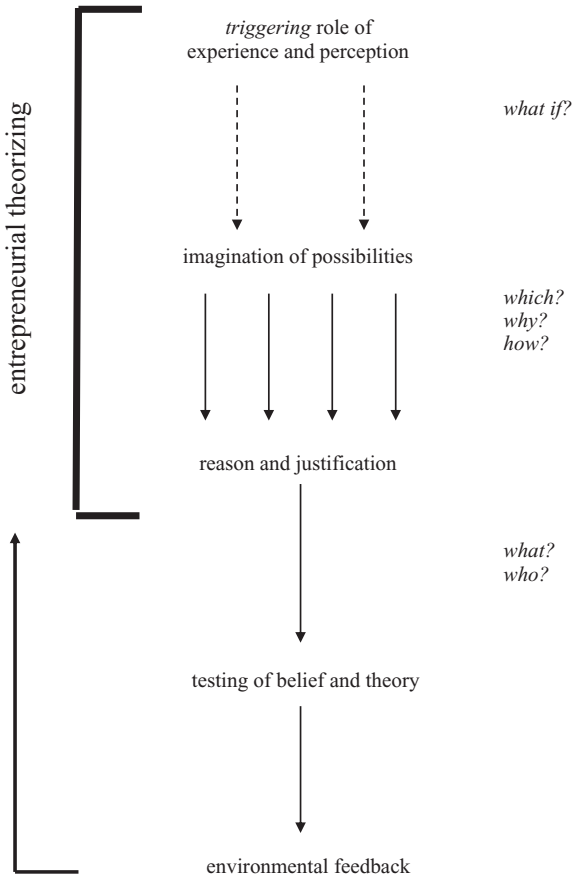

Figure 1. Stylized representation of entrepreneurial theorizing and belief formation

is simply to metaphorically link the two and, more generally, to theoretically note the *functional equivalence* between theorizing in these two different contexts (for an excellent discussion of theorizing based on functional equivalence, see Morgeson and Hofmann, 1999).

The triggering role of experiential and observational fragments

The process of entrepreneurial theorizing and associated belief formation is initiated or triggered by experiential or observational fragments (see Figure 1). An entrepreneur may, for example, *see*—perceive, recognize, experience, observe—something done poorly by another organization or see a customer problem or need that is not being addressed, in which case, *seeing* may induce theorizing about alternative possibilities (cf. Hsieh, Nickerson, and Zenger, 2007). As noted by Rudolph Spreckels, an early twentieth-century entrepreneur and industrialist: 'When I *see* something badly done or not done at all, I see an opportunity to make a fortune' (quoted in Williamson, 2007: 10).

Experiences and observations, then, provide the triggering *raw material* from which the entrepreneurial possibility space is essentially bootstrapped, theorized and created. However, our emphasis is specifically on the *triggering, and, thus, not directly causal,* role of experience and observation in belief formation. Though individuals may have similar experiences or observations, the observations themselves do not necessarily induce the same beliefs or action patterns, or for that matter, the recognition of opportunities. Rather, observations may trigger the process of entrepreneurial theorizing and belief formation (thus the dotted lines in Figure 1). As noted by March *et al.* (1991), observations and experiences offer only fragmented lessons and directions about what an entrepreneur might do as an alternative or what novel opportunities and possibilities might be created. One way to conceptualize experiences and observations is to think about these as data or fragmented samples which inform, though do not determine, eventual entrepreneurial beliefs.

To illustrate how experiences and observations trigger, rather than cause, theorizing about the entrepreneurial possibility space, consider the case of Isaac Newton. Newton observed how an apple fell from a tree (Westfall, 1983) and this observation triggered within him questions about why it fell the way it did. The fact that other apples—and other objects for that matter—had not only fallen previous to the one observed by Newton, but had, of course, been observed by many others, illustrates that the observation and experience itself is only a fragment loosely related to beliefs. Thus, additional mechanisms are needed to understand how novel beliefs and expectations emerge.

Interestingly, at least in the context of entrepreneurship, the more that entrepreneurial experiences and observations themselves are *causal* in determining entrepreneurial beliefs, the less likely these beliefs are to result in true novelty and breaks with the past. A fairly *obvious* observation about an entrepreneurial opportunity—say, of seeing something done poorly by another entrepreneur or organization—which then in essence contains lessons learned within it, is likely to be exploited by numerous entrepreneurs, and thus is unlikely to lead to entrepreneurial rents (cf. Barney, 1986). Now, the observed *obviousness* of an opportunity can often be judged

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only *ex post*, nonetheless, the intuition of experiential and observational fragments as triggers (rather than causes) clarifies how *new* beliefs emerge.

The intuition for the triggering role that fragmented observations play in entrepreneurial theorizing and associated learning is consistent with the *poverty of stimulus* argument in psychology (Chomsky, 1986; Stich and Ravenscroft, 1994). This argument suggests that, relative to the actual knowledge manifest by humans, observations and experiences provide only limited and fragmented input and data.[6] Child psychologists, for example, persuasively show that humans have capabilities to infer and theorize, to in effect bootstrap knowledge, far beyond what has been observed, seen, or perceived (e.g., Gopnik, 1996; Spelke *et al.*, 1992). Similarly, philosophers, such as Charles Peirce (1957), have discussed this capability under the label of *abduction*. Thus, even more *minor* creative acts—such as the use of language—have been shown to clearly outstrip extant inputs, observations, and experiences, and to rely on theorizing processes. As previously noted, children manifest capability and creativity far beyond what their experience and observations would seem to allow (Chomsky, 2003). So observations and experiences are, in effect, impoverished and fragmented compared to actual human capability and ability to infer and theorize (Fodor, 1991; Gopnik, 1996).

So, in the case of entrepreneurs, if experiences and observations indeed are fragmented and only in limited supply (March *et al.*, 1991) and if they *only* trigger eventual beliefs, what then accounts for the emergence of novel beliefs beyond perception and the senses?

Imagination of possibilities

Imagination provides one of the key engines of entrepreneurial theorizing. Entrepreneurs imagine possibilities[7] for courses of future action and thereby add new possibilities to a set of fragmented observations and experiences (see Figure 1). Imagination, then, essentially adds to and creates the entrepreneurial possibility space. Whether new products, new structures, or new markets, the creative ideational process of imagination importantly offers varied and new sets of possibilities for what a nascent organization might choose to pursue. Imagination represents a type of *ideational trial and error* (similar to theorizing in scholarly settings: Weick, 1989; cf. Campbell, 1974; Rescher, 2005), which provides part of the entrepreneurial raw material that results in anticipations, conjectures, and eventual beliefs about the environment and possible courses of action. Importantly, imagination is a low-cost way to generate, identify, and consider a diversity of entrepreneurial possibilities. Imagination avoids the costs and time required to physically experiment and wait for environmental feedback (see the complementary discussion of *offline learning* by Gavetti and Levinthal, 2000). Thus, far before actual entrepreneurial action and trials, this type of ideational work and mental trial and error provides much-needed guidance and learning for what possibilities—new markets, new products, new structures—the entrepreneur and nascent organization might pursue.

The concept of imagination can, in part, be separated from what is (or has been) seen, observed, perceived, experienced, or known. As shown by psychologists, imagination is *separate* from both the senses and perception (Kosslyn, 1980; also see Casey, 1971; Currie and Ravenscroft, 2003 Shepard and Cooper, 1982). The entrepreneurial process of imagination specifically then is *not*—though it may include it—the act of bringing past or current observations and perceptions into one's mind from memory (Ryle, 1949; cf. Thomas, 1999), nor is it the mere processing of environmental information (Haber, 1970; cf. Kiesler and Sproull, 1982; Walsh,

[6] The poverty of stimulus argument is succinctly summarized as follows: The problem that arises if we consider the matter [of the origins of beliefs and expectations, and knowledge more generally] with a little care is one of poverty of the stimulus. Although our cognitive systems surely reflect our experience in some manner, a careful specification of the properties of these systems on one hand, and the experience that somehow led to their formation on the other, shows that the two are separated by a considerable gap, in fact, a chasm. The problem is to account for the specificity and the richness of the cognitive systems that arise in the individual on the basis of the limited information available (Chomsky, 1986: xxv).

[7] Much of the vocabulary that we use in our subsequent theoretical development will be enlightened by work from philosophers who have described reasoning and justification as the process of considering possibilities and possible worlds (cf. Lewis, 1973; Seddon, 1972; also see Goldman, 1999). The language of *possibility* also features prominently in related literatures, ranging from theories of imagination (Kosslyn, 1980) to theories of intention (Rosenberg, 1995; related concepts such as *volition*, see Zhu, 2004) to theories of pretense (Leslie, 1987), and other complementary conceptualizations of theorizing and learning (cf. Peirce, 1957). . Imagination was, of course, also considered by Shackle, 1979.

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1995). Though we recognize the clear links between perception and imagination, making a distinction between extant experiential and observational approaches and imagination is important to our argument, as many extant approaches simply treat the mental and cognitive capabilities of humans (see Lindsay and Norman, 1977 for an overview; cf. Bower and Hilgard, 1981) as repositories for *housing and recalling* past observations and perceptions (Crowder, 1976; Skinner, 1989; cf. Walsh, 1995).

Entrepreneurial imagination is a uniquely creative and generative act for supposing, conceiving, and considering various *new* possibilities (and, *im*possibilities for that matter) for courses of entrepreneurial action (Figure 1) (Kosslyn, 1980; cf. Yablo, 1993). Entrepreneurs specifically consider *what* might be done. Imagination allows for completely new thoughts and completely new imagined scenarios, and permits envisioning an entirely new future (Block, 1981; Lewis, 1986).[8] The intuition here, specifically with regard to imagination, is complementary to the work of Gaglio (2004), who emphasizes the role that *mental simulations* play in entrepreneurial activity. Through imagination, entrepreneurs cognitively simulate and think counterfactually, thus allowing for the unique creation of possibilities beyond the senses. Imagination encompasses thought experimentation (cf. Brown, 1991, 2004; Gendler, 2004) and, more generally, the human capacity for abduction, 'which has to do with the elaboration of possibilities' (Rescher, 1976: 72; also see Niiniluoto, 1999; Paavola, 2004). And, imagination and theorizing, then, essentially gives *pre-experiential guidance* (Rescher, 1976). Indeed, as noted by Charles Peirce, 'man's mind has a natural adaptation to *imagining* correct *theories* of some kinds . . . If man had not the gift of a mind adapted to his requirements, he could not have acquired any knowledge' (1957: 71, emphasis added).

The critical importance of imagination and its triggering links to experience and perception can be highlighted by referencing the *recombination* process commonly used to explain innovation and entrepreneurial activity. Scholars have shown that the recombination of various knowledge elements (Rosenkopf and Nerkar, 2001; Fleming and Sorenson, 2004) can lead to highly promising and valuable products and entrepreneurial possibilities. The intuition of recombination—particularly the recombination of experiences—also shows up prominently in the entrepreneurship literature where Shane, for example, defines an opportunity as a 'situation in which a person can create a new means-ends framework for *recombining resources* that the entrepreneur believes will yield a profit' (Shane, 2003: 18).

Our theory directly adds to the notion of *recombination* by articulating the underlying process used to judge and arbitrate between *what* is recombined and *how* it is recombined (Figure 1). In other words, entrepreneurial imagination and theorizing explain the remarkable success with which entrepreneurs recombine. As shown by Rivkin (2000), if recombination is merely random, the likelihood of success is infinitely small. This is true even of entrepreneurial activity, just as it is true of scholarly theorizing (see Lakatos, 1973; Peirce, 1957) and human learning more generally (Chomsky, 1986). Imagination and theorizing then allow for entrepreneurs to hypothesize and conjecture about possible recombinations and to focus on those with a higher likelihood of success. Thus, while we know from numerous literatures that recombination can lead to novel outcomes and value creation (e.g., Ahuja and Lampert, 2001; also see Smith and DiGregario, 2002), theorizing—and particularly the imagination of possibilities—gives us further intuition about how and why and what elements might be recombined (see Figure 1).

In sum, entrepreneurial imagination involves developing imagined representations about the

[8] A natural question, of course, is the origin of this entrepreneurial capacity to imagine new possibilities and the related human capacity to theorize. If not directly from experience, where do these capabilities come from? In line with developmental psychologists and philosophers (e.g., Leslie, 1987; Spelke, *et al.*, 1992; cf. Rosenberg, 1995) we argue that humans have inherent and natural abilities to imagine and theorize (cf. Kosslyn, 1980)—uniquely imagine, create, and piece together, conjectured possibilities from limited observation and experience. As noted by Peirce, 'man's mind has a natural adaptation to *imagining correct theories* of some kinds . . . If man had not the gift of a mind adapted to his requirements, he could not have acquired any knowledge' (1957: 71; also see Chomsky, 2003; Leslie, 1987). To briefly contrast this with other learning approaches, while Bandura argues that 'humans come with few inborn patterns' (1986: 20) and, thus, places emphasis on experience and observation in learning, we build on others who note how capabilities for imagination and theorizing are importantly anchored in human nature, and this allows for uniquely creative acts and new learning (Chomsky, 2003; Peirce, 1957). In related fashion, Carruthers further notes that 'as knowledge seekers . . . suppositions play a crucial role. Without a capacity to suppose, neither science nor technological innovation would be possible, except on a trial and error basis' (2002: 230). This type of imaginative supposition and pretense, of course, is readily manifest in child's play (Currie and Ravenscroft, 2002; Harris, 2000; Leslie, 1987), and imagination and supposition certainly also play a key role in entrepreneurial theorizing, specifically in expanding the set of possibilities for future action.

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environment and novel possibilities that guide eventual entrepreneurial pursuits. Imagining possible entrepreneurial landscapes, even creating new ones, differs from random *hill climbing* and local search. Rather than climbing extant hills, the process we are describing has more to do with imagination—how hills are imagined, created, and built in the entrepreneurial *mind's eye*. Overall, the low cost of imagining possibilities, mental simulation, and thought experimentation permits the consideration of a wide range of highly risky or implausible possibilities. Thus, rich *new* entrepreneurial possibilities (and, impossibilities) can be imagined, created, and mentally tested.

Reason and justification

The third key element of entrepreneurial theorizing is the process of reasoning and justification. Imagined possibilities, triggered by fragmented observations, need to be reasoned and justified toward more full-fledged conjectures, hypotheses, models, and theories. These theories then shape entrepreneurial action and strategy. Selecting among entrepreneurial possibilities is inherent to entrepreneurial activity itself, as not all imagined possibilities can be physically tried and tested.

Selecting the best possible hypothesis or emerging nascent theory to test is, of course, rather difficult, as there may be very little, if any, data or experiential support for a particular entrepreneurial possibility. This is almost inherently the case when defining a novel belief and course of action that may take the form of a new product, new business, or novel strategy. Only through trying, experimenting, and doing does the entrepreneur begin to develop a more sure belief, understanding, learning, and knowledge (cf. Cyert and March, 1963). However, prior to such testing, reason and justification provide an intermediate opportunity to carefully evaluate, cognitively test, and ultimately refine feasible beliefs about what entrepreneurial actions should be taken.

Entrepreneurial theorizing, just like scholarly theorizing, then, does not depend (only) on physical trial or experience for its support, but rather, 'during the theory development process, *logic replaces data as the basis of evaluation*' (Whetten, 1989: 491; also see Seddon, 1972). The entrepreneur or nascent organization uses logical reasoning and justification to comparatively assess the merits of alternative possibilities (see Figure 1). Answering the theoretically important *why* question of various possibilities (cf. Kaplan, 1964; Whetten, 1989), particularly relative to competing sets of possibilities and opportunities, is fundamental to entrepreneurial theorizing and decision making. The logical exercise of reasoning and justifying possibilities and potential courses of action moves ideas from the realm of hunches, ideas, and possibilities, to conjectures, hypotheses, and, eventually, beliefs and theories. This, of course, does not happen without significant mental effort, nor is this process as linear or explicit as the word *theorizing* itself might suggest. Initial guesses, ideas, and conjectures about future entrepreneurial possibilities are—through thought experimentation—rigorously considered, mentally tested, argued, discarded, and further developed, as entrepreneurs move toward increasing certainty and belief about a particular entrepreneurial possibility that should be tested and tried (see Figure 1).

There is an important interplay between entrepreneurial theorizing (specifically reason and justification) and entrepreneurial experience and observation. Experiences and observations, even when fragmented and inconclusive, can provide anchoring facts and data for considering the feasibility of particular possibilities and associated entrepreneurial actions. Via association and analogy (Gavetti *et al.*, 2005), experience and observation from neighboring industries or markets may provide much-needed data to, in part, justify a particular entrepreneurial idea and theory. But again, given the inherent newness of some entrepreneurial action—particularly of the variety that leads to radical innovation—there are often only fragmented observations and biased facts to support the nascent theory. Thus, the entrepreneurial theory development process may inherently be one that is more focused on ideas, imagination, and logic rather than experience, data, and extant facts.[9]

Our emphasis on reason and justification requires us to anchor our arguments on a particular,

[9] The intuition for highlighting the role that *entrepreneurial theorizing* plays in new learning comes from one of the authors' personal experiences in the venture capital industry. Specifically, this author noted that the process of planning ventures and entrepreneurial actions seemed highly similar to the process of scholarly interaction and theorizing, and extant models of entrepreneurial learning and activity have not considered the role that theorizing plays not only in shaping scholarly learning, but also in shaping entrepreneurial learning and activity.

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emerging conception of human rationality[10]—one that is less bounded, though certainly not perfectly rational. Our conception of human nature and rationality is consistent with scholars who emphasize humans' surprising capability to reason appropriately, to get things right, and to find new solutions to problems (see Krueger and Funder, 2004 also see Gigerenzer and Goldstein, 1996; Gilbert, 2006; McKenzie, 2003, 2005). While experiential (and observational) boundedness and experiential bias have been emphasized in the extant organizational literature (cf. Levitt and March, 1988), conceptions of human rationality also need to take into consideration the human capacities for reasoning creatively even in uncertain environments (cf. Rosenberg, 1995)—a capacity to generate new, creative solutions with only limited and localized experimentation and testing. In the management literature, Grandori (2005; cf. Grandori, 1984) has also noted that theories in organizational scholarship rather poorly account for *rational discovery*—that is, the evidence for organizations getting many things right, such as, planes flying, organizations working, new products emerging, etc. (Grandori, 2005). Surely this can't all simply be the result of random variation. Our emphasis, then, builds on this more *rational* approach to human reasoning (see McKenzie, 2005). New entrepreneuring organizations provide an apt setting to consider this type of rationality, as seemingly against all odds, in highly uncertain environment, and often with only sparse experience—novel solutions are nonetheless manifest, new products are developed, new markets are created, new possibilities are explored, and radical, new creativity is revealed.

SOCIAL MECHANISMS OF ENTREPRENEURIAL THEORIZING

The process of entrepreneurial theorizing discussed above, and any subsequent testing of entrepreneurial theories, are seldom individual-level activities. Rather as noted by West, 'new venture success often depends on how the *founding team* collectively understands its world, estimates the effects of possible actions, makes decisions, and allocates appropriate resources' (2007: 77, italics added). Thus, important social processes are commonly involved. These social processes are important to entrepreneurial theorizing for two reasons. *First*, as the possibilities which entrepreneurs seek to address become more complex, the need for collective theorizing and experimentation increases (cf. Nickerson and Zenger, 2004). Moreover, the knowledge required to develop entrepreneurial theories is often widely dispersed (cf. Hayek, 1945). Consequently, effective theorizing first demands assembling or aggregating observations and experience by effectively organizing the individuals in whom knowledge is housed. While entrepreneurial theories must ultimately reside within individuals, single individuals nonetheless are unlikely to have explored all possible implications, designs, or marketable ideas that emerge from this theory. *Second*, the actual doing and *testing* of a given entrepreneurial theory (see Figure 1), more often than not, requires assembling a sufficiently large collective which shares a particular theorized belief. We highlight below two social mechanisms—social interaction and self-selection—that contribute to the entrepreneurial theorizing processes outlined above. We then discuss how self-selection helps define which theorized beliefs are actualized and tested in nascent markets.

[10] We might also note that our focus on entrepreneurial reason and justification as an important element of entrepreneurial theorizing parallels and is complementary with a changing and emerging conception of human rationality. That is, some scholars have recently called for a less-bounded, though certainly not perfectly rational, conception of human nature and rationality, specifically noting much evidence for the surprising human capabilities to reason appropriately, and the surprising human capabilities to get things right and to find new solutions to problems (e.g., Krueger and Funder, 2001; also see Gilbert, 2006; McKenzie, 2003, 2005). That is, while experiential (and observational) boundedness has been emphasized in the extant organizational learning literature (cf. Levitt and March, 1988)—conceptions of human rationality also need to take into consideration the human capacities for reasoning correctly (cf. Rosenberg, 1995)—a capacity to generate new, creative solutions with only limited and localized experimentation and testing. In the management literature, Grandori (2005; cf. Grandori, 1984) has also noted that theories in organizational scholarship rather poorly account for *rational discovery*, that is, the evidence for organizations getting many things right; such as, planes flying, organizations working, new products emerging, etc. (Grandori, 2005). Surely this can't all simply be the result of random variation. Thus, these outcomes need further explanation, as heavily bounded conceptualizations of rationality cannot completely explain creative outcomes (cf. Kitcher, 1994). Our conception of rationality, then, is complementary with Grandori's *epistemic* rationality and recent evidence in psychology. New organizations provide an apt setting to consider this type of rationality, as—seemingly against all odds and often without sparse experience—novel solutions are manifest, new products are developed, new markets are created, new possibilities are explored, and radical, new creativity is manifest.

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Social interaction

Social interaction facilitates entrepreneurial theorizing. Entrepreneurial theories emerge as ideas, and possibilities are collectively imagined, generated, conjectured, hypothesized, criticized, defended, debated, reasoned, refuted, discarded, justified, and, eventually, believed, accepted, and selected (and later tested or tried, or not) in a collective and social context. Thus, by assembling individuals and then facilitating social interaction, 'an organization can acquire more information than any individual' (Arrow, 1974: 53).

Social interaction and the aggregation of observational fragments. As noted by Hayek (1945), beliefs and knowledge are often *local* and thus widely dispersed among individuals. Individuals have different experiences, observations, and perceptions about what is feasible, what truly represents an opportunity, what resources ought to be purchased in factors markets, and what capabilities should be developed. Social interaction both inside and outside the firm facilitates aggregating disparate observational and experiential fragments (see Figure 1). One way to think about this process of aggregating fragmented experiences and perceptions is as assembling a puzzle in which disparate observations and perceptions provide an increasingly clear conceptualization of opportunities in the environment. Observational fragments represent individuals' experiences, observations, and perceptions, and are aggregated in a collective context. Social interaction also allows for the comparison of disparate observations, allows for their aggregation, and enables their use in assembling an entrepreneurial theory.

However, mere aggregated observations do not directly provide a nascent collective with a *true* understanding of the opportunity landscape and its associated possibilities. After all, individuals may have differing and conflicting beliefs about an opportunity, and uncertainty about the future accentuates this problem. Aggregated experiences, thus, are a seed for imagination.

Social interaction and the imagination of possibilities. Using fragmented and aggregated experiences and observations as raw materials (see Figure 1), nascent entrepreneurial organizations imagine novel ideas and theories to guide future entrepreneurial action. Social interaction facilitates such ideation and theorizing beyond what has been observed and experienced. This collective effort generates a wider view of the entrepreneurial possibility space, thereby adding to the aggregate observations of the nascent organization.[11]

Insights about this collective *imagination of possibilities* can be drawn from the literature on brainstorming. This literature indeed shows that specific forms of collective interaction may facilitate both increases in the quantity and *potential* quality of ideas (Paulus and Yang, 2000; cf. Sutton and Hargadon, 1996; Taylor, Berry and Block, 1958; though see Rietzschel, *et al.*, 2006). The literature specifically suggests that in both idea generation and idea selection an optimal collective process can create results of higher quality than those achievable by any one individual (e.g., Sutton and Hargadon, 1996; Hargadon and Bechky, 2006). Individuals build off of each others' ideas and thoughts. They challenge and criticize ideas. Through such interaction, they collectively engage in theory development regarding entrepreneurial possibilities. While our intent here is not to reify this interactional process by arguing that the collective as a whole theorizes independent of its individuals, it is nonetheless true that interaction (and the associated aggregation of ideas) can importantly facilitate the entrepreneurial process of theorizing. Furthermore, the collective process is also necessary as a shared belief inherently must emerge for collective action to be taken (Simon, 1964). In other words, divergent beliefs may need to 'be compromised because others [have] different values and no social action is possible at all without some element of cooperation and, in particular, agreement' (Arrow, 1974: 27). Thus, *both* the creation *and* the pursuit of new entrepreneurial opportunities generally require collective action.

Social interaction and reason and justification. Beliefs about entrepreneurial opportunities and possibilities are also often reasoned and justified in collective settings. The process of interaction permits a

[11] The collective process of the imagination of possibilities might be thought of as the type of *generation and creation of alternatives* or *search for a course of action* to which Herbert Simon referred; specifically a collective process through which 'possible courses of action [are] discovered, designed, or synthesized' (1964: 7). That is, individuals jointly generate and voice disparate alternatives and potential courses of action that a nascent collective might engage in. Imagination, again, provides the underlying engine and human capability through which this activity occurs, coupled with aggregated experiences and observations. Individuals then voice their conceptualizations of what the environment might look like, or to return to the landscape metaphor, what various peaks might look like. The nascent organization, then, jointly considers various alternatives about what might be pursued.

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collective determination of what the nascent organization should pursue. Collective reasoning and justification is at the heart of the entrepreneurial theorizing process. Through collective reasoning, disparate ideas and possibilities are reconciled until, ideally, a shared belief and understanding emerge. Very often it is simply not feasible for nascent organizations to pursue multiple courses of action (cf. Simon, 1964). As noted by Katz and Lazarsfeld, 'if individuals cannot agree on *what should come next*, they cannot take collective action' (1955: 62). The process of reasoning and justification, then, allows for imagined ideas to be more fully vetted in a collective context. Entrepreneurs and other participants may need to, in essence, *sell* their beliefs and ideas to others in an effort to ensure that a shared collective belief emerges. The process of reasoning and justification then moves ideas from the realm of conjecture and possibility to increasing certainty of belief and intent about what a nascent organization might actually do (see Figure 1).

Reasoning and justification, of course, do not guarantee that the best possibilities are selected. That is, given the rather radical uncertainties associated with nascent entrepreneurial activity, entrepreneurs often are wrong. Nevertheless, the collective process of winnowing ideas and theories occurs through social interaction as ideas are collectively argued, vetted, defended, and reconciled—and much-needed consensus is sought. This process of reasoning and justification is also particularly central to firms seeking to garner support and resources from external stakeholders (cf. Pfeffer and Salancik, 1978). In short, social interaction capitalizes on the collective reasoning capacities and common judgment of many individuals, with each offering their opinions, insights, and observations about particular entrepreneurial opportunities to pursue.

To briefly return to our landscape analogy, the social interaction of individuals in collective theorizing and imagining possibilities ideally leads to a more refined and precise theory about the formation of entrepreneurial landscapes (cf. Hsieh, Nickerson, and Zenger, 2007). The theorizing process itself then guides early exploration (or put differently, creation or building) of this landscape. The actual trials, which now can scarcely be regarded as random trial-and-error (cf. Hartmann, 1933), are preceded by collective thought experimentation about what is likely to happen and why. Entrepreneurial theorizing then is a process of collective what if-type questioning about potential actions and their associated outcomes, introducing various competing predictions and eventually jointly converging to the most reasonable and best justified course of action.

Of course, groups of individuals are by no means a panacea in generating entrepreneurial theories that lead to the best of all possible actions and strategies. Not all interactional collective processes are superior to individual-level reasoning and action, and groups often get things wrong (see e.g., Stroebe, Diehl, and Abakoukim, 1992; cf. Sugden, 2001). In fact, there may be collective productivity losses due to social loafing (Karau and Williams, 1993), deindividuation (Festinger *et al.*, 1952; Diener, 1979), evaluation apprehension (e.g., Diehl and Stroebe, 1987), or groupthink (Janis, 1972). Incentives, of course, also are an issue in team production (Olson, 1965). In all, any social interaction or team production, then, is highly sensitive to underlying incentives, outside options, and any number of interactional team processes. Furthermore, and importantly, the underlying composition of the team itself—in terms of its individuals (see Laughlin *et al.*, 1998)—is likely to affect what theoretical possibilities are generated, imagined, and eventually pursued. All that said, the central point here is that individuals, through joint theorizing, decide what action the nascent organization should take.

Self-selection

Despite our prior emphasis on social interaction and collective theorizing, individuals also naturally develop their own beliefs, theories, and judgments about future possibilities. Individuals certainly reason and justify (or question) for themselves the potential feasibility or value of a given entrepreneurial possibility, associated theory and strategy. This highlights our second social mechanism: individuals self-select both *into* and *out of* nascent entrepreneurial organizations. This type of individual-level *sorting* and self-selection, in part, determines the initial conditions of the organization (cf. Huber, 1991), that is *what* theories emerge from social interaction and *who* decides to pursue particular, theorized entrepreneurial possibilities. Importantly, self-selection or sorting essentially determines which entrepreneurial and novel strategies are actually tried and tested. While in the previous section we have highlighted the importance of social interaction in generating and winnowing down imagined, theoretical possibilities for action, we explicitly recognize that individuals also may have (or develop)

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their own (independent of their social context) anticipations and beliefs about the future. We also recognize that individuals may need to *buy into* the theorized entrepreneurial possibility before entrepreneurial action. We will first discuss self-selection *into* nascent entrepreneuring collectives, then self-selection *out of* collectives.

Self-selection *into* nascent organizations. Individuals self-select into or join others who imagine the future in a similar manner. In other words, entrepreneurs have or develop theories about possibilities and seek to align themselves with others who envision a similar theorized future, specifically where their theories and beliefs cohere with others. The role that *ex ante* individual values (beliefs, interests, and so forth) play in the emergence of collective outcomes has been persuasively shown by Schneider (1987). Thus, shared beliefs may not inherently result from social interaction and socialization, but rather individuals with certain types of values and beliefs may simply select interaction with others who share these beliefs. This type of self-similarity, or *homophily*, has been persuasively shown to drive various collective processes (see McPherson *et al.*, 2001). While social interaction, as we have discussed, plays an important role in the emergence of entrepreneurial theories, individuals themselves also have or develop their own beliefs, anticipations, expectations, hopes, dreams, interests, and desires about possible future states which drive their participation and contribution to collective efforts (cf. Elster, 1989; Hirschman, 1970).

In the case of entrepreneurship, individuals may have their own unique theories for entrepreneurial possibilities and novel strategies, and individuals then seek to align themselves (through participation and collective action) with those whose theories most closely match their own imagined theories and conceptualizations. The process of self-selection is similar to that observed in the nascent stages and emergence of social movements and collective action, specifically where individual-level interests, expectations, beliefs, dreams, and more general attraction, drive participation and contribution to a particular collective cause or purpose (Olson, 1965; cf. Hardin, 1982; Oliver, 1993). Additionally, one's sense of self—of who one is—and general identity may also play an important role in choosing and selecting to participate in nascent collective action, such as a social movement (cf. Polletta and Jasper, 2001).

The social mechanism of self-selection, however, does not necessarily require each individual to possess a theory and belief by which they determine alignment or coherence. It may simply be that individuals are attracted (Schneider, 1987) to others' beliefs and theories which they find particularly plausible, without ex ante having theorized their own conceptualizations or beliefs about an entrepreneurial possibility. An important element of attraction and self-selection to entrepreneurial theories is the inducement that it gives to contribute to a nascent organizational cause or purpose (March and Simon, 1958). Of course, an attraction to theories viewed as particularly plausible may also result from simple pecuniary motives. Individuals may simply view the pecuniary rewards from supporting more plausible collective beliefs and theories as larger than the rewards from supporting rather implausible ones (cf. Wu and Knott, 2006).

Self-selection *out* of nascent organizations. Self-selection *out of* nascent collectives intending to pursue a particular theorized possibility plays an central role in not only determining *who* eventually physically tests an entrepreneurial theory but also *which* entrepreneurial beliefs and theories actually are physically tested (given the need for collective effort). Once individuals through social interaction have theorized possibilities and winnowed them down to one they will physically try, individuals may self-select *out* if they disagree (see Hirschman's, 1970 related discussion of *exit* in organizations). That is, an individual may self-select out if their own conceptualization and associated reasoning, *even after* social interaction and theorizing, differs radically from the general consensus around what theorized entrepreneurial possibility should be experimented—why and how. Thus, social interaction does not necessarily result in agreement or theoretical coherence, as individuals may yet have their own theories and associated beliefs about which product to develop, what market to create, or how to specifically organize. Entrepreneurs may then self-select out of one nascent entrepreneuring organization to pursue a different theorized possibility, perhaps attracting their own supportive collective.

Importantly, self-selection out of organizations in effect arbitrates between which entrepreneurial activities are actually pursued and which are not. If a sufficiently large group of people is not convinced of the feasibility and promise of a particular strategy and course of action, the idea and its accompanying theory may go untested.

In sum, the end result of the process of social interaction and self-selection (both *into* and *out of*

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collectives) is that nascent entrepreneuring organizations are composed of collections of individuals who have jointly (or independently) imagined and created a shared belief and associated theory about a particular entrepreneurial action. The emerging entrepreneurial collective represents, in some significant part, a more homogeneous group of individuals who, in essence, have a belief or *buy into* a hypothesized theory about a future entrepreneurial possibility and jointly intend to pursue it (cf. Bratman, 1987; Tollefsen, 2002, 2006).[12] Our theoretical development explicitly stops short of discussing changes in beliefs that result from testing these entrepreneurial theories and thereby gaining environmental feedback and experience (see Figure 1). These learning mechanisms have, of course, been carefully explicated in behavioral and experiential models of organizational learning (Cyert and March, 1963; Greve, 2003).

DISCUSSION: CONTRIBUTIONS, OPPORTUNITIES, AND LIMITATIONS

Prior research on the origins of entrepreneurial beliefs, expectations, and associated strategies has focused on the role that experience, observation, and perception play in belief formation and the emergence of strategies. In this article we argue that these extant mechanisms are important but incomplete. Experiences and observations provide the underlying raw material or data for the generation of novel beliefs and associated strategies. But, experiences and observations themselves, particularly in uncertain environments, do not provide sufficient information and knowledge for the generation of new beliefs and novel strategies. Thus, through the process of theorizing and imagination, entrepreneurs can add vital *data* and insights about the possibility space beyond past experience. And, through reasoning and justification, these possibilities are further vetted in deciding which of them might be pursued by the nascent organization. Importantly, the process of entrepreneurial theorizing involves not just individual-level mechanisms, but we have also outlined the central role that social mechanisms, social interaction and self-selection, play in the formation of beliefs and the emergence of novel organizational strategies.

Our contribution also links to extant efforts to understand how organizations, somehow, are able to generate novel beliefs even with limited samples of experience. March and colleagues (1991) make the conjecture that imagination may provide a key mechanism of belief formation and learning for organizations with limited *samples* of experience and data. We have further developed this point by highlighting the role that imagination plays in the generation of novel possibilities, and we have more generally linked imagination with entrepreneurial theorizing. We have also linked extant experiential and observational mechanisms to our model by highlighting the role that experiences play in triggering entrepreneurial theorizing and belief formation (see Figure 1).

Importantly, our arguments shed light on emergence of beliefs at the early, nascent stages of organizations. Understanding what happens at the *birth* of an organization is critical, as early organizational beliefs and choices disproportionately affect the organization far into the future. As noted by Huber (1991: 91):

> 'What an organization knows at its birth will determine what it searches for, what it experiences, and how it interprets what it encounters. While there seems to be universal agreement [that this early] knowledge strongly influences future learning, many of the rich details of the matter are yet to be investigated.'

[12] Three brief caveats related to our assumptions about entrepreneurial theorizing and *social* dynamics need to be mentioned. *First*, our theory assumes that the features of the theorized entrepreneurial possibility itself will result in buy-in by others (based on reasoning and justification), without consideration for matters related to how the theorized possibility is *sold* or framed by a nascent entrepreneur (cf. Polletta and Jasper, 2001). Matters related to rhetoric and framing prove quite important here, as rhetoric and framing (or entrepreneurial stories; see Lounsbury and Glynn, 2001; cf. Emrich *et al.*, 2001) may persuade and influence others to join in, particularly where there is much uncertainty about the future. *Second*, an alternative way of linking individuals with collective intentions and beliefs, specifically compared to the mechanisms of social interaction and self-selection, may be through socialization. That is, perhaps individuals are socialized to see an entrepreneurial theory and associated possibility as attractive, independent of its real benefits, which may or may not be known and, thus, social interaction in the form of *social construction*' may play a very different type of role from how we have conceptualized it (Barnes and Bloor, 1982; Latour and Woolgar, 1986). *Third* and finally, we have, in part, assumed a rather frictionless world in terms of social interaction and self-selection and, thus, clearly, various additional social matters such as the entrepreneur's initial social network (e.g., Hite and Hesterly, 2001), or the initial founding conditions and logics of organizing (e.g., Baron *et al.*, 1999; Burton and Beckman, 2007; Stinchcombe, 1965) may play an important role in entrepreneurial theorizing, resultant learning, and nascent organizational activity. These matters remain outside the scope of our theory, though we hope that links are carefully made in future research.

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We believe that the early theorizing processes outlined in this article contribute to our understanding of organizational initial conditions (cf. Baron *et al.*, 1999), specifically as we have explicated the emergence of nascent organizational beliefs that shape the path-dependent future of the organization.

Finally, central to our contribution are the social dynamics associated with belief formation. Theories of strategy and organization often treat organizations as unitary actors, rather than collections of individuals (for an overview, see Gavetti *et al.*, 2007). We have also sought to contribute to the organizational literature by highlighting the critical emergent, social, and aggregational processes associated with entrepreneurial theorizing and novel strategy making. Our theory has emphasized how beliefs about potential entrepreneurial opportunities are often negotiated through a collective process that allows for the potential aggregation of individual observations, and social interaction and self-selection further shape the emergence of novel beliefs and strategies.

Opportunities for future research

There are a number of limitations to our arguments and theory, and each provides an opportunity for future research. First, matters of affect, emotion, and passion may play an important role in entrepreneurial belief formation, opportunity recognition, and creation (e.g., Baron, 2008), and thus also in the creation of opportunities and the entrepreneurial theorizing process explicated previously. We have largely focused on the rational and logical aspects of entrepreneurial theorizing. Clearly, however, the manner in which ideas and theories are presented and discussed has much to do with whether there is large-scale buy in by others. This provides a clear opportunity for future research. Second, the link between the individual and collective processes of theorizing deserves further consideration. Specifically, while we think that these entrepreneurial theorizing processes are, in some ways, mutually instantiated between the individual and collective levels, important questions remain. For example, the question of how fragmented, individual-level observations and experiences are aggregated is a critical one. Furthermore, it may be that matters of power and more general individual influence drive the emergence of a collective belief. Our theory implicitly assumes that all individuals somehow have equal *voice* in the entrepreneurial theorizing process. And, there are many questions about imagination and whether social interaction, indeed, facilitates ideation and other creative processes (Amabile, 1996). While some have suggested that there are significant benefits to this type of social interaction (Sutton and Hargadon, 1996), others have found highly negative effects (Stroebe *et al.*, 1992). Thus, a key question concerns what the contingencies of social interaction are and when social interaction leads to better or more accurate beliefs about opportunities.

Third, we have specifically focused on explaining how radical, new beliefs emerge, but we have not tackled the question of how these beliefs emerge in incumbent settings (and, in particular, why incumbents perhaps appear more myopic) (Levinthal and March, 1993). It may simply be that an organization's experience and history often leads to a *curse of knowledge* (Levitt and March, 1988). Experience may lead to rigid and myopic beliefs that theorizing cannot unsettle given the heavy reliance of incumbent organizations on their past experience. Organizations, after all, are heavily path dependent and this path dependence may somehow obviate and temper an organization's ability to engage in novel activities that create new entrepreneurial opportunities. Evidence of organizational innovation activity seems to support this argument, at least on the surface, specifically as new organizations are disproportionately more likely to create new products and markets (Rosenbloom and Christensen, 1994; Zenger, 1994).

Finally, our theoretical effort remains at a fairly high level of abstraction and, thus, questions about how theorizing (and the imagination of possibilities, etc.) might be measured and empirically tested provide an important opportunity for future research. We believe that a grounded approach provides the natural next step for these arguments. For example, the process of entrepreneurial theorizing can be readily observed and studied during critical organizational events, such as when a new organization is seeking venture funding. The social processes of entrepreneurial theorizing may be most salient when the nascent organization is *pitching* and selling its belief, strategy, and opportunity to other, vital, external constituents or stakeholders, such as venture capitalists or suppliers (cf. Zott and Amit, 2007). Nascent organizations specifically engage in these vital activities early during their formation, and studying this setting will likely surface many of the underlying processes suggested by our theory. For example, venture capitalists and other investors must evaluate radically new ideas and entrepreneurial

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theories that may have very limited support in terms of data, and limited corollaries with past experience and observation. Intuitively at least, our theory also provides a link between the nascent organization and these external stakeholders. In effect, entrepreneurs try to reason and justify their proposed course of action to external constituents and, thus, this theorizing process may be surfaced in these vital interactions. The nascent organization may then also theorize jointly with relevant external stakeholders and, thus, through broader social interaction with external constituents, justify and define an intended direction for the organization.

CONCLUSION

We argue that entrepreneurial theorizing provides an important antecedent for the emergence of entrepreneurial beliefs and novel strategies. Entrepreneurs theorize both individually and collectively—triggered by observational and experiential fragments—by imagining entrepreneurial possibilities for courses of future action, by reasoning and justifying possibilities, and by forming shared beliefs about possible futures and collective intentions to test or try their theories. The mechanisms of social interaction and self-selection play an important role in entrepreneurial theorizing, both in enabling and constraining nascent collective action. In other words, the mechanisms of social interaction and self-selection not only shape entrepreneurial ideas and theories themselves, but also, importantly, provide the boundaries for which entrepreneurial theories are tested (specifically given that the testing of entrepreneurial theories requires sufficient collective buy in). In all, we argue that entrepreneurial theorizing provides a key organizational initial condition that importantly shapes subsequent organizational experience, search and learning, and more generally, the path-dependent future of organizations.

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REFERENCES

Ahuja G, Lampert CM. 2001. Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal* **22**(6–7): 521–543.

Ajzen I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* **50**: 179–212.

Ajzen I, Fishbein M. 1980. *Understanding Attitudes and Predicting Social Behavior*. Prentice Hall: Englewood Cliffs, NJ.

Alvarez SA, Barney JB. 2007. Discovery and creation: alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal* **1**(1–2): 11–26.

Amabile TM. 1996. *Creativity in Context*. Westview Press: Boulder, CO.

Argote L. 1999. *Organizational Learning: Creating, Retaining and Transferring Knowledge*. Kluwer Academic Publishers: Boston, MA.

Arrow KJ. 1974. *The Limits of Organization*. W.W. Norton and Company: New York.

Bandura A. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice Hall: Englewood Cliffs, NJ.

Barnes B, Bloor D. 1982. Relativism, rationalism, and the sociology of knowledge. In *Rationality and Relativism*, Hollis M, Lukes S (eds). Basil Blackwell: Oxford, U.K.; 21–47.

Barney J. 1986. Strategic factors markets: expectations, luck and business strategy. *Management Science* **32**: 1504–1511.

Baron JN, Hannan MT, Burton MD. 1999. Building the iron cage: determinants of managerial intensity in the early years of organizations. *American Sociological Review* **64**: 527–549.

Baron RA. 2004. The cognitive perspective: a valuable tool for answering entrepreneurship's basic 'why' questions. *Journal of Business Venturing* **19**: 221–239.

Baron RA. 2008. The role of affect in the entrepreneurial process. *Academy of Management Review* **33**: 328–340.

DOI: 10.1002/sej

Baron RA, Ward TB. 2004. Expanding the entrepreneurial cognition's toolbox: potential contributions from the field of cognitive science. *Journal of Business Venturing* **28**: 553–573.

Baumol WJ. 2002. *The Free-market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. Princeton University Press: Princeton, NJ.

Bhide A. 2000. *The Origin and Evolution of New Businesses*. Oxford University Press: Oxford, U.K.

Block N. 1981. Psychologism and behaviorism. *Psychological Review* **90**: 5–43.

Boghossian P, Peacocke C. 2001. *New Essays on the A Priori*. Oxford University Press: Oxford, U.K.

Bonjour L. 1998. *In Defense of Pure Reason: A Rationalist Account of A Priori Justification*. Cambridge University Press: Cambridge, U.K.

Bower GH, Hilgard ER. 1981. *Theories of Learning*. Prentice Hall: Englewood Cliffs, NJ.

Bratman M. 1987. *Intention, Plans and Practical Reason*. Harvard University Press: Cambridge, MA.

Brown JR. 1991. *Laboratory of the Mind*. Routledge: Oxford, U.K

Brown JR. 2004. Peeking into Plato's heaven. *Philosophy of Science* **71**: 1126–1138.

Burton MD, Beckman CM. 2007. Leaving a legacy: position imprints, and successor turnover in young firms. *American Sociological Review* **72**: 239–266.

Byrne RM. 2005. *The Rational Imagination: How People Create Alternatives to Reality*. MIT Press: Cambridge, MA.

Campbell DT. 1974. Evolutionary epistemology. In *The Philosophy of Karl R. Popper*, Schilpp PA (ed). Open Court: LaSalle, IL; 412–463.

Carruthers P. 2002. Human creativity: its evolution, its cognitive basis, and its connections with childhood pretence. *British Journal for the Philosophy of Science* **53**: 225–249.

Casey ES. 1971. Imagination: imagining and the image. *Philosophical and Phenomological Research* **31**: 474–490.

Chomsky N. 1959. A review of B.F. Skinner's verbal behavior. *Language* **35**: 26–58.

Chomsky N. 1975. *Reflections on Language*. Pantheon: New York.

Chomsky N. 1986. *Knowledge of Language: Its Nature, Origin, and Use*. Greenwood Publishing Group: Santa Barbara, CA.

Chomsky N. 2003. *Cartesian Linguistics: A Chapter in the History of Rationalist Thought*. Cybereditions Corporation: Christchurch, New Zealand.

Cohen MD, March J, Olsen JP. 1972. A garbage can model of organizational choice. *Administrative Science Quarterly* **17**: 1–25.

Cohen W, Levinthal D. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35**: 128–152.

Corbett AC. 2005. Experiential learning within the process of opportunity identification and exploitation. *Entrepreneurship: Theory and Practice* **29**: 473–491.

Crowder RG. 1976. *Principles of Learning and Memory*. Lawrence Erlbaum: Hillsdale, NJ.

Currie G, Ravenscroft I. 2003. *Recreative Mind: Imagination in Philosophy and Psychology*. Oxford University Press: Oxford, U.K.

Cyert RM, March JG. 1963. *A Behavioral Theory of the Firm*. Prentice Hall: Englewood Cliffs, NJ.

Davidson D. 1963. Actions, reasons, and causes. *Journal of Philosophy* **60**: 685–700.

Denrell J. 2003. Vicarious learning, undersampling of failure, and the myths of management. *Organization Science* **14**: 227–243.

Denrell J, March J. 2001. Adaptation as information restriction: the hot stove effect. *Organization Science* **12**: 523–538.

Diehl M, Stroebe W. 1987. Productivity loss in brainstorming groups: toward the solution of a riddle. *Journal of Personality and Social Psychology* **53**: 497–509.

Diener SC. 1979. Deindividuation, self-awareness, and disinhibition. *Journal of Personality and Social Psychology* **37**: 1160–1171.

Dierickx I, Cool K. 1989. Asset stock accumulation and the sustainability of competitive advantage. *Management Science* **35**: 1504–1511.

Elster J. 1989. *Nuts and Bolts for the Social Sciences*. Cambridge University Press: Cambridge, U.K.

Emrich CG, Brower HH, Feldman JM, Garland H. 2001. Images in words: presidential rhetoric, charisma, and greatness. *Administrative Science Quarterly* **46**: 527–557.

Fang C. 2003. Learning in the absence of feedback: an experimental study. Wharton Working Paper Series, The Wharton School, Philadelphia, PA.

Festinger L, Pepitone A, Newcomb T. 1952. Some consequences of deindividuation in a group. *Journal of Abnormal and Social Psychology* **47**: 382–389.

Fiol CM, Lyles MA. 1985. Organizational learning. *Academy of Management Journal* **10**: 803–813.

Fleming L, Sorenson O. 2004. Science as a map in technological search. *Strategic Management Journal* **25**(8–9): 909–928.

Fodor J. 1991. The dogma that didn't bark (a fragment of naturalized epistemology). *Mind* **100**: 201–220.

Folger R, Turillo CJ. 1999. Theorizing as the thickness of thin abstraction. *Academy of Management Review* **24**: 742–758.

Foss K, Foss NJ, Klein PG. 2007. Original and derived judgment: an entrepreneurial theory of economic organization. *Organization Studies* **28**: 1893–1912.

Foss NJ. 2007. Strategic belief management. *Strategic Organization* **5**: 249–258.

Gaglio C. 2004. The role of mental simulations and counterfactual thinking in the opportunity identification

process. *Entrepreneurship Theory and Practice* **28**: 533–552.

Gaglio C, Katz J. 2001. The psychological basis of opportunity identification: entrepreneurial alertness. *Small Business Economics* **16**: 95–111.

Gavetti G, Levinthal D. 2000. Looking forward and looking backward: cognitive and experimental search. *Administrative Science Quarterly* **45**: 113–137.

Gavetti G, Levinthal D, Ocasio W. 2007. Neo-Carnegie: the school's past, present, and reconstructing for the future. *Organization Science* **18**: 523–536.

Gavetti G, Levinthal D, Rivkin J. 2005. Strategy making in novel and complex worlds: the power of analogy. *Strategic Management Journal* **26**(8): 691–712.

Gendler TS. 2004. Thought experiments rethought—and perceived. *Philosophy of Science* **71**: 1152–1164.

Gigerenzer G, Goldstein DG. 1996. Reasoning the fast and frugal way: models of bounded rationality. *Psychological Review* **103**: 650–669.

Gilbert M. 2006. Rationality in collective action. *Philosophy of Social Science* **36**: 3–17.

Goldman A. 1994. Psychological, social, and epistemic factors in the theory of science. *Philosophy of Science* **2**: 277–286.

Goldman A. 1999. *Knowledge in a Social World*. Oxford University Press: Oxford, U.K.

Gopnik A. 1996. The scientist as child. *Philosophy of Science* **63**: 485–514.

Gopnik A, Meltzoff A. 1997. *Words, Thoughts, and Theories*. MIT Press: Boston, MA.

Gopnik A, Schulz L. 2004. Mechanisms of theory formation in young children. *Trends in Cognitive Science* **8**: 371–377.

Gopnik A, Wellman H. 1992. Why the child's theory of mind really is a theory. *Mind and Language* **7**: 145–171.

Grandori A. 1984. A prescriptive contingency view of organizational decision making. *Administrative Science Quarterly* **29**: 192–208.

Grandori A. 2005. From bounded to epistemic rationality: toward a theory of rational discovery. Working Paper, Conference on the Microfoundations of Organizational Capabilities and Knowledge Processes, Copenhagen Business School, Copenhagen, Denmark.

Greve HR. 2003. *Organizational Learning From Performance Feedback: A Behavioral Perspective on Innovation and Change*. Cambridge University Press: Cambridge, U.K.

Haber RN. 1970. Imagine! They are finally talking about images again. *Contemporary Psychology* **15**: 556–559.

Hardin R. 1982. *Collective Action*. Johns Hopkins University Press: Baltimore, MD.

Hargadon A, Bechky B. 2006. When collections of creatives become creative collectives: a field study of problem solving at work. *Organization Science* **17**: 484–500.

Harris PL. 2000. *The Work of the Imagination*. Blackwell: Oxford, U.K.

Hartmann GW. 1933. Insight vs. trial and error in the solution of problems. *American Journal of Psychology* **84**: 377–386.

Hayek F. 1945. The use of knowledge in society. *The American Economic Review* **35**: 519–530.

Hirschman A. 1970. *Exit, Voice, and Loyalty*. Harvard University Press: Cambridge, MA.

Hite JM, Hesterly WS. 2001. The evolution of firm networks: from emergence to early growth of the firm. *Strategic Management Journal* **22**(3): 275–286.

Horgan T, Woodward J. 1985. Folk psychology is here to stay. *Philosophical Review* **94**: 197–226.

Hsieh C, Nickerson JA, Zenger TR. 2007. Opportunity discovery, problem solving, and the entrepreneurial theory of the firm. *Journal of Management Studies* **44**: 1255–1277.

Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**: 88–115.

Ireland RD, Hitt MA, Sirmon DG. 2003. A model of strategic entrepreneurship: the construct and its dimensions. *Journal of Management* **29**: 963–989.

Janis I. 1972. *Victims of Group Think*. Houghton Mifflin: Boston, MA.

Kaplan A. 1964. *The Conduct of Inquiry: Methodology for Behavioral Science*. Chandler: San Francisco, CA.

Karau S, Williams K. 1993. Social loafing: a meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology* **65**: 681–706.

Katz E, Lazarsfeld PF. 1955. *Personal Influence: The Part Played by People in the Flow of Mass Communications*. Transaction Publishers: Piscataway, NJ.

Kiesler S, Sproull L. 1982. Managerial response to changing environments: perspectives on problem sensing from social cognition. *Administrative Science Quarterly* **27**: 548–570.

Kirzner I. 1985. *Discovery and the Capitalist Process*. University of Chicago Press: Chicago, IL.

Kitcher P. 1994. Contrasting conceptions of social epistemology. In *Socializing Epistemology: The Social Dimensions of Knowledge*, Schmitt FF (ed). Rowman and Littlefield: Lanham, MD; 111–134.

Kolb DA. 1984. *Experiential Learning: Experience as the Source of Learning and Development*. Prentice Hall: Englewood Cliffs, NJ.

Kosslyn S. 1980. *Image and Mind*. Harvard University Press: Cambridge, MA.

Krueger JI, Funder DC. 2004. Towards a balanced social psychology: causes, consequences, and cures for the problem-seeking approach to social behavior and cognition. *Behavioral and Brain Sciences* **27**: 313–327.

Krueger NF. 2003. Thinking entrepreneurially: entrepreneurial cognition. In *The International Handbook of*

DOI: 10.1002/sej

Entrepreneurship Research, Acs ZJ, Audtresch DB (eds). Kluwer Academic: Dordrecht, The Netherlands.

Lakatos I. 1973. Science and pseudoscience. Open university lecture, The London School of Economics and Political Science. Available at: http://www.lse.ac.uk/collections/lakatos/scienceAndPseudoscience.htm (accessed 20 May 2006).

Latour B, Woolgar S. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton University Press: Princeton, NJ.

Laughlin P, Bonner B, Altermatt T. 1998. Collective versus individual induction with single versus multiple hypotheses. *Journal of Personality and Social Psychology* **75**: 1481–1489.

Leslie AM. 1987. Pretence and representation: the origins of 'theory of mind.' *Psychological Review* **94**: 412–426.

Levinthal DA, March JG. 1993. The myopia of learning. *Strategic Management Journal* **14**(S2): 95–112.

Levitt B, March J. 1988. Organizational learning. *Annual Review of Sociology* **14**: 319–340.

Lewis D. 1973. *Counterfactuals*. Harvard University Press: Cambridge, MA.

Lewis D. 1986. *On the Plurality of Worlds*. Basil Blackwell: New York.

Lindsay PH, Norman DA. 1977. *Human Information Processing*. Academic Press: Ann Arbor, MI.

Lounsbury M, Glynn MA. 2001. Cultural entrepreneurship: stories, legitimacy, and the acquisition of resources. *Strategic Management Journal* **22**(6–7): 545–564.

Makadok R. 2001. Toward a synthesis of the resource-based and dynamic-capabilities views of rent creation. *Strategic Management Journal* **22**: 387–401.

March J, Simon H. 1958. *Organizations*. Wiley: New York.

March JG. 1991. Exploration and exploitation in organizational learning. *Organization Science* **2**: 71–87.

March JG, Sproull LS, Tamuz M. 1991. Learning from samples of one or fewer. *Organization Science* **2**: 1–13.

McKenzie CRM. 2003. Rational models as theories—not standards—of behavior. *Trends in Cognitive Sciences* **7**: 403–406.

McKenzie CRM. 2005. Judgment and decision making. In *Handbook of Cognition*, Lamberts K, Goldstone RL (eds). Sage: New York; 321–363.

McMullen JS, Shepherd D. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review* **31**: 132–152.

McPherson M, Smith-Lovin L, Cook JM. 2001. Birds of a feather: homophily in social networks. *Annual Review of Sociology* **27**: 415–444.

Mitchell RK, Busenitz L, Bird B, Gaglio CM, McMullen J, Morse E, Smith B. 2007. The central question in entrepreneurial cognition research. *Entrepreneurship Theory and Practice* **31**: 1–27.

Morgeson FP, Hofmann DA. 1999. The structure and function of collective constructs: implications for multilevel research and theory development. *Academy of Management Review* **24**: 249–265.

Morris MW, Moore PC. 2000. The lessons we (don't) learn: counterfactual thinking and organizational accountability after a close call. *Administrative Science Quarterly* **45**: 737–765.

Nagel E. 1961. *The Structure of Science: Problems in the Logic of Scientific Explanation*. Harcourt, Brace and World: New York.

Neisser U. 1976. *Cognition and Reality: Principles and Implications of Cognitive Psychology*. Freeman Publishing: San Francisco, CA.

Nelson R, Winter S. 1982. *An Evolutionary Theory of Economic Change*. Harvard University Press: Cambridge, MA.

Nickerson JA, Zenger TR. 2004. A knowledge-based theory of the firm: the problem-solving perspective. *Organization Science* **15**: 617–622.

Niiniluoto I. 1999. Defending abduction. *Philosophy of Science* **66**: 436–451.

Oliver PE. 1993. Formal models of collective action. *Annual Review of Sociology* **19**: 271–300.

Olson M. 1965. *Logic of Collective Action*. Cambridge University Press: Cambridge, U.K.

Paavola S. 2004. Abduction as a logic of discovery: the importance of strategies. *Foundations of Science* **9**: 267–283.

Paulus PB, Yang HC. 2000. Idea generation in groups: a basis for creativity in organizations. *Organization Behavior and Human Decision Processes* **82**: 76–87.

Peirce CS. 1957. The logic of abduction. In *Peirce's Essays in the Philosophy of Science*, Thomas V (ed). Liberal Arts Press: New York; 195–205**.**

Pfeffer J, Salancik GR. 1978. *The External Control of Organizations*. Stanford University Press: Palo Alto, CA.

Polletta F, Jasper J. 2001. Collective identity and social movements. *Annual Review of Sociology* **27**: 285–305.

Rescher N. 1976. Peirce and the economy of research. *Philosophy of Science* **43**: 71–98.

Rescher N. 2005. *What if?: Thought Experimentation in Philosophy*. Transaction Publishers: New Brunswick, NJ.

Rietzchel E, Nijstad B, Stroebe W. 2006. Productivity is not enough: a comparison of interactive and nominal brainstorming groups on idea generation and selection. *Journal of Experimental Social Psychology* **42**: 244–251.

Rivkin J. 2000. Imitation of complex strategies. *Management Science* **46**: 824–844.

Rosenberg A. 1995. *The Philosophy of Social Science*. Westview Press: Boulder, CO.

Rosenbloom RS, Christensen CM. 1994. Technological discontinuities, organizational capabilities, and strategic

commitments. *Industrial and Corporate Change* **3**: 655–685.

Rosenkopf L, Nerkar A. 2001. Beyond local search: boundary-spanning, exploration, and impact in the optical disc industry. *Strategic Management Journal* **22**(4): 287–306.

Ryle G. 1949. *The Concept of Mind*. University of Chicago Press: Chicago, IL.

Schneider B. 1987. The people make the place. *Personnel Psychology* **40**: 437–453.

Schwartz B. 1978. *Psychology of Learning and Behavior*. W.W. Norton and Company: New York.

Seddon G. 1972. Logical possibility. *Mind* **81**: 481–494.

Shackle GL. 1979. *Imagination and the Nature of Choice*. Edinburgh University Press: Edinburgh, Scotland.

Shane S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science* **11**: 448–469.

Shane S. 2003. *A General Theory of Entrepreneurship: The Individual-opportunity Nexus*. Edward Elgar: Northampton, MA.

Shane S, Venkataraman S. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* **25**: 217–226.

Shepard R, Cooper L. 1982. *Mental Images and Their Transformations*. MIT Press: Cambridge, MA.

Shepherd DA, McMullen JS, Jennings PD. 2007. The formation of opportunity beliefs: overcoming ignorance and reducing doubt. *Strategic Entrepreneurship Journal* **1**(1–2): 75–95.

Simon HA. 1964. On the concept of organizational goal. *Administrative Science Quarterly* **9**: 1–22.

Simon HA. 1979. Rational decision making in business organizations. *American Economic Review* **69**: 493–513.

Skinner B. 1989. The origins of cognitive thought. *American Psychologist* **44**: 13–18.

Smith KG, DiGregorio. 2002. Bisociation, discovery, and the role of entrepreneurial action. In *Strategic Entrepreneurship*, Hitt MA, Ireland RD, Camp SM, Sexton DL (eds). Wiley-Blackwell: Hoboken, NJ; 129–150.

Spelke ES, Breinlinger K, Macomber J, Jacobson K. 1992. Origins of knowledge. *Psychological Review* **99**: 605–632.

Stich S, Ravenscroft I. 1994. What is folk psychology? *Cognition* **50**: 447–468.

Stinchcombe A. 1965. Social structure and organizations. In *Handbook of Organizations*, March J (ed). Rand McNally: Chicago, IL; 142–193.

Stroebe W, Diehl M, Abakoumkin G. 1992. The illusion of group effectivity. *Personality and Social Psychology Bulletin* **18**: 643–650.

Sugden R. 2001. The logic of team reasoning. *Philosophical Explorations* **6**: 161–185.

Sutton RI, Hargadon A. 1996. Brainstorming groups in context: effectiveness in a product design firm. *Administrative Science Quarterly* **41**: 685–718.

Taylor DW, Berry PC, Block CH. 1958. Does group participation when using brainstorming facilitate or inhibit creative thinking? *Administrative Science Quarterly* **3**: 23–47.

Thomas NJT. 1999. Are theories of imagery theories of imagination? *Cognitive Science* **23**: 207–245.

Tollefsen C. 2006. Reasons for action and reasons for belief. *Social Epistemology* **20**: 55–65.

Tollefsen DP. 2002. Collective intentionality and the social sciences. *Philosophy of Social Science* **32**: 25–50.

Walsh JP. 1995. Managerial and organizational cognition: notes from a trip down memory lane. *Organization Science* **6**: 280–321.

Walsh JP, Ungson GR. 1991. Organizational memory. *Academy of Management* **16**: 57–91.

Weick KE. 1989. Theory construction as disciplined imagination. *The Academy of Management Review* **14**: 516–531.

West P. 2007. Collective cognition: when entrepreneurial teams, not individuals, make decisions. *Entrepreneurship Theory and Practice* **31**: 77–102.

Westfall RS. 1983. *Never at Rest: The Biography of Isaac Newton*. Cambridge University Press: Cambridge, U.K.

Whetten DA. 1989. What constitutes a theoretical contribution? *Academy of Management Review* **14**: 490–495.

Whetten DA, Felin T, King BG. 2009. Theory-borrowing in organizational studies: issues and future directions. *Journal of Management* **35**: 537–563.

Williamson OE. 2007. Corporate boards of directors: in principle and in practice. *Journal of Law, Economics, and Organization* **24**: 247–272.

Wu B, Knott AM. 2006. Entrepreneurial risk and market entry. *Management Science* **52**: 1315–1330.

Yablo S. 1993. Is conceivability a guide to possibility? *Philosophy and Phenomological Research* **53**: 1–42.

Zenger T. 1994. Explaining organizational diseconomies of scale in R&D: the allocation of engineering talent, ideas, and effort by firm size. *Management Science* **40**: 708–729.

Zhu J. 2004. Understanding volition. *Philosophical Psychology* **17**: 247–273.

Zollo M, Winter SG. 2002. Deliberate learning and the evolution of organizational capabilities. *Organization Science* **13**: 339–352.

Zott C, Amit R. 2007. Business model design and the performance of entrepreneurial firms. *Organization Science* **18**: 181–199.

DOI: 10.1002/sej