FROM FAILURE TO SUCCESS: ADDRESSING TENSION WITHIN THE KNOWLEDGE CREATION PROCESS OF SMALL- AND MEDIUM-SIZED ENTERPRISES

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DEBATING POINTS

1. With regard to learning, is linking organizational and individual level of relevance for SMEs or does linking just add confusion?

2. According to your understanding of learning, do the acquisition of experience and transformation of experience assume a sequential order or do they happen simultaneously? If you believe that they happen in a simultaneous process, how to articulate it in a way that is clear to the audience?

3. What other factors influence the entrepreneur's learning in the face of failure? Which of these factors fit into the storyline of the present article and which of them could be influenced by entrepreneurship training, education, and policies?

INTRODUCTION

The tension between failure and success is perhaps the most fundamental tension within the field of entrepreneurship. Despite a universal aspiration for success, failure is a built-in component of entrepreneurship due to the heightened uncertainty and risk involved in entrepreneurial endeavors (Lubatkin & Chatterjee, 1994; McGrath, 1999; Venkataraman, 1997). Indeed, the entrepreneurial journey is "riddled with interrupted plans, unexpected obstacles, conflicting goals, and unattainable aspirations" (Morris, Kuratko, Schindehutte, & Spivack, 2012, p. 21). Successful entrepreneurs, however, consider their failure a valuable source of knowledge (Holcomb, Ireland, Holmes, & Hitt, 2009). For these reasons, pioneering entrepreneurship scholars have called for more research that explores failure as the onset of a learning journey to success for entrepreneurs (Cardon & McGrath, 1999; Cope, 2005; McGrath, 1999).

Failure is a stressful and sometimes devastating event in the entrepreneurial process (Cope, 2005; Shepherd, 2003). Because of the bitter nature of failure, scholarly investigations of how individuals accumulate knowledge by making mistakes, failing, and learning from their mistakes and failures have been scarce in the field of entrepreneurship. A substantial amount of work has mounted around such themes as the causes of failure and means to avoid it (Carter, Williams, & Reynolds, 1997; Gaskill, Van Auken, & Manning, 1993; Reynolds, 1987; Romanelli, 1989; Zacharakis, Meyer, & DeCastro, 1999), but the fundamentally negative view of failure has led to a pervasive bias in entrepreneurship research and practice (McGrath, 1999). As a result, the learning opportunity failure provides for organizations as well as individuals has been long understudied (Cannon & Edmondson, 2001).

It has been established that entrepreneurial knowledge is instrumental in at least two domains crucial to venture success: entrepreneurial opportunities and coping with liabilities of newness (Markman, 2007; Politis, 2005). Indeed, it is knowledge that "determines the entrepreneur's selection of the most appropriate course of action in any specific uncertain environment" (Minniti & Bygrave, 2001, p. 5). Existing research shows that prior knowledge not only facilitates the discovery and exploitation of opportunities (Ardichvili, Cardozo, & Rae, 2003; Cooper, Woo, & Dunkelberg, 1989; Shane, 2000; Shane & Venkataraman, 2000) but also helps entrepreneurs capitalize on opportunities by developing necessary skills as well as building networks and a strong business reputation (Shane & Khurana, 2003; Shepherd, Douglas, & Shanley, 2000). Equally important is the implication of knowledge in enabling entrepreneurs to overcome barriers so as to enter new markets, launch new products, or commercialize new technologies (Cohen & Levinthal, 1990).

In light of the linkage between knowledge and entrepreneurial success and the gaps in the entrepreneurial learning literature, we attempt to address the fundamental tension between failure and success from a learning perspective to explore the knowledge creation process within organizations. Building on March's (1991) organizational learning theory and Kolb's (1984) experiential learning theory (ELT), a holistic model of the learning process by which knowledge is created through the transformation of experience, we develop a theoretical framework to understand how and when entrepreneurial organizations and individuals learn from failure. We develop our propositions against the background of small- and medium-sized enterprises (SMEs), within which we expect the organizational and the individual levels to be intertwined. We

argue that failure experience could lead to knowledge creation and in turn contribute to the future success of SMEs. In delineating the knowledge creation process triggered by failure, we also aim to address the creative tension involved at the organizational level (exploration-exploitation) as well as that at the individual level (cognition-emotion) in the context of SMEs. Our understanding of SMEs is a qualitative one: We have organizations in mind that are characterized by flat hierarchies, informal institutions, and personal relationships. Regarding organizational structure, we limit our propositions to those organizations with only one main hierarchical level: the entrepreneur (usually an owner-manager) at the top management level and employees at the operative level.

In the following text we first introduce the theoretical and empirical grounding to establish failure as a potential source of entrepreneurial knowledge. Applying March's (1991) organizational learning theory in the SME context, we highlight failure as a trigger for the exploration strategy and the critical the role of entrepreneurs in promoting exploration. Next, we seek to disentangle the concepts of experience and knowledge and further examine the knowledge creation process within individuals. For us, the entrepreneur's learning from failure is a dynamic process, in which failure experience is acquired, transformed, and distilled into entrepreneurial knowledge. Guided by affective event theory (AET), a framework that integrates cognition and emotion to explain individual reactions to events in a work environment (Weiss & Cropanzano, 1996), we integrate the role of emotional intelligence (EI) and learning goal orientation into the model. We conclude with a discussion of theoretical and practical implications.

THEORETICAL FRAMEWORK

Failure as a Source of Knowledge

Failure has been viewed as instrumental to knowledge creation by numerous organizational researchers and psychologists. The notion of "knowledge" varies across the level of analysis. At the organizational level, knowledge refers to the extent that reality is correctly represented by the system's *code*—the routines, procedures, rules, and norms of an organization (March, 1991). We define knowledge at the individual level as the extent that reality is correctly represented by the entrepreneurs' hypotheses of themselves, their origination, and the market within which their organizations operate. Although defined differently, knowledge at the organizational level can be traced back to individual-level behaviors: The organization learns from individual-level action because "without action there is no insight" (Gartner, Carter, & Hills, 2003, p. 144). In other words, organizational knowledge is influenced by individual knowledge, and at the same time an organization's knowledge also shapes the knowledge of its members via processes of socialization (Bandura, 1977; March, 1991; Schein, 1983, 1985).

A vast body of research at the organizational level has informed us that failure is central to organizational change and adaptation (Baum & Dahlin, 2007; Chuang & Baum, 2003; Madsen & Desai, 2010). Failure, in the organizational learning literature, is defined as performance that is significantly below aspiration level (Baum & Dahlin, 2007; Cannon & Edmondson, 2001; Chuang & Baum, 2003; Cyert & March, 1963; March & Simon, 1958). According to the aspiration level and performance feedback model (Baum & Dahlin, 2007; Cyert & March, 1963; March, 1991), failure upsets the status quo, draws attention to potential problems, and stimulates exploration of new practices and strategies

rather than reinforcing or refining current ones (Baum & Dahlin, 2007; Chuang & Baum, 2003).

The notion that failures are "vital engines for change" (Chuang & Baum, 2003, p. 27) has received substantial empirical support. For instance, Chuang and Baum (2003) found that failure of a specific naming strategy decreased nursing home chains' use of the current strategy and increased the use of a different naming strategy, indicating exploration and learning. Another example comes from Baum and Dahlin's (2007) research on the railroad industry. Data on the accident rates from 1975 to 2001 showed that railroads performing far below social accident aspirations in the prior year exhibited lower accident costs in the following year, confirming the idea that when a railroad's performance was unsatisfactory, the organization was forced to implement more extensive changes so as to improve its accident prevention (Baum & Dahlin, 2007). Similarly, Haunschild and Rhee (2004) analyzed the data on automaker recalls in the United States between 1966 and 1999 and found that prior recall history (both voluntary and involuntary) reduced automakers' future errors.

Organizations learn not only from their own experiences, but also from the observation of others' failure (Baum & Dahlin, 2007; Kim & Miner, 2007; Madsen & Desai, 2010). Experience held by organizations in a common domain could produce reactions that are similar to direct failures (Madsen & Desai, 2010). Failure experiences of other organizations have been shown to negatively correlate with the focal organization's failure in various industries, including the global orbital launches industry (Madsen & Desai, 2010), railroad industry (Baum & Dahlin, 2007), and commercial banking industry (Kim & Miner, 2007). Indeed, observational learning is vital for

creating organizational and system-level changes that benefit the focal organization. When exploration within the organization is costly, one should examine meaningful analogues, such as mistakes and failures of similar organizations (Weick, Sutcliffe, & Obstfeld; 1999). Building on this line of research, Baum and Dahlin (2007) claimed that organizations emphasize learning from their own experience (local search) when performance is near aspirations, and emphasize learning from others' lessons (nonlocal search) when performance deviates from aspirations, especially when it falls significantly below aspirations. This compelling empirical evidence leads us to propose the following:

Proposition 1: Failure is a potential source of knowledge for organizations.

At the individual level, failure represents a difficult yet valuable type of challenge that could be "an essential prerequisite for learning and adaptation" (Sitkin, 1992, p. 231). From a learning perspective, both minor mistakes and major mishaps could offer valuable lessons to entrepreneurs (e.g., Ellis & Davidi, 2005; Morris & Moore, 2000; Shepherd, 2003; Wong & Weiner, 1981). Consequently, in the present article, we follow Cannon and Edmondson (2001) in defining failure as an entrepreneurial initiative that deviates from the entrepreneur's expected and desired results. Based on this definition, failure encompasses a wide range of critical events within the entrepreneurial journey, such as failing to retain a key employee or being rejected by a venture capitalist. Our definition of failure includes but is not limited to bankruptcy or business closure.

Complementing the organizational learning literature reviewed above, McGrath (1999) articulated why failure could be informative for entrepreneurs. In planning entrepreneurial initiatives, individuals incorporate the equivalent of clearly articulated research hypotheses as assumptions. The repertoire of assumptions is then subject to

continuous assessment in the entrepreneurial process. In line with this logic, failure represents a form of disproval of certain assumptions. It thus contributes to entrepreneurial knowledge by eliminating false assumptions and providing information to modify current assumptions. The result is an updated repertoire of venture-related hypotheses that could be used to improve future entrepreneurial initiatives.

Echoing McGrath (1999), Ellis and Davidi (2005) argued that the creation of mental models starts with generating and then testing hypotheses. Individuals tend to generate new hypotheses and update their mental models when they encounter failure. Potential results of failure include an increase in the number of constructs representing objects or phenomena and an expansion in connections among constructs. In the entrepreneurial context, this expanded connection means the entrepreneur could uncover new means-ends relationships that lead to the discovery of lucrative opportunities (Shane & Venkataraman, 2000). To the extent that the complexity and extensiveness of their mental models reflect the depth and breadth of knowledge (Evans, 1988), failure contributes to entrepreneurs' knowledge as they discover new variables and recognize causal relationships between old and new constructs.

Using a different analogy, Minniti and Bygrave (2001) argued that failure creates a trigger for entrepreneurs to change and update their information system. According to these authors, entrepreneurs employ a learning algorithm determined by the outcomes of a sequence of choices among competing beliefs or actions. The entrepreneurs make some initial decisions based on an instinct or existing knowledge and wait for the consequences. If the results of certain decisions happen to bring positive outcomes, a behavioral pattern is reinforced. In other words, with bounded rationality, entrepreneurs

tend to repeat those choices that happen to reach certain expectations, regardless of their actual superiority. Only when the results are below expectations do they start a new search of options. This algorithm makes failure an important source of knowledge because it breaks a potentially dangerous path-dependency and introduces new information to entrepreneurs' decision-making. With these theoretical arguments, we contend that failure can contribute to entrepreneurs' venture-related knowledge.

Proposition 2: Failure is a potential source of knowledge for entrepreneurs.

Tension Between Exploration and Exploitation Within SMEs

Having established that failure is a potential source of knowledge; we proceed to investigate the knowledge creation process within SMEs specifically. Within the organizational learning literature, how SMEs learn and adapt has generated increasing scholarly interest over the last decade (Bierly & Daly, 2007). An extensive body of research has shown that learning leads to a competitive advantage for SMEs by facilitating fast adaptation of the business model (Fontes & Coombs, 1996), attracting venture capitalists (Busenitz, Fiet, & Moesel, 2004), exploring business opportunities at low cost (Ravasci & Turati, 2005), and accelerating the growth strategy (Watts, Cope, & Hulme, 1998). In short, learning is viewed as a management approach to underpin sustainable development in SMEs (Wyer, Mason, & Theodorakopoulos, 2000). While existing studies have established a link between learning and superior performance for SMEs (e.g., Chaston, Badger, & Sadler-Smith, 1999), they shed limited light on how the

decision to learn is made at the strategic level and, further, how the knowledge strategy is carried out at the operative level. This limitation might be due to the fact that the current literature does not intertwine the individual and organizational levels for SMEs. We deem that approach promising, because SMEs usually have neither a developed hierarchy nor slack resources and therefore mainly rely on the top management's abilities to handle complexity (Lubatkin et al., 2005).

For SMEs, knowledge is stored in the organization's formal and informal institutions (i.e., the rules, routines, norms, and beliefs of the organization) as well as the organizational members' minds (i.e., the knowledge of the entrepreneurs and their employees). Put differently, organizational and individual knowledge interact in SMEs. To begin with, the founder sets the culture and fundamental values for an organization (Schein, 1983, 1985). Next, in the process of managing an SME, the entrepreneur typically influences the organization's routines, procedures, rules, and norms by his or her entrepreneurial initiatives (March & Simon, 1958; Hambrick & Manson, 1984). These entrepreneurial initiatives involve behaviors like employing novel combinations of resources for exploring opportunities to create future goods or services and/or developing innovative approaches to further exploit these opportunities (Shane & Venkataraman, 2000; Schumpeter, 1934; Smith & Di Gregorio, 2002). One could imagine that for entrepreneurial SMEs, the tension between exploration and exploitation is constantly present in the organization's learning process.

According to March (1991), the organization's adaptation process involves two distinct methods of searching for alternatives: exploration and exploitation. Exploration refers to actions related to experimentation, variation, flexibility, risk taking, and

innovation. Exploitation, by contrast, encompasses strategies concerning selection, refinement, execution, and efficiency. In the entrepreneurial context, the essence of exploitation is the refinement of existing business models, products, or services, whereas the core of exploration is experimentation in order to explore new business opportunities (Holland, 1975).

Compared to the exploration strategy, exploitation produces more predictable, proximal results (March, 1991). For instance, the search for new distribution channels and funding resources can be costly in the short term and highly uncertain. Systems that rely only on exploration are likely to suffer from the high costs of opportunity recognition and lack of benefits of exploiting old certainties (March, 1991). However, exploration creates the variance critical for long-term success. Empirical evidence shows that there is a concave relationship between exploitation and performance, indicating that exploitation leads to reduced returns at a future point in time (Bierly & Daly, 2007). An organization excels when it is "ambidextrous" (Tushman & O'Reilly, 1996). Rather than being dominated by either exploration or exploitation, an ambidextrous organization possesses skills and competencies as well as the subcultures to support each approach.

While both exploration and exploitation strategies are indispensable for success, they compete for the organization's limited resources. An extensive body of research has considered the allocation of resources for exploitation and exploration in general (e.g., Bierly & Chakrabarti, 1996; Zack, 1999; March, 1991; Levinthal & March, 1993). However, SMEs are typically more resource constrained and have less slack resources than large firms (Bierly & Daly, 2007; Harrison & Leitch, 2005; Ravasi & Turati, 2005; Sadler-Smith, Spicer, & Chaston, 2001). As a result, SMEs face greater challenges in

developing a knowledge resource base to manage the potential tensions and tradeoffs associated with exploration and exploitation. Such a challenge is further intensified by an organization's path-dependency: Once an organization has created a competence in either exploration or exploitation, it is usually more efficient for the organization to continue on that path (Levinthal & March, 1993).

Failure contributes to the organizational knowledge of SMEs by triggering an exploration strategy. Outcomes are considered either successes or failures based on the organization's aspirations (March & Simon, 1958), and the adaptation strategy is determined by benchmarking performance to the aspiration level (Cyert & March, 1963; March & Shapira, 1992). Specifically, performance that runs distant from the aspiration level triggers an exploration strategy, which results in nonlocal search and larger changes with the potential to raise the organization's performance closer to aspirations (Singh, 1986). Moreover, performance that is well below the aspiration level imposes increased urgency for the organization to explore new alternatives (Baum & Dahlin, 2007). Hence, failure is the key to triggering the more effective yet normally less preferred strategy, exploration.

> *Proposition 3: Failure contributes to a more balanced knowledge strategy of SMEs by triggering an exploration strategy.*

The decision of whether to allocate resources for exploitation or exploration is further influenced by the tradeoffs between short-term and long-term orientation as well as between individual- versus organizational-level benefit (March, 1991). For instance, from

the individual perspective, it might be beneficial for a salesperson to focus on exploiting existing contacts in the short run, although the organization's success depends on exploring new business opportunities in the long run. As a result, the entrepreneurs and their employees have different tendencies towards exploration or exploitation. Since an exploration strategy benefits the firm in the long run (Bierly & Daly, 2007; March, 1991), the entrepreneur has stronger incentives and more flexibility to broaden his or her own knowledge via exploration. In contrast, under a typical organizational incentive design, employees are motivated by short-term payoffs and tend to deepen their personal knowledge by an exploitation strategy. Additionally, when an employee engages in exploration on behalf of the organization, he or she has to bear personal risks when it does not work out while having to share the benefits with the organization when it pays off. The entrepreneur, on the other hand, has relatively symmetrical risks and benefits from exploration and thus is more prone to exercise exploration.

In the specific case of SMEs that are staffed only with strategic and operative roles, the top management stays the closest to the changes in customer demand and is sensitive to the need for exploration. In contrast to larger organizations, where exploration is regarded as a bottom-up process (e.g., Wooldridge & Floyd, 1989), we argue that in SMEs knowledge generation via exploration is likely to be a top-down process. This might also explain why SMEs are more ready to explore than larger organizations (e.g., Zahra, Ireland, & Hitt, 2000; Busenitz & Barney, 1997; Eisenhardt & Schoonhoven, 1990).

In short, we propose:

Proposition 4: The entrepreneur is more likely to engage in exploration than his or her employees.

Eventually, it is a managerial decision to allocate resources to refining existing certainties and/or to exploring new opportunities. Learning processes can increase both exploitation as well as exploration, since the outcome of learning is knowledge. From a knowledge-based perspective, the principal function of an organization is the creation, integration, and application of knowledge (Grant, 1996; Nonaka, 1994; Spender, 1996). The development of sustainable competitive advantages comes from the identification, development, and application of key resources (Barney, 1991; Grant, 1996; Peteraf, 1993). The resource that is most likely to lead to a sustainable competitive advantage is the organization's knowledge (Conner & Prahalad, 1996). By developing knowledge about the organization, the market, and the customers, the SME is ultimately creating an important resource. Since the dilemma presented by exploration or exploitation is rooted in the SME's limited resources, knowledge creation can be key to addressing the tension between exploration and exploitation.

With resources available, exploration and exploitation do not necessarily have to be mutually exclusive strategies (Knott, 2002). In fact, these two strategies are complementary in an organization's adaptation (Floyd & Lane, 2000). For example, He and Wong (2004) have found that the interaction between exploration and exploitation strategies is positively related to sales growth. Similarly, Helfat and Raubitschek (2000)

showed that balanced knowledge strategies at Sony, Canon, and NEC allowed these giants to develop new upstream and downstream products and integrate vertically in the value chain. The link between an optimal exploration-exploitation combination and performance is even stronger for SMEs than for larger organizations since the performance of large organizations can be driven by many other factors, such as diversity of products, markets, or divisions, in addition to their adaptation strategy (Lubatkin et al., 2006). The key to finding the optimal combination, however, lies in the availability of relevant knowledge. This is because each entrepreneurial initiative associated with exploration or exploitation has its unique risk-benefit portfolio, and only with knowledge accumulated from prior experiences, analyses of current situations, and estimations of future trends could that portfolio be accurately obtained. Once the risk-benefit portfolios associated with both strategies become available, SMEs could then decide a combination of adaptation strategy that is most effective under their specific circumstances.

It is important to point out that knowledge is not only a result of exploitation and exploration (March, 1991), but is also a facilitator for an effective adaptation strategy. For instance, a niche brewery is facing the decision whether to invest its limited capital in exploring a new type of beer that seems to have good potential or in exploiting its current best-seller, or both. If the brewery first invests a small amount in the new beer and tests it in a local market, it could then gather information about costs of production, customer reaction, net profit, and an estimated payback time for investment. With this knowledge at hand, the brewery can perform a more precise cost-benefit analysis and decide the proportion of investment to be allocated in exploration and exploitation, respectively.

Therefore, the more knowledge a SME has, the more complementary exploration and exploitation strategies can use.

> *Proposition 5: Knowledge reduces the tension between exploitation and exploration: the more knowledge available, the more complementary the two strategies can be.*

Acquiring and Transforming Experience in the Learning Process

Given the critical role of the entrepreneur in SMEs, we next sought to determine how failure leads to a knowledge creation process within entrepreneurial individuals. The mounting literature on entrepreneurial learning seems to converge on one point: entrepreneurial learning is experiential in nature (Cope, 2005; Politis, 2005; Rae & Carswell, 2000). In this regard, ELT (Kolb, 1984) appears to be particularly relevant for our discussion. As a cognitive and situative learning theory, ELT emphasizes the process of learning rather than its outcomes (Corbett, 2005). Compared with behavioral learning theories that explain activities with clear goals, regular feedback, and reinforcement, ELT is more attuned to the entrepreneurial context (Corbett, 2005). This is because both start-up entrepreneurs and those in charge of strategic renewal in large organizations are faced with market trends and technology development that change so rapidly that they need to constantly unlearn habits or ways of thinking.

ELT delineates two basic dimensions of learning: the acquisition of experience and the transformation of acquired experience into knowledge. According to ELT, learning involves the interaction between grasping and transforming experience. The first

dimension requires individuals to resolve the tension between *apprehension* (concrete experience) and *comprehension* (abstract conceptualization). When individuals make sense of the environment through tangible, felt qualities of immediate experience, apprehension occurs. In contrast, when individuals grasp experience by interpreting it as meaningful symbols and placing them within an abstract structure, comprehension occurs. The second dimension, where experience is then turned into knowledge, involves the tension between *intention* (reflective observation) and *extension* (active experimentation). In the course of intention, individuals look inward to reflect upon their experiences, whereas in the process of extension individuals look outward to execute their ideas and interact with the external world (Kolb, 1984).

Entrepreneurs are constantly immersed in streams of immediate experiences (Reuber, Dyke, & Fisher, 1990). The entrepreneurial environment is so turbulent that entrepreneurs rarely have time to theorize (Busenitz & Barney, 1997). Rather, "learning by doing" constitutes a distinguishing feature of entrepreneurship (Cope & Watts, 2000; Minniti & Bygrave, 2001). Hence, we argue that the dominant mode by which entrepreneurs acquire experience is apprehension. Furthermore, two concrete sources provide raw materials for the apprehension of experience: personal involvement with the venture and direct observations of creating and growing a new venture (Minniti & Bygrave, 2001; Reuber et al., 1990).

These two sources, however, are not mutually exclusive. In the process of starting and then managing their business, most entrepreneurs rely on both sources at different stages of their ventures, although the degree to which entrepreneurs rely upon a particular source varies. For example, during the prelaunch stage, entrepreneurs gain industry

experience via previous employment in relevant industries (Cooper et al., 1989) as well as prior engagements with comparable opportunities (Carroll & Mosakowski, 1987). Entrepreneurs could also have been exposed to direct experience by observing role models such as parents (Scherer, Brodzinski, & Wiebe, 1990) and mentors (Kram, 1983). After launching a new venture, entrepreneurs' own practices become their major source of experience. At the same time, entrepreneurs could continue to gain valuable experience by observing their business partners, competitors, and clients and actively participating in learning communities (i.e., local networks; Szarka, 1990). Consequently, we argue that entrepreneurs' concrete failure experience comes from both their own day-to-day operations and their observations of others' venture-related experience.

> *Proposition 6: Entrepreneurs internalize failure through concrete experience (i.e., apprehension), which consists of two primary sources: personal involvement and observations.*

According to ELT, knowledge creation results from the combination of grasping and transforming experience (Kolb, 1984). Once the entrepreneur has acquired a "stock of experience" (Minniti & Bygrave, 2001), a transformational process involving the conversion of experience into relevant knowledge must take place for learning to occur. Deviating from Kolb (1984), who suggested that individuals choose between *intention* (reflective observation) and *extension* (active experimentation) as their dominant mode of transformation, we maintain that both intention and extension are active in the process of transforming failure experience into entrepreneurial knowledge.

Failure leads individuals to switch their information processing from an automatic to a conscious manner, in which cognitive activities are characterized by awareness, attention, and reflection (Louis & Sutton, 1991). Under the conscious mode, individuals invest time and effort in deepening their understanding of the problems they are facing. Individuals often react to failure by asking themselves: Why did I fail? (Weiner, 1985; Wong & Weiner, 1981). As Wong and Weiner (1981) proposed, expectancy disconfirmation (unexpected events) and frustration (failure to attain a certain goal) give rise to an attributional search, a search for potential explanations when one's experiences cannot be readily assimilated into existing belief systems or schemas. Since individuals are motivated to terminate or prevent a negative state of affairs by locating its causes, attributional search serves an adaptive function to eliminate failure in the future.

Another means of deep reflection triggered by failure is to ask oneself: What could I have done differently? (Morris & Moore, 2000). Cognitive and social psychology research has demonstrated that unexpected and negative outcomes provoke counterfactual thinking (Roese & Olson, 1997). For instance, Morris and Moore (2000) found that failure, while causing both surprise and frustration to individuals, could induce upward counterfactual thinking that helps individuals focus on factors that can lead to a better outcome (Roese & Olson, 1997; Williams & Lees-Haley, 1996). With a deepened understanding of the causes and implication of prior failure, entrepreneurs could act on the external environment to further extend the transformation of their failure experience.

Proposition 7: Entrepreneurs transform failure experience through (a) reflective observation (i.e., intension) and (b) active experimentation (i.e., extension).

Learning from failure is both retrospective and prospective, as it is the interaction between the past and the future that provides the basis for abstract conceptualization. Daudelin (1996) asserted that the key process of learning is "developing insights from past events and applying them to future actions" (p. 38). The "insights" in the language of ELT, are abstract or symbolic representations of experience (Kolb, 1984). As Cope (2005) contended, an essential feature of mistakes and crises within the entrepreneurial process is their capacity to stimulate deep reflection, which is instrumental to creating higher-level learning from these experiences. In the entrepreneurial context, we argue, failure experiences lead entrepreneurs to abstract and generalize across contexts, to recognize patterns, and to build relationships across different situations and events, thereby allowing for more effective action in a *broader* range of new situations. In short, it is through abstract conceptualization that higher-order knowledge is created (Henry, 1989).

Proposition 8: Entrepreneurs generate knowledge from concrete failure experiences through abstract conceptualization (i.e., comprehension).

However, entrepreneurs' learning from failure is by no means automatic; rather, it is complicated by negative emotions (Shepherd, 2003). Vince (1998, 2001) has identified emotion as an indispensable piece in the learning puzzle: The onset of a learning process is often characterized by anxiety, fear, and doubt (Vince, 1998). These negative emotions tend to trigger a defensive reaction (Bion, 1961), either fight (taking a hostile stance toward the difficult situation) or flight (running away from difficult emotions).

Individuals involved in a defensive reaction move in the direction of "willing ignorance" (Vince & Martin, 1993, p. 210), meaning that they develop avoidance strategies and search for information for self-justification. Although "willing ignorance" might be an effective means to maintain self-esteem and thus protect one against the threat of self-destruction (Vince, 1998), it is detrimental to learning, especially the higher-level learning that failure entails.

The obstacle that negative emotions present is especially salient for entrepreneurs. Because of the substantial financial and personal resources entrepreneurs devote to found, nurture, and develop a venture, they are personally identified with their business. Their business is of such personal significance that it could be compared to a child (Cardon, Zietsma, Saparito, Matherne, & Davis, 2005). Therefore, failure associated with their business represents a form of personal loss to entrepreneurs (Cope, 2003). For example, losing the ownership of a business has the emotional intensity of the death of a loved one and could generate intense grief (Shepherd, 2003). Through in-depth interviews with five entrepreneurs who had recently experienced a business failure, Singh, Corner, and Pavlovich (2007) found that besides grief, interviewees experienced negative emotions such as guilt, frustration, anger, and depression. Therefore, we propose:

Proposition 9. Entrepreneurs' learning journey is emotionally charged, and the presence of negative emotions presents obstacles for them to learn from failure.

The Interaction Between Cognition and Emotion

Whereas ELT is able to capture the entrepreneurial spirit of "trial and error," applying it to study entrepreneurial learning from failure is not without its limitations. For example, ELT does not adequately address the magnitude of uncertainty and risk embedded in the entrepreneurial process (Cope, 2005). Further, ELT is primarily a cognition-based theory and overlooks the subconscious processes, such as defense mechanisms, that are commonly present in learning situations (Vince, 1998). Consequently, we integrate AET to address the tension between cognition and emotion. By doing so, we hope to better understand the intrapersonal aspects of entrepreneurs' learning process triggered by failure.

As individuals proceed further into the learning process, emotions and affect play a dual role in impacting what and how they think (Morris et al., 2012). Baron (2008) articulated two influences of emotions on entrepreneurs' cognition. First, individuals experiencing positive emotions tend to be more creative than those experiencing negative emotions. As a result, the former are better able to connect informational "dots" in complex and ambiguous situations. Second, positive emotions encourage use of effective coping strategies, such as direct efforts to address problems, whereas negative emotions enhance preferences for less effective strategies such as withdrawal, denial, and even substance abuse.

Since emotions can take learning in two directions, either discouraging learning or promoting it, entrepreneurs' ability to master emotions will determine the effectiveness of their learning from failure. Hence, an important individual difference, EI, is likely to moderate the relationship between failure experience and entrepreneurial learning. Mayer

and colleagues (Mayer, Salovey, & Caruso, 2004; Salovey & Mayer, 1990) defined EI as the capability to accurately perceive, access, and generate emotions so as to assist thought, understand emotions, and reflectively regulate emotions to promote personal growth. In short, EI indicates the extent to which individuals' cognitive capabilities are informed by emotions and the extent to which emotions are cognitively managed (George, 2000).

EI consists of four interrelated abilities: understanding and expressing one's own emotions, regulating one's emotions, perceiving and understanding the emotions of others, and channeling one's emotions toward constructive activities that facilitate performance. The fact that learners cannot be separated from their social and situational context (Holman, Pavlica, & Thorpe, 1997) makes emotional abilities regarding both self and others relevant to facilitating the learning process. Not surprisingly, the role of EI in learning has received empirical support from various learning contexts, including schoolchildren's academic performance (Parker, Summerfeldt, Hogan, & Majeski, 2004) and individuals' moving forward from project failure (Shepherd, Patzelt, & Wolfe, 2011). Therefore, we advance the following hypothesis:

> *Proposition 10. Entrepreneurs' EI positively moderates the relationship between failure and learning, so that the higher the EI, the more effective their learning from failure.*

Entrepreneurs' emotional responses to failure are not universal. According to AET, failure as an incident is subject to appraisal and its resultant emotional experience varies

depending on interpretations (Weiss & Cropanzano, 1996). Integrating cognition with emotion, Weiss and Cropanzano (1996) advocated a two-stage appraisal process. Appraisal begins with evaluating an event for its relevance to one's personal set of goals in simple positive or negative terms. The initial appraisal then leads to more specific interpretation, focusing on the focal event's consequences and attributions and the available options to cope with it. The relevance of an event is determined by goal relevance, the extent to which it touches on personal desires or concerns (Lazarus, 1991). The positive or negative emotional valance of an event is later evaluated against goal congruence, whether the event is consistent (beneficial) or inconsistent (harmful) with one's desires and concerns. In addition, the intensity of the emotions associated with an event is closely tied to the importance or desirability of the goals.

Depending on the entrepreneur's personal goals, events of similar characteristics could eventuate in the experience of different emotions, or emotions with different intensity, because of varied interpretations. In the phenomenon of learning from failure, the entrepreneur's learning goal is of particular relevance to our discussion. Learning goal orientation (LGO) refers to the desire to understand something new or to improve one's level of competence in a given activity (Button, Mathieu, & Zajac, 1996; Elliott & Dweck, 1988; Heyman & Dweck, 1992; Payne, Youngcourt, & Beaubien, 2007). When individuals are learning goal oriented, they strive to increase their ability. They tend to view failure as an event that is diagnostic and provides valuable feedback for developing their competencies. Since individuals with LGO tend to believe their ability can be improved (Chen & Mathieu, 2008), failure does not represent a fixed hopeless state but motivates them to engage in learning activities to bridge the gap between their current

level of ability and that required to reach desired outcomes. In other words, if the entrepreneur is learning goal oriented, the negative valance of failure is partially offset by its motivational and informational value. Individuals with higher LGO are expected to be less anxious about the end result and focus on mastery of the task. As a result, when presented with failure and obstacles, individuals with higher LGO are able to maintain higher levels of self-efficacy and develop more effective learning strategies (Chen & Mathieu, 2008).

Empirical evidence supports these considerations. In an experimental study with schoolchildren, Elliott and Dweck (1988) found that when the learning goal value was heightened, participants actively sought challenging tasks despite public errors, and as a result, their problem-solving strategies became more sophisticated. Similarly, Button and colleagues (1996) found that individuals with high levels of LGO felt challenged by failure but continued to strive for improvement despite the negative feedback that accompanied difficult or novel tasks (LePine, 2005). We therefore advance the following proposition:

> *Proposition 11. Entrepreneurs' LGO positively moderates the relationship between failure and learning, so that the stronger the LGO, the more effective their learning from failure.*

DISCUSSION

Failure is a potential source of knowledge for both the entrepreneurial organization and individuals. Failure triggers exploration in an SME's knowledge strategy and thus creates variance vital for long-term success. The knowledge created in this process serves as a key resource, which in turn alleviates the tension between exploration and exploitation. Further, the entrepreneur plays a critical role in the organization's adoption of the exploration strategy. At the individual level, the entrepreneur learns from failure through two interrelated processes: acquiring and transforming failure experience. The concrete experience of failure provides the entrepreneur with the raw materials for transformation through internal reflection and external experimentation. The transformed experience is simultaneously assimilated and distilled into abstract concepts, from which entrepreneurial knowledge is created. Further, learning from failure is an affective event to which entrepreneurs with a higher LGO react with less negative emotions. Other things being equal, entrepreneurs with a higher EI can better manage their emotions and thus more effectively capitalize the learning value of failure.

Theoretical Implications

The theoretical implications of this paper are threefold. First, this paper responds to a longstanding need for entrepreneurship research to move from a preoccupation with achieving success and avoiding failure to an integrated view that links these two phenomena (Aldrich & Fiol, 1994). One of the most important determinants of entrepreneurial success is the effective recognition and exploitation of opportunities (Kirzner, 1973; Shane & Venkataraman, 2000; Venkataraman, 1997). In addition to Shane and Venkataraman (2000), scholars from a cognitive perspective (e.g. Baron,

1998, 2004, 2006; Busenitz, 1996, 1999; Mitchell and colleagues, 2002, 2004) have shaped our knowledge of the mental makeup of entrepreneurs (e.g., prior knowledge, cognitive mechanisms, and heuristics) that make one alert to and capable of capitalizing on entrepreneurial opportunities. However, this body of literature views knowledge as a static concept and is less likely to answer questions such as where the prior knowledge comes from, how cognitive mechanisms are developed, and how heuristics are tested and updated (Corbett, 2005). In delineating a process of assimilation of experience and reconstruction of cognitive schemas, this article offers a peek into the "black box" of knowledge creation triggered by failure. It could contribute to the entrepreneurship literature by beginning to shed light on how a critical experience like failure contributes to the entrepreneur's stock of knowledge and, potentially, entrepreneurial success.

Second, we aim to address the dilemma SMEs face when implementing a knowledge strategy. Given that "ambidextrous organizations" (Tushman & O'Reilly, 1996), those that effectively implement both exploitation and exploitation, are more likely to succeed in the entrepreneurial context, it is important to understand what causes an SME's ambidextrous orientation (Lubatkin et al., 2006). Adopting a knowledge-based view, we claim that knowledge, as a resource, is the key to resolving the tension between exploration and exploitation. In identifying failure as a trigger of exploration and knowledge as an elevation of resource constraints, we begin to answer such questions as what motivates SMEs to adopt exploration and what enables SMEs to implement a balanced adaptation strategy. Further, in our model, knowledge is not only the outcome of a adaptation strategy, but it also contributes to the refinement of the SME's strategy. This critical feedback loop represents an entrepreneurial upward spiral brought on by

knowledge that, in addition to entrepreneurial mindset and culture (Shepherd, Patzelt, &

Haynie, 2010), could potentially explain how and why an organization becomes more

entrepreneurial over time.

Third, this article addresses the tension between cognition and emotion in the

learning process. Recently, an emerging stream of research has begun to highlight the

influence of entrepreneurial emotion on entrepreneurial activities (Brundin, Patzelt, &

Shepherd, 2008; Chen, Yao, & Kotha, 2009; Foo, 2009; Foo, Uy, & Baron, 2009; see

also the special issue on the heart of entrepreneurship in *Entrepreneurship Theory*

Practice) and has called for a better understanding of "the exact cognitive and emotional

intraperson process and their interplay" (Welpe, Spörrle, Grichnik, Michl, & Audretsch,

2012, p. 70). As an extension of this conversation, the present model explores the direct

effect of emotion and the indirect effect of goals and EI in entrepreneurs' learning from

failure. As Cope (2003) observed from his in-depth interviews, "the emotional

complexity and intimacy of the relationship between the entrepreneur and the small

business is unique" (p. 400). The close bond between the entrepreneur and organization

(Cardon et al., 2005) makes entrepreneurship an ideal emotional context within which to

study learning beyond traditional cognitive models. With the aid of AET, the present

model accounts for failure's emotional repercussion and the defense mechanisms

entrepreneurs exhibit as a result; ELT seems unable to explain these reactions fully

(Vince, 1998). In doing so, this article goes beyond simple application of ELT in the

entrepreneurial context and takes the unique opportunity to address the emotional aspects

in experiential learning. This extension could add to the theoretical development of ELT

and contribute to the core literature of management learning.

Practical Implications

The present article informs the managerial practice of SMEs. Our organizational-level analysis reveals that SMEs' knowledge strategy is top-down, and the decision to explore often comes from the entrepreneur. To motivate employees to adopt and implement exploration, entrepreneurs first need to be aware of the imbalanced risk-benefit structure for their employees. The SME's promotion and compensation systems need to offer incentives for exploration (Balkin, Markman, & Gomez-Mejia, 2000). For example, for salespersons, a 5-year stock option of the company better promotes the exploration of new contacts than a monthly evaluation of sales. Moreover, SME owners should not limit their means to financial incentives, as a myriad of nonmonetary factors such as leader-member relationships, trust, commitment, and access to resources have all been shown to induce employees' proactive behaviors (Hackett, Farh, Song, & Lapierre, 2003; Ilies, Nahrgang, & Morgeson, 2007; Wayne & Green, 1993).

A review of the current entrepreneurship training and mentoring programs reveals a heavy focus on "hard facts" such as commercializing technology, developing markets, creating business plans, and developing skills in business administration, finance, and marketing (Henry, Hill, & Leitch, 2003). While these interventions are highly relevant to successfully launching and managing a business, the present research and many other existing studies show that a range of "soft skills" (e.g., social skills and EI) are equally important for entrepreneurial success (Markman & Baron, 2003; Shepherd, 2009). Hence, it would be beneficial to add the domain of self-development (e.g., understanding one's own experience, developing EI, setting appropriate goals, learning how to learn, and developing leadership competence) to existing entrepreneurship training programs. Prior

research has shown that it is possible to improve one's EI through training and life experiences (Wong, Foo, Wang, & Wang, 2007). Training programs can be designed to help entrepreneurs develop their EI so that they can better cope with difficult situations. Accepting that EI may take time to develop, entrepreneurship mentors can invest in helping entrepreneurs set a learning goal rather than focusing on short-term outcomes. A learning orientation would not only lower the level of entrepreneurs' detrimental emotions, but also contribute to the long-term success of their ventures (March, 1991).

Finally, this article has important implications for entrepreneurship education and training. From an educational perspective, failure could be more powerful than success because "it's often easier to pinpoint why a failure has occurred than to explain a success" (McGrath, 1999, p. 28). Since there is a significant undersampling of failure in contrast to the high rates of failure reported in entrepreneurial businesses (Denrell, 2003), we urge entrepreneurship educators, inside and outside universities, to design training and education programs that better reflect the reality facing entrepreneurs. As Shepherd (2004) suggested, a number of actions can be taken to improve entrepreneurship education. First, lecture content should offer statistics on the likelihood of business failure and highlight the point that failure represents an opportunity to learn. Second, entrepreneurs who closed their business or once experienced major mistakes should be considered potential guest speakers in class. Third, case studies should include a more diverse range of business cases, including near-failure and failure stories. Finally, first-hand experiences of failure, which can be gained through role-play activities and simulations, can be most effective. For example, students could be placed into the role of entrepreneurs who are preparing to inform employees that their business is about to close

and layoff is inevitable. In short, as educators, we share the responsibility of informing future entrepreneurs about both the ups and downs of entrepreneurship and thereby better preparing them for future challenges.

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