




Opportunity evaluation and changing beliefs during the nascent entrepreneurial process

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Abstract

This article explores an important but less understood part of the nascent entrepreneurial process, the changes that occur to beliefs associated with continuing evaluation of the opportunity and related learning. Using samples from the Panel Study of Entrepreneurial Dynamics, we demonstrate that engaging in planning activities by nascent entrepreneurs as they proceed through the process is associated with a decrease in perceptions of environmental uncertainty but an increase in perceived individual self-efficacy and business performance expectations. Overall, our evidence is consistent with a dynamic view of the nascent stage of the entrepreneurial process characterized by ongoing significant changes in beliefs.

Keywords

belief changes, nascent entrepreneurship process, self-efficacy, uncertainty

Introduction

A central area of interest in entrepreneurship research is the emergence of new organizations; prior research in this area generally characterizes new venture creation as a process of opportunity identification, evaluation, and exploitation (Dimov, 2011). After identifying a potential opportunity, the entrepreneur then begins work to realize this decision by engaging in activities that foster the launch of the business, such as gathering resources, seeking capital, developing products, establishing a location, and hiring staff.

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In addition to the important activities related to resource gathering and implementation of the business, we believe an underemphasized aspect of the process is the ongoing assessment and transformation of the entrepreneurial opportunity. Our complementary characterization suggests that an important part of the nascent entrepreneurial process is a continuing evaluation of the opportunity, resulting in learning and changes in beliefs. This approach reflects a perspective that nascent entrepreneurship is fundamentally an experience of change, and this process results in 'webs of beliefs... that keep reweaving (and thus altering) as [actors] try to coherently accommodate new experiences' (Tsoukas and Chia, 2002: 570). Beliefs represent expectations surrounding the expected consequences of performing a behavior, such as launching a venture, and they are an important construct in understanding entrepreneurial action and decision making (McMullen and Shepherd, 2006; Shepherd et al., 2007).

The purpose of this article is to investigate the existence, magnitude, and determinants of changes in nascent entrepreneur beliefs concerning themselves, the business, and the external environment as they engage in planning activities associated with the opportunity under consideration. We expect that performing planning activities will decrease perceptions of environmental uncertainty, increase perceived individual self-efficacy and generate changes in performance expectations. We test our hypotheses using the Panel Study of Entrepreneurial Dynamics (PSED), a nationally representative data set of US adults in the process of starting businesses tracked over multiple waves of data collection. The longitudinal nature of this data set allows us to link planning activities to *changes* in expectations and perceptions. We find that planning activities, such as undertaking a business plan, engaging in market definition, and developing financial projections are associated with changes in beliefs as predicted by our hypotheses. Overall, our evidence is consistent with a dynamic view of the nascent stage of the entrepreneurial process.

While our findings may not be totally unanticipated given the inherent change involved with entrepreneurship, we believe that demonstrating and documenting these relationships within a broad, representative sample of nascent entrepreneurs provides value to a number of areas in the entrepreneurship literature. First, it deepens understanding of nascency during the entrepreneurial process, an area in which 'there is a potential for major contributions from PSED-type research' (Davidsson, 2006: 16). As a supplement to existing research that focuses more on investigating the determinants of progress through the nascency period (e.g. Davidsson and Honig, 2003; Liao and Welsch, 2003; Samuelsson and Davidsson, 2009), and the achievement of outcomes such as venture launch or profitability (e.g. Delmar and Shane, 2004; Kessler and Frank, 2009; Parker and Belghitar, 2006), we provide evidence of how the continuously developing process includes changes in entrepreneur perceptions of themselves, their potential business opportunity and the external environment.

Second, our results regarding the influence of planning activities on beliefs serve as a complement to prior studies that link business planning activities to venture-related outcomes such as avoiding closure and accelerating product development (Delmar and Shane, 2004; Liao and Gartner, 2006). These studies speculate that planning activities foster legitimacy, gathering resources and relationships with external stakeholders. We consider a more proximal outcome of these activities compared to the more distal measures of eventual venture outcomes, as our study emphasizes the near-term cognitive implications of engaging in planning activities, showing that these activities are associated with changes in key beliefs of the nascent entrepreneur. In this respect, our work relates to prior research on entrepreneurial learning. We add empirical breadth to this developing literature stream in which such studies are still rare (Ravasi and Turati, 2005). Moreover, as a complement to prior studies of postlaunch learning, we provide evidence that shows the importance of learning before actual exploitation. The mental representations formed during the nascency period are a form of learning that 'constrain and seed' future learning (Gavetti and Levinthal, 2000: 133).

Third, our examination of beliefs enriches our understanding of the determinants of entrepreneurial activity. The field of judgment and decision making suggests that choosing a course of action, such as the pursuit of an entrepreneurial opportunity, is a combined result of 'desires (utilities, personal values, goals, ends, etc.) and beliefs (expectations, knowledge, means, etc.)' (Hastie, 2001: 655). A healthy stream of entrepreneurship literature has concentrated on the desires aspect of the combination (Carter et al., 2003; Douglas and Shepherd, 2002), while beliefs have drawn comparatively less attention, meaning that 'we have little scientific understanding of where [entrepreneurial] beliefs come from and how they are formed' (Shepherd et al., 2007: 75). Understanding more about the determinants of beliefs is critical because they represent the 'fundamental building blocks' (Fishbein and Ajzen, 1975: 15) of specific attitudes and the ensuing intentions and behaviors that have featured so prominently in theories explaining entrepreneurial behavior, such as the Theory of Planned Behavior (Ajzen, 1985, 1991). Our work demonstrates that a key determinant of entrepreneurial beliefs is the set of planning activities undertaken by the nascent entrepreneur.

Prior literature

The entrepreneurial process

While much of the early work in entrepreneurship attempted to isolate the personal characteristics or traits that distinguished entrepreneurs from nonentrepreneurs, the emphasis began to shift in the mid-1980s toward a more behavioral approach focusing on the activities of entrepreneurs. Most notably, Gartner (1988) proposed that entrepreneurship should be conceived as a set of activities involved in new venture creation. Work in this tradition has offered a variety of conceptions of what entrepreneurs do (i.e. the entrepreneurial process). Gartner (1985), for example, argued that an entrepreneur locates a business opportunity, accumulates resources, markets products and services, produces the product, builds an organization, and responds to governments and society. More generally, Bygrave and Hofer (1991) defined the entrepreneurial process to include 'all functions, activities and actions associated with the perceiving of opportunities and the creation of organizations to pursue them' (p. 14). Reynolds (2007) identified the new firm creation process as a two-step process: initial entry into the start-up process through the conception of an entrepreneurial opportunity followed by the actual creation of a new business.

The evaluative aspects of the process have also been noted; the approach in this article relates most closely to these conceptions of the entrepreneurial process. A common emphasis being that an exploitable opportunity arises from the actions and interactions of entrepreneurs although these have been described in a variety of ways. For example, Bhave (1994) argued that opportunity refinement is a critical part of the process, describing venture creation as an iterative, conceptual process subject to continuing change and refinement. Wright and Marlow (2012) similarly note, 'the complex and dynamic nature of the new venture creation process' (p. 107). Sarasvathy (2001) describes a process of effectuation that 'allows a decision maker to change his or her goals and even to shape and construct them over time' (p. 247) as they design new organizations (Sarasvathy et al., 2008). Lumpkin et al. (2004) emphasize that formation of opportunities follows discovery, but note that formation involves both further elaboration and evaluation of the opportunity prior to launch. Creation-based views of entrepreneurial opportunities (Alvarez and Barney, 2007) argue that opportunities are created by the endogenous actions, reactions, and enactments of entrepreneurs. Dimov (2007) describes an opportunity development process in which opportunities 'emerge in an iterative process of shaping and development' as initial ideas are 'elaborated, refined, changed, or even discarded' (p. 714).

Despite the use of different terms, these works reflect a common theme that refining the potential opportunity and examining feasibility are critical parts of the nascency process. In this respect, the literature reflects a view of entrepreneurial opportunities focused on what entrepreneurs actually do (Dimov, 2011; Venkataraman et al., 2012). As Lumpkin et al. (2004) summarize, 'many entrepreneurship scholars agree that refining business ideas and investigating their feasibility is a critical pre-launch activity' (p. 86). Our aim in this article is to contribute to this area of the literature by exploring and empirically examining the links between specific actions of nascent entrepreneurs and changes in their beliefs around the opportunity.

These perspectives, emphasizing elaboration and evaluation of the opportunity, suggest that this aspect of the entrepreneurial process involves learning. Learning is the process by which new information is incorporated into the existing knowledge and understanding of individuals (Huber, 1991; Levitt and March, 1988), while entrepreneurial learning refers to the process fostering the development of a specific subset of knowledge and skills, namely those related to starting up and managing new ventures (Politis, 2005). In considering the type of knowledge that results from entrepreneurial learning, Cope (2005) asserts that entrepreneurs must learn about themselves, the business/opportunity, the environment, small business management, and management of relationships. The changes in beliefs that we examine in our research are closely related to the first three categories from this classification; we argue that this learning is fostered by conducting planning activities.

Empirical investigations of the nascency stage

Analyses of the nascency phase of the entrepreneurial process have investigated what occurs during this phase and why it might matter in terms of achieving outcomes. Initial efforts focused on determining the types of activities undertaken by nascent entrepreneurs, such as looking for facilities, seeking funds, and purchasing supplies and equipment (Carter et al., 1996). The activities that nascent entrepreneurs initiate when trying to establish a new business, referred to as either 'start-up' or 'gestation' activities, are an active area of research. Davidsson and Honig (2003), for example, found that certain human capital and social capital variables, such as prior managerial experience and being part of a business network, were associated with the conduct of future gestation activities. Comparison of different groups or 'types' of entrepreneurs/ventures has been the subject of a number of other similar studies of the nascency stage. Technology-based ventures involved more start-up activities than non-technology-based ventures (Liao and Welsch, 2003) as did parallel founders compared to novice and serial founders (Alsos and Kolvereid, 1998), and innovative versus imitative ventures (Samuelsson and Davidsson, 2009). In a sample of Canadian nascents, Menzies et al. (2006) found no difference in activity rates between men and women.

A final stream of research in this area has investigated whether particular start-up activities are determinants of outcomes such as launching the venture and the level of performance achieved after launch. In a series of articles, Delmar and Shane (2003, 2004) examined the relationship of start-up activities to successful postlaunch outcomes, finding that engaging in business planning was associated with a number of positive outcomes such as lower hazard of disbanding and increased future product development and organizing activities. Liao and Gartner (2006) found similar outcomes; nascents who had written a business plan were much less likely to quit the launch process. Similarly, LeBrasseur et al. (2003) found a relationship between the number of start-up activities and the level of postlaunch sales achieved while Dimov (2010) noted that early planning activities help nascents judge the value of opportunities, and those judgments affect venture emergence.

Overall, the existing work examining what nascent entrepreneurs do after identifying a potential opportunity has focused mostly on describing those activities and investigating how they might be related to the achievement of outcomes such as venture launch, first sales and profitability. In contrast, we have comparatively less knowledge of how these activities might be associated with changes in expectations and perceptions.

Hypotheses

We examine changes in nascent entrepreneur beliefs where beliefs refer to mental representations of the self and the external environment; they include areas such as expectations of outcome states and the means to achieve them (Hastie, 2001), as well as judgments about capabilities and the anticipation of the probable effects of different events and courses of action (Bandura, 2001). Investigation of changes in beliefs is an important undertaking in the entrepreneurship literature; Casson (1982) links the 'essence of entrepreneurship' to the different beliefs and perceptions held by individuals (p. 14). More contemporary research emphasizes the importance of analysing the formation of entrepreneurial beliefs (Dimov, 2010; Felin and Zenger, 2009; Gregoire et al., 2010).

Our decision regarding which entrepreneurial beliefs to investigate is informed by views of entrepreneurship that represent the decision to exploit an opportunity as a career choice (e.g. Kihlstrom and Laffont, 1979; Lazear, 2005; Lucas, 1978). That is, the decision to enter entrepreneurship is a comparative decision in which an individual compares returns from entrepreneurship to returns available in alternative employment. This decision is, therefore, influenced by key factors such as the estimated returns of the opportunity, nascent's belief that they can actually achieve the outcomes, and the uncertainty of those outcomes. We turn first, to the perceived uncertainty surrounding the opportunity given its association with required financial returns. Exploitation requires that the entrepreneur believe that returns provide a premium for bearing uncertainty (Shane and Venkataraman, 2000: 223). Since the seminal work of Knight (1921), uncertainty has featured prominently in the entrepreneurship literature; moreover, as Milliken (1987) argues, uncertainty qualifies as a type of belief noting that it represents 'a perceptual experience' and 'not an objective state of the world' (p. 136). Next, we consider the strength of the nascent entrepreneur's belief that they can personally achieve the projected outcomes, that is, entrepreneurial self-efficacy. Foundational work unambiguously sees this as a type of belief with Bandura (1997) defining self-efficacy as 'belief about what one can do under different sets of conditions with whatever skills one possesses' (p. 37). Finally, we consider changes that may occur to the projected financial performance of the venture as such expectations are a fundamental belief underlying the comparative economic decision and likely to be revised as learning occurs. Our interests are thus, consistent with McMullen and Shepherd's (2006) emphasis on the importance of entrepreneur beliefs about the opportunity and their particular abilities.

We investigate the role of what we have termed 'planning activities' in influencing these beliefs. Planning activities represent a subset of the broader category of gestation or start-up activities and cause the nascent to reflect upon factors such as potential markets, products to be developed and required resources (Dimov, 2010). These activities provide information about the entrepreneurial opportunity under consideration, such as general business planning, defining potential markets, and developing financial projections. However, they do not include gestation activities unlikely to generate evaluation information such as saving money, purchasing raw materials, opening a bank account, or establishing a phone line. While these latter activities play an important role in achieving launch of a new venture, their direct function is not to foster evaluation.

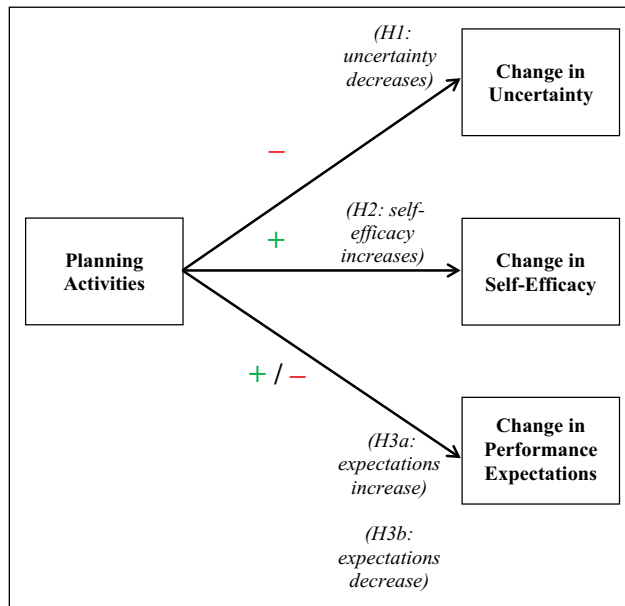


Figure 1. Theoretical model.

Planning-related activities have been described in a number of ways; following the work of Katz and Gartner (1988), for example, Manolova et al. (2012) describe developing a business plan, conducting market research, and starting to work full-time on the venture as organizing activities related to intentionality. Other research has used the phrases ‘business planning’ or ‘early planning’ to describe these types of activities; for example, both Dimov (2010) and Yusuf (2012) include defining market opportunities, developing projected financial statements, and preparing a business plan as planning. Similarly, Delmar and Shane (2003) include gathering information about the market and competition, developing financial projections, and authoring either a formal or informal plan as business planning. Our conception of planning activities is broadly consistent with such approaches; we include activities likely to generate learning about the external environment, the entrepreneur’s capabilities, and the value of the opportunity. They serve as the type of theoretical analysis or thought experiments that Gavetti and Levinthal (2000) describe as off-line cognition, which serves as a complement to experiential learning. Castrogiovanni (1996) similarly argues that these types of preventive planning activities result in what Miles and Randolph (1980) refer to as proactive learning which is an outcome of attempting to discover causal relationships prior to acting (as opposed to enactive or experiential learning in which learning flows from experience). Our overall theoretical model is depicted in Figure 1.

Perceived uncertainty. We first contend that the nascent entrepreneurs are likely to learn more about the surrounding environment and its relationship to the entrepreneurial opportunity as they engage in planning activities. Milliken (1987) defines uncertainty as ‘an individual’s perceived inability to predict something accurately’ due to a perceived lack of sufficient information suggesting there are at least three different types of environmental uncertainty (p. 136). State uncertainty occurs when individuals perceive the external environment, or a particular part of that environment, to be unpredictable. Effect uncertainty occurs when individuals are unsure of the impact of changes in the

environment on themselves or their organization. Finally, response uncertainty refers to an inability to predict the consequences of a change undertaken by the individual. Consistent with the prior studies of uncertainty in the new venture process (Delmar and Shane, 2003, 2004; Liao and Gartner, 2006; Matthews and Human, 2000, 2004), we focus on state uncertainty. Examples of such include the inability to predict macroeconomic trends, technology development, or the behavior of potential stakeholders (e.g. suppliers or financing sources), competitors, and other external actors.

Progress through the nascency stage and executing planning activities should result in reductions in uncertainty. As McGrath (2002) describes, uncertainty around entrepreneurial opportunities can be reduced 'by an actor making investments to create additional information' (p. 300). For example, the activities of the nascent might generate better knowledge of the technological trajectory of a new industry or the outcome of important legislation that will affect a particular firm/industry. While this information may be either favorable or unfavorable to the nascent's specific plans, the future becomes less uncertain when gathering information. Folta (1998) similarly emphasizes how certain types of uncertainty may be resolved by learning activities as an individual makes investments to investigate the external environment. This view is also consistent with the seminal work of Knight (1921), who emphasized the importance of uncertainty in entrepreneurship and argued that one of the primary activities of the entrepreneur is to reduce this uncertainty: 'rational conduct strives to reduce to a minimum the uncertainties involved' (p. 238). In sum, more information about the external environment and its state becomes available as the nascent makes investments in evaluation, leading to better knowledge of the motivations, expectations, and likely behaviors of external actors. This learning leads to reductions in state uncertainty.

Hypothesis 1: The number of planning activities will be associated with reductions in state uncertainty.

Entrepreneurial self-efficacy. Perceived self-efficacy refers to 'people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance' (Bandura, 1986: 391).

Consistent with Bandura's argument that self-efficacy beliefs are domain-specific, we focus on entrepreneurial self-efficacy, which 'refers to the strength of an individual's belief that he or she is capable of successfully performing the roles and tasks of an entrepreneur' (Chen et al., 1998: 301), specifically creating and managing one's own business. Not surprisingly, self-efficacy beliefs play an important role in determining entrepreneurial behaviors. Prior research indicates they are related to entrepreneurial intentions (e.g. Chen et al., 1998), working to launch a venture (e.g. Arenius and Minniti, 2005), and the actual launch (e.g. Markman et al., 2002). As Bandura (1986, 1997) notes, the outcomes individuals anticipate are largely dependent on how they judge their capabilities to perform in given situations. This indication is consistent with evidence that those who are led to believe that they have high competencies are more willing to engage in risky behavior (Krueger and Dickson, 1994).

We predict that nascent entrepreneur self-efficacy will increase as more planning activities are undertaken during nascency. Gist and Mitchell (1992) describe determinants of self-efficacy and explain how '[i]n novel task situations, self-efficacy is formed through an assessment of task requirements and personal and situational resources and constraints'. The importance of the link between changes in self-efficacy and the availability of information is noted; engaging in planning activities during the entrepreneurial process generates the information that fosters increases in entrepreneurial self-efficacy.

Related empirical work also suggests that nascent information-gathering activities and associated learning lead to increases in self-efficacy. For example, Forbes (2005) studied a sample of new ventures (with an average age of just under two years and employment level of just over eight employees) in the Internet services industry. It was found that decision comprehensiveness was related to higher levels of entrepreneurial self-efficacy where this notion indicated the degree to which the entrepreneur searched for and analyzed information in making decisions. Zhao et al. (2005) also found evidence that individuals who report higher levels of learning about entrepreneurship from academic classes have higher levels of entrepreneurial self-efficacy. Thus, we expect that continuing evaluation of the entrepreneurial opportunity generates increased knowledge, which boosts the strength of the nascent's belief in the ability to perform successfully as an entrepreneur.

Hypothesis 2: The number of planning activities will be associated with increases in entrepreneurial self-efficacy.

Performance expectations. Delmar and Shane (2004) highlight the external, legitimating aspects of business planning, arguing that nascent entrepreneurs must convince potential employees, customers, suppliers, and investors of the value of the venture idea in order to gain legitimacy. However this assumes that the nascent entrepreneur is already personally convinced of the value of the venture idea. Given the high degree of uncertainty surrounding entrepreneurial opportunities, a reasonable first step is for entrepreneurs to gather additional information for themselves to learn more about the expected financial returns of an identified opportunity. This view is consistent with Knight's (1921) argument that entrepreneurs exercise judgment in the face of uncertainty in order to create an estimate or forecast of future performance. Although a striking feature of the judging faculty is its liability to error, Knight describes how entrepreneurs strive to lessen this error and arrive at better estimates. In sum, this aspect of planning allows the nascent to explore the potential of the business idea and develop a detailed road map for converting an opportunity into a profitable venture (Baron and Shane, 2008: 206). The exploration of the opportunity and the creation of the road map produce information and provide learning opportunities that lead to changes in performance projections.

While we predict changes in performance expectations associated with planning activities, the direction of these changes will depend on the nature of the learning. On the positive side, planning during the pre-start-up phase provides a variety of 'intellectual, volitional, and social benefits' (Dimov, 2010: 1134) whereby the nascent may uncover additional information suggesting greater market acceptance or broader potential application of the opportunity idea. Relatedly, these efforts might generate better knowledge of how to best exploit the opportunity, which fosters 'more intelligent forecasting' (Knight, 1921: 260). Examples of this additional information might include determinations of the most appropriate target market, understanding how the product or service might be customized and recognizing methods to produce in a more efficient manner. Thus, as nascent uncover more positive information and develop enhanced understanding of means of exploitation, projected performance will increase.

Hypothesis 3a: The number of planning activities will be associated with increases in nascent expectations of financial performance.

Yet, planning may also reveal negative information; obstacles to exploitation may emerge as far more serious than originally anticipated. Additional planning activities might also indicate that customers are less interested in the opportunity or that it may not be as broadly deployed. In the most extreme cases, planning may indicate that the venture idea is largely infeasible. Given the ex

ante uncertainty regarding the exact nature of the information uncovered while conducting planning activities, we offer the following alternative hypothesis regarding the direction of the changes in performance expectations.

Hypothesis 3b: The number of planning activities will be associated with decreases in nascent expectations of financial performance.

Methods

Data

Investigation of our research questions requires a longitudinal data set of individuals who have decided to enter the entrepreneurial process along with a detailed set of characteristics. Furthermore, the data must include perceptions of environmental uncertainty, estimates of self-efficacy, and evaluations of expected performance at separate stages of the panel while tracking the activities of the respondents. One of the few data collection efforts that include this type of information is the PSED. The goal of the PSED is to generate nationally representative, longitudinal data sets of US adults in the process of starting businesses, identified from random digit dialing telephone surveys. Two data sets are available, PSED I, which includes a cohort of 830 nascent entrepreneurs identified through a screening survey conducted in 1998–2000, and PSED II, which includes a cohort of 1214 nascent entrepreneurs identified through screening surveys conducted in 2005–2006. Gartner et al. (2004) provide a review of the PSED I data and Reynolds and Curtin (2008) review the PSED II data. Both data sets follow the respondents across multiple waves of surveys.

Each data set used a series of screening questions to identify nascent entrepreneurs. As a first screen, respondents were asked whether they were trying to start a business, either for themselves or on behalf of their employers. Individuals who replied 'yes' to either of the two questions needed to meet three additional criteria to be considered nascent by the PSED: (1) they expect to be owners or part owners of the new firm, (2) they have been active in trying to start the new firm in the past 12 months, and (3) the effort is still in the start-up or gestation phase and is not an infant firm (infant firms are those that have had a positive monthly cash flow that covers expenses and owner-manager salaries for more than three months).

The PSED I data set was utilized for the uncertainty and self-efficacy hypotheses and the PSED II data set to examine the performance expectations hypotheses. We preferred the PSED II sample for its larger sample size and the manner in which respondents were asked about their sales expectations.¹ The PSED I data set was utilized for the uncertainty analyses because PSED II does not include uncertainty measures and for the self-efficacy analyses because the questions related to self-efficacy were only asked in the first wave of the PSED II. In each case, the data came from the first two survey waves, which were separated by approximately 12 months for each data set. We next provide detail on the samples.

PSED I sample. The starting data set of 830 nascent entrepreneurs was cleaned using an algorithm recommended by Shaver.² As part of this cleaning, nascent entrepreneur cases that should have been classified as infant firms were removed from the sample. To focus on autonomous nascent entrepreneurs, we elected to remove cases in which those expected to own part of the business were nonhuman persons, such as a corporation (Reynolds and Curtin, 2004). These adjustments reduced the starting potential sample size to 715. Sample attrition flowed from those dropping out of the panel (193 cases) between waves of data collection. Furthermore, only a subset of the respondents (approximately 70%) completed a detailed mail survey, which contained the questions regarding

uncertainty perceptions, in addition to the initial phone survey. Of the 522 Wave 1 and Wave 2 participants, 331 provided responses to the Wave 1 and Wave 2 mail surveys; our samples were smaller due to missing data across the independent and dependent variables. While we had no ex ante expectations that those completing the mail survey or those with missing data were different than those who did not, we included a robustness check in which we controlled for potential non-random attrition from the sample.

PSED II sample. The PSED II sampling identified 1214 individuals who passed the series of screening questions as active nascent entrepreneurs. Following the advice of Reynolds and Curtin (2008), we removed individuals who appeared to be reactivating dormant businesses (they had periods of profitable operation prior to the initial interview). To focus on nascent entrepreneurs, we removed cases in which the effort to start a new business involved a takeover of an existing business, use of a franchise, or sponsorship by an existing business, leaving a starting sample of 940. Additional sample attrition flowed from those dropping out of the panel (186 cases) between waves of data collection and those who abandoned the venture from the first wave to the second wave (174 cases). Remaining attrition (94 cases) was primarily associated with those who were unable to provide estimates of sales at either the first or second wave. As part of our robustness checks, we included a Heckman correction to control for potential nonrandom attrition from the sample.

Dependent variables

We describe below the separate dependent variables used to test each of our hypotheses. In all cases, the dependent variable utilized in the regression models is the change in the value from Wave 1 to Wave 2 (i.e. Wave 2 value minus Wave 1 value).³

Perceptions of environmental uncertainty were drawn from a series of 11 questions included in the mail survey portion of the PSED I. These questions focus on state uncertainty, or the nascent's difficulty in predicting the state of the external environment. Each question was preceded by the phrase, 'Considering the economic and community context for the new firm, how certain are you that the new business will be able to accomplish each of the following?', and the response scale was anchored from very high (5) to very low (1). We reverse scored these items such that high scores indicate high levels of uncertainty. As suggested by the prior literature using these items (Liao and Gartner, 2006; Matthews and Human, 2000, 2004), three factors were extracted from the 11 questions representing financial, competitive, and operational uncertainty. *Financial Uncertainty* (alpha = 0.81) consists of four items dealing with obtaining capital from external sources such as banks and venture capitalists. *Competitive Uncertainty* (alpha = 0.71) is made up of four items concerned with attracting customers, competing with other firms, complying with regulations, and keeping up with technological advances. *Operational Uncertainty* (alpha = 0.66) consists of three items dealing with obtaining raw materials, attracting employees, and dealing with distributors. We utilized these three dimensions as three separate dependent variables.⁴

We obtain our measure of Entrepreneurial Self-Efficacy by averaging responses to three items. Respondents indicated their agreement with the following items on a scale of 1 (completely disagree) to 5 (completely agree): (1) Overall, my skills and abilities will help me start a business; (2) My past experience will be very valuable in starting a business; and (3) I am confident I can put in the effort to start a business. These items loaded on a single factor (alpha = 0.75) in a factor analysis of entrepreneurial expectancy items included in the PSED (Gatewood, 2004), and they have been

used in prior research such as Townsend et al. (2010) although they labeled the variable ‘ability expectancy’.

Expectations of financial performance were measured using respondent estimates of fifth-year sales of their new ventures. While respondents provided estimates of both first-year and fifth-year sales, we elected to utilize fifth-year sales because the early sales figures from start-up ventures may not be reflective of the potential of the business. Estimated sales were used because neither version of the PSED provides data on projected total profits or margins. We take the natural log of the sales measure as it is significantly skewed.

Independent variables

Current Planning Activities is a summation of a series of binary variables indicating whether between Wave 1 and Wave 2 a nascent had engaged in certain planning activities. The list of activities in PSED I and II is very similar, with some minor differences. In both sets of regressions, planning activities included the following: wrote a business plan, worked to define the market for the opportunity, sought external funds, developed financial statement projections, and developed/tested/completed a prototype for the product or service. For the self-efficacy and uncertainty regressions using the PSED I data, planning activities also included the following: ‘took classes related to entrepreneurship’ and ‘devoted full-time effort to the start-up’. For the expectations regressions using the PSED II data, planning activities also included the following: ‘collected information about competitors’, ‘began talking to customers’, and ‘determined regulatory requirements’.

Control variables

We control first for the number of planning activities completed before the Wave 1 data collection as the completion of activities prior to the survey might be associated with subsequent changes in beliefs. The amount of time each individual has spent in nascency was then controlled; this was necessary because the PSED’s process for identifying nascent leads to wide variance in the amount of time the individuals have been involved with trying to start their business prior to the first interview. The length of time individuals have already spent in the process could influence subsequent changes in beliefs.

Dummy variables were included to control for possible differences driven by the nascent’s status as of Wave 2, either launched, abandoned, or still in process (the excluded category).⁵ Next we controlled for the interest in financial returns by including a measure of the strength of financial motive based on responses to three questions around career reasons: (a) ‘earn a larger personal income’, (b) ‘financial security’, and (c) ‘build great wealth (Carter et al., 2003). The respondents rated each item between 1 and 5 (the highest). Because the confidence level of the nascent might affect changes in beliefs, we added a confidence measure based on the nascent’s estimate of how likely, on a scale of 0–100, it would be that the business would be operating 5 years in the future.⁶ Demographic controls include a dummy variable indicating whether the nascent has previously been involved in a start-up effort, gender, age, race, and years of education. Finally, we included a series of industry dummies to account for any effects associated with particular industrial sectors (results for industry dummies not included in regression tables). Tables 1 and 2 present descriptive statistics for the variables included in the PSED I (uncertainty and self-efficacy) regressions and the PSED II (sales expectations) regressions, respectively.⁷

Results

The PSED I and PSED II data sets include survey weights so that calculated statistics are representative of the overall US population. These weights account for differences in selection probabilities and response rates (Curtin and Reynolds, 2004). Our ordinary least-squares regressions utilize these weights as recommended by Reynolds and Curtin (2004, 2008).

Table 3 presents the results of the analysis regarding changes in perception of financial, competitive, and operational uncertainty, respectively. The dependent variable in each model is the change in uncertainty between Wave 2 and Wave 1; positive values of the dependent variable indicate increases in uncertainty, while negative values indicate reductions. Each model includes the Wave 1 value as a control, and these values are unsurprisingly associated negatively with changes in uncertainty. Hypothesis 1 predicted that the number of planning activities would be associated with greater reductions in uncertainty. The hypothesis receives support for both financial uncertainty and competitive uncertainty as shown by the significant negative coefficients of *Current Planning Activities* in Models 2 ($b = -0.090, p < 0.05$) and 5 ($b = -0.073, p < 0.05$). The hypothesis is not supported for operational uncertainty; the relevant coefficient in Model 8 is in the predicted direction, but the effect is not significantly different from zero.

The remaining models of Table 3 present the results of regressions that include two corrections. First, we adjusted for potential selection effects driven by sample attrition; attrition flowed from both dropping out of the panel between Wave 1 and Wave 2 of the survey ($n = 193$) and from a failure to complete the mail surveys ($n = 191$). To address possible bias caused by attrition from the sample, we included a Heckman correction (Heckman, 1979).⁸ Second, we added a correction for possible endogeneity of planning activities by using a set of instrumental variables for *Current Planning Activities*, implemented through a two-stage least-squares approach.⁹ Models 3, 6, and 9 include both the selection correction and the instrumented current planning activities. The results are largely consistent with the prior models, and there is now also support for the relationship between *Current Planning Activities* and operational uncertainty.¹⁰

Table 4 shows the regression results associated with the *Entrepreneurial Self-Efficacy* dependent variable. The results indicate that those involved in larger start-up teams and those with more prior entrepreneurial experience have greater increases in self-efficacy; men tend to have smaller changes. As with the uncertainty regressions, the Wave 1 value of the dependent variable is also highly significant – those with initial high levels of self-efficacy see less increase. The coefficient of *Current Planning Activities* in Model 11 ($b = 0.053, p < 0.05$) supports the prediction of Hypothesis 2. Engaging in more planning activities is associated with increased levels of self-efficacy. Model 12, which includes the previously described corrections for potential selection effects and the possible endogeneity of *Current Planning Activities*, also supports the prediction of Hypothesis 2 ($b = 0.312, p < 0.05$).

We turn next to the results regarding changes in sales expectations. Prior to discussing the results related to the direction of changes in beliefs (either positive or negative), we note that we first ran regressions with a dependent variable of absolute value changes in sales expectations to evaluate whether planning activities were associated with greater changes regardless of direction (results available from authors). Results of these regressions indicated that number of planning activities was positively associated with absolute value changes in sales expectations. That is, completion of more planning activities tends to be associated with both positive and negative changes in sales expectations. Table 5 presents the results of the analysis regarding the direction of the changes in expectations of fifth-year sales. In addition to the significant relationship for the Wave 1 expectations, the models provide some evidence that those involved in larger start-up teams and those with more entrepreneurial experience have

Table I. Descriptive statistics for PSED I uncertainty – self-efficacy regressions.

Variable	Mean	SD	Correlations*																							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)				
(1) Change in financial uncertainty	0.053	0.973																								
(2) Change in competitive uncertainty	0.025	0.728	0.26																							
(3) Change in operational uncertainty	0.152	1.039	0.30	0.26																						
(4) Change in entrepreneurial self-efficacy	0.024	0.600	-0.04	-0.12	0.01																					
(5) Current planning activities	1.284	1.410	-0.01	-0.12	-0.11	0.03																				
(6) Financial uncertainty Wave I	2.992	1.016	-0.61	-0.18	-0.07	0.01	-0.08																			
(7) Competitive uncertainty Wave I	1.787	0.659	-0.15	-0.62	-0.10	-0.06	-0.08	0.23																		
(8) Operational uncertainty Wave I	1.965	0.769	-0.25	-0.22	-0.64	-0.12	-0.05	0.20	0.40																	
(9) Entrepreneurial self-efficacy Wave I	4.383	0.677	-0.07	0.26	0.01	-0.53	0.13	-0.08	-0.38	-0.11																
(10) Prior planning activities	4.226	1.685	-0.11	-0.09	0.01	-0.06	0.12	0.09	0.03	0.04	0.17															
(11) Start-up team size	1.806	1.138	-0.11	0.01	0.06	0.14	0.05	-0.11	-0.18	-0.11	0.03	-0.05														
(12) Time in nascency	4.146	5.816	-0.06	-0.19	0.04	-0.15	0.06	0.07	0.15	-0.05	0.02	0.10	-0.13													
(13) Launched	0.357	0.517	0.16	-0.01	0.07	-0.02	0.34	-0.07	-0.07	-0.09	0.21	0.19	-0.02	-0.16												
(14) Abandoned	0.143	0.389	0.06	0.17	-0.06	0.08	-0.40	-0.06	-0.03	0.09	-0.13	-0.03	0.12	-0.13	-0.30											
(15) Prior entrepreneurial experience	0.500	0.541	-0.08	0.05	0.13	0.06	0.08	0.14	-0.17	-0.22	0.20	0.14	-0.08	-0.01	0.01	-0.11										
(16) Strength of financial motive	4.035	0.976	-0.03	0.11	-0.03	-0.09	-0.09	-0.04	-0.21	0.02	0.11	0.01	0.03	-0.11	-0.03	0.12	0.09									
(17) Confidence	85.331	21.791	0.02	-0.03	-0.04	-0.05	0.07	-0.13	-0.19	-0.06	0.18	-0.05	0.06	0.04	0.17	-0.23	-0.18	-0.06								
(18) Gender (Male = 1)	0.661	0.466	-0.02	0.07	-0.02	-0.12	0.00	0.01	-0.04	0.04	0.07	0.15	0.14	0.06	-0.09	0.08	-0.02	0.12	-0.01							
(19) Age	39.387	11.592	-0.05	-0.14	0.08	-0.08	0.07	0.15	0.16	-0.04	0.11	0.15	-0.05	0.32	-0.08	-0.03	0.23	-0.30	-0.09	0.08						
(20) Race (White = 1)	0.765	0.465	0.00	0.12	0.05	-0.03	0.08	-0.03	-0.04	-0.08	0.04	0.01	0.17	-0.10	0.17	0.14	-0.08	-0.24	0.06	0.01	0.17					
(21) Years of education	14.370	2.389	-0.07	-0.08	0.00	-0.06	0.03	0.02	0.13	-0.07	0.02	0.14	0.00	-0.01	0.13	-0.08	0.21	-0.04	-0.16	0.07	0.15	0.03				

n = 137; SD: Standard Deviation.
Correlations in bold are significant at p < 0.05.

Table 2. Descriptive statistics for PSED II performance expectations regressions.

Variable	Mean	SD	Correlations*														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)			
(1) Change in sales expectations	-0.258	2.152															
(2) Current planning activities	1.706	1.457	0.05														
(3) Wave I sales expectations	11.809	2.258	-0.32	0.14													
(4) Prior planning activities	4.015	2.332	0.02	-0.23	0.20												
(5) Start-up team size	1.670	0.987	0.01	-0.02	0.28	0.20											
(6) Time in nascency	3.087	4.262	0.03	-0.12	0.01	0.04	-0.01										
(7) Launched	0.124	0.362	0.02	-0.01	0.05	0.12	0.00	-0.07									
(8) Prior entrepreneurial experience	0.434	0.557	0.06	0.01	0.15	0.17	0.08	0.00	0.06								
(9) Strength of financial motive	3.471	1.224	-0.03	0.04	0.29	0.03	0.04	-0.01	0.07	-0.06							
(10) Gender (Male = 1)	0.597	0.566	0.04	0.10	0.18	0.00	-0.01	-0.01	0.04	0.04	0.07						
(11) Age	40.933	13.362	-0.03	-0.08	0.01	0.05	0.07	0.08	-0.02	0.30	-0.26	-0.01					
(12) Race (White = 1)	0.712	0.587	0.03	-0.11	-0.14	0.10	0.06	-0.09	0.14	0.14	-0.26	-0.03	0.21				
(13) Years of education	14.562	3.223	-0.04	-0.08	0.05	0.19	0.08	-0.11	0.06	0.16	-0.24	-0.12	0.23	0.22			

n = 486; SD: Standard Deviations.
Correlations in bold are significant at p < 0.05.

Table 3. Uncertainty regressions (Dependent variable: Wave 2 - Wave 1 estimate of uncertainty).

	Financial Uncertainty			Competitive Uncertainty			Operational Uncertainty		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Base	Main	Heckman+LIML	Base	Main	Heckman+LIML	Base	Main	Heckman+LIML
Current planning activities									
Wave 1 uncertainty	-0.553 ^{***} (0.075)	-0.090 ⁰ (0.038)	-0.434 ⁺ (0.186)	-0.679 ^{***} (0.073)	-0.073 ⁰ (0.030)	-0.326 ⁺ (0.132)	-0.791 ^{***} (0.071)	-0.036 (0.042)	-0.407 ⁰ (0.204)
Prior planning activities	-0.074 ⁺ (0.040)	-0.067 ⁺ (0.038)	-0.05 (0.043)	-0.011 (0.027)	-0.685 ^{***} (0.071)	-0.703 ^{***} (0.071)	0.020 (0.039)	0.023 (0.038)	-0.749 ^{***} (0.082)
Start-up team size	-0.132 ⁺ (0.070)	-0.123 ⁺ (0.069)	-0.133 (0.089)	-0.076 ^{**} (0.034)	-0.066 ⁺ (0.034)	-0.152 ⁺ (0.071)	-0.021 (0.048)	-0.015 (0.049)	-0.030 (0.079)
Time in nascency	-0.004 (0.010)	-0.004 (0.010)	-0.004 (0.012)	-0.008 (0.006)	-0.007 (0.006)	-0.016 ⁺ (0.008)	-0.008 (0.008)	-0.008 (0.008)	-0.005 (0.010)
Launched	0.174 (0.150)	0.206 (0.150)	0.316 ⁺ (0.170)	-0.004 (0.093)	0.019 (0.091)	0.055 (0.099)	-0.018 (0.133)	0.000 (0.135)	0.148 (0.170)
Abandoned	0.205 (0.156)	0.079 (0.160)	-0.397 (0.284)	0.194 (0.118)	0.094 (0.128)	-0.256 (0.236)	0.111 (0.152)	0.065 (0.163)	-0.423 (0.302)
Prior entrepreneurial experience	0.128 (0.112)	0.153 (0.112)	0.289 ⁺ (0.171)	-0.032 (0.084)	-0.023 (0.084)	0.103 (0.111)	-0.096 (0.118)	-0.087 (0.120)	0.076 (0.158)
Strength of financial motive	-0.093 (0.060)	-0.099 ⁺ (0.058)	-0.145 ⁺ (0.069)	-0.073 (0.044)	-0.077 ⁺ (0.045)	-0.105 ⁺ (0.054)	-0.057 (0.064)	-0.061 (0.064)	-0.069 (0.073)
Confidence	-0.003 (0.003)	-0.003 (0.003)	-0.004 (0.004)	-0.003 ⁺ (0.002)	-0.003 ⁺ (0.002)	-0.006 ^{**} (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)
Gender (Male = 1)	0.05 (0.116)	0.042 (0.113)	0.003 (0.125)	0.052 (0.081)	0.041 (0.080)	-0.008 (0.090)	-0.102 (0.110)	-0.102 (0.111)	-0.020 (0.141)
Age	0.001 (0.005)	0.002 (0.005)	0.000 (0.006)	-0.001 (0.004)	-0.001 (0.004)	-0.015 ⁺ (0.008)	0.002 (0.005)	0.002 (0.005)	-0.007 (0.009)
Race (White = 1)	0.039 (0.119)	0.042 (0.115)	-0.054 (0.205)	0.119 (0.086)	0.119 (0.085)	-0.048 (0.131)	-0.094 (0.119)	-0.091 (0.119)	-0.129 (0.146)
Years of education	-0.005 (0.029)	-0.009 (0.028)	-0.016 (0.036)	0.015 (0.020)	0.014 (0.019)	0.005 (0.021)	-0.003 (0.027)	-0.005 (0.027)	-0.011 (0.030)
Selection correction term			0.577 (0.787)			1.248 ⁺ (0.646)			0.601 (0.488)
Constant	2.802 ^{***} (0.735)	2.965 ^{***} (0.725)	3.478 ^{***} (0.785)	1.575 ^{***} (0.469)	1.658 ^{***} (0.472)	1.939 ^{***} (0.544)	1.719 ^{***} (0.708)	1.756 ^{***} (0.712)	1.814 ^{***} (0.812)
Industry dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.400	0.416	N/A	0.408	0.423	N/A	0.438	0.440	NA
F-value	5.915 ^{***}	5.398 ^{***}	3.587 ^{***}	6.984 ^{***}	7.511 ^{***}	6.112 ^{***}	9.736 ^{***}	9.152 ^{***}	6.310 ^{***}
Number of observations	188	188	188	248	248	248	234	234	234

LIML: limited information maximum likelihood.

Robust standard errors in parentheses* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4. Entrepreneurial self-efficacy regressions (dependent variable: Wave 2–Wave 1 estimate of entrepreneurial self-efficacy).

	Model 10	Model 11	Model 12
	Base	Main	Heckman+LIMLIV
Current planning activities		0.053* (0.026)	0.312* (0.142)
Wave 1 entrepreneurial self-efficacy	-0.550** (0.063)	-0.559** (0.065)	-0.612** (0.086)
Prior planning activities	0.028 (0.022)	0.024 (0.021)	0.009 (0.035)
Start-up team size	0.081* (0.036)	0.078* (0.034)	0.079 (0.075)
Time in nascency	-0.009 (0.008)	-0.010 (0.007)	-0.011 (0.011)
Launched	0.072 (0.066)	0.050 (0.065)	-0.052 (0.093)
Abandoned	-0.018 (0.103)	0.047 (0.110)	0.357+ (0.203)
Prior entrepreneurial experience	0.168* (0.070)	0.159* (0.070)	0.121 (0.088)
Strength of financial motive	0.049 (0.040)	0.051 (0.040)	0.073 (0.064)
Confidence	0.002+ (0.001)	0.002+ (0.001)	0.002 (0.003)
Gender (Male = 1)	-0.153* (0.068)	-0.142* (0.067)	-0.065 (0.113)
Age	-0.001 (0.003)	-0.001 (0.003)	0.000 (0.004)
Race (White = 1)	-0.001 (0.098)	-0.013 (0.099)	-0.030 (0.167)
Years of education	-0.014 (0.015)	-0.012 (0.015)	-0.002 (0.017)
Selection correction term			-0.236 (0.793)
Constant	2.021** (0.413)	1.996** (0.414)	1.843** (0.467)
Industry dummies	YES	YES	YES
R-squared	0.380	0.390	N/A
F-value	5.593**	5.252**	4.142**
Number of observations	260	260	260

LIML: limited information maximum likelihood.

Robust standard errors in parentheses + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

greater increases in sales expectations. The coefficient of 0.136 ($p < 0.05$) on *Current Planning Activities* in Model 14 provides support for Hypothesis 3a. Nascents who engage in more planning activities experience greater increases in future performance expectations. As with the uncertainty and self-efficacy analyses, we also considered corrections for attrition and for the possible endogeneity of planning activities.^{11,12} The results of Model 15, which include both corrections, provide further support of the relationship between the planning activities and higher sales expectations.

Finally, we have reported results using the first two waves of the PSED I and PSED II data. We also ran pooled regressions as robustness checks across the first four waves of data, that is, we calculated the change between each adjacent wave (Wave 1 and 2, Wave 2 and 3, and Wave 3 and 4) and pooled these observations. For the entrepreneurial self-efficacy and performance expectations predictions (Hypotheses 2 and 3), the pooled results were similar to the Wave 1–2 results (magnitude and significance). For the uncertainty perceptions, we did not find significant changes in uncertainty perceptions related to the number of planning activities in the later wave information. Apparently, planning activities have a greater impact earlier in the process compared to later, at least for reducing uncertainty. This also suggests that there may be some value in a more detailed examination of nascent entrepreneurial data sets across multiple waves. In particular, this would open the empirical analyses to a number of interesting longitudinal analysis techniques.

Table 5. Performance expectations regressions (dependent variable: Wave 2–Wave 1 estimate of projected Year 5 logged sales).

	Model 13	Model 14	Model 15
	Base	Main	Heckman+LIMLIV
Current planning activities		0.136* (0.057)	0.727* (0.336)
Wave 1 sales expectations	-0.289** (0.049)	-0.306** (0.050)	-0.380** (0.069)
Prior planning activities	0.043 (0.029)	0.066* (0.032)	0.145* (0.060)
Start-up team size	0.154+ (0.079)	0.159* (0.076)	0.201* (0.085)
Time in nascency	0.011 (0.019)	0.017 (0.018)	0.040+ (0.021)
Launched	0.080 (0.146)	0.073 (0.152)	0.038 (0.219)
Prior entrepreneurial experience	0.323* (0.133)	0.306* (0.129)	0.223 (0.149)
Strength of financial motive	0.090 (0.064)	0.095 (0.063)	0.099 (0.071)
Gender (Male = 1)	0.252+ (0.134)	0.238+ (0.135)	0.198 (0.161)
Age	-0.004 (0.006)	-0.003 (0.006)	-0.003 (0.007)
Race (White = 1)	-0.111 (0.162)	-0.078 (0.160)	0.091 (0.214)
Years of education	-0.002 (0.025)	-0.001 (0.025)	-0.006 (0.031)
Selection correction term			0.547 (0.604)
Constant	2.378** (0.679)	2.123** (0.654)	1.042 (0.996)
Industry dummies	YES	YES	YES
R-squared	0.163	0.178	N/A
F-value	2.907**	2.867**	2.479**
Number of observations	486	486	486

LIML: limited information maximum likelihood.

Robust standard errors in parentheses + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

Our review of the method used for this study and its associated results have highlighted the positive aspects of the PSED I and PSED II data sets; however, prior to turning to the discussion, it is important to acknowledge the data sets also include certain limitations. Both sets consist of self-reported data from the United States, which may result in some bias in reporting. The opportunities under consideration by the PSED nascent entrepreneurs tend to be of relatively small scale. Although we see no obvious reason why these issues would prevent our findings from generalizing to non-US samples or to potential ventures of more significant scale, the results of our study should be applied to these other areas cautiously. Also, while the data are quite extensive, they are certainly not exhaustive. Data availability resulted in our choice of a certain list of planning activities; however, other planning-related activities remain uninvestigated. The beliefs we chose to examine were somewhat constrained as well, focusing on changes in beliefs related to the environment, the individual, and the financial performance of the opportunity. It would be useful to know whether and how individuals update a wider range of perceptions and other beliefs as they proceed through the nascency stage and how those might be related to particular types of planning activities. In particular, beliefs about other performance expectations, such as profit, would be notable to investigate.

Discussion

Our work provides strong empirical support to views of the entrepreneurial process that emphasize the continuing, dynamic process of change that occurs via opportunity refinement and evaluation

(e.g. Bhawe, 1994; Corner and Wu, 2012; Lumpkin et al., 2004). In particular, our results indicate that engaging in planning activities is associated with reductions of financial and competitive uncertainty (consistent with Hypothesis 1), increases in entrepreneurial self-efficacy (consistent with Hypothesis 2), and increases in performance (sales) expectations (consistent with Hypothesis 3a). Overall, our work provides unique evidence from a large-scale, representative sample of nascent entrepreneurs working to set up real businesses that nascency involves ‘a critical, albeit often underestimated, learning process’ (Ravasi and Turati, 2005: 138). Our research also highlights the importance of start-up activities in the entrepreneurial process; however, unlike prior literature focused on resource generation aspects and the relationship of such activities to making progress through the process (e.g. Davidsson and Honig, 2003; Delmar and Shane, 2004; Parker and Belghitar, 2006), this study highlights the evaluative and learning aspects of these activities. In this respect, our results complement those of Dimov (2010) who found a relationship between early planning activities and opportunity confidence. We build upon that work by showing the continuing impact of planning activities through the nascency process and link those activities to ongoing changes in beliefs. Taking the two studies together bolsters the view of nascent entrepreneurship as a complex, continuing process where activities such as planning continue to generate an evolving view of the opportunity. Thus, we might expect certain activities to be a continuing characteristic of entrepreneurial behavior despite passing what are often seen as important transition points in more traditional, step-wise views of nascent entrepreneurship.¹³ Extending the findings of Dimov (2010), we demonstrate effects on other beliefs such as sales expectations and individual dimensions of uncertainty. Planning activities appear to be particularly useful for reducing financial and competitive uncertainty. It is understandable, however, that they might be less useful in reducing operational uncertainty, which may actually require the nascent to launch the venture to learn about such issues. We also show that these results hold in a broader sample that includes team-based start-ups.

Such changes in beliefs are particularly important because of their relationship to entrepreneurial outcomes. For example, McMullen and Shepherd (2006) note that ‘the amount of uncertainty is considered to be the barrier between prospective entrepreneurs and entrepreneurial action’ (p. 133), and research supports the idea that efforts to reduce uncertainty are associated with higher entrepreneurial performance (Sawyer et al., 2003). Townsend et al. (2010) demonstrate that nascent entrepreneurs in the PSED who possess higher levels of ability expectancy (i.e. entrepreneurial self-efficacy) have increased probability of achieving launch, and De Clercq and Arenius (2006) found similar evidence with nascent entrepreneurs in Belgium and Finland. We are unaware of prior studies that explicitly link changes in performance expectations to probability of achieving launch; however, the rationale of linking higher expected payoffs to increased likelihood of exploitation is clear. Moreover, we investigated this relationship in our data and found as shown in Model 16 of Table 6 that changes in sales expectations are indeed related to probability of launch in our sample of PSED II entrepreneurs.

How well the changes in belief we observe represent ‘true learning’ is an interesting question for further study. We observed significant changes in beliefs associated with planning activities; however, one limitation of our study is that we have no information on whether those changes in beliefs truly represent improved knowledge. The nature of learning is important because if indeed, the learning that we observe is accurate, our research suggests that nascent entrepreneurs may clearly benefit from engaging in more planning activities. While we note the caution of Bower and Hilgard (1981) who advise that ‘only confusion results if performance and learning are equated’, we did find some evidence that suggests higher performance for nascents who have learned (p. 14). Model 17 of Table 6 indicates that nascent entrepreneurs who have higher expected performance of their opportunity actually achieve higher first-year sales, necessarily tentative evidence given

Table 6. Regressions relating sales expectations to outcomes.

	Model 16	Model 17
	DV = $p(\text{launch})$	DV = $\log(\text{first-year sales})$
Change in sales expectations	0.261* (0.126)	0.647** (0.072)
Current planning activities	-0.032 (0.173)	0.183** (0.055)
Wave 1 sales expectations	0.117 (0.083)	0.700** (0.069)
Prior planning activities	0.252* (0.098)	0.123** (0.033)
Start-up team size	-0.147 (0.168)	-0.089 (0.100)
Time in nascency	-0.099 (0.065)	-0.001 (0.020)
Prior entrepreneurial experience	0.131 (0.329)	0.135 (0.139)
Strength of financial motive	0.217 (0.138)	-0.150+ (0.080)
Gender (Male = 1)	0.296 (0.311)	-0.229 (0.182)
Age	-0.004 (0.015)	-0.003 (0.006)
Race (White = 1)	1.409* (0.627)	1.396** (0.148)
Years of education	0.003 (0.074)	-0.021 (0.022)
Constant	-6.312** (1.407)	0.585 (1.021)
Industry dummies	YES	YES
Wald chi-squared	33.99**	N/A
Number of observations	482	66

DV: dependent variable.

Robust standard errors in parentheses + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

the relatively smaller sample size compared to our other regressions. Nevertheless, this evidence is suggestive of the potential value of engaging in planning activities, which leads to learning and increases in performance expectations, and this evidence is consistent with prior literature suggesting links between entrepreneurial learning and performance outcomes (e.g. Liu et al., 2013). Additional research might investigate what other factors foster learning as individuals investigate entrepreneurial opportunities. A limitation of our research in this area, however, is that we are unable to directly measure the actual microprocesses of learning as they occur. Other types of research, such as experiments or field-based studies, would allow a fine-grained investigation of how and why exactly these outcomes (i.e. changes in beliefs) are occurring from planning activities. Such an approach would also better establish a causal relationship between planning and changes in beliefs. Our work generates evidence consistent with this causal relationship, but ultimately it cannot directly ascertain what is driving the particular findings.¹⁴

A particularly noteworthy aspect of our findings is the degree of change in nascent entrepreneur expectations for the eventual performance of their business. Just over 90% of the sample saw projections of the future sales of their business change between the two survey waves. More specifically, the median Wave 1 annual revenue expectation in our sample was US\$100,000. For nascents whose revenue expectations increased ($n = 181$), the median annual revenue expectation at Wave 2 was US\$200,000, a 100% increase. These dramatic changes occurred over the relatively short time frame of one year. Given that the expected economic value of the entrepreneurial opportunity at least partially influences the exploitation/launch decision, it is important to first realize that large changes are occurring in these estimates but it is also critical to determine the drivers of these changes.

The above discussion raises two interesting issues for further investigation. First is the magnitude of the changes, which is economically quite significant. Why do we see such large changes in

expectations over such a short period of time? What are the specific drivers of these changes; that is, what is the nature of the information that is being uncovered during the nascency period that results in such dramatic revisions of expected performance? The second noteworthy aspect of the above descriptive statistics is the presence of both increased and decreased expectations. Our theoretical development and empirical investigation focused largely on what might be described as positive changes in beliefs, such as the increases in sales expectations described above; however, given the pervasiveness of negative changes as well, a fruitful area for further consideration is the driver of these changes. Somewhat unexpectedly, a large number of nascent entrepreneurs reduced their beliefs about the expected performance of the potential venture. This evidence seems inconsistent with common views of nascent entrepreneurs as imperfect decision makers subject to a wide variety of mental biases, such as overconfidence and escalation of commitment. A significant portion of nascents do appear to have the ability to incorporate negative information into their beliefs and expectations.

From a practitioner perspective, our results suggest that nascent entrepreneurs should consider a broader interpretation of the value of planning activities. Focusing on the legitimation aspects of planning might lead nascents to see it largely as an obligation imposed by external parties. Our research indicates that planning also serves an important complementary role of generating information and driving changes in beliefs, which will ultimately foster development of the opportunity. Relatedly, while planning activities may be undertaken in an effort to convince external parties to support the potential venture, it is important for the nascent to keep an open mind to the information being generated and use it for internal purposes to continually evaluate the value of proceeding with the opportunity.

Practitioners and researchers may also note that our analyses raise some evidence suggestive of an influence of team-based start-ups on learning in the nascent entrepreneurial process. A number of the specifications across all three types of beliefs (uncertainty, sales expectations, and self-efficacy) generated at least marginally significant support for a relationship between team size and greater changes in beliefs. This suggests that there may be benefits to a joint planning environment and the social aspects of a team-based start-up. Perhaps larger teams provide greater repositories of knowledge resources that nascents may draw upon as they attempt to learn more about their entrepreneurial opportunities in addition to access to a larger external network. Moreover, a larger team size provides greater variation in experience, which could be helpful in evaluating the implications of new information for the entrepreneurial opportunity under consideration. This suggests an area worthy of future research.

We believe our work has a number of additional research implications. First, our results indicate that the factors that underlie the decision to engage in an entrepreneurial career through a venture launch continue to undergo significant changes during the nascency stage of the entrepreneurial process. The identification of a potential opportunity and the ensuing efforts to establish a new venture are merely the start of a continuing process of learning about the opportunity. Thus, rather than characterizing an entrepreneurial career choice as a binary, one-time choice, we should view the decision to pursue an entrepreneurial opportunity as a dynamic decision process in which the decision is subject to updating and revision as more information about the opportunity becomes available. Our work here is consistent with recent research by Yusuf (2012) who uses cluster analysis to distinguish between types of nascent exit. One group of exiting nascents ('reactive exit') invested very little effort to investigate the opportunity, while a separate group engaged in much more evaluation activity ('intelligent exit'). Interpreting these results, Yusuf (2012) reasoned that planning activities were valuable because they generated information likely to influence beliefs and expectations surrounding the opportunity. Our work moves beyond this supposition to provide specific evidence of an association between planning

activities and changes in important beliefs surrounding the venture. Our evidence of significant negative changes in performance expectations along with Yusuf's (2012) speculation regarding 'intelligent exit' suggests that we should consider a more cautious approach in labeling attrition from the entrepreneurial process as a failure. It may simply be that a significant portion of those who elect to abandon pursuit of an entrepreneurial opportunity have simply discovered that the opportunity is insufficiently attractive. If a nascent entrepreneur learns during evaluation that an opportunity is less valuable than originally believed, failure to exploit that opportunity is not necessarily evidence of a bad outcome. If expected returns are no longer sufficient to compensate for bearing the uncertainty of the opportunity, the decision to abandon the opportunity should be seen as a rational decision and not a failure.

Second, our results reinforce the complementarity of planning and learning during the entrepreneurial process. The relationship we identified between planning activities and learning was surprisingly similar across a wide variety of individual and opportunity characteristics. For example, one might expect that planning would be less valuable for experienced entrepreneurs. Perhaps engaging in planning activities would be expected to have less of an effect for low-novelty opportunities. Finally, the anticipation might be that planning is less useful for highly confident entrepreneurs who might be less receptive to new information. Additional analyses failed to support any of these expectations. In unreported regressions, we investigated potential moderating influences of factors such as prior experience, other human capital measures, measures of the novelty of the opportunity, and other potential moderators; none significantly weakened the influence of planning activities. Overall, our results provide strong empirical support to learning views of the entrepreneurial process. Updating beliefs as time passes and learning occurs is also consistent with a real options perspective on entrepreneurial opportunities. When facing uncertain opportunities, individuals can invest to resolve uncertainty and then decide whether to exercise or abandon the option.

In general, our research highlights the need for more process research to better understand how individuals change their beliefs, expectations, emotions, and other mental representations during the opportunity development/exploration stage. Not only are these changes in and of themselves important, but they are likely to have significant future impact given the potential for path dependency in the entrepreneurial process.

Conclusion

This research began with a broad view of the nascency stage and demonstrated that it consists of more than just the gathering of resources and pursuing implementation actions by fully committed entrepreneurs. We provided a unique investigation of the existence and determinants of changes in expectations and perceptions regarding environmental uncertainty, entrepreneurial self-efficacy, and financial performance during the nascency stage of the entrepreneurial process. This stage of the process truly involves continuing evaluation and learning, resulting in significant changes in beliefs. The degree of these changes is influenced by the planning activities in which the entrepreneur engages. Overall, our quest to understand the decision to engage in entrepreneurial activities will be furthered by a clearer understanding of the dynamic nature of this decision and the inherent learning aspects of the nascency stage of the entrepreneurial process.

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Notes

1. The second wave PSED I sales expectation question was asked only of people who answered that an employee had been hired either in the first wave or in the second wave.
2. The algorithm is referred to as *kscleans06.sps* and downloaded from <http://shaverk.people.cofc.edu/kscleans06.sps>
3. In the PSED II data, the waves are referenced by letter. We use numbers here for convenience.
4. To ensure compatibility and comparison with prior research in this area (e.g. Liao and Gartner, 2006; Matthews and Human, 2004), we decided to proceed with this operational uncertainty measure despite a reliability slightly lower than the recommended cutoff of 0.70 (Nunnally, 1994). We verified the three-factor solution for the uncertainty measures and the one-factor solution for the entrepreneurial self-efficacy measure via exploratory factor analysis (principal components factor analysis with varimax rotation, retaining factors with an eigenvalue greater than one) as well as a confirmatory factor analysis. Factor loadings for each item were in excess of standard guidelines.
5. The *Abandoned* dummy is not included in the sales expectations regression because those who abandoned the effort were not asked about future sales expectations.
6. The confidence variable is not available in the PSED II data set, so it is not included in sales expectations analysis.
7. We considered adding data from additional waves of the PSED data that would have allowed us to examine longitudinal empirical models. Unfortunately, as we attempted to extend the panel, we found fewer and fewer individuals who participated in multiple ongoing waves with answers to the variables in our study, resulting in inadequate sample sizes to conduct these analyses.
8. To achieve identification in the selection correction model, the set of variables employed in the selection probit were the same as those used in the final regression models with the following exceptions. Following Parker and Belghitar's (2006) suggestion, the selection equation included a set of regional dummies to capture potential differences in regional migration patterns, and it also included measures of whether the nascent was married and whether he or she was employed. The selection equation did not include any variables requiring information from future waves, that is, whether the nascent achieved launch.
9. We used three variables to instrument for planning activities. They included respondent income (logged), a measure of similar industry experience (logged years), and a Likert scaled item (*completely disagree* to *completely agree*) in response to the question, 'If I work hard, I can successfully start a business'. To test the relevance of the instruments used, we compared first-stage *F*-statistics to the critical values recommended by Stock and Yogo (2004). The instruments were only weakly related, raising a concern because weak instruments result in asymptotic bias that increases with the instruments' weakness. In the absence of strong instruments, we elected to utilize limited information maximum likelihood (LIML) estimation, which is generally unbiased with weak instruments and is also preferred for small sample sizes (Bascle, 2008). We also checked the exogeneity of the instruments to confirm that they were not themselves correlated with the error term of the second-stage equation. The Hansen's *J*-statistic supports a conclusion of exogeneity.
10. The raw magnitude of the planning activities coefficients in the correction models is increased; however, this reflects the use of predicted values for planning activities in the instrumental variables regression. These predicted values have smaller variance, which influences the raw coefficient magnitude. Standardized coefficients are quite similar across the three models. We do not report the *r*-squared in the instrumental variable models because it has 'no natural interpretation' in instrumental variable estimation and is, therefore, 'not very useful' (Wooldridge, 2002: 471).
11. The variables employed in the selection model were the same as those used in the final regression

models with the following exceptions. Following Parker and Belghitar's (2006) suggestion, the selection equation included a set of eight regional dummies to capture potential differences in regional migration patterns that might affect attrition. The selection equation also included measures of the respondent's attitude toward the initial survey and his or her understanding of the initial survey. The selection equation did not include any variables requiring information from future waves, for example, whether the nascent achieved launch.

12. We used four variables to instrument for planning activities. They included: a measure of commitment to the venture defined as the sum of three binary variables that indicate whether the respondent bought materials, major items, or liability insurance for the business; an additional measure of commitment based on whether the respondent agreed, was neutral to, or disagreed with the statement that 'my personal philosophy is to do whatever it takes to establish my own business'; a binary variable indicating whether the nascent's current occupation was white collar; and a binary variable indicating whether being first to market was important for the business. The first-stage *F*-statistics indicated that instruments were weakly related (Stock and Yogo, 2004), hence we again used LIML estimation. The Hansen's *J*-statistic supports the exogeneity of the instruments in each regression equation.
13. Thanks to an anonymous reviewer for suggesting this insight.
14. We appreciate the recommendations of our anonymous reviewers to more carefully consider several of these limitations.

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