



## WHY WE PLAN: THE IMPACT OF NASCENT ENTREPRENEURS' COGNITIVE CHARACTERISTICS AND HUMAN CAPITAL ON BUSINESS PLANNING

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*We examine the impact of nascent entrepreneurs' cognitive attributes and human capital on business planning behavior. We find that entrepreneurial self-efficacy facilitates development of formal business plans and entrepreneurial perseverance promotes engaging in business planning activities. Further, advanced academic education leads nascent entrepreneurs to engage in business planning activities and create formal business plans, but prior work experience has a marginal effect on business plan formality. The results further indicate that a nascent entrepreneur's striving for outside financing promotes business planning activities, while being in a supportive environment or a member of a business association does not impact business planning behavior. Copyright © 2015 Strategic Management Society.*

### INTRODUCTION

Faced with incomplete information and high uncertainty, nascent entrepreneurs, who are in the process of establishing new firms, must determine an appropriate course of action (Alvarez and Busenitz, 2001; Dess, Lumpkin, and Covin, 1997; Gruber, 2010; Hutzschenreuter and Kleindienst, 2006). Business planning has received great attention from entrepreneurship and strategy scholars as a central activity to make sense of business environments and identify an appropriate course of action (Grant, 2003; Miller and Cardinal, 1994; Schwenk and Shrader, 1993; Shane and Delmar, 2004; Shrader, Taylor, and Dalton, 1984). However, the extant literature focuses almost exclusively on the performance effects of business planning (Castrogiovanni, 1996; Schwenk and Shrader, 1993). Further, the limited literature on the antecedents of business planning has uncovered mainly exogenous,

environmental factors where business planning addresses formal requirements of investors and other institutions while the content and type of business planning appears to be less relevant (e.g., Honig and Karlsson, 2004; Kirsch, Goldfarb, and Gera, 2009). Taken together, substantial research questions are raised as to whether an individual's business planning is merely a response to institutional forces or, in addition, if specific characteristics of nascent entrepreneurs can be identified that lead to business planning activities. For instance, prior research highlights that the decision to engage in entrepreneurship is affected by an individual's cognitive characteristics and human capital (Rauch and Frese, 2007; Unger *et al.*, 2011). However, little is known about how these characteristics of nascent entrepreneurs affect their pursuit of business opportunities. By explicating the antecedents that affect an individual's decision to engage in business planning, we can get a better understanding of the role that business planning fulfills for entrepreneurs, which is a long-standing and important debate in entrepreneurship and strategy research (Delmar and Shane, 2003, 2004; Mintzberg, 1981; Mintzberg, 1994; Shane and Delmar, 2004).

Keywords: cognitive characteristics; human capital; institutional forces; business planning; nascent entrepreneurs

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Our study makes two main contributions. First, we analyze whether and how cognitive factors influence the business planning approach. We draw on cognition literature that identifies entrepreneurial self-efficacy and perseverance as salient characteristics of entrepreneurs (Markman, Baron, and Balkin, 2005; Burke, Fraser, and Greene, 2010; Chen, Greene, and Crick, 1998; Groves, Vance, and Choi, 2011; Markman and Baron, 2003; Zhao, Siebert, and Hills, 2005). We study how entrepreneurial self-efficacy and perseverance impact the decision to undertake business planning activities and to what extent the planning approach is formalized. Second, we build on prior research that indicates that prior knowledge and experience of an individual determine the perception and effectiveness of business planning (Burke *et al.*, 2010; Dencker, Gruber, and Shah, 2009). The current article examines if prior knowledge and experience also impact whether and how the individual engages in planning behavior just as the individual's prior knowledge can shape the outcomes of business planning.

This study uses data of the Panel Study of Entrepreneurial Dynamics (PSED) II, which provides detailed information on business formation based on a multi-year tracking of a representative sample of U.S. nascent entrepreneurs (Reynolds, 2007). For the purpose of this study, 479 single-owner founders are identified and examined with respect to their cognitive characteristics, prior experience, and business planning behavior. This research design allows us to assess the impact of an individual entrepreneur's attributes on business planning activities while controlling for the potentially confounding effects at the founding team and organizational level. The current article provides valuable insights on the roles cognition and experience of the individual play for planning behavior and, thus, contributes to the growing literature that stresses the importance of an individual's characteristics in the pursuit of business opportunities (Cassar, 2010; Foss *et al.*, 2008; Gavetti and Rivkin, 2007).

## **THEORY AND HYPOTHESES**

### **Cognitive characteristics and business planning**

In the founding process, the entrepreneur is generally confronted with a high degree of ambiguity and complexity (e.g., Alvarez and Barney, 2005; Busenitz and Barney, 1997; Stone and Brush, 1996).

The entrepreneur's cognition, which encompasses the mental processes of the individual, plays an important part in gathering, storing, transforming, and interpreting information in order to determine the appropriate course of action (Baron, 2004). Entrepreneurship scholars have uncovered that cognitions affect the identification of business opportunities and the decision to pursue perceived opportunities (Baron, 2004; Forbes, 1999). While prior research has shown a significant difference between the cognitive characteristics of non-entrepreneurs and entrepreneurs (Busenitz and Barney, 1997; Chen *et al.*, 1998; Markman and Baron, 2003; Markman *et al.*, 2005), less research is directed at how cognitive characteristics vary among entrepreneurs and how such differences impact the entrepreneurial approach employed. In this research, we highlight two cognitive characteristics (i.e., entrepreneurial self-efficacy and entrepreneurial perseverance) that vary among entrepreneurs and can be expected to impact a nascent entrepreneur's decision of whether and how to engage in business planning.

Prior to analyzing effects of entrepreneurial self-efficacy and entrepreneurial perseverance on business planning, we need to develop an understanding of nascent entrepreneurs' perception of business planning. Business planning is an activity that is directed to predict the future and develop an appropriate course of action (Mintzberg, 1981). As individuals contemplate the future states they face, perceived uncertainty and risk can lead to cognitive dissonance and induce doubts and fears which, in turn, could cause individuals to avoid engaging in more business planning activities. Instead, they may focus on present states they can affect and control. Further, business planning is commonly a far-reaching task resulting in formal and extensive documents that take substantial time to prepare (Honig, 2004). Given the projected time and expertise required to carry out business planning successfully, business planning likely represents a daunting task for nascent entrepreneurs. However, because business planning is broadly portrayed as a key start-up activity in the entrepreneurship domain, aspiring entrepreneurs are expected to perceive it as a desirable and effective activity that increases chances of success (Cassar and Friedman, 2009). Subsequently, we turn to examining the effects of entrepreneurial self-efficacy and perseverance on an individual's decision to engage in business planning activities.

*Entrepreneurial self-efficacy*

Entrepreneurial self-efficacy relates to an individual's belief that one is capable of successfully performing certain roles and tasks in the entrepreneurial domain (Chen *et al.*, 1998). As such, it needs to be distinguished from an individual's general self-efficacy, which captures an individual's belief about general capabilities to perform tasks in a manner to achieve personal goals (Bandura, 1977; Cassar and Friedman, 2009). A person's entrepreneurial self-efficacy can be based on experience in the field, but can also be subject to inductions, assumptions, and cognitive biases (Bandura and Locke, 2003; Chen *et al.*, 1998).

Individuals with higher levels of entrepreneurial self-efficacy perceive that they have the ability to carry out the required tasks in the entrepreneurial domain successfully. Subsequently, their levels of motivation and goal orientation also increase (e.g., Zhao *et al.*, 2005). Since business planning is commonly portrayed as a key entrepreneurship task, these highly self-efficacious individuals should engage in business planning activities due to their greater motivation, goal orientation, and perceived skills while others with low entrepreneurial self-efficacy might shy away due to a lack of confidence and abilities to adequately engage in business planning (Bandura, 1982; Gruber, 2007; Gruber, MacMillan, and Thompson, 2008; Shane and Delmar, 2004).

However, other research suggests that entrepreneurs with high levels of perceived self-efficacy are likely to be subject to optimistic biases leading to underestimation of risks and overestimation of the chances of success (e.g., Palich and Bagby, 1995; Cooper, Woo, and Dunkelberg, 1988). Compared to entrepreneurs with low self-efficacy, entrepreneurs with high entrepreneurial self-efficacy might perceive fewer threats in the environment and have a higher tolerance for ambiguity based on the belief that they are capable of making their venture successful. The optimistic biases of entrepreneurs with high entrepreneurial self-efficacy might make them overestimate the chances of success and underestimate the need for business planning activities. Supporting these arguments, Cooper, Folta, and Woo (1995) find that entrepreneurs who have higher levels of initial confidence seek less information. Moreover, entrepreneurial self-efficacy may lead to categorizing complex situations as being less risky, more manageable, and more feasible, which, in

consequence, reduces the perceived need to plan (Palich and Bagby, 1995).

Facing this controversy, a key question concerns whether nascent entrepreneurs perceive business planning as a desirable action. Prior research reports that the institutional forces (Honig, 2004; Honig and Karlsson, 2004; Wiltbank *et al.*, 2006) lead to a positive perception of the relevance of business planning. We further expect that highly self-efficacious entrepreneurs perceive themselves as being more capable than others of undertaking business planning successfully. Taken together, we posit:

*Hypothesis 1a: Nascent entrepreneurs with higher levels of entrepreneurial self-efficacy will undertake more business planning activities than nascent entrepreneurs with lower levels of entrepreneurial self-efficacy.*

*Entrepreneurial perseverance*

Entrepreneurial perseverance refers to a cognitive characteristic of individuals that leads to continued efforts and persistent behaviors in the entrepreneurial domain in spite of resistances, setbacks, and uncertainty of outcomes (Markman and Baron, 2003; Markman *et al.*, 2005). Perseverance is developed and reinforced through prior persistent and effortful behavior and positive outcomes (Bandura, 1982; Markman and Baron, 2003). Entrepreneurs who exhibit higher levels of entrepreneurial perseverance believe that their own continued efforts positively impact the outcomes of their entrepreneurial activities (Gatewood, Shaver, and Gartner, 1995). In consequence, individuals with higher levels of entrepreneurial perseverance are willing to invest greater efforts to reach a particular goal (Gollwitzer, 1999).

The inclination of individuals with higher levels of entrepreneurial perseverance toward actions and efforts might lead these individuals to generally engage in more start-up activities (Cassar and Friedman, 2009) and pursue these activities with greater efforts (Karlsson and Honig, 2009). Bandura (1997) maintains that perseverance positively impacts the level of stress that individuals can bear in adverse contexts and is related to effortful behavior. Individuals with lower levels of entrepreneurial perseverance might avoid engaging in and continuing business planning activities since business planning often forces them to deal with uncertainty and ambiguity in terms of conflicting or negative signals (Markman *et al.*, 2005). With respect to entrepre-

neurial perseverance, we follow prior arguments and expect that business planning is perceived as a desirable, but challenging, activity. We posit that highly perseverant entrepreneurs are more likely to initiate and sustain business planning activities, resulting in an overall greater likelihood of business planning behavior. Hence, we predict:

*Hypothesis 1b: Nascent entrepreneurs with higher levels of entrepreneurial perseverance will undertake more business planning activities than nascent entrepreneurs with lower levels of entrepreneurial perseverance.*

### Human capital and business planning

Human capital is shaped through education and work experiences (Baron and Ensley, 2006). In the entrepreneurial domain, prior research suggests that education and experience are likely to shape how individuals make planning decisions and perform tasks in the process of establishing new ventures (Brinckmann, Grichnik, and Kapsa, 2010; Dencker *et al.*, 2009; Honig, 2004).

#### Formal academic education

Academic education is generally directed at improving analytic, social, and domain-specific knowledge and skills (e.g., Boud and Solomon, 2001). Even in applied professional studies, education is predominantly focused on the conceptual level, with a strong focus on planning-based approaches (Honig, 2004; Karlsson and Honig, 2009; Wiltbank *et al.*, 2006). This orientation in education is likely to impact the future activities of students who have higher levels of academic education. First, as educators insist on reflective, analytic, and dialectic problem solving, students are likely to follow the normative call and develop the perception that a planning-based approach is preferable (Honig, 2004). Second, students will also perceive decision-making situations according to the schemas they learned and derive solutions by applying the conceptual models they studied (Baron, 2004). Third, as students have acquired analytic approaches and planning tools, they are likely to apply them to gain competitive benefits from their intellectual capital investments. Taken together, we posit:

*Hypothesis 2a: Nascent entrepreneurs with advanced academic education will undertake*

*more business planning activities than nascent entrepreneurs lacking such advanced academic education.*

#### Pre-founding entrepreneurial experience

Different scholars propose that individuals with prior founding experience are more likely to engage in business planning activities. The information, knowledge, and skills gained in previous ventures can make their business planning approaches more efficient and effective (Dencker *et al.*, 2009). Nascent entrepreneurs who lack prior founding experience have less knowledge about the areas in which they need to plan and the type of planning that would be most beneficial. These first-time entrepreneurs might feel overwhelmed by the planning tasks (e.g., Cooper *et al.*, 1995). Moreover, they lack data from prior operations that could benefit their planning efforts (Brinckmann *et al.*, 2010). In contrast, experienced entrepreneurs would perceive business planning as something beneficial, as each venture is different and the current venture's idiosyncrasies will likely lead to a perceived need to engage in business planning in spite of prior entrepreneurial experience. Hence, we predict:

*Hypothesis 2b: Nascent entrepreneurs with more prior entrepreneurial experience will undertake more business planning activities than nascent entrepreneurs with less prior entrepreneurial experience.*

#### Pre-founding managerial experience

Research shows that the need for business planning generally increases as the size and complexity of organizations increase (Brinckmann *et al.*, 2010). Moreover, established organizations have data on past performance, historical trends, and market information that can support business planning activities (Busenitz and Barney, 1997; Mintzberg, 1973). Provided that a substantial proportion of firms engage in business planning (e.g., Stone and Brush, 1996), individuals who have gained managerial experience in an established organization are more likely exposed to business planning practices (Busenitz and Barney, 1997; Mintzberg, 1973; Wiltbank *et al.*, 2006). The exposure to business planning over time is likely to improve their perception, knowledge, and abilities in business planning (Dencker *et al.*, 2009). Entrepreneurs with prior managerial experience can also better draw on

information and insights that assist their business planning activities. Following prior arguments, we predict:

*Hypothesis 2c: Nascent entrepreneurs with more prior managerial experience will undertake more business planning activities than nascent entrepreneurs with less prior managerial experience.*

## METHOD

### Data and sample

This study uses a dataset from the PSED II, which was designed to offer valid and reliable data on the process of business formation (Gartner *et al.*, 2004; Reynolds, 2007). From the initial sample of 1,214 nascent entrepreneurs chosen from a representative sample of 31,845 adults in the U.S. population (Reynolds and Curtin, 2008), we selected a subsample of 479 single-owner ventures for the purpose of this study. This research design allowed us to examine the impact of an individual entrepreneur's attributes on business planning behavior, while avoiding the confounding effects of complex team-level or organizational-level factors. In our final sample, 58.87 percent of the nascent entrepreneurs are men, which is similar (62.69%) to the full sample; 17.54 percent (17.64% in the full sample) of our sample entrepreneurs are less than 30 years of age, and 64.93% (64.64%) are less than 50 years old. In our final sample, 38.41 percent (42.16%) have finished college; and 55.95 percent (54.66%) have no prior start-up experience, while 6.26 percent (5.28%) report three or more prior start-up efforts. Also, 17.99 percent (21.84%) have no prior industry experience, while 20.92 percent (22.17%) have more than 15 years of experience in the industry of the start-up business. Overall, the differences between our final sample and initial full sample characteristics are not statistically significant at the 0.05 level of significance.

The sector distributions reflect those found among existing firms, but with a slightly greater emphasis in the same top three, consumer service (36.95%), retail store (14.61%), and business consulting (8.35%), as in the final sample. In the final sample, 22.34 percent (23.68% of the full sample) of the businesses are in high-tech industries. While there is substantial diversity in the amount and intensity of time and resource commitment in our final sample,

the start-up requires the respondent to contribute, on average, \$20,281 (\$22,619 in the full sample).

### Measurement and variables

#### Dependent variables

To obtain a more fine-grained understanding of the nascent entrepreneurs' business planning activities, we differentiate between measures that capture: (1) whether the individuals have engaged in business planning activities (the variable *Business planning*); and (2) whether these business planning activities produce either unwritten or written results (the variable *Business plan formality*). The Appendix lists the variables used in this study and the survey instruments developed in the PSED II project.

#### Cognitive characteristics

To be consistent with the PSED II design and the cognition literature (Cassar and Friedman, 2009; Wang *et al.*, 2011), we consider two cognitive variables. Entrepreneurial self-efficacy and entrepreneurial perseverance were derived using multi-item measurements of five-point Likert scale responses as measured in prior PSED research (Cassar and Friedman, 2009; Townsend, Busenitz, and Arthurs, 2010). As the Cronbach's alphas (0.71 and 0.70) indicated reliability of measurement, the factor scores of the two constructs were used in the estimation.

#### Human capital

Our measures capture the human capital of nascent entrepreneurs in terms of professional and educational experience. Entrepreneurial experience was measured by the number of prior businesses founded. Managerial experience was measured by the years of managerial work experience. Formal academic education was measured by a dummy variable that indicated whether the nascent entrepreneur had earned a bachelor's degree or higher.

#### Control variables

Following Delmar and Shane (2003), we control for a number of individual, organizational, and environmental-level factors that have been found in earlier studies to affect business planning and venture performance. In addition, given that previous studies have identified mainly institutional forces as antecedents for business planning (Honig and Karlsson,

2004), we account for these factors. Specifically, the following control variables are included in our estimation: community network (professional membership), community support, investor funding requirement, initial financial resource endowment, opportunity attractiveness, industry group, technology-intensive industry, venture duration, and the entrepreneur's gender and age.

### Estimation methods

To examine whether and how nascent entrepreneurs engage in business planning activities, we use binary logit models to test if the individuals have engaged in business planning for the new business and ordered logit models to test different degrees of business plan formality. In ordered logit, one potential problem is that its parallel regression assumption is often violated. As an alternative method, the `gologit2` procedure in *Stata* fits a generalized ordered logit model (Williams, 2006). Specifically, we find from the Brant test that the parallel regression assumption of conventional ologit is violated at  $p = 0.063$  (and the likelihood ratio test at  $p = 0.006$ ). Accordingly, we report the test results from logit and `gologit2` in Table 2.

## RESULTS

Table 1 shows the descriptive statistics and correlations of the variables. The data indicate no collinearity concerns. We find that about 45 percent of 479 founders engage in business planning activities and 33 percent complete a written business plan. Among 212 founders who engage in business planning activities, about 28 percent do not produce any written documents. This distribution suggests that business planning, and especially formal business planning, is not the norm. In a representative sample of 223 ventures in Sweden (Delmar and Shane, 2003; Shane and Delmar, 2004), 40 percent completed a business plan, which may reflect, in comparison to our sample, longer venture duration, more start-up experience, higher external funding, multiple owners in their sample, or cultural effects.

Table 2 reports the results of the logit analysis explaining the business planning activities and the estimates of generalized ordered logit regarding the formality of business plans. We find that entrepreneurial self-efficacy does not impact whether

nascent founders engage in business planning. However, founders who are highly self-efficacious develop more formal business plans than founders with lower levels of entrepreneurial self-efficacy (partial support for Hypothesis 1a). Founders with higher levels of entrepreneurial perseverance are more likely to engage in any kind of business planning. When highly perseverant entrepreneurs develop business plans, however, these plans do not differ significantly with regard to formality (partial support for Hypothesis 1b). Turning to human capital, we find that advanced academic education increases the likelihood of founders to engage in business planning activities and create more formal business plans (support for Hypothesis 2a). Regarding the impact of nascent entrepreneurs' prior work experience, we find a positive and marginally significant effect of entrepreneurial experience on business plan formality (partial support for Hypothesis 2b).

The estimates of control variables in Table 2 suggest that initial endowment of financial resources has a positive effect on business planning, but it has no effect on the formality of those business planning activities. The coefficients for high-technology industry are not significant in the models predicting business planning, while they are positive and significant in the models of business plan formality. We also find that opportunity attractiveness and industry group do not affect the decision to engage in business planning, but influence the formality of business planning. The institutional forces do not facilitate entrepreneurs' preparation or formalization of business plans, but the search for external funding increases the likelihood of business planning. Finally, older entrepreneurs are less likely to engage in business planning, but when they choose to develop a business plan, they do not show significant differences in business plan formality.

### Robustness tests

We have taken various steps to ensure that our findings are robust and to ameliorate concerns over potential biases due to sample selection, measurement errors, and alternative controls. One of potential sources of sample selection bias is varying founding experience of the sample entrepreneurs (Baron and Ensley, 2006) and its impact on business planning activities. When we examined alternative measures for serial and portfolio entrepreneurs from the PSED II items, their impacts were not significant in any model. From a process perspective, another

Table 1. Descriptive statistics and correlation matrix<sup>a</sup>

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1 Business planning	0.45	0.50	1.00																
2 Business plan formality	2.00	0.74	<sup>d</sup>	1.00															
3 Opportunity attractiveness <sup>b</sup>	10.25	1.72	<b>0.12</b>	<b>0.18</b>	1.00														
4 High-technology industry	0.22	0.42	-0.06	<b>0.16</b>	0.03	1.00													
5 Resource endowment <sup>c</sup>	20.61	144.29	<b>0.10</b>	-0.06	<b>0.14</b>	-0.01	1.00												
6 Venture duration	3.50	3.29	-0.01	-0.01	0.00	-0.02	0.00	1.00											
7 Entrepreneur gender	0.59	0.49	0.01	0.06	<b>0.24</b>	<b>0.13</b>	0.06	-0.04	1.00										
8 Entrepreneur age	43.47	12.58	<b>-0.11</b>	-0.01	<b>-0.13</b>	-0.01	-0.04	<b>0.11</b>	-0.07	1.00									
9 Entrepreneurial self-efficacy	0.05	0.74	-0.01	0.10	<b>0.14</b>	0.08	0.07	0.04	0.01	0.05	1.00								
10 Entrepreneurial perseverance	0.06	0.72	<b>0.10</b>	-0.03	0.08	<b>0.10</b>	-0.05	-0.04	<b>0.11</b>	-0.06	<b>0.29</b>	1.00							
11 Formal academic education	0.38	0.49	<b>0.15</b>	<b>0.17</b>	0.09	-0.04	<b>0.10</b>	0.04	<b>-0.12</b>	<b>0.13</b>	<b>0.11</b>	<b>-0.12</b>	1.00						
12 Entrepreneurial experience	1.05	2.03	0.02	0.12	<b>0.13</b>	0.05	0.05	-0.03	0.02	<b>0.16</b>	<b>0.11</b>	-0.06	0.08	1.00					
13 Managerial experience	10.39	9.69	0.02	0.02	<b>0.11</b>	0.02	0.03	0.09	<b>0.10</b>	<b>0.57</b>	<b>0.12</b>	0.01	<b>0.18</b>	<b>0.27</b>	1.00				
14 Community support	-0.04	0.93	0.01	-0.08	-0.01	0.05	0.03	0.06	-0.04	<b>0.14</b>	<b>0.13</b>	0.12	<b>0.11</b>	0.00	<b>0.12</b>	1.00			
15 Professional membership	0.08	0.27	0.06	0.04	0.05	-0.01	<b>0.15</b>	-0.04	-0.05	0.05	0.04	<b>-0.10</b>	0.05	<b>0.18</b>	<b>0.14</b>	0.03	1.00		
16 Investor requirement	0.11	0.31	<b>0.18</b>	0.12	<b>0.16</b>	0.01	<b>0.21</b>	0.04	0.04	-0.03	0.02	0.08	0.03	<b>0.13</b>	0.06	0.01	<b>0.10</b>	1.00	

<sup>a</sup>Correlation coefficients in bold are significant at the 5% level ( $p < 0.05$ , two-tailed tests).

<sup>b</sup>Opportunity attractiveness was coded as the log of expected revenue.

<sup>c</sup>Resource endowment was measured in thousands of dollars.

<sup>d</sup>Business plan formality is a nested measure (N = 212) of business planning (N = 479).

Table 2. Determinants of business planning and formality: hierarchical logit and generalized ordered logit models

	Business planning					Business plan formality <sup>a</sup>				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Entrepreneurial self-efficacy			-0.0960		-0.2101			0.5041**		0.5598**
Entrepreneurial perseverance				0.3275**	0.3935***				-0.1246	-0.2176
Formal academic education		0.5853***	0.5952***	0.6496***	0.6828***		0.8806***	0.9578***	0.8779***	0.9551***
Entrepreneurial experience	-0.0184	-0.0157	-0.0157	-0.0114	-0.0040		0.3081*	0.0302	0.3014*	0.0203
Managerial experience	0.0088	0.0094	0.0094	0.0073	0.0085		-0.0108	-0.0087	-0.0102	-0.0079
Investor requirement		0.9623***	0.9576***	0.9054***	0.8835**		0.5989	0.5817	0.6152	0.6134
Community support	0.0342	0.0424	0.0424	-0.0018	0.0089		-0.1747	-0.2336	-0.1610	-0.2180
Professional membership	0.2664	0.2649	0.2649	0.3511	0.3635		-0.5652	-0.5967	-0.5820	-0.6358
Opportunity attractiveness	0.1004*	0.0632	0.0679	0.0547	0.0627	0.2115**	0.1789*	0.1802*	0.1838**	0.1857**
NAICS industry group	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
High-technology industry	-0.3716	-0.3677	-0.3530	-0.4191*	-0.3978	0.6380*	0.7179**	0.6703*	0.7181**	0.6575*
Resource endowment	0.0107***	0.0080**	0.0081**	0.0083**	0.0085**	-0.0018	-0.0027	-0.0033	-0.0026	-0.0032
Venture duration	0.0006	0.0009	0.0008	0.0006	0.0004	0.0019	0.0019	0.0016	0.0022	0.0021
Entrepreneur gender	-0.0920	0.0026	0.0020	-0.0237	-0.0382	-0.0314	0.1634	0.2005	0.1848	0.2439
Entrepreneur age	-0.0189**	-0.0257***	-0.0258***	-0.0251**	-0.0252***	-0.0063	-0.0084	-0.0110	-0.0083	-0.0109
Constant 1	-0.9744	-0.9218	-0.9483	-0.7869	-0.8020	-2.4813	-2.7631	-2.3588	-2.9205	-2.6335
Constant 2						-4.7138**	-4.9876**	-4.9274**	-5.1491**	-5.2112**
Observations	479	479	479	479	479	212	212	212	212	212
McFadden's R <sup>2</sup>	0.04	0.07	0.07	0.08	0.08	0.05	0.10	0.11	0.10	0.11
LR $\chi^2$	28.78	47.13	47.64	52.54	54.70	21.70	46.05	50.31	46.38	51.23
LR test	0.0002	0.0000	0.0000	0.0000	0.0000	0.0055	0.0001	0.0000	0.0002	0.0000

<sup>a</sup>In Stata, gologit2 fits a generalized ordered logit model for ordinal dependent variable (Williams, 2006). A major strength of gologit2 is that it can fit models that are less restrictive than the parallel lines models fitted by ordered logit (ologit), but more parsimonious and interpretable than those fitted by a nonordinal method, such as multinomial logit (mlogit). In particular, we find from the Brant test with AD2 (1: Unwritten or in your head; 2: Informally written; 3: Formally prepared business plan; see the Appendix) that the parallel regression assumption of ologit is violated at  $p = 0.063$  (and the LR test at  $p = 0.006$ ). Accordingly, we report the coefficients without deviations from proportionality.  
\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$  (two-tail tests).

potential bias is left or right data censoring due to different start-up dates, delayed business planning, or early termination of new ventures (Yang and Aldrich, 2012). We used a median split test based on venturing duration and found no substantial differences between the two subgroups in statistical significance of hypothesized relationships. We also compared the results from the follow-up panel of Wave B (12-month lag) and found our findings to be robust across extended samples and observation periods. Further, following the two-stage approach outlined by Delmar and Shane (2003), we investigated potential sample selection bias by including the Heckman correction terms for venture disbanding and operating firm status using the follow-up survey data. The correction term for operating firms is significant in one model of business planning, but our focal results remain consistent in all models.

Our theory and analysis focus on the individual-level effects and avoid potential confounding effects introduced by team configurations. To determine whether our findings hold for other settings, we compared our empirical results with the remaining and the full ventures, and did not find substantial differences in the hypothesized relationships. Further, we used another two-stage Heckman model where the first-stage model reflected the decision to be an individual founder (rather than a team-based founder) and the second-stage model included the correction terms. We found that our use of the sample of individual founders was not likely to impose a bias, as the Heckman correction terms and the likelihood ratio tests were not statistically significant.

Additionally, in order to investigate a potential simultaneity (i.e., the same cognition variables may influence both founding and planning decisions), we used another two-stage Heckman model where the first-stage model captured the decision to start or own a new business and the second-stage model examined the hypothesized relationships with the correction terms. The PSED II allows this investigation with the screener interviews. At the time of the initial survey, 16 percent were not starting a new business and 34 percent did not own any businesses. We tried both entry measures in the first stage and found that our findings were robust to this source of biases.

We further examined whether the results of generalized ordered logit (gologit2) for an ordinal dependent variable (i.e., *Business plan formality*) were robust to alternative measurement and model specification. For a robustness check, we redefined

*Business plan formality* as a binary variable of written versus unwritten business plans and used a logit model. Overall, the results are almost identical to Table 2, and the coefficients of entrepreneurial experience are positive and significant across all models, providing further support for Hypothesis 2b. We also examined new logit estimates of Models 6 to 10 with a dichotomous variable of *Business plan formality* with the full 479 observations. We found that the coefficients were largely unchanged, but their  $LR \chi^2$  and  $R^2$  were lower than the ordered logit models with the nested 212 observations.

We also examined the effects of potential measurement issues and skewed distribution of the data values in our theoretical variables. Specifically, our measure of entrepreneurial self-efficacy might also capture the human capital aspect of nascent entrepreneurs. For a robustness test, we reestimated the models in Table 2 by replacing the factor score variable with each of the three PSED II items. Although its statistical significance becomes weaker in individual items, the results remain largely consistent with our findings. We also reestimated the models of human capital variables with and without cognition variables and found that the coefficients of human capital variables were largely unchanged in their direction, size, and significance. Another concern is that the data values of the two cognition variables are highly skewed and violate the normality assumption. We found that log transformation passed skewness tests for normality ( $p\text{-value} > 0.01$ ), and the results with log-transformed variables were consistent with Table 2.

Finally, we investigated potential measurement errors and mis-specification problems with alternative control variables. To control for the value of business opportunity, for instance, we used different measures of opportunity attractiveness and industry groups available in the PSED II database such as expected revenues, number of employees, and availability of other job opportunities. Again, the results were robust across alternative measures and additional controls.

## DISCUSSION AND CONCLUSION

Successfully maneuvering in environments of risk and uncertainty is a challenge for nascent entrepreneurs. Scholars of the business planning school advocate that business planning is a valuable activity for making sense of business environments, learning,

and enabling swift actuation because decision makers are better prepared. In contrast, other scholars caution that business planning can be a squandering of time and resources, as predictions are of limited value. Following this school of thought, especially in environments of uncertainty, entrepreneurs would be better advised to immediately proceed to action and attempt to control the environment. Prior empirical studies uncovering antecedents of business planning identified primarily institutional forces (Honig and Karlsson, 2004; Karlsson and Honig, 2009; Kirsch *et al.*, 2009).

Given the controversy in the theory domain and limited empirical findings, this study was directed at scrutinizing prominent characteristics of the individual that affect whether and how individuals pursue the planning approach. In so doing, we contribute to the growing literature that stresses the role of an individual's characteristics in the strategy and planning process (e.g., Cassar, 2010; Foss *et al.*, 2008; Gavetti and Rivkin, 2007; Hutzschenreuter and Kleindienst, 2006).

### Implications for academia and practice

Our findings indicate that cognitive factors, such as entrepreneurial self-efficacy and entrepreneurial perseverance, affect whether and how individuals undertake business planning activities. In particular, we find that entrepreneurial self-efficacy causes nascent founders to develop more formal business plans. This is especially striking, as one might conjecture that highly self-efficacious individuals do not perceive the need for formal business planning. Our empirical results suggest that these founders might associate substantive benefits, as we do control for institutional forces and the related symbolic effects (Honig and Karlsson, 2004; Kirsch *et al.*, 2009). In contrast, highly perseverant founders are more likely to engage in business planning activities, but do not necessarily develop a more formal business plan. This tendency might be based on a belief that informal business planning might suffice and that persevering behavior will lead to success whether it is formally planned or not. Further, the results also indicate that business planning is perceived as a challenging activity, as individuals with low entrepreneurial perseverance are less likely to engage in business planning, while individuals with low self-efficacy are less likely to develop formally written business plans. This can be due to a lack of willing-

ness or perceived ability to confront ambiguity and complexity in the planning process and endure the needed efforts.

Prior research suggests that entrepreneurial self-efficacy can be an early predictor of new venture success (Rauch and Frese, 2007), and nascent entrepreneurs can benefit from business planning with regard to resource acquisition from stakeholders and alignment with institutional forces (Brinckmann *et al.*, 2010; Honig and Karlsson, 2004). However, our empirical results suggest that those who would likely learn and benefit most from informal and formal business planning (i.e., those with low entrepreneurial self-efficacy or low entrepreneurial perseverance) may not pursue this activity. In this regard, our study supplements the existing work on how an individual's cognition, such as the belief in his/her own ability, can lead to planning activities and experiential learning that can support venture development (e.g., Cassar and Friedman, 2009). Our findings also contribute to recent cognition research that aims at understanding the mental models and processes of how cognition affects start-up behaviors that ultimately determine firm performance (Kaplan, 2011). Our findings suggest that the perception of abilities might be an important antecedent to engage in potentially value-creating activities, while a perceived lack of abilities might lead individuals to avoid or delay salient activities.

Further, our findings caution both entrepreneurs and managers that their cognition and experience influence the likelihood of engaging in business planning, irrespective of the value business planning could provide to their firms. Hence, when facing the decision of whether and how to pursue business planning, decision makers are advised to critically reflect on their predispositions. They can consult with different stakeholders about appropriate forms of business planning given the specific context to validate their subjective assessments. Moreover, they can experiment with business planning activities to expose them to knowledge and skills with which they might not normally be familiar. Our findings further suggest that individuals with advanced academic education are more inclined to engage in business planning. While in certain contexts this inclination can be beneficial, in other instances it might be detrimental. Hence, individuals with advanced academic education should consider alternative approaches to determine an appropriate course of action when formal planning is likely of limited value.

## Limitations and outlook

Several limitations need to be taken into consideration. First, our study focuses only on ventures that are founded by one individual. However, we believe that our findings provide valuable insights about preferences of individuals in founding teams that will likely shape the team-building processes. Second, while this study investigates the role of two prominent cognitive constructs, other cognitive characteristics and processes (e.g., tolerance of ambiguity and risk-taking propensity) may impact whether and how entrepreneurs engage in business planning activities. Third, this study utilizes the PSED II instruments for the measurements of dependent and independent variables. Therefore, it should be noted that some cautions are in order when interpreting the empirical results, with careful reference to the PSED II measurement items. Further, we emphasize that the cognition measures are perceptual measures. Hence, the cognition measures primarily capture conscious parts that the individuals consider relevant for them and are willing to report, while other more subconscious parts are ignored.

This study's findings point to further research opportunities. While our research puts forth the notion that entrepreneurial cognition impacts how nascent entrepreneurs pursue business opportunities with business planning activities, the specific mechanisms require further exploration. With respect to the antecedents of business planning, future research could investigate the specific functions business planning activities fulfill for the nascent entrepreneur. In our theoretical discussion, we highlighted both sensemaking and confidence-building functions of business planning, yet their specific effects need further investigation. We believe that by further examining specific cognition-behavior mechanisms, future research can enhance our understanding of how individuals faced with incomplete information and high uncertainty determine an appropriate course of action.

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- AY6: Overall, my skills and abilities will help me start this new business.
  - AY7: My past experience will be very valuable in starting this new business.
  - AY8: I am confident I can put in the effort needed to start a business.
  - Likert-like scale: 1 (Strongly agree); 2 (Agree); 3 (Neither); 4 (Disagree); or 5 (Strongly disagree).
  - Reverse coded prior to factor analysis for straightforward interpretation.
  - Previously tested and used in Cassar and Friedman (2009).
  - Entrepreneurial perseverance: (Cronbach's alpha = 0.70)
    - AY9: There is no limit as to how long I would give maximum effort to establish this new business.
    - AY10: My personal philosophy is to 'do whatever it takes' to establish my own business.
    - Likert-like scale: 1 (Strongly agree); 2 (Agree); 3 (Neither); 4 (Disagree); or 5 (Strongly disagree).
    - Reverse-coded prior to factor analysis for straightforward interpretation.

## APPENDIX

### Variables and PSED II measurement items

#### Dependent variables

- Business planning: (dummy variable)
  - AD1: Have you already begun preparation of a business plan for this new business, will you prepare one in the future, or is a business plan not relevant for this new business?
  - Coded as 1 (Yes); 0 (No, not yet, will in the future; No, not relevant).
- Business plan formality: (three-level categorical variable)
  - AD2: What is the current form of your business plan—is it unwritten or in your head, informally written, or formally prepared?
  - Coded as 1 (Unwritten or in your head); 2 (Informally written); 3 (Formally prepared business plan).
- Business plan formality: (dummy variable)
  - AD2N recoded from AD2: 0 (Unwritten or in your head); 1 (Written business plan).
  - Used for robustness check of the result of generalized ordered logit analysis of AD2 in *Stata*.

#### Cognitive characteristics

- Entrepreneurial self-efficacy: (Cronbach's alpha = 0.71)

#### Human capital

- Formal academic education:
  - AH6: What is the highest level of education you have completed?
  - Recoded as 1 (College or higher formal education); 0 (Otherwise).
- Entrepreneurial experience:
  - AH12: How many other businesses have you helped to start as an owner or part-owner?
- Managerial experience:
  - AH21: For how many years, if any, have you had managerial, supervisory, or administrative responsibilities?

#### Institutional forces

- Investor funding requirement:
  - AE1: Have financial institutions or other people been asked for funds for this new business, do you expect to ask for funds in the future, or is outside financial support not relevant for this new business?
  - Coded as 1 if external funding sought.
- Community support: (Cronbach's alpha = 0.84)
  - AP1: The social norms and culture of the community where you live are highly supportive of success achieved through one's own personal efforts.

- AP2: *The social norms and culture of your community emphasize self-sufficiency, autonomy, and personal initiative.*
- AP3: *The social norms and culture of your community encourage entrepreneurial risk taking.*
- AP4: *The social norms and culture of your community encourage creativity and innovativeness.*
- AP5: *The social norms and culture of your community emphasize the responsibility that the individual has in managing his/her own life.*
- AP6: *Young people in your community are encouraged to be independent and start their own businesses.*
- Reverse coded prior to factor analysis for straightforward interpretation.
- Professional membership:
  - AE22: *Has this new business become a member of a trade or industry association, will this new business become a member of a trade or industry association in the future, or is this not relevant to this new business?*
  - Coded as 1 (Holding a membership); 0 (Otherwise).
- Opportunity attractiveness:
  - AT2: *Once this new business is operational, what is the total revenue or income expected in the first 12 months of operation?*
  - Recoded as the log of the first one-year expected revenue.
  - Alternative measures did not change the results: five-year expected revenue (AT3), one-year or five-year number of employees (AT4 and AT5), and AT6 (*Are you involved in this new business to take advantage of a business opportunity or because you have no better choices for work?*).
- Industry groups:
  - AA1: *What kind of business are you starting?*
  - Coded as 2002 NAICS six-digit codes.
  - Alternative coding of 2002 SIC four-digit codes did not significantly change the results.
- Technology-intensive industry:
  - AS6: *Would you consider this new business to be high tech?*
  - Recoded as 1 for high-tech industries; 0 (Otherwise).
- Resource endowment:
  - AQ12: *The total amount contributed to this new business either to purchase ownership or as a loan to this new business.*
  - Recoded as thousands of dollars.
- Venture duration:
  - AA8: *In what month and year did you first think about starting this new business?*
  - Coded as the number of years elapsed since its inception to 2007.
- Entrepreneur gender:
  - AH1: *Are you male or female?*
  - Coded as 1 for male entrepreneurs; 0 (Otherwise).
- Entrepreneur age:
  - AH2: *How old are you?*
  - Coded as the number of years.