



Entrepreneurial Self-Efficacy: Refining the Measure

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A growing number of studies on entrepreneurial motivation, intentions, and behavior include entrepreneurial self-efficacy (ESE) as an explanatory variable. While there is broad consensus among researchers on the importance of including ESE in an intentionality model, there remain inconsistencies in the definition, dimensionality, and measurement of ESE. This study takes an important step toward refinement and standardization of ESE measurement. Within a new venture creation process framework, a multi-dimensional ESE instrument is developed and tested on a diverse sample that includes nascent entrepreneurs. Implications for entrepreneurship theory and entrepreneurship education are discussed.

Introduction

Entrepreneurship-oriented intentions are considered precursors of entrepreneurial action (Bird, 1988; Kolvereid, 1996; Krueger & Brazeal, 1994; Krueger, Reilly, & Carsrud, 2000). In order to further develop entrepreneurship theory, researchers need an understanding of the factors that might influence the intentions of those considering entrepreneurship for the first-time nascent entrepreneurs (Carter, Gartner, & Reynolds, 1996; Reynolds, Carter, Gartner, & Greene, 2004; Rotefoss & Kolvereid, 2005). Factors that would influence one to become an entrepreneur are many, and consist of various combinations of personal attributes, traits, background, experience, and disposition (Arenius & Minniti, 2005; Baron, 2004; Krueger et al.; Shane, Locke, & Collins, 2003).

One of these personal attributes, entrepreneurial self-efficacy (ESE), appears to be a particularly important antecedent to new venture intentions (Barbosa, Gerhardt, & Kickul, 2007; Boyd & Vozikis, 1994; Zhao, Seibert, & Hills, 2005). Simply stated, ESE is a construct that measures a person's belief in their ability to successfully launch an entrepreneurial venture. ESE is particularly useful since it incorporates personality as well as environmental factors, and is thought to be a strong predictor of entrepreneurial intentions and ultimately action (Bird, 1988; Boyd & Vozikis). Moreover, recent research suggests that an individual's ESE may be elevated through training and education; thus, potentially

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improving the rate of entrepreneurial activities (Florin, Karri, & Rossiter, 2007; Mueller & Goic, 2003; Zhao et al.).

While the ESE construct is quite promising, it remains empirically underdeveloped and many scholars have called for further refinement of the construct (e.g., Forbes, 2005; Kolvereid & Isaksen, 2006). Three issues, in particular, appear to warrant further investigation and serve as the motivation for this study. First, there remains some debate on whether an ESE construct is even necessary. Several scholars (see Chen, Gully, & Eden, 2004) advocate the use of a general measure of self-efficacy instead of a domain-specific ESE construct. Second, the dimensionality of the construct has yet to be fully established. While most scholars acknowledge the multi-dimensional nature of the ESE construct (e.g., Wilson, Kickul, & Marlino, 2007; Zhao et al., 2005), very few researchers have explicitly examined the underlying dimensions that make up the actual construct by using some type of theoretical model of entrepreneurial activity and tasks. Moreover, several scholars have simply relied on single survey questions to capture an individual's level of ESE. Finally, very few studies have included a sampling of nascent entrepreneurs (Forbes). Rather, most of the initial studies of ESE relied on samples of university students or samples of small business owners (Chen, Greene, & Crick, 1998; De Noble, Jung, & Ehrlich, 1999; Drnovsek & Glas, 2002; Mueller & Goic, 2003).

The current study attempts to advance the understanding of ESE and its effect on venture intentions by developing a multi-dimensional measure of ESE within a four-phase venture creation process framework. The instrument's reliability and validity is then tested, using a diverse sample that includes nascent entrepreneurs—individuals who are engaged in activities that are intended to result in a new business—and non-nascent entrepreneurs.

Measuring ESE

Self-efficacy refers to an individual's belief in their personal capability to accomplish a job or a specific set of tasks (Bandura, 1977). Self-efficacy is a useful concept for explaining human behavior as research reveals that it plays an influential role in determining an individual's choice, level of effort, and perseverance (Chen et al., 2004). Simply stated, individuals with high self-efficacy for a certain task are more likely to pursue and then persist in that task than those individuals who possess low self-efficacy (Bandura, 1997).

Self-efficacy, when viewed as a key antecedent to new venture intentions, is referred to as ESE (Boyd & Vozikis, 1994; Chen et al., 1998; Krueger & Brazeal, 1994). Although the literature on ESE is quite robust, there remain at least three obstacles that impede further development and effective application of the construct. First, disagreement exists as to whether the ESE construct is more appropriate than general self-efficacy (GSE). Second, there is inconsistency in the manner in which researchers attempt to capture the dimensionality of the ESE construct. Third, ESE researchers appear to be overly reliant on data collected from university students and practicing entrepreneurs. Each of these potential obstacles is discussed in the following paragraphs. A summary of relevant empirical studies is also provided in Table 1.

GSE Versus ESE

There remains fundamental disagreement regarding the very need for an ESE construct. Some theorists argue that a GSE construct is sufficient, as it is a relatively stable,

Table 1

Empirical Studies Involving ESE

References	Specificity	Dimensionality	Sample	Key findings
Anna, Chandler, Jansen, and Mero (1999)	ESE	12 items loading on 4 factors	170 women business owners	The types of ESE exhibited by female business owners in traditional industries differed from female business owners in nontraditional industries.
Arenius and Minniti (2005)	ESE	1 item	51,721 participants in the Global Entrepreneurship Monitor project	ESE is positively associated with being a nascent entrepreneur.
Barbosa et al. (2007)	ESE	18 items loading on 4 factors	528 university students from Russia, Norway, and Finland	Differing cognitive styles and levels of risk preference are associated with different types of ESE.
Baughn, Cao, Le, Lim, and Neupert (2006)	ESE	16 items	782 upper-division university students from China, Vietnam, and the Philippines	Female students exhibited lower levels of ESE than their male counterparts in China, Vietnam, and the Philippines.
Baum and Locke (2004)	GSE	2 items [†]	229 owners of small woodworking firms	GSE has a strong direct effect on venture performance.
Baum, Locke, and Smith (2001)	GSE	3 items [†]	414 CEOs of woodworking ventures	GSE is indirectly associated with venture performance.
Begley and Tan (2001)	ESE	7 items loading on 1 factor [†]	1,253 MBA students from 6 East Asian and Western countries	East Asian MBA students exhibited lower levels of ESE than MBA students in Western countries.
Bradley and Roberts (2004)	GSE	4 items	7,176 participants in the National Survey of Families and Households	GSE is positively associated with job satisfaction among the self-employed.
Chen et al. (1998)	ESE	22 items loading on 5 factors	140 undergraduate and MBA students and 175 small business managers and founders	The type of ESE exhibited by entrepreneurs differs from those exhibited by managers.
De Noble et al. (1999)	ESE	22 items	359 undergraduate and graduate university students	ESE is positively associated with entrepreneurial intentions. ESE can differentiate entrepreneurship students from nonentrepreneur students.
Dmiovsek and Glas (2002)	ESE	19 items loading on 5 factors [†]	302 innovators and graduate students from Slovenia and the Czech Republic	The type of ESE exhibited by innovators differed from those exhibited by graduate business students.
Erikson (2002)	ESE	6 items	65 British MBA students	The multiplicative effect of perceived entrepreneurial competence and entrepreneurial commitment is strongly correlated with entrepreneurial capital.
Florin et al. (2007)	ESE	8 items [†]	220 undergraduate university students	GSE is associated with entrepreneurial drive. Senior university students exhibit higher self-efficacy than their undergraduate counterparts.

Table 1
Continued

References	Specificity	Dimensionality	Sample	Key findings
Forbes (2005)	ESE	15 items loading on 5 factors [†]	95 Internet entrepreneurs	ESE is influenced by the way in which entrepreneurs make strategic decisions.
Kolvereid and Isaksen (2006)	ESE	18 items loading on 4 factors	297 Norwegian business founders	ESE is <i>not</i> significantly associated with entrepreneurial behavior.
Kristiansen and Indarti (2004)	ESE	2 items	251 university students from Indonesia and Norway	ESE is positively associated with entrepreneurial intentions among Norwegian and Indonesian students.
Krueger et al. (2000)	ESE	Not given	97 undergraduate university students	Perceived self-efficacy is positively associated with perceived feasibility of entrepreneurial intentions.
Markman, Balkin, and Baron (2002)	GSE	8 items [†]	217 patent-holding inventors	GSE exhibited by inventors who launched a new venture differs from those exhibited by inventors who did not launch a new venture.
Markman, Baron, and Balkin (2005)	GSE	8 items	217 patent-holding inventors	Entrepreneurs score higher in self-efficacy than nonentrepreneurs.
Scherer, Adams, Carley, and Wiebe (1989)	GSE	5 items [†]	366 undergraduate university students	High-performing parental entrepreneurial role models positively influence GSE.
Tominc and Rebernik (2007)	ESE	1 item	603 participants in the Global Entrepreneurship Monitor project	GSE is lower among Hungarian early-stage entrepreneurs compared to their counterparts in Slovenia and Croatia.
Utsch and Rauch (2000)	GSE	5 items [†]	201 German entrepreneurs	Self-efficacy does not mediate the relationship between achievement orientation and new venture performance.
Utsch, Rauch, Rothfuss, and Frese (1999)	GSE	6 items [†]	177 managers and entrepreneurs	Entrepreneurs exhibited higher levels of self-efficacy than managers.
Wilson et al. (2007)	GSE	6 items [†]	933 middle/high school and MBA students	ESE is associated with entrepreneurial intentions and education can elevate ESE.
Zhao et al. (2005)	ESE	4 items loading on 1 factor [†]	265 MBA students	ESE plays a mediating role between entrepreneurial intentions and formal learning, entrepreneurial experience, and risk propensity.

[†] Self-efficacy was actually measured using a composite score.
ESE, entrepreneurial self-efficacy; GSE, general self-efficacy; CEOs, chief executive officers; MBA, Master of Business Administration.

trait-like, generalized competence belief (Chen et al., 2004). GSE captures an individual's perception of their ability to successfully perform a variety of tasks across a variety of situations. In other words, GSE refers to an individual's confidence in meeting task demands, regardless of those demands.

Researchers advocate the use of a measure of GSE because entrepreneurs require a diverse set of roles and skill sets; therefore, they believe it would simply be too difficult to identify a comprehensive, yet parsimonious, list of specific tasks explicitly associated with entrepreneurial activities (Markman, Balkin, & Baron, 2002). From a purely pragmatic perspective, it is much easier to measure GSE than to explicitly capture the nuances of ESE. In any event, several empirical studies have measured self-efficacy by eliciting responses about an individual's confidence in various areas not specific to entrepreneurial activities (e.g., Baum & Locke, 2004; Baum et al., 2001; Utsch & Rauch, 2000).

Bandura (1977, 1997), however, argued that self-efficacy should be focused on a specific context and activity domain. The more task specific one can make the measurement of self-efficacy, the better the predictive role efficacy is likely to play in research on the task-specific outcomes of interest (Bandura, 1997). Gist (1987) suggested that researchers aggregate a number of related but domain specific measures rather than relying on an omnibus test. While a composite measure of self-efficacy would be arguably more convenient, a number of scholars have sacrificed convenience in favor of greater predictive power (e.g., Begley & Tan, 2001; Chen et al., 1998; De Noble et al., 1999; Forbes, 2005; Kolvereid & Isaksen, 2006).

The majority of existing ESE measurement scales have been developed in a similar manner. Salient literature is referenced to identify tasks associated with core entrepreneurial activities or skills, such as opportunity recognition, risk and uncertainty management, and innovation. This list of tasks is then reviewed by academic experts and/or entrepreneurs to ensure appropriateness. Factor analytic techniques are subsequently used to identify final measurement items. Chen et al. (1998), for example, developed an ESE scale by referencing 36 entrepreneurial roles and tasks which, in turn, were reduced to a 26-item measurement instrument. Factor analysis identified 22 items that loaded on five distinct dimensions: (1) marketing, (2) innovation, (3) management, (4) risk taking, and (5) financial control. Such techniques produced viable task-specific ESE measurement instruments that allowed researchers to distinguish entrepreneurs from nonentrepreneurs (Chen et al.), better understand entrepreneurial decision-making processes (Forbes, 2005), and effectively predict entrepreneurial intentions (De Noble et al., 1999).

Unidimensional Versus Multi-dimensional Measures of ESE

While most theorists argue that ESE is best conceptualized as a multi-dimensional construct, much of the empirical research has relied on limited-dimensional or even unidimensional measures of ESE (Arenius & Minniti, 2005; Baum & Locke, 2004; Baum et al., 2001; Kristiansen & Indarti, 2004). At the extreme, several scholars claim to have measured ESE by simply asking subjects to respond to one or two questions regarding their confidence in starting a new venture. As an illustration, in a recent study by Tominc and Rebernik (2007), respondents were asked to provide a yes or no response to the question, "Do you have the knowledge, skills, and experience required to start a new business?"

Even those studies attempting a broader approach to measuring ESE dilute the multi-dimensionality of the construct by relying on a "total ESE" score rather than focusing on the underlying dimensions (Chen et al., 1998; De Noble et al., 1999; Forbes, 2005; Zhao et al., 2005). In their study of whether managers and entrepreneurs exhibited

differing levels of ESE, Chen et al. identified five underlying factors or dimensions of the ESE construct but relied on a total ESE score (i.e., an average of 22 items). Although this technique allowed them to effectively distinguish entrepreneurs and managers, their results offered little insight on the importance of the construct's specific underlying dimensions (e.g., marketing, innovation, etc.). In other words, a total or composite measure of ESE fails to provide insight into what specific areas of self-efficacy are most influential. For example, it is impossible to determine whether a high level of self-efficacy in risk-taking or marketing is more influential in creating entrepreneurial intentions than a high level of self-efficacy in finance.

The shortcomings of using a "total" ESE score are apparent in the results of a recent study by Zhao et al. (2005). Investigating the mediating role of self-efficacy in the development of entrepreneurial intentions, Zhao et al. discovered that entrepreneurial education was positively associated with higher levels of ESE. Moreover, the authors reported that a higher level of ESE was positively associated with entrepreneurial intentions. This finding is particularly intriguing since it suggests that entrepreneurial education may lead to greater levels of entrepreneurial activity by elevating an individual's confidence in launching a new venture. Once again, the authors relied on a "total" or composite ESE score, which made it impossible to identify those specific areas of education or training that are most effective in strengthening ESE.

A limited number of studies have disaggregated the ESE construct and focused on its underlying dimensions. Barbosa et al. (2007), for example, examined the relationship between cognitive styles and four task-specific types of ESE—opportunity-identification self-efficacy, relationship self-efficacy, managerial self-efficacy, and tolerance self-efficacy. The author's findings are noteworthy, as they indicate that the various types of self-efficacy or underlying dimensions may have individual and unequal relationships to multiple dependent variables, particularly entrepreneurial intentions and nascent behavior. Further support for the need to examine the underlying dimensions of the ESE construct was provided by Mueller and Goic's (2003) international comparative study. They adapted a four-phase venture creation process model originally proposed by Stevenson, Roberts, and Grousbeck (1985), and constructed a separate measure of ESE for specific tasks associated with each of the four phases of the process (searching, planning, marshaling, and implementing). Mueller and Goic reported that an individual's level of ESE varied by phase, empirically confirming the construct's multi-dimensional nature.

Students and Small Business Owners Versus Nascent Entrepreneurs

The final obstacle in the development of an appropriate ESE construct has been the lack of diversity in those populations sampled and tested. For example, much of the existing empirical research has relied on data collected exclusively from samples of university students (e.g., Begley & Tan, 2001; De Noble et al., 1999; Wilson et al., 2007) or existing entrepreneurs and/or small business owners (Baum & Locke, 2004; Forbes, 2005; Markman et al., 2002). Few studies of ESE have included nascent entrepreneurs. This omission is particularly troublesome since ESE is commonly modeled as a key antecedent to entrepreneurial intentions that, in turn, leads to nascent behavior and ultimately to entrepreneurial action (see models proposed by Carter et al., 1996; Lichtenstein, Carter, Dooley, & Gartner, 2007; Reynolds et al., 2004; Sequeira, Mueller, & McGee, 2007).

At first glance, it may appear that student samples are commonly used simply because most researchers have easy access to a large pool of candidates. However, the use of students should not be condemned out of hand when studying entrepreneurial

intentionality. Indeed, university students enrolled in entrepreneurship courses typically exhibit characteristics of nascent entrepreneurial behavior by engaging in coursework that will prepare them for entrepreneurial careers. Students are also appropriate subjects when attempting to identify if and how ESE can be strengthened through education and training (Peterman & Kennedy, 2003). Nonetheless, student samples possess obvious limitations. First and foremost, most students simply do not have the experience and resources to judge whether they can be successful entrepreneurs.

Empirical research that relies on samples of current entrepreneurs and/or small business owners presents another set of limitations. Such individuals have already committed to starting a small business; therefore, their perceptions of ESE as it relates to entrepreneurial intentions must be inherently retroactive. Moreover, as Markman et al. (2002) admit, it is quite difficult to determine the causal direction of ESE. In other words, does the creation of a new venture increase one's ESE, or does high ESE lead one to start a new company?

Nascent entrepreneurs, on the other hand, are individuals who have yet to start a new business. However, they possess the desire to start a new business and are involved in specific activities that bring such desires to fruition (Carter et al., 1996). Stated more precisely, Aldrich and Martinez (2001, p. 43), describe nascent entrepreneurs as individuals "who not only say they are currently giving serious thought to the new business, but also are engaged in at least two entrepreneurial activities, such as looking for facilities and equipment, writing a business plan, investing money, or organizing a start-up team."

Nascent entrepreneurship has been the subject of a number of empirical studies (e.g., Arenius & Minniti, 2005; Carter, Gartner, Shaver, & Gatewood, 2003; Davidsson & Honig, 2003; Reynolds et al., 2004). While none of these studies specifically address ESE as a variable to explain nascent behavior, the implications for theorizing about a relationship between ESE and nascent behavior are quite clear. Since nascent behavior (by definition) follows intentions, then factors that promote intentionality (including ESE) would also help explain nascent behavior. Researchers who study antecedents to entrepreneurial intentions and nascent behavior (e.g., Barbosa et al., 2007; Zhao et al., 2005) are in need of an ESE measure that has been thoroughly tested for reliability, validity, and applicability to a diverse set of populations—including nascent entrepreneurs.

Based on review and analysis of studies that include ESE as a variable, we conclude that previous attempts at measuring ESE suffer from three types of limitations: (1) failure to make a clear distinction between GSE and self-efficacy related to specific tasks associated with the venture creation process, (2) failure to account for the multi-dimensional nature of ESE, and (3) failure to include nascent entrepreneurs in the sample. In the following section, we describe an ESE scale development procedure that addresses the limitations of previous scale development efforts and produces a reliable, theory-driven, multi-dimensional measure of ESE.

Methods

Scale Development Protocol

To avoid the problems of ESE measurement cited above, we elected to follow Mueller and Goic (2003) by defining entrepreneurial tasks within a venture creation "process model." This model was first proposed by Stevenson (Stevenson et al., 1985) and divides entrepreneurial activities into four discrete phases. For convenience, these phases are labeled (1) searching, (2) planning, (3) marshaling, and (4) implementing (Mueller & Goic).

The *searching* phase involves the development by the entrepreneur of a unique idea and/or identification of a special opportunity. This phase draws upon the entrepreneur's creative talents and the ability to innovate. Entrepreneurs, in contrast to managers, are particularly adept at perceiving and exploiting opportunities, before these opportunities are recognized by others (Hisrich & Peters, 1998).

The *planning* phase consists of activities by which the entrepreneur converts the idea into a feasible business plan. At this stage, the entrepreneur may or may not actually write a formal business plan. However, he or she must evaluate the idea or business concept and give it substance as a business. The plan addresses questions such as: What is the size of the market? Where will the business establishment be located? What are the product specifications? How and by whom will the product be manufactured? What are the start-up costs? What are the recurring operating costs of doing business? Will the venture be able to make a profit and if so, how soon after founding? How rapidly will the business grow and what resources are required to sustain its growth (Mueller & Goic, 2003)?

The *marshaling* phase involves assembling resources to bring the venture into existence. At the end of the planning phase, the business is only "on paper" or in the mind of the entrepreneur. To bring the business into existence, the entrepreneur gathers (marshals) necessary resources such as capital, labor, customers, and suppliers without which the venture cannot exist or sustain itself (Mueller & Goic, 2003).

The final phase is *implementing*. The entrepreneur is responsible for growing the business and sustaining the business past its infancy. To this end, the successful entrepreneur applies good management skills and principles. As an executive-level manager, the entrepreneur engages in strategic planning and manages a variety of business relationships with suppliers, customers, employees, and providers of capital. Growing an enterprise requires vision and the ability to solve problems quickly and efficiently. Not unique to entrepreneurship, these tasks are also required of effective managers. But the entrepreneur is the primary risk-bearer of the enterprise with a financial stake in its long-term growth and success (Mueller & Goic, 2003).

With this four-phase venture creation process model as a theoretical guide, ESE scale development was undertaken using a multi-step procedure focused on understanding the underlying structure of the construct (Gerbing & Anderson, 1988). The sequence of steps used in this protocol is depicted in Figure 1.

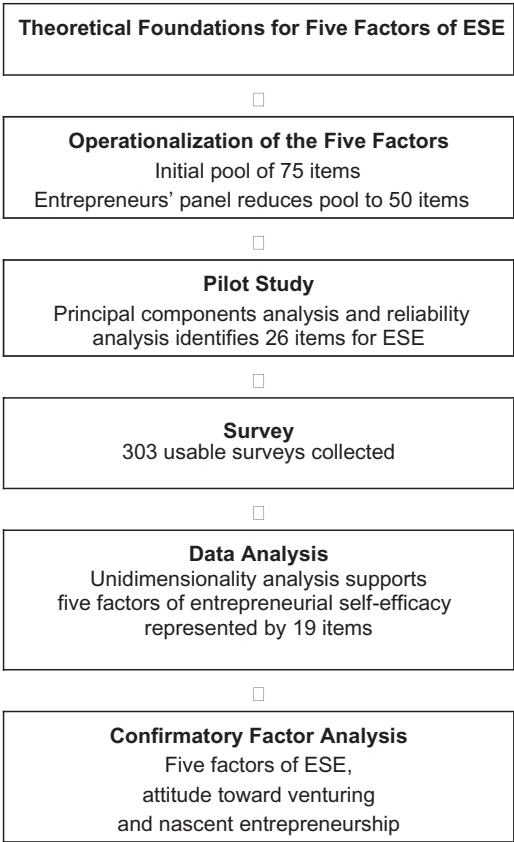
The first step was to identify a number of specific tasks uniquely associated with each phase of the four-phase new venture creation process (i.e., searching, planning, marshaling, and implementing). Tasks associated with the implementing phase were further divided into two categories to make a clear distinction between "people-related" tasks and "financial-related" tasks of managing a small start-up business.

An initial 75-item list of entrepreneurial tasks was compiled by two of the authors who consulted existing entrepreneurship texts, theoretical and practical research, as well as expert knowledge from practicing entrepreneurs to determine the tasks and competencies essential to creating and maintaining a venture. This list was given to an "expert panel" consisting of three entrepreneurship professors from two local universities who were former entrepreneurs as well as a practicing entrepreneur in the local community that was an adjunct professor at one of the universities. Entrepreneurial tasks deemed irrelevant or of little importance by the panel were discarded resulting in 50 tasks.

A 50-item survey instrument was constructed and administered to a test sample of 88 senior-level undergraduate business students. Respondents were asked to indicate on a 5-point Likert scale (1 = very little, 5 = very much) how much confidence they had in their ability to engage in each of the 50 entrepreneurial tasks. Data collected from the test

Figure 1

Protocol of Scale Development



sample were then analyzed using factor analysis (Principal components with Varimax rotation). Items not meeting a .40 factor-loading cutoff criteria were eliminated in a sequence of rotations yielding a 5-factor ESE model with 26 items. These 26 items were subsequently used in a large-scale empirical evaluation of the underlying structure of ESE.

Large-Scale Empirical Evaluation of ESE. Most studies of ESE have relied on student subjects (Chen et al., 1998; De Noble et al., 1999; Zhao et al., 2005). For this study, we surveyed a broad range of subjects that included nascent entrepreneurs and was diverse with respect to age, education, race/ethnicity, and social background. Following Aldrich and Martinez (2001), we define nascent entrepreneurs as individuals who engage in activities that are meant to result in a feasible business start-up (Aldrich & Martinez). In our sample, respondents were coded as “nascent entrepreneurs” if they had engaged in at least two of the following behaviors: (1) attending a “start your own business” planning seminar or conference, (2) writing a business plan or participating in seminars that focus on writing a business plan, (3) putting together a start-up team, (4) looking for a building or equipment for the business, (5) saving money to invest in the business, and (6)

developing a product or service. In addition, to fit the nascent entrepreneur criteria, these individuals could not be previous or current business owners.

This sampling technique offers the ability to compare the nascent entrepreneurs in the sample, with a baseline group representing those in the broader population who are not currently taking steps toward launching a business. Gauging this baseline group is important because nascent entrepreneurs were once members of this broader group in the population before they began taking steps to launch their businesses. A number of researchers have undertaken empirical studies that confirm a positive relationship between ESE and entrepreneurial intentions (Barbosa et al., 2007; De Noble et al., 1999; Sequeira et al., 2007; Zhao et al., 2005). Because nascent behavior is a likely consequence of such intentionality (Carter et al., 1996; Lichtenstein et al., 2007; Reynolds et al., 2004; Rote-foss & Kolvereid, 2005; Sequeira et al.), the ESE instrument used in this study was tested on a sample that includes nascent entrepreneurs, as well as a sample of individuals who are not taking steps toward starting a business. This sampling technique enables a more robust understanding of ESE as it relates to the general population, as well as those who are in the process of launching their business.

Data were collected from three different sources in order to achieve diversity and also to capture nascent entrepreneurs. The first source utilized a special website designed to facilitate data collection and improve the response rate for this study. Three organizations (two ethnic organizations and a technology-oriented association) agreed to participate in the study and were provided information regarding the survey website. These organizations then sent an e-mail to their members containing the link to the survey. This e-mail message encouraged member participation. If the members were interested in participating in the study, they could click on the link embedded in the e-mail. This website source resulted in 93 online responses.

The second source of data was taken from a series of seminars sponsored by organizations that provided assistance in business start-up. These organizations were a local business assistance center and their affiliated organizations, as well as an ethnic organization that assisted individuals in business start-up. Approximately 290 surveys were distributed at these seminars resulting in 111 responses with a response rate of 38%.

Data were also collected using a snowball technique. "Snowballing" involves recruiting individuals to collect data from other individuals whom they think meet certain inclusion criterion defined by the researcher (Spreen, 1992). This technique has been proven to be a useful data collection method when dealing with hidden populations for whom adequate lists and relevant sampling frames are unavailable (Faugier & Sargeant, 1997). The use of the snowball technique is particularly relevant for this study since nascent entrepreneurs seem to fit the definition of a *hidden* population. Identifying a population of individuals who are engaged in pre-startup activities is difficult (Krueger et al., 2000), far more difficult than determining race, gender, and other clearly identifiable characteristics.

Undergraduate students from a public university located in the southwestern region of the United States were selected as initial contacts for this snowballing technique. These students were enrolled in entrepreneurship, international business, or organizational behavior classes comprised of varying ethnicities, backgrounds, and social statuses. Their involvement allowed us to gather a much broader and diverse sample than would otherwise be possible. Students were specifically instructed to give the surveys to a nonstudent who had never owned a business in the past and did not currently own a business. Information sheets were attached to the front of each survey where each nonstudent respondent could provide contact information. The students were told that each respondent to whom they gave the survey would be contacted to verify that the survey had indeed

been completed by that individual. Two hundred and ninety-six surveys were distributed, and we received 185 responses resulting in a response rate of 62%.

The three data sources resulted in a combined total of 389 responses. The sample was reviewed to determine if any respondent had ever owned or currently owned a business. If so, these current and former entrepreneurs were deleted from the sample. A few respondents did not complete a majority of the survey. These cases were also removed from the sample. Data preparation and examination eliminated additional cases resulting in a usable sample of 303.

One of the primary goals of the sampling technique was to ensure that data were collected from both nascent entrepreneurs and from a baseline group of individuals who were not involved in nascent entrepreneurial activities. Therefore, the total sample includes 109 nascent entrepreneurs, 64 of which were obtained from the seminar-referred subsample, 37 from the snowball-referred subsample, and eight from the website-referred subsample.

t-Tests were performed comparing key demographic characteristics of the seminar-referred respondents with the characteristics of the respondents found through the snowballing technique and the website. The latter two groups were combined since only 12 usable responses were obtained through the Internet. Results of the *t*-tests indicate that there were no statistically significant differences between these groups on the important sampling criteria of gender, ethnicity, employment status, and marital status. The differences identified were small or inconsequential. For example, the mean age of the seminar-referred group was 37.7 years while that of the snowball group's was 30.6 years. Not surprisingly, given age differences, the seminar-referred respondents also possessed, on average, relatively more work experience and education. As the two groups of respondents appeared quite similar, the decision was made to combine them in order to achieve the precision needed to refine the ESE measure.

Results

Sample Characteristics

As shown in Table 2, the final usable sample consists of 142 males with an average age of 33.1 years, and 161 females with an average age of 34.2 years. Sixty-one percent of the 303 individuals in the sample are interested in starting their own business and are engaged in a business start-up activity. Thirty-six percent of the sample can be classified as nascent entrepreneurs (those engaged in at least two business start-up activities). The sample is quite diverse with respect to race and ethnicity: 122 (40.3%) are Caucasian/White; 47 (15.5%) are Black/African-American; 50 (16.5%) are East-Asian/Oriental; 39 (12.9%) are Hispanic/Latino; 35 (11.6%) are South-Asian; five (1.7%) are Middle-Eastern; and three (1%) are some combination of the above races. Two individuals in the sample did not disclose their race.

The sample also includes individuals with varying levels of education: 31 (10.2%) have a high school degree or less; 184 (60.8%) have a college degree or some college education; 79 (26.1%) have a graduate degree or some graduate education; and nine (3%) have a doctorate. Respondents in the sample have an average of 12 years work experience and represent the following levels in their organizations: 36% are nonmanagers; 16% are managers or supervisors; 10% are mid- to upper-level managers; 38% did not report their level. Sixty-three percent of the sample is employed full time, 21% is employed part time, 8% are unemployed, and 6% are full-time students. Approximately 44% work in

Table 2

Descriptive Statistics for Sample (n = 303)

	Percentage
Gender	
Male	46.9
Female	53.1
Age	
19–29	47.9
30–39	21.4
40–49	20.1
50–59	8.3
60 and over	2.3
Education	
Less than high school graduate	1.0
High school graduate	9.2
Some college coursework	24.8
Associate degree	11.2
Bachelor degree	24.8
Some graduate coursework	12.2
Master's degree	13.9
Doctoral degree	3.0
U.S. born	
Yes	61.4
No	38.6
Ethnicity	
White	40.5
African-American	15.6
Latino	13.0
East Asian	16.8
South Asian	11.6
Middle Eastern	1.7
Other	1.0
Work experience	12 years
Employment status	
Full time	63.0
Part time	21.0
Unemployed	8.0
Full-time student	6.0
Employment position	
Nonmanager	36.0
Lower level manager/supervisor	16.0
Mid- to upper-level manager	10.0
Missing	38.0
Nascent entrepreneurs	
Nascent entrepreneurs	36.3
Individuals interested in a business start-up and who have engaged in one start-up activity	61.0
Neither	2.7

organizations that have less than 150 employees. Thirty-nine percent are foreign born, while 61% were born in the United States.

Importantly, the composition of the final sample in this large-scale study strengthens the resulting findings for researchers. A review of descriptive statistics for the sample in Table 2 shows that the subgroup proportions in each of the demographic categories compare favorably with actual distributions in the population. More than two-thirds of the

sample is drawn from the prime age years for pursuing entrepreneurship (under 40). Additionally, the final sample includes a healthy representation of minority groups that are not adequately represented in many studies. The result is that the study has increased generalizability.

Analysis of ESE

After conducting the survey of prospective entrepreneurs, common factor analysis identified a multi-dimensional structure for ESE. Maximum likelihood extraction with oblique rotation initially identified five factors. The theoretically grounded four-dimensional structure of ESE was identified with the modification that the dimension of “implementing” now had two subdimensions present (one representing “people aspects of implementation” and another representing “financial aspects of implementation”). The maximum likelihood extraction technique was used because the final modeling steps of the analysis would use confirmatory factor analysis using structural equation modeling that is based on common factor analysis.

Specifically, five ESE dimensions were identified and labeled: (1) searching, (2) planning, (3) marshaling, (4) implementing-people, and (5) implementing-financial. To further test the discriminant validity of these five ESE dimensions and to better understand the nomological validity of the ESE dimensions, items representing attitude toward venturing, and nascent entrepreneurship were included in the analysis.

Following Gerbing and Anderson’s (1988) protocol, unidimensionality analysis was executed on the multi-item constructs. Encouragingly, each factor of ESE and the attitude toward venturing construct accounted for at least 50% of the variance in the set of items representing each construct. At the end of this item pruning, 19 items were found to best represent the five factors of ESE. In sum, these five factors were found to have adequate reliability for inclusion in a multiple-indicator measurement model to assess the internal and external consistency of these constructs (Gerbing & Anderson).

The items for the ESE factors and for the attitude toward venturing construct along with the corresponding Cronbach alphas derived in reliability analysis are presented in Table 3. As can be seen, the values for Cronbach alphas are all above .80 indicating a healthy level for the reliability of each construct. Common factor analysis of the items for the six multi-item constructs disclosed a simple structure as evidenced by items intended to represent a single factor loaded only on that factor (Bagozzi, Yi, & Phillips, 1991).

Our final model included a dichotomous variable representing nascent entrepreneurship. This behavior variable was composed in the following way. Nascent entrepreneurs are those who have never owned a business and did not currently own a business. Further, nascent entrepreneurs were designated as those who had participated in at least two of the following six behaviors currently or in the past: (1) attending a “start your own business planning” seminar or conference, (2) writing a business plan or participating in seminars that focus on writing a business plan, (3) putting together a start-up team, (4) looking for a building or equipment for the business, (5) saving money to invest in the business, and (6) developing a product or service. A comparison of means between nascent entrepreneurs and the baseline group of respondents who have not taken two steps toward launching a business are also included in Table 3. As can be seen, nascent entrepreneurs report means that are higher at the .05 level of statistical significance for 20 of the 22 items. (Two of the items for the implementing-financial construct are not statistically significant—although these means were higher in an absolute sense.)

The nascent entrepreneurship variable was included in the final modeling to allow more powerful assessment of the convergent, discriminant, and nomological validity of

Table 3

Constructs and Comparison of Item Means between Nascent Entrepreneurs and Baseline Group

		Factor loading	<i>t</i> -value	<i>p</i> -value	Difference
<hr/>					
	<i>Searching</i> —(How much confidence do you have in your ability to . . . ?)	Cronbach's $\alpha = .84$			
q3.23	Brainstorm (come up with) a new idea for a product or service	.80	4.38	.00	.52
q3.13	Identify the need for a new product or service	.79	3.30	.00	.40
q3.17	Design a product or service that will satisfy customer needs and wants	.79	6.36	.00	.72
	<i>Planning</i> —(How much confidence do you have in your ability to . . . ?)	Cronbach's $\alpha = .84$			
q3.20	Estimate customer demand for a new product or service	.81	2.53	.01	.31
q3.26	Determine a competitive price for a new product or service	.80	3.88	.00	.44
q3.24	Estimate the amount of start-up funds and working capital necessary to start my business	.72	2.50	.01	.33
q3.12	Design an effective marketing/advertising campaign for a new product or service	.70	2.38	.02	.33
	<i>Marshaling</i> —(How much confidence do you have in your ability to . . . ?)	Cronbach's $\alpha = .80$			
q3.14	Get others to identify with and believe in my vision and plans for a new business	.77	4.42	.00	.47
q3.25	Network—i.e., make contact with and exchange information with others	.76	3.20	.00	.36
q3.22	Clearly and concisely explain verbally/in writing my business idea in everyday terms	.75	2.72	.01	.33
	<i>Implementing-people</i> —(How much confidence do you have in your ability to . . . ?)	Cronbach's $\alpha = .91$			
q3.18	Supervise employees	.82	2.85	.00	.28
q3.10	Recruit and hire employees	.81	2.94	.00	.34
q3.6	Delegate tasks and responsibilities to employees in my business	.81	2.46	.01	.28
q3.9	Deal effectively with day-to-day problems and crises	.80	3.67	.00	.37
q3.8	Inspire, encourage, and motivate my employees	.78	2.50	.01	.24
q3.2	Train employees	.78	2.63	.01	.28
	<i>Implementing-financial</i> —(How much confidence do you have in your ability to . . . ?)	Cronbach's $\alpha = .84$			
q3.7	Organize and maintain the financial records of my business	.82	1.57	.12	.19
q3.15	Manage the financial assets of my business	.81	3.16	.00	.38
q3.5	Read and interpret financial statements	.78	1.29	.20	.18
	<i>Attitude toward venturing</i> —In general, starting a business is . . .	Cronbach's $\alpha = .87$			
q3.29	Worthless/worthwhile	.92	7.01	.00	.49
q3.31	Disappointing/rewarding	.84	3.89	.00	.34
q3.28	Negative/positive	.76	7.42	.00	.59
	<i>Nascent entrepreneurship</i> —Participated in at least two of the following six behaviors currently or in the past:				
1	Attending a “start your own business planning” seminar or conference				
2	Writing a business plan or participating in seminars that focus on writing a business plan				
3	Putting together a start-up team				
4	Looking for a building or equipment for the business				
5	Saving money to invest in the business				
6	Developing a product or service				

the ESE-related constructs, as well as the attitude toward venturing construct (Hair, Anderson, & Tatham, 1991). A table of correlations among the constructs of the study and nascent entrepreneurship is included in Table 4. These results correspond to those of the comparison of means between nascent entrepreneurs and the baseline group of respondents. Here, a positive correlation with nascent entrepreneurship is found for 20 of the 22 items.

Final Modeling

Following a confirmatory factor analysis approach similar to Kreiser, Marino, and Weaver (2002), we used covariance analysis (AMOS 7) to rigorously evaluate the factor structure of the 19 ESE items (Bollen, 1989) and to estimate the correlations among the seven constructs of the proposed confirmatory factor analysis model. The AMOS 7 algorithm minimizes a fit function between the actual covariance matrix and a covariance matrix implied by the estimated parameters from a series of structural equations for the confirmatory factor analysis model. These incremental fit indices compare the proposed model to a baseline or null model. The Comparative Fit Index (CFI) (Bentler, 1990) and the Tucker-Lewis Index (Hair et al., 1991) suggested that the comparative model fit is excellent with a CFI of .96, and a Tucker-Lewis Index of .95. Additionally, the RMSEA (.06) suggested a good model had been identified.

All coefficients in this confirmatory factor analysis model were statistically significant at $p = .05$. Figure 2 depicts the results of this modeling. All depicted path coefficients are statistically significant at $p = .05$. The confirmatory factor analysis model resulted in a $\chi^2_{(221)}$ value of 407.2. The correlations among pairs of constructs are presented in Table 5.

The high correlations among the ESE factors of searching, planning, and marshaling hinted that these three factors might be better represented by just one factor. An alternative confirmatory factor analysis model was run in which the searching, planning, and marshaling factors were collapsed into one factor in a model with four constructs instead of the original six. This alternative model posted a $\chi^2_{(221)}$ value of 490.6. When comparing the results of the original model with the alternative model, the decrement in fit for the alternative model ($\chi^2_{(11)} = 83.4$) proved to be substantial and statistically significant at $p = .05$. Accordingly, this alternative model was dropped in favor of the original model with five factors.

In sum, the 19 items allowed for an excellent simultaneous measurement of constructs representing five ESE constructs, as well as attitude toward venturing and nascent entrepreneurship. As can be seen in Figure 2, each construct is measured by its own set of unique items. Such a structure gives evidence for both convergent validity and discriminant validity, as the proposed items for each construct load on the respective constructs and do not load on the other constructs (Bagozzi et al., 1991). The confirmatory factor analysis model suggests convergent validity of the items included in the model because the items of the same constructs share a relatively high degree of the variance of their respective underlying constructs, as indicated by the factor loadings being statistically significant at $p = .05$. Additionally, all factor loadings were statistically significant, and the corresponding t -values were higher than 2.0 (Gerbing & Anderson, 1988). The internal consistency of each construct is also evidenced by the face validity or conceptual relatedness of the items. Importantly, this relatedness resulted from the theoretical grounding of the scales that were developed in this study.

Discriminant validity for the constructs in the final model is suggested by the items for each construct having factor loadings which are not statistically significant at $p = .05$, with conceptually similar, but distinct constructs (Bagozzi et al., 1991). In other words, the

Table 4

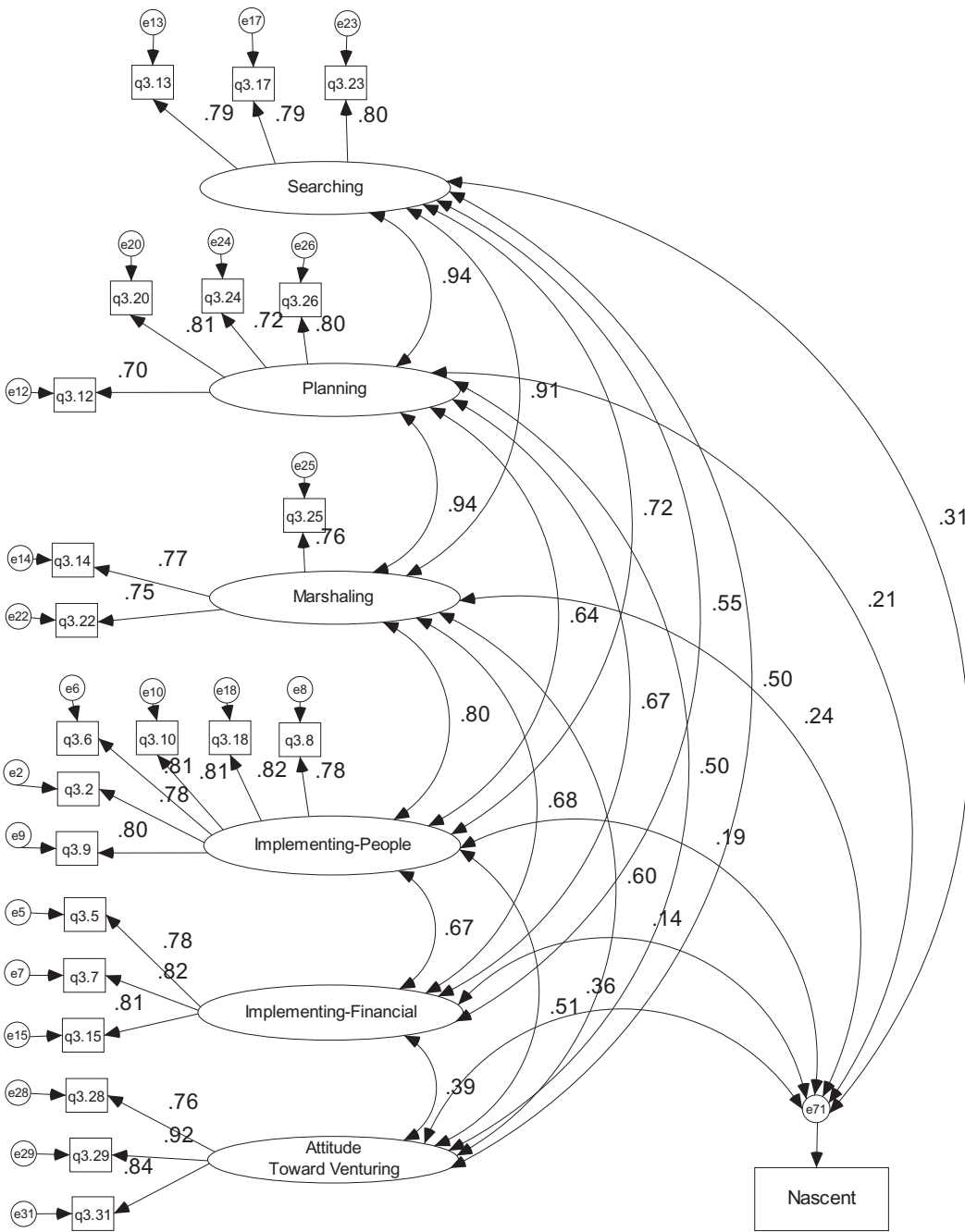
Correlations of Items for Five Factors of Entrepreneurial Self-efficacy, Attitude toward Venturing and Nascent Entrepreneur Status

	q3.23	q3.13	q3.17	q3.20	q3.26	q3.24	q3.12	q3.14	q3.25	q3.22	q3.18	q3.10	q3.6	q3.9	q3.8	q3.2	q3.7	q3.15	q3.5	q3.29	q3.31	q3.28
Searching																						
q3.13	0.64																					
q3.17	0.63	0.62																				
Planning																						
q3.20	0.59	0.66	0.63																			
q3.26	0.58	0.6	0.6	0.64																		
q3.24	0.47	0.5	0.45	0.60	0.62																	
q3.12	0.53	0.62	0.48	0.55	0.54	0.48																
Marshaling																						
q3.14	0.6	0.55	0.59	0.55	0.56	0.43	0.51															
q3.25	0.58	0.54	0.53	0.61	0.63	0.54	0.52	0.62														
q3.22	0.58	0.46	0.5	0.55	0.56	0.54	0.47	0.55	0.56													
Implementing-people																						
q3.18	0.49	0.45	0.53	0.42	0.46	0.38	0.4	0.54	0.48	0.52												
q3.10	0.48	0.47	0.45	0.42	0.41	0.37	0.44	0.53	0.44	0.51	0.63											
q3.6	0.45	0.39	0.43	0.36	0.39	0.4	0.38	0.51	0.41	0.52	0.7	0.67										
q3.9	0.52	0.42	0.48	0.38	0.41	0.32	0.39	0.54	0.44	0.47	0.67	0.67	0.61									
q3.8	0.48	0.49	0.49	0.4	0.38	0.37	0.46	0.57	0.44	0.53	0.64	0.63	0.62	0.62								
q3.2	0.42	0.4	0.43	0.37	0.4	0.31	0.38	0.43	0.38	0.47	0.63	0.66	0.65	0.65	0.6							
Implementing-financial																						
q3.7	0.3	0.35	0.33	0.37	0.39	0.42	0.38	0.37	0.35	0.4	0.45	0.49	0.45	0.44	0.44	0.41						
q3.15	0.37	0.39	0.42	0.42	0.4	0.55	0.39	0.48	0.45	0.45	0.43	0.43	0.42	0.45	0.36	0.37	0.69					
q3.5	0.3	0.37	0.3	0.39	0.41	0.52	0.42	0.4	0.38	0.52	0.44	0.43	0.48	0.37	0.45	0.41	0.63	0.61				
Attitude toward venturing																						
q3.29	0.36	0.35	0.4	0.32	0.4	0.37	0.3	0.44	0.36	0.45	0.39	0.36	0.32	0.36	0.38	0.34	0.25	0.3	0.33			
q3.31	0.35	0.33	0.38	0.3	0.42	0.33	0.27	0.44	0.34	0.45	0.4	0.37	0.35	0.42	0.46	0.42	0.22	0.27	0.32	0.76		
q3.28	0.23	0.26	0.29	0.24	0.28	0.33	0.2	0.32	0.27	0.36	0.27	0.3	0.22	0.24	0.28	0.21	0.21	0.27	0.71	0.63		
Nascent entrepreneurship																						
Nascent	0.23	0.18	0.32	0.14	0.2	0.14	0.13	0.23	0.17	0.15	0.15	0.16	0.14	0.19	0.13	0.14	0.09	0.17	0.07	0.33	0.35	0.21

Note: All Pearson product moment correlations greater than .09 in absolute value are statistically significant at $p = .05$.

Figure 2

Confirmatory Factor Analysis Model of ESE Factors, Attitude Toward Venturing, and Nascent Entrepreneurship (CFI = .96, TLI = .95, RMSEA = .06)



Note: All paths are statistically significant at $p = .05$

Table 5

Correlations between Constructs Derived through Confirmatory Factor Analysis

Searching	<--	Marshaling	.91
Searching	<--	Implementing-people	.72
Planning	<--	Searching	.94
Planning	<--	Marshaling	.94
Planning	<--	Implementing-people	.64
Planning	<--	Implementing-financial	.67
Planning	<--	Attitude toward venturing	.50
Implementing-people	<--	Marshaling	.80
Implementing-financial	<--	Searching	.55
Implementing-financial	<--	Marshaling	.68
Implementing-financial	<--	Implementing-people	.67
Implementing-financial	<--	Attitude toward venturing	.39
Attitude toward venturing	<--	Searching	.51
Attitude toward venturing	<--	Marshaling	.60
Attitude toward venturing	<--	Implementing-people	.51
Nascent entrepreneurship	<--	Searching	.31
Nascent entrepreneurship	<--	Planning	.21
Nascent entrepreneurship	<--	Marshaling	.24
Nascent entrepreneurship	<--	Implementing-people	.19
Nascent entrepreneurship	<--	Implementing-financial	.14
Nascent entrepreneurship	<--	Attitude toward venturing	.36

items representing one construct do not also represent another construct to a high degree. The ESE constructs manifest the same discriminant validity for each other as they do for the attitude toward venturing and nascent entrepreneurship dimensions. Evidence for this discriminant validity was seen in two ways. First, none of the confidence intervals for any of the correlations between constructs included 1.0 ($p < .05$) (Gerbing & Anderson, 1988). Second, a series of constrained models in which the correlation between two constructs was set to 1 were computed. This allowed comparison of the unconstrained model with the constrained model. For each pair of constructs tested in this way, the chi-square test statistic was higher for the constrained model. Additionally, the difference between the unconstrained and the constrained model was statistically significant ($\chi^2 > 3.84$). In this way, the case for the discriminant validity of the constructs of the final model was developed.

Discussion

This study supports the advancement of research on ESE and its relationship to entrepreneurial intentions by developing a more robust measure of ESE that can be used by researchers in a variety of contexts. Importantly, the multi-dimensional nature of the ESE measure was assessed by testing it within a four-phase venture creation process framework. Much of the preceding empirical research has relied on “total ESE” scales and the results of such research have shed little light on how the underlying dimensions of ESE influence entrepreneurial intentions and which ones, if any, are most important for strengthening ESE.

This study is also one of the first efforts to explicitly include nascent entrepreneurs in order to establish the validity and utility of this new multi-dimensional ESE scale within

the context of entrepreneurial intentions models. By including nascent entrepreneurs, researchers gain a valuable perspective on the phenomenon of ESE. For example, results presented in Table 3 suggest that nascent entrepreneurs exhibit higher levels on the ESE dimensions than do their counterparts in the baseline group. The final modeling depicted in Figure 2 suggests that there is a positive relationship between nascent entrepreneurship and the ESE constructs, as well as attitude toward venturing. Together, these results suggest that nascent entrepreneurs feel more confident about operating across all stages of the entrepreneurship process than do those individuals in the general population who have not fully pursued entrepreneurial endeavors. Moreover, nascent entrepreneurs appear to be particularly confident in their ability to search for entrepreneurial opportunities and marshal the required resources to exploit such opportunities, supporting the notion that entrepreneurs likely approach the discovery and exploitation of potentially profitable opportunities differently than nonentrepreneurs (Shane & Venkataraman, 2000).

The majority of ESE studies have relied mainly on binary correlations or regression techniques. This study's use of the SEM technique allows the simultaneous measurement of multi-item constructs and the correlations among those constructs. By accounting for error in the measurement of individual items, SEM allows a more meaningful gauging of the substantive relationships among constructs (Dillon, White, Rao, & Filak, 1997). As a result, the substantive relationships are more clearly demonstrated than through the use of piecemeal or less robust measurement techniques.

Another key contribution of the study is the development, validation, and use of a new ESE measure that is based on specific tasks in which nascent entrepreneurs engage during the process of launching a venture. Other measures of ESE, while multi-dimensional, are based on more general management tasks such as marketing, strategic planning, and business decision-making. These more generalized measures of ESE do not assess confidence in performing specific tasks associated with planning, launching, and growing a new venture.

Implications for Entrepreneurship Education

A number of entrepreneurship researchers and scholars have proposed and tested the use of an education (or training) "intervention" to raise an individual's level of ESE (e.g., Baughn et al., 2006; Cox, Mueller, & Moss, 2002; Erikson, 2002; Florin et al., 2007; Wilson et al., 2007). For example, Cox et al. measured change in ESE before and after the completion of an undergraduate course in entrepreneurship to determine course effectiveness. Wilson et al. noted that a well-designed entrepreneurship (education) program should give the student a realistic sense of what it takes to start a business as well as raising the student's self-confidence level (ESE). They also advocated incorporating ESE into the pre- and post-measurement of entrepreneurship training programs and courses to provide educators with better information about continuous improvement and program effectiveness. For such important applications, the availability of a refined, consistent, and robust measure of ESE is essential.

The findings of this study suggest that a properly designed entrepreneurship education program should take into account the multi-dimensional and sequential nature of entrepreneurial tasks. Additional insights can be gained from examining the pattern of correlations presented in Table 5. Note, for example, that the correlation between nascent entrepreneurship and the searching dimension of ESE is stronger than the correlation between nascent entrepreneurship and the other dimensions of ESE. This finding suggests that nascent entrepreneurs' confidence in performing "searching" tasks develops before gaining confidence in tasks that come later, such as planning and marshaling of resources.

Nascent entrepreneurs appear to follow an “inspiration, then perspiration” sequence in ESE development. After being attracted to venturing and then searching for opportunity, nascent entrepreneurs gain more confidence in their abilities related to other domains of entrepreneurship. These other domains require more concrete skills, such as planning, marshaling, and the implementation of day-to-day management of employees and finances for the venture. In practical terms, the pattern of “inspiration, then perspiration” in ESE development for nascent entrepreneurs suggests that educational activities should address both the up-front activities in which inspiration is important (such as envisioning success and identifying a new product or service idea), as well as the perspiration dimensions of venturing. These perspiration dimensions require crucial implementation skills in planning, marshaling resources, managing people, and managing the finances of the venture.

Conclusions

This study takes an important step toward the refinement and standardization of ESE measurement by employing confirmatory factor analysis on a large and diverse empirical sample. The study’s findings suggest that ESE is best viewed as a multi-dimensional construct. Moreover, this refined ESE measure appears particularly appropriate for examining the behavior of nascent entrepreneurs. Support for this assertion resulted from a comparison of nascent entrepreneurs with a baseline group which was comprised of individuals who have not taken at least two steps to launch a new venture. In this comparison, nascent entrepreneurs consistently posted higher ratings on the ESE measures. Additionally, a positive relationship between nascent entrepreneurship and the five dimensions of ESE was revealed using covariance analysis in the form of confirmatory factor analysis. Together, these results provide a more textured understanding of ESE and its ability to gauge the increased confidence of nascent entrepreneurs across the dimensions of a new venture creation process framework.

Future studies of ESE should seek to understand how the different dimensions of ESE relate to venture growth expectations (Autio, 2005). For example, do nascent entrepreneurs pursuing high growth potential ventures differ from other nascent entrepreneurs on the five dimensions of ESE? Future research is also needed to explore the relationships between ESE and subsequent venture performance. The literature suggests that higher levels of ESE influence the likelihood of successfully launching a new business. However, there is still limited understanding of ESE’s role in the new venture’s performance after start-up. Perhaps equally important, it remains unclear if certain underlying dimensions of ESE are more important than others after a new business is launched. For example, veteran entrepreneurs might be more aware of the role of luck and favorable timing in their achievements, and therefore more humble about their own ability to control the destinies of their ventures. This effect might be more marked for those entrepreneurs pursuing high-growth ventures. Additionally, cross-cultural studies of ESE could identify particular cultural factors that influence the development of ESE. For example, is high ESE more important to successful venturing in certain cultural contexts than in others? In summary, future research should explore moderating conditions for ESE such as (1) stage of venture development, (2) growth goals of entrepreneurs, and (3) cultural influences on ESE. We look forward to seeing entrepreneurship researchers gain insight on such important phenomena in the future using the measures of ESE refined in this study.

REFERENCES

- Aldrich, H.E. & Martinez, M.A. (2001). Many are called, but few are chosen: An evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice*, 25(4), 41–56.
- Anna, A., Chandler, G., Jansen, E., & Mero, N. (1999). Women business owners in traditional and non-traditional industries. *Journal of Business Venturing*, 15(3), 279–303.
- Arenius, P. & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics*, 24(3), 233–247.
- Autio, E. (2005). *High-expectation entrepreneurship. Global entrepreneurship monitor*. London: GEM Research Consortium.
- Bagozzi, R.P., Yi, Y., & Phillips, L.W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36, 421–458.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barbosa, S., Gerhardt, M., & Kickul, J. (2007). The role of cognitive style and risk preference on entrepreneurial self-efficacy and entrepreneurial intentions. *Journal of Leadership & Organizational Studies*, 13(4), 86–104.
- Baron, R.A. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship's basic "why" questions. *Journal of Business Venturing*, 19(2), 221–239.
- Baughn, C., Cao, J., Le, L., Lim, V., & Neupert, K. (2006). Normative, social and cognitive predictors of entrepreneurial interest in China, Vietnam and the Philippines. *Journal of Developmental Entrepreneurship*, 11(1), 57–77.
- Baum, J. & Locke, E. (2004). The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of Applied Psychology*, 89(4), 587–598.
- Baum, J.R., Locke, E.A., & Smith, K.G. (2001). A multi-dimensional model of venture growth. *Academy of Management Journal*, 44, 292–303.
- Begley, T. & Tan, W. (2001). The socio-cultural environment for entrepreneurship: A comparison between East Asian and Anglo-Saxon countries. *Journal of International Business Studies*, 32(3), 537–553.
- Bentler, P.M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bird, B. (1988). Implementing entrepreneurial ideas: The case for intention. *Academy of Management Review*, 13(3), 442–453.
- Bollen, K.A. (1989). *Structural equations with latent variables*. New York: John Wiley and Sons.
- Boyd, N. & Vozikis, G. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice*, 18(4), 63–77.
- Bradley, D. & Roberts, J. (2004). Self-employment and job satisfaction: Investigating the role of self-efficacy, depression, and seniority. *Journal of Small Business Management*, 42(1), 37–58.
- Carter, N.M., Gartner, W.B., & Reynolds, P.D. (1996). Exploring start-up event sequences. *Journal of Business Venturing*, 11, 151–166.

- Carter, N.M., Gartner, W.B., Shaver, K.G., & Gatewood, E.J. (2003). The career reasons of nascent entrepreneurs. *Journal of Business Venturing*, 18(1), 13–39.
- Chen, G., Gully, M.S., & Eden, D. (2004). General self-efficacy and self-esteem: Toward theoretical and empirical distinction between correlated self-evaluations. *Journal of Organizational Behavior*, 25, 375–395.
- Chen, G.C., Greene, P.G., & Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers. *Journal of Business Venturing*, 13, 295–317.
- Cox, L., Mueller, S.L., & Moss, S.E. (2002). The impact of entrepreneurship education on entrepreneurial self-efficacy. *International Journal of Entrepreneurship Education*, 1(2), 229–247.
- Davidsson, P. & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing*, 18, 301–331.
- De Noble, A., Jung, D., & Ehrlich, S. (1999). Entrepreneurial self-efficacy: The development of a measure and its relationship to entrepreneurial action. In R.D. Reynolds, W.D. Bygrave, S. Manigart, C.M. Mason, G.D. Meyer, H.J. Sapienze, & K.G. Shaver (Eds.), *Frontiers of entrepreneurship research* (pp. 73–78). Waltham, MA: P & R Publication Inc.
- Dillon, W.R., White, J.B., Rao, V.R., & Filak, D. (1997). Good science: Use structural equation models to decipher complex customer relationships. *Marketing Research*, Winter, 22–31.
- Drnovsek, M. & Glas, M. (2002). The entrepreneurial self-efficacy of nascent entrepreneurs: The case of two economies in transition. *Journal of Enterprising Culture*, 10(2), 107–131.
- Erikson, T. (2002). Entrepreneurial capital: The emerging venture's most important asset and competitive advantage. *Journal of Business Venturing*, 17(3), 275–290.
- Faugier, J. & Sargeant, M. (1997). Sampling hard to reach populations. *Journal of Advanced Nursing*, 26, 790–797.
- Florin, J., Karri, R., & Rossiter, N. (2007). Fostering entrepreneurial drive in business education: An attitudinal approach. *Journal of Management Education*, 31(1), 17–42.
- Forbes, D. (2005). The effects of strategic decision making on entrepreneurial self-efficacy. *Entrepreneurship Theory and Practice*, 29(5), 599–626.
- Gerbing, D.W. & Anderson, J.C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(May), 186–192.
- Gist, M. (1987). Self-efficacy: Implications for organizational behavior and human resource management. *Academy of Management Journal*, 12, 472–485.
- Hair, J.F., Jr., Anderson, R.E., & Tatham, R.L. (1991). *Multivariate data analysis*. New York: MacMillan.
- Hisrich, R.D. & Peters, M.P. (1998). *Entrepreneurship*. Boston, MA: Irwin McGraw-Hill.
- Kolvereid, L. (1996). Prediction of employment status choice intentions. *Entrepreneurship Theory and Practice*, 21(1), 47–58.
- Kolvereid, L. & Isaksen, E. (2006). New business start-up and subsequent entry into self-employment. *Journal of Business Venturing*, 21(6), 866–885.
- Kreiser, P.M., Marino, L.D., & Weaver, K.M. (2002). Assessing the psychometric properties of the entrepreneurial orientation scale: A multi-country analysis. *Entrepreneurship Theory and Practice*, 26(4), 71–94.
- Kristiansen, S. & Indarti, N. (2004). Entrepreneurial intention among Indonesian and Norwegian students. *Journal of Enterprising Culture*, 12(1), 55–78.

- Krueger, N.F., Jr. & Brazeal, D.V. (1994). Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship Theory & Practice*, 18(3), 91–104.
- Krueger, N.F., Reilly, M.D., & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, 15, 411–432.
- Lichtenstein, B.B., Carter, N.M., Dooley, K.J., & Gartner, W.B. (2007). Complexity dynamics of nascent entrepreneurship. *Journal of Business Venturing*, 22(2), 236–248.
- Markman, G., Balkin, D., & Baron, R. (2002). Inventors and new venture formation: The effects of general self-efficacy and regretful thinking. *Entrepreneurship Theory & Practice*, 27(2), 149–165.
- Markman, G.D., Baron, R.A., & Balkin, D.B. (2005). Are perseverance and self-efficacy costless? Assessing entrepreneurs' regretful thinking. *Journal of Organizational Behavior*, 26(1), 1–19.
- Mueller, S.L. & Goic, S. (2003). East-West differences in entrepreneurial self-efficacy: Implications for entrepreneurship education in transition economies. *International Journal of Entrepreneurship Education*, 1(4), 613–632.
- Peterman, N.E. & Kennedy, J. (2003). Enterprise education: Influencing students' perceptions of entrepreneurship. *Entrepreneurship Theory & Practice*, 28(2), 129–144.
- Reynolds, P.D., Carter, N.M., Gartner, W.B., & Greene, P.G. (2004). The prevalence of nascent entrepreneurs in the United States: Evidence from the panel study of entrepreneurial dynamics. *Small Business Economics*, 23, 263–284.
- Rotefoss, B. & Kolvereid, L. (2005). Aspiring, nascent and fledgling entrepreneurs: An investigation of the business start-up process. *Entrepreneurship & Regional Development*, 17, 109–127.
- Scherer, R., Adams, J., Carley, S., & Wiebe, F. (1989). Role model performance effects on development of entrepreneurial career preference. *Entrepreneurship Theory & Practice*, 13(3), 53–71.
- Sequeira, J., Mueller, S.L., & McGee, J.E. (2007). The influence of social ties and self-efficacy in forming entrepreneurial intentions and motivating nascent behavior. *Journal of Developmental Entrepreneurship*, 12(3), 275–293.
- Shane, S., Locke, E.A., & Collins, C.J. (2003). Entrepreneurial motivation. *Human Resource Management Review*, 13(2), 257–279.
- Shane, S. & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217–226.
- Spreen, M. (1992). Rare populations, hidden populations and link-tracing designs: What and why. *Bulletin Methodologie Sociologique*, 36, 34–58.
- Stevenson, H.H., Roberts, M.J., & Grousbeck, H.I. (1985). *New business ventures and the entrepreneur*. Burr Ridge, IL: Richard D. Irwin.
- Tominc, P. & Rebernik, M. (2007). Growth aspirations and cultural support for entrepreneurship: A comparison of post-socialist countries. *Small Business Economics*, 28(2/3), 239–255.
- Utsch, A. & Rauch, A. (2000). Innovativeness and initiative as mediators between achievement orientation and venture performance. *European Journal of Work & Organizational Psychology*, 9(1), 45–62.
- Utsch, A., Rauch, A., Rothfuss, R., & Frese, M. (1999). Who becomes a small scale entrepreneur in a post-socialist environment: On the difference between entrepreneurs and managers in East Germany. *Journal of Small Business Management*, 37(3), 31–42.

Wilson, F., Kickul, J., & Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education. *Entrepreneurship Theory & Practice*, 31(3), 387–406.

Zhao, H., Seibert, C., & Hills, C. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology*, 90(2), 1265–1272.

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