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Measure for Measure: Modeling Entrepreneurial Self-Efficacy onto Instrumental Tasks Within the New Venture Creation Process

Jill Kickul

Robert S. D'Intino

We examine the various components of entrepreneurial self-efficacy within the entrepreneurship literature from a measurement perspective. Two published entrepreneurial self-efficacy instruments are tested and compared. Additionally, we study how self-efficacy relates with many of the tasks and roles identified within the entrepreneurial new venture life-cycle. Our study suggests relationships between self-efficacy, perceived skills, and abilities to manage a new venture, and entrepreneurial intentions to start a new venture. We discuss relationships between entrepreneurship research and university teaching and make specific suggestions on how further work on improving measurement in entrepreneurship will benefit both research and teaching effectiveness.

Entrepreneurship has always been a vibrant productive force in the economy and at the forefront of adaptation and growth of new markets (Gavron, Cowling, Holtham and Westall 1998). Future entrepreneurs must continually find innovative ways to introduce new products, services, and technological processes. Entrepreneurship educators are experiencing a growing demand to help facilitate the development of a nascent entrepreneur's success. Many entrepreneurial-oriented students are searching for universities that offer courses to assist them in developing the knowledge, skills, and abilities necessary for the effective launch, management, and growth of their new ventures. As educators formulate and implement their entrepreneurship programs, many have used previous research to assist them in identifying the skill sets and behaviors associated with new venture creation, and to further understand the influence of entrepreneurs' perceptions (Cooper, Woo, and Dunkelberg 1988) and their intentions (Bird 1988; Krueger, Reilly, and Carsrud 2000) on their entrepreneurial behavior (Shaver and Scott 1991).

Examining the role of entrepreneurial self-efficacy is one way to understand the new venture creation process to assist educators in the design of new entrepreneurship curriculum and courses. Self-efficacy may play an important role in uncovering the essential skills set needed throughout the various stages of the entrepreneurial life-cycle. The purpose of this article is to examine the various components of entrepreneurial self-efficacy within the entrepreneurship literature from a measurement perspective. Additionally, we seek to understand how self-efficacy relates with many of the

tasks and roles that have been identified within the entrepreneurial life-cycle (see Figure 1). Finally, we further investigate the association between these critical tasks and entrepreneurial intentions (Boyd and Vozikis 1994).

Entrepreneurial Self-Efficacy

The construct of self-efficacy has been widely applied in psychology as an individual difference variable. Self-efficacy is defined by Bandura (1977) as people's judgments of their capabilities to organize and execute courses of actions required to attain designated types of performances. It is concerned not with the skills one has but with the judgments of what one can do with whatever skills one possesses. Self-efficacy is believed to be related to one's choice of activities, one's effort and persistence, thought processes, and emotional reactions when confronted by obstacles (Bandura 1977; Lent, Brown, and Hackett 1994). Self-efficacy is acquired gradually through the development of complex cognitive, social, linguistic, and physical skills that are obtained through education and life experience (Bandura 1982; Gist 1987). Thus, the acquisition of skills and task competencies based on past performance and achievements reinforces self-efficacy and contributes to higher aspirations and future performance (Herron and Sapienza 1992). Research examining self-efficacy and knowledge gained has found that pretraining self-efficacy measures positively predict learning outcomes (e.g., Gist, Schwoerer, and Rosen 1989; Martocchio and Weber 1992).

Self-efficacy has a number of theoretical and practical implications for entrepreneurial success because initiating a new venture requires unique skills and abilities. In this study we examine two published research studies that developed entrepreneurial self-efficacy measurement instruments and compare them. The entrepreneurial self-efficacy research by De Noble, Jung, and Ehrlich (1999) identified the following six theoretical dimensions of entrepreneurial self-efficacy:

1. Risk and uncertainty management skills
2. Innovation and product development skills
3. Interpersonal and networking management skills
4. Opportunity recognition
5. Procurement and allocation of critical resource
6. Development and maintenance of an innovative environment

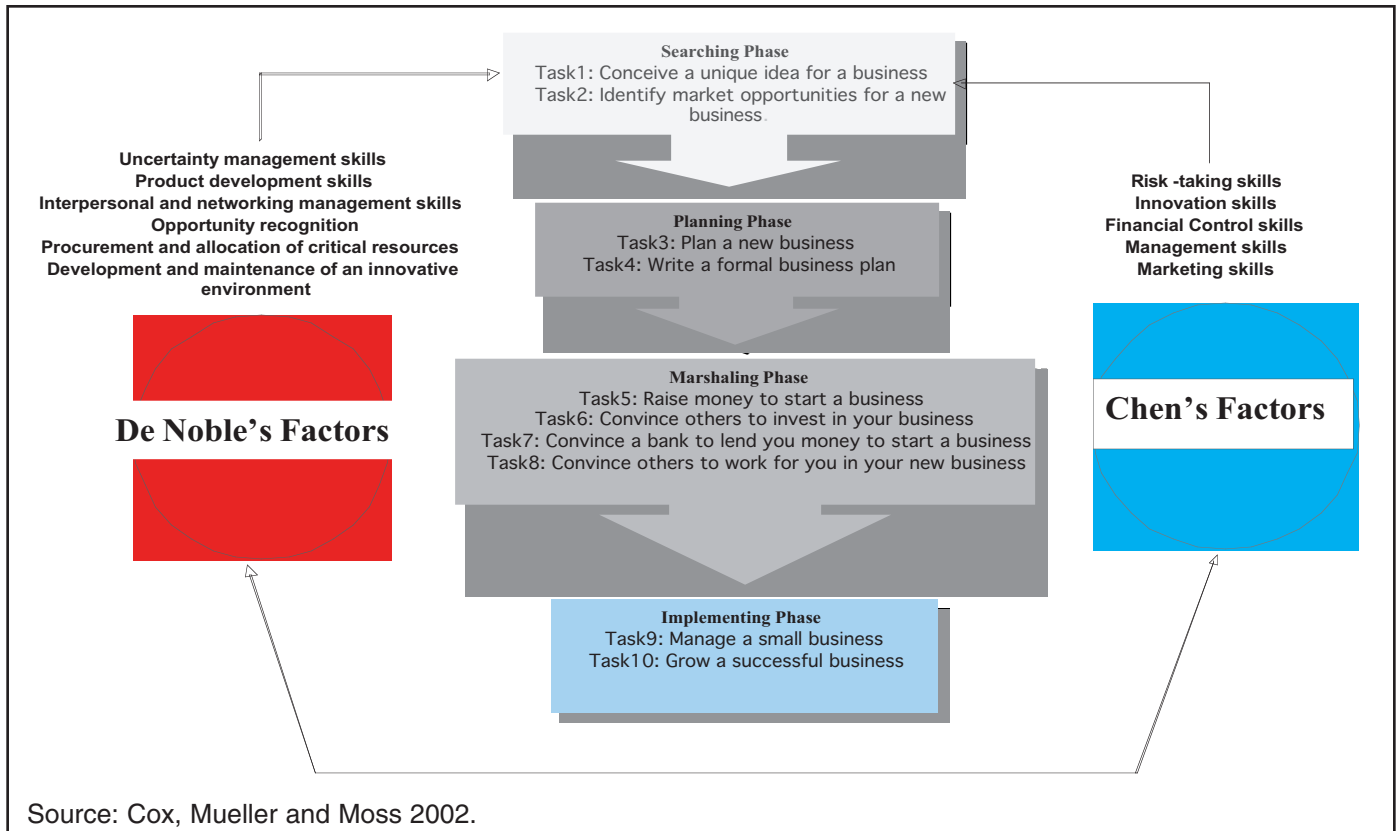


Figure 1. Relationship of Self-Efficacy to Tasks and Roles Identified within the Entrepreneurial Life-cycle

Chen, Greene, and Crick (1998) has also proposed and identified the following five entrepreneurial self-efficacy factors:

1. Marketing (e.g., set and marketing goals and expand business)
2. Innovation (e.g., new venturing and new ideas)
3. Management (e.g., reduce risk and uncertainty)
4. Risk-taking (e.g., makes decisions under uncertainty and risk)
5. Financial control (e.g., develop financial system and internal controls)

Both of these researcher teams found many of these self-efficacy factors to be related to entrepreneurial intentions. As mentioned earlier, one of the purposes of our article is to examine how these entrepreneurial self-efficacy factors advocated by De Noble et al. (1999) and Chen et al. (1998) converge on several of the underlying self-efficacy dimensions. That is, from a measurement standpoint, we will begin to investigate the convergent and discriminant validity of the two published entrepreneurial self-efficacy measures. Many of these factors may not only be associated with the broad construct of intentionality but also associated with many of the critical tasks and roles that have been identified within the entrepreneurial life-cycle.

Method

Overview

Study participants were 138 graduate students enrolled in a part-time MBA (Master of Business Administration) program at a large, midwestern university. These students were recruited from entrepreneurship or management courses included within the graduate curriculum. Of the 138 participants, 53 percent were male and 47 percent were female. The average age was 26.20 years. All participants were informed that we were conducting research to better understand their attitudes and beliefs regarding entrepreneurial ventures. In their study questionnaire, students were asked to provide responses about their interest in starting their own business (entrepreneurial intentions) as well as their perceived skills and abilities in performing entrepreneurial roles and tasks.

Measures

Entrepreneurial Self-Efficacy (De Noble et al. 1999). We employed De Noble et al.'s 34-item self-efficacy measure that includes six core dimensions:

1. Risk and uncertainty management skills ("I can work

productively under continuous stress, pressure and conflict.”)

2. Innovation and product development skills (“I can originate new ideas and products.”)
3. Interpersonal and networking management skills (“I can develop and maintain favorable relationships with potential investors.”)
4. Opportunity recognition (“I can see new market opportunities for new products and services.”)
5. Procurement and allocation of critical resources (“I can recruit and train key employees.”)
6. Development and maintenance of an innovative environment (“I can develop a working environment that encourages people to try out something new.”)

Participants rated themselves on how capable they believe they are in performing each task using a 7-point Likert scale where 1 represents “Strongly Disagree” and 7 represents “Strongly Agree.”

Entrepreneurial Self-Efficacy (Chen et al. 1998). We also had participants rate themselves on Chen et al’s 22-item self-efficacy measure. As mentioned earlier, their scale included five factors (marketing, innovation, management, risk-taking, and financial control. Again, participants rated themselves on how capable they believe they are in performing each task using a 7-point Likert scale where 1 represents “Strongly Disagree” and 7 represents “Strongly Agree.”

Entrepreneurial Life-Cycle Tasks and Roles

Cox, Mueller, and Moss (2002) created a scale to measure participant’s perceptions of their ability to perform many of the instrumental functions within each stage of the entrepreneurial life-cycle. Our study participants were asked to think

about the process of starting a new business venture in terms of the following ten tasks statements of the Cox et al. instrument (see Figure 1 for the statements). For each statement, participants rated their level of confidence on a 7-point Likert scale (1 = “Not Confident”; 7 = “Completely Confident”).

Entrepreneurial Intentions to Start a New Venture

Two items from Crant (1996) were used to measure entrepreneurial intentions: “I will probably own my own business one day,” and “It is likely that I will personally own a small business in the relatively near future.” Moreover, two additional items specifically designed for this study were also used: “Being ‘my own boss’ is an important goal of mine,” and “I often think of having my own business.” Responses to these items were indicated on a 7-point Likert scale (1 = “strongly disagree”; 7 = “strongly agree”).

Results

To examine the degree of convergence and divergence on the two measures of self-efficacy, the data were submitted to a factor analysis using principal components extraction and oblique rotation. An 11-factor solution resulted as indicated through our interpretation of the scree plot and the eigenvalues greater than 1.0. Comrey (1973) suggests that loadings in excess of .71 (50% overlapping variance) are considered excellent, .63 (40% overlapping variance) very good, .55 (30% overlapping variance) good, .45 (20% overlapping variance) fair, and .32 (10% overlapping variance) poor. Using this framework, items were chosen that were .45 or higher on one of the factors and were .32 or lower on the other factor. Table 1 displays the results of the factor analysis.

Table 1. Results of Factor Analysis

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	24.401	43.574	43.574	24.161	43.145	43.145	18.932	34.145	34.145
2	5.194	9.275	52.849	4.955	8.848	51.993	18.529	33.000	67.143
3	2.581	4.608	57.457	2.305	4.117	56.110	15.018	31.883	82.157
4	2.275	4.063	61.520	2.007	3.585	59.694	11.090	28.300	93.247
5	1.787	3.192	64.712	1.554	2.775	62.469	3.606	16.525	96.852
6	1.607	2.869	67.58	11.341	2.395	64.865	9.135	14.130	110.982
7	1.602	2.860	70.441	1.326	2.368	67.233	11.499	11.499	122.481
8	1.355	2.420	72.861	1.022	1.826	69.058	10.367	10.367	132.848
9	1.228	2.193	75.055	.920	1.644	70.702	7.950	7.950	140.798
10	1.110	1.982	77.037	.844	1.507	72.209	3.908	3.908	144.706
11	1.034	1.846	78.882	.775	1.384	73.593	1.774	1.774	146.480

Table 2.
Measures and Factors

	Factors										
	1	2	3	4	5	6	7	8	9	10	11
Expand business	.984		-.104								.128
New products and services	.942	.128	-.124								.144
Set and meet sales goals	.936	.173				-.194	-.165				
Set and attain profit goals	.921			.197	.130		-.268			.179	
New venturing and new ideas	.903					.105	-.123		.150		.140
New methods of production, marketing, and management	.902	-.163		-.120		.143					
Set and meet market share goals for my company	.895										
Establish position in product market	.861		.101	.142					-.102		-.143
New markets and geographic territories	.817							-.110		.137	
Conduct a market analysis	.752	-.192	.381		.116		-.263	.118		-.148	-.115
Strategic planning and develop information system	.614						.187				-.115
Reduce risk and uncertainty	.594						.134	-.148	.194		
Make decisions under uncertainty and risk	.509				.136	-.186	.246		.161	-.141	
I can develop new relationships with key people who are connected to capital sources.		.915	.114	-.217	.134	.162	-.104	-.157	-.214	.117	
I can see new market opportunities for new products and services	.137	.890		-.118		.152		.121	-.116		
I can develop and maintain favorable relationships with potential investors		.868	-.109		.116						
I can identify new areas for potential growth		.765						.216			
I can react quickly to take advantage of business opportunities		.759				-.115		.215			.133
I can convince others to join with me in pursuit of my vision	.154	.755	-.142		-.176						.196
I can persuade others to accept my viewpoint		.638	.156				-.102		.216	.131	
I can encourage people to take initiative and responsibilities for their ideas and decisions, regardless of outcomes		.634		.166	-.113	.136	.205				
I can inspire others to embrace the vision and values of the company		.474	.175	.116	-.157	-.171			.272	.305	.224
I can work productivity under continuous stress, pressure, and conflict	-.263	.464	.145	.282	.102		-.172				-.138
I can originate new ideas and products		.432		.148		.320	.146		-.150		-.357
Take calculated risks	.359	.405		-.162		-.289	.323		.157		-.110
I can manage the negotiation process to obtain outcomes favorable to me		.357	.322	.338	.118	-.171				-.148	.301
I can determine what the business will look like.		.354		.223				.250		.132	
I can react quickly to unexpected change and failure			.883	-.187						.203	.108
I can tolerate unexpected changes in business conditions	-.101		.692					.237	.148	-.201	.176
I can discover new ways to improve existing products		.312	.638	-.363		.133		.121			
I can maintain a positive outlook despite setbacks and negative feedback from naysayers	.185		.588	.392	-.227	-.191	.122	-.140	-.121		
I can formulate a set of actions in pursuit of opportunities	.212	.101	.508	.256					-.177		-.130
I can develop a new working environment that encourages people to try out something new	.115	.198	.394	.109		.292	.138	-.109	-.115		

Table 2 continued

	1	2	3	4	5	6	7	8	9	10	11
I can focus on the demands of the business despite the inevitable conflict between one's personal and professional life	.138		-.226	.922							-.165
I can persist in the face of adversity	-.239			.810	.197	.146				.131	
I can identify and build management teams			.209	.258		.141	.214	.110		.161	.154
Develop financial system and internal controls					.922						.105
Perform financial analysis		.155	-.114		.842						
Control costs	.215	-.107	.107		.629					.288	
I can form partner or alliance relationships with others		.130				.894	-.132			-.145	.153
I can tap the expertise of others						.641		.161	.156	.112	
I can foster an interactive working environment				.162	-.114	.487	.166		.147		
I can create a working environment that lets people be more their own boss			-.173				.767	.112		.136	-.115
I can tolerate ambiguities	-.176	-.241	.341			-.124	.755				
I can develop contingency plans to recruit key technical staff			.316	-.197			.459	.152		.399	
Take responsibility for ideas and decisions	.318						.414	-.165	.305		-.229
I can design products that solve current problems	-.101	.136	.151				.134	.763	.152		
I can create products that fulfill customers' unmet needs	.215	.289						.639	-.137		
I can bring product concepts to market in a timely manner		-.130		.272		.167	.110	.631			
Establish and achieve goals and objectives	.353	-.138		.210						.742	
Manage time by setting goals	.201		.132							.659	.177
Define organizational roles, responsibilities, and policies	.351	-.102			.139	.181		-.133	.470		.425
Work under pressure and conflict	.180	.284					.172	-.138	.286		
I can identify potential sources of funding for investment		.331	-.113	.134	.168		.183		-.161	.577	
I can articulate the vision and values of the organization	-.163	.425	.285	.148			-.320		.279	.453	
I can recruit and train new employees		.419	.249	-.134	.155	.160	-.157			.120	.550

Extraction Method: Principal Axis Factoring

Correlational and Regression Analyses

To examine the relationship between the resulting factors and entrepreneurial tasks, we first investigated the relationship between the new factors (composites established for each) and entrepreneurial intentions. Correlational analysis revealed that Factors 2, 3, 8, 11 (four of De Noble et al.'s items) were related to intentions to start a new venture. These factors, as shown in Figure 2, were also significantly associated with each of the entrepreneurial instrumental tasks.

Additional analyses were also completed to examine the influence on the four phases and corresponding tasks on entrepreneurial intentions. Table 3 depicts the results of the regression analysis. The table displays the unstandardized regression coefficient (B), the standard error associated with B (SE B), and the standardized regression coefficient (β). As shown in Table 3, tasks involving raising money to start a business (Marshaling, Task 5) and convincing others to invest in your business (Marshaling, Task 6) as well as the imple-

menting task of managing a small business (Implementing, Task 9) were significantly related to intentions to start or launch a new business.

Discussion

Many entrepreneurial intentions models describing the context of entrepreneurial intentionality can be revised and strengthened by including the concept of self-efficacy. Entrepreneurial self-efficacy can be employed to better understand and explain both the development of entrepreneurial intentions and the conditions under which these intentions may be best translated into entrepreneurial actions. That is, the individual who has identified key efficacy perceptions about starting a business may set higher personal goals and may be more persistent in overcoming entrepreneurial challenges and obstacles, particularly early on in the launch of their venture.

Our factor analysis results revealed that the self-efficacy measures differed across multiple areas. Factor items and

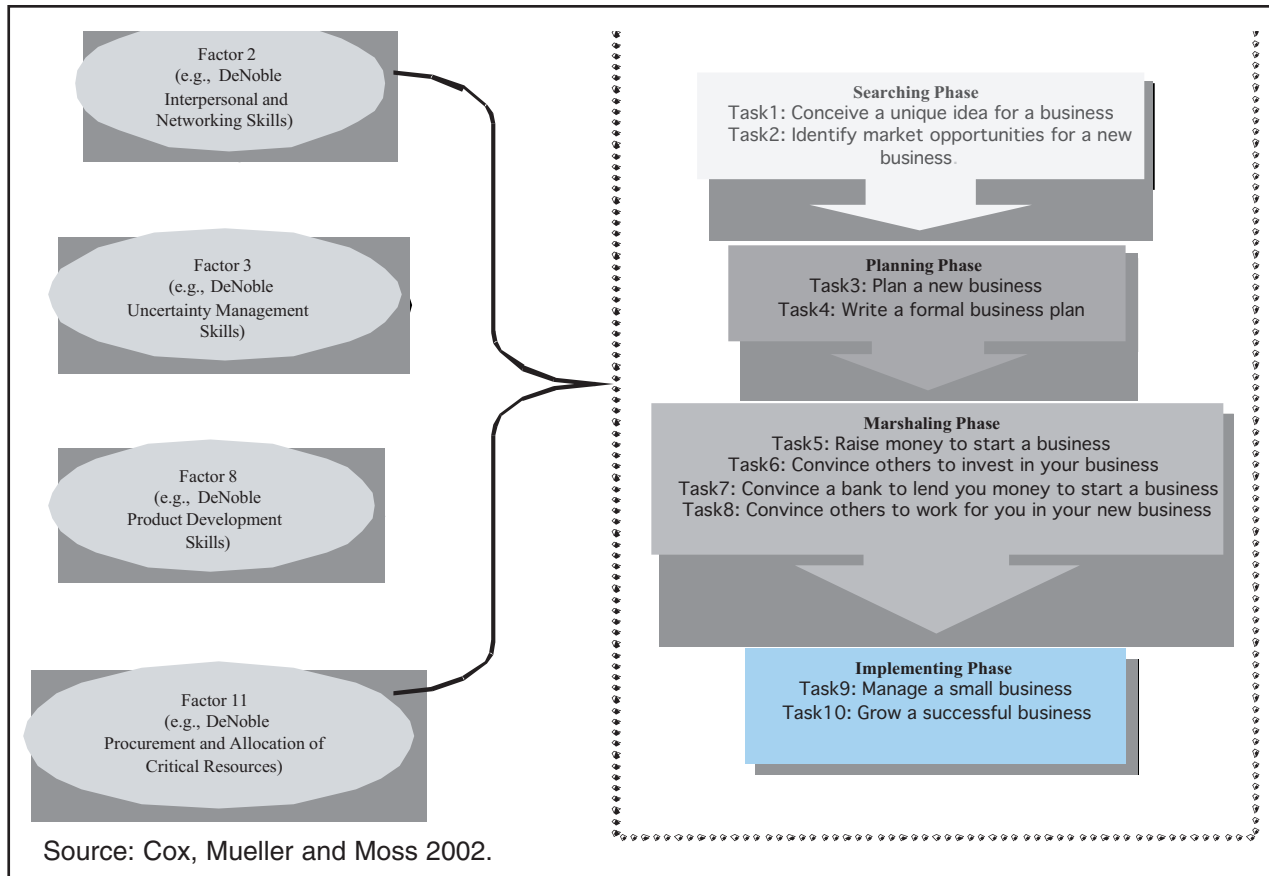


Figure 2. Relationship Between New Factors and Entrepreneurial Intentions

loadings showed the divergence of De Noble et al.'s and Chen et al.'s entrepreneurial self-efficacy factors. Since they were both intended to measure the same construct, it seems further work may be needed to clarify how researchers operationalize and validate these scales. Four of De Noble et al.'s factors were found to be related to the instrumental tasks within the entrepreneurial process. These tasks, particularly those involved in the marshaling and implementing phases of a new venture, were linked to entrepreneurial intentions. None of the tasks involved within the searching phase (e.g., conceive a unique idea for a business, and identify market opportunities for a new business) were found to be associated with intentions.

Many of these opportunity recognition tasks are critical in the initial building stages and ongoing growth stages of a new venture. The opportunity recognition process has been described as multidimensional, incorporating the search process for new ideas as well as the recognition of feasible business opportunities (Hills, Schrader, and Lumpkin 1999). While some entrepreneurs start ventures prior to identifying opportunities, as the venture moves beyond the start-up phase, the opportunity recognition process becomes vital to the venture's growth capability as it confronts new environ-

mental changes and seeks new innovations for growing the business (Zietsma 1999).

Conclusions

This study begins an initial step toward understanding entrepreneurial self-efficacy and how various researchers have operationalized the construct. It is our hope that future studies will examine how this entrepreneurial belief can assist nascent entrepreneurs as they become involved in the planning and launch of their venture. Considering the relationship between the entrepreneurial self-efficacy and the entrepreneurial intention, one can expect to enhance the entrepreneurial intention by putting systematic and continuous efforts on entrepreneurial self-efficacy. Many entrepreneurship courses focus on commonly identified entrepreneurial management and planning skills, but often ignore entrepreneurial skills, such as innovation and risk-taking. The teaching of entrepreneurial skills often tends to be technical, with insufficient attention paid to the cognition and belief systems of the entrepreneur. Educators should take into account entrepreneurial attitudes and perceptions when designing or assessing their entrepreneurship program and course objectives.

Finally, another approach to enhancing entrepreneurial

Table 3. Influence on Four Phases and Corresponding Tasks on Entrepreneurial Intentions**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig. F Change
.545	.297	.253	1.0610	6.716	.000

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	β		
(Constant)	.883	.615			1.436	.153
Searching-task1	6.735E-02	.144	.059		.469	.640
Searching-task2	5.787E-02	.166	.045		.349	.727
Planning-task3	.192	.176	.157		1.093	.276
Planning-task4	-.150	.133	-.124		-1.125	.262
Marshaling-task5	.315	.132	.285		2.390	.018
Marshaling-task6	-.350	.156	-.301		-2.241	.026
Marshaling-task7	3.612E-02	.187	.031		.193	.847
Marshaling-task8	.124	.181	.103		.681	.497
Implementing-task9	.705	.269	.529		2.627	.009
Implementing-task10	-.300	.266	-.222		-1.126	.262

a Dependent Variable: Entrepreneurial Intentions

self-efficacy is to study the environment of potential and actual entrepreneurs. An environment perceived to be more supportive will increase entrepreneurial self-efficacy because individuals assess their entrepreneurial capacities in reference to perceived resources, opportunities, and obstacles existing in their environment. Setting up a supportive environment in our classrooms that focus on essential entrepreneurial skills, tasks, and abilities may give future entrepreneurs the necessary competencies and confidence to launch and grow their own businesses within a marketplace that demands agility and continual innovation.

Recommendations for Future Measurement Research

A cognitive perspective on entrepreneurship and individual entrepreneurs is currently being established to help build an important aspect of theoretical and empirical entrepreneurship research. One major facet of social cognition research involves the empirical measurement of cognitive style and entrepreneurship self-efficacy discussed in this article. In addition, we propose a broader perspective suggesting that

to make further progress researchers must systematically construct reliable and valid empirical measurement tools prior to conducting further laboratory and field research. Baron (2004: 169) states that "entrepreneurship, as a field, can benefit greatly from expanding the array of conceptual tools at its disposal." Specifically, we propose that our current entrepreneurship research toolbox of measurement instruments focusing on cognitive measures of entrepreneurship readiness, potential, and behavior should be systematically compared and tested for reliability and validity. In particular, for cognitive constructs where two or more competing measuring instruments have been constructed and published, we propose that research studies should be designed to test these measures one against the other for reliability and validity.

We suggest that entrepreneurship researchers working from the cognitive perspective will benefit from employing more reliable and valid measurement instruments to better understand the cognitive constructs. Some construct measures that could be tested include the following entrepreneurship research topics: counterfactual thinking (Baron 2000);

creativity potential and creativity skills (creative intelligence); decision making—both systematic and heuristic strategic decisions (Forbes 2003); entrepreneurial alertness (Gaglio and Katz 2001); entrepreneurial scripts (Mitchell and Chesteen 1995); goal setting; opportunity recognition (Krueger 2000; Krueger and Dickson 1994); prospect theory (Baron 2004); perceptions of risk versus opportunity; puzzle and problem solving; regulatory focus theory (Brockner, Higgins, and Low 2004); self confidence; self-efficacy; self-monitoring; specific functional entrepreneurial knowledge, skills, and abilities; social competence (Baron and Markman 2003); successful intelligence (Sternberg 2003); and the various positive and negative cognitive bias and error theories including optimistic thinking, illusion of control (Simon and Houghton 2002), the planning fallacy, and small and large number bias thinking. All of these entrepreneurial concepts involve perceptions about data and information storage, retrieval, processing, transformation, decision making, and entrepreneurial actions to start and grow new ventures.

We suggest that once researchers possess better empirical measurement instruments to conduct cognitive perspective research studies, we can move forward to study nascent and potential entrepreneurs systematically. Specifically, how they process data and information as they proceed through the new venture process, and learn more about patterns of venture success and nonsuccess. In addition, the more we learn about nascent and potential entrepreneurs in the field, the more information we will have to design improved education curriculum for university students enrolled in entrepreneurship courses. For example, if we can measure our student's cognitive styles and entrepreneurial self-efficacy at the beginning of an entrepreneurship course, and at the conclusion, we will begin to understand the effectiveness of our curriculum and teaching. More students are enrolling in entrepreneurship courses every year. We can contribute to their education by presenting research studies using the most reliable and valid measures possible for measuring cognitive processes of successful nascent entrepreneurs.

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