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Self-Efficacy for Resolving Environmental Uncertainties: Implications for Entrepreneurial Educational and Support Programs

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Abstract: Using a unique sample of rural Kentucky residents, we demonstrated that, in the domain of operational and competitive environmental uncertainties, self-efficacy beliefs are significantly higher among nascent entrepreneurs than among non-entrepreneurs. We employed the hierarchical logistic regression analysis to demonstrate that this result is robust across gender and marital status. Contrary to previous studies, we found that married females with high self-efficacy in the domain of financial uncertainties are less likely to start a new business than females with low self-efficacy in that domain. Based on our results, we offer suggestions for entrepreneurial educational and support programs.

Introduction

Since the elimination of the Tobacco Quota Program in October 2004, the Commonwealth of Kentucky, the most tobacco-dependent state in the U.S., has been undergoing a major reorganization of its local economy, especially in rural areas. Entrepreneurship has been suggested as a sustainable development strategy (Scorsone, 2003). Holcomb and Muske (2000) described several ways that Extension can help entrepreneurs, including assistance with financial analysis, development of managing and planning skills, product development, evaluation of the production process, help with development of a professional network (local, state, and national), and interpretation of specific provisions of law. Historically, Extension specialists have been considered "providers of unbiased information."

More recently, the view of the role of Extension has been expanded. For instance, Scorsone (2003) suggested that Extension can develop programs that stimulate community support for existing and potential entrepreneurs. Bagdonis, Thomson, and Altemose (2008) contended that Extension can facilitate various collaborative initiatives. In this article we argue that Extension can play another important role: It can help to develop entrepreneurial educational and support systems that bolster the efficacy beliefs of those considering

starting and running their own business.

Psychologist Albert Bandura (1986) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). People who believe they can produce desired outcomes and avoid unpleasant ones have incentive to act. Self-efficacy was first applied to the field of entrepreneurship in the 1990s. Chen, Greene, and Crick (1998) demonstrated that entrepreneurs' self-efficacy is significantly higher than that of managers in two domains—innovation and risk taking. DeNoble, Jung, and Ehrlich (1999) showed that entrepreneurship students demonstrated significantly higher self-efficacy than did their peers from non-entrepreneurial majors in the domains of developing new opportunities and coping with the unexpected.

Findings from both studies suggest that the perceived capability to resolve environmental uncertainties is an important contributor to individuals' entrepreneurial success. Matthews and Human (2000) described seven primary sources of environmental uncertainty: customers, suppliers, distributors, competitors, government, technology, and financial markets. They demonstrated that in an urban setting individuals tend to group these sources of uncertainty in terms of financial uncertainty (lack of information about financial markets), competitive uncertainty (associated with attracting customers, competing with other companies, complying with government regulations, and keeping pace with technological advances), and operational uncertainty (related to ability to obtain raw materials, attract employees, and deal with distributors).

A growing body of research attests to the predictive power of entrepreneurial self-efficacy. However, researchers have also shown that the level of self-efficacy and its predictive power on entrepreneurial outcomes vary by gender. For example, women tend to report both lower entrepreneurial self-efficacy and lower entrepreneurial intentions than men do (e.g., Gatewood, Shaver, Powers & Gartner, 2002). Wilson, Kickul, and Marlina (2007) found that the effect of entrepreneurial self-efficacy on entrepreneurial intentions was stronger for women than for men.

Of course, self-efficacy in the domain of environmental uncertainties is not the only determinant of entrepreneurial intentions and activities. Existing literature suggests that unemployment, lack of income, fear of job loss, dissatisfaction with the entrepreneur's previous job, the potential for increased life satisfaction, and demographic factors, such as gender, age, education level, marital status, and ethnicity, strongly correlate with self-employment (see Gartner, Shaver, Carter, & Reynolds, 2004). For example, insufficient income is an important "push" factor that influences entrepreneurship. Several studies have shown this effect to be stronger for women than for men, especially in transition economies (e.g., Lauxen-Ulbrich & Leicht, 2002).

The rates of nascent entrepreneurship were reported to be highest in the age category of 25 to 34 years old, although this result might not be applicable to female entrepreneurship (e.g., Gartner et al., 2004). Women are more likely to withdraw from employment when they reach the child-rearing age and return to employment later when their children grow up (e.g., Unger & Crawford, 1992). Family structure was repeatedly shown to have a strong effect on an individual's decision to choose self-employment over wage employment. Generally, if the head of the household is responsible for maintaining the family, he or she is more likely to prefer activities that involve fewer risks, although females are more likely to be the "primary parent, emotional nurturer and housekeeper" (Unger & Crawford, 1992, p. 474) and to avoid risky self-employment activities.

In this article we evaluated how self-efficacy in the domain of environmental uncertainty correlates with the probability of engaging in entrepreneurial activities in rural Kentucky across gender and marital status; we also controlled for certain demographic characteristics. Building on Chen and colleagues' (1998) suggestion that entrepreneurial educational and support systems might be particularly effective if they were designed to bolster the efficacy beliefs of those considering starting and running their own business, we also sought to

develop recommendations for the entrepreneurial educational and support programs.

Research Objectives and Hypotheses

The research reported in this article had two main objectives. First, we intended to compare self-efficacy in the domain of environmental uncertainties between two groups of rural Kentucky residents in the post Tobacco Buyout environment: nascent entrepreneurs and non-entrepreneurs. To reach this objective, we used a measure of self-efficacy for resolving environmental uncertainties (SEEU) based on the measure of perceived environmental uncertainty suggested by Matthews and Human (2000). We tested the hypothesis that *nascent entrepreneurs in rural Kentucky have higher self-efficacy for the basic tasks associated with resolving environmental uncertainties than do rural Kentucky residents without entrepreneurial intentions* (H1). Second, we explored how demographic characteristics such as gender and marital status modulate the predictive capabilities of SEEU. We hypothesized that *the difference in SEEU between nascent entrepreneurs and not entrepreneurs varies by gender* (H2) *and by marital status* (H3).

Method

Data

Data were collected between the summer of 2005 and the fall of 2006 during the initial stages of the Tobacco Buyout Program. During this period, the economy was beginning to adjust to the new changes, and we expected that a number of people would be in the process of forming entrepreneurial intentions. Overall, we received responses from 702 randomly selected rural households in Kentucky; 699 participants answered questions related to their intentions to start a new business and steps that they have undertaken toward it; 540 participants (22.4% women) answered these and the items related to self-efficacy for resolving environmental uncertainties. Table 1 presents additional descriptive statistics of the sample.

Table 1.
Descriptive Statistics (N = 540)

	Min	Max	Mean	Frequency	Percentage	Std. Deviation
Demographics						
Age	16	88	52.90	-	-	14.86
Male	0	1	-	419	77.6	-
Female	0	1	-	121	22.4	-
White	0	1	-	519	96.1	-
Non-White	0	1	-	21	3.9	-
Married	0	1	-	436	80.7	-
Divorced	0	1	-	24	4.4	-
Income groups						

<$30,000	0	1	-	81	15	-
$30,000-$80,000	0	1	-	268	49.6	-
$80,000-$120,000	0	1	-	126	23.3	-
>$120,000	0	1	-	64	11.9	-
Education						
No high school	0	1	-	29	5.4	-
High school completed	0	1	-	139	25.7	-
At least some college completed	0	1	-	372	68.9	-
Self-efficacy measures						
Financial uncertainties	1	5	3.02	-	-	.879
Non-financial uncertainties	1	5	3.33	-	-	.648
Dependent variable						
Nascent entrepreneurs	0	1	-	78	14.4	-

Measures

Independent Variables: Self-Efficacy for Resolving Environmental Uncertainties

To develop a measure of self-efficacy that targets respondents' beliefs about their ability to resolve various environmental uncertainties, we modified 11 items suggested by Matthews and Human (2000). We asked participants the following: "Imagine that you have decided to start a new business. Please indicate how certain you are that your new business will be able to accomplish each of the following." Four items described sources of financial market uncertainty, two described resource-related uncertainties, and remaining items targeted each of the other five sources of entrepreneurial uncertainty. The response scale was ranged from highly uncertain (1) to highly certain (5).

Factor analysis revealed that two factors had eigenvalues higher than 1.00 accounting for 54.1% of the variance (see Table 2). All 11 items loaded onto 2 factors, and all loadings were greater than .40.

Table 2.
Factor Analysis—Rotated Factor Matrix for Self-Efficacy Items

Self-Efficacy Items	NFSE	FSE

Please, indicate how certain you are that your new business will be able to accomplish each of the following...		
Obtain bank financing	.220	**.828**
Obtain venture capital financing	.167	**.831**
Obtain start-up capital	.212	**.857**
Obtain working capital	.279	**.843**
Obtain raw materials	**.545**	.145
Attract employees	**.514**	.207
Deal with distributors	**.711**	.113
Attract customers	**.735**	.236
Compete with other businesses	**.718**	.291
Comply with local, state and federal regulations	**.614**	.113
Keep up with technological advances	**.714**	.148
Variance explained	29.17	27.93
Reliability estimate (alpha)	.799	.892
Note: Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, Rotation converged in three iterations.		

Consistent with Matthews and Human (2000), items related to financial tasks loaded on one factor representing financial self-efficacy (FSE, = .892). A self-efficacy for finance-related tasks factor was also found in Chen et al.'s (1998) measure of entrepreneurial self-efficacy for financial control and in DeNoble et al.'s (1999) self-efficacy for initiating an investor relationship. Seven items describing operational and competitive uncertainties loaded on a second factor, which we refer to as self-efficacy for resolving non-financial environmental uncertainties (NFSE, = .799). To calculate an individual score for each measure, we used the average score on all items representing each factor.

Dependent Variable: Nascent Entrepreneurs

We asked our respondents two questions: "Are you planning to start a new business?" and "Which steps have you taken toward starting your new business?" Only respondents who indicated that they were planning to start a new business who had already taken at least one step toward starting a new business—financing, marketing, or production—were considered as nascent entrepreneurs (coded as 1 if nascent entrepreneur, 0 otherwise).

Control Variables

Age, gender, marital status, ethnicity, education level, and income were used as control variables in the study. Age was measured in years. Gender was coded 0 for male and 1 for female. Marital status was coded 1 for married respondent and 0 otherwise. We coded education level as 0 = "at least some college level training" and 1 = "no college education."

Ninety-six percent of respondents in our sample indicated that they were Caucasian. This result is not surprising given the Census 2000 report that the white population in Kentucky is over 91% and that the majority of the nonwhite Kentucky population is concentrated in urban areas. Therefore, we coded ethnicity as 1 = nonwhite and 0 = white. To increase response rate, we did not ask respondents their exact household income. Instead, they were asked to indicate the income group to which they belonged from the following categories: less than $30,000 a year (this category was coded as 1 if yes or 0 otherwise).

Interaction Variables

Our second objective was to test for possible differences in the relationship between self-efficacy for resolving environmental uncertainties and the probability of being a nascent entrepreneur across different demographic groups. To this end, we investigated two-way interactions between self-efficacy and gender, and self-efficacy and marital status. Motivated by the findings of Unger and Crawford (1992) that marital status strongly affects entrepreneurial intentions of females, but does not affect as strongly entrepreneurial intentions of males, we investigated whether marital status affects the predictive power of entrepreneurial self-efficacy of females and males differently by testing a three-way interaction among self-efficacy, gender, and marital status. In addition, because various researchers noted that demographic profile of entrepreneurs varies by gender (e.g., Gartner et al., 2004) we controlled for possible interactions of gender with three other demographic characteristics: age, marital status, and ethnicity.

Analysis and Results

Hierarchical logistic regression was used to explore the relationship between the self-efficacy measures and entrepreneurial actions (SPSS 15.0 for Windows software was used for all analyses). First, we set up the basic model with entrepreneurial intentions as the dependent variable and six control variables as predictors. Next, we ran a series of hierarchical logistic regressions adding one of the 9 interaction terms described above at a time. In the final model we included only the self-efficacy measures and interaction terms that passed a log-likelihood ratio test (i.e., $p<.1$; Table 3).

Table 3.
Hierarchical Logistic Regression Analysis, Dependent Variable: Nascent Entrepreneurs

	Log-Likelihood Ratio Test Sig.	***B***	***SE***	***p***	**Odds Ratio**
Constant	-	-3.703	.989	.000	.025
Demographic Characteristics					
Age	-	-.023	.010	.016	.977

Gender	-	1.255	.567	.027	3.508
Ethnicity	-	2.276	.565	.000	9.738
Married	-	.113	.424	.790	1.120
Income	-	.581	.370	.117	1.787
Education	-	-.480	.318	.131	.619
Self-Efficacy Variables					
NFSE	-	.807	.230	.000	2.241
FSE	-	-.007	.176	.968	.993
Interaction Terms					
NFSE x GENDER	.367	-	-	-	-
NFSE x MARRIED	.643	-	-	-	-
NFSE x GENDER x MARRIED	.018	.515	.476	.280	1.673
FSE x GENDER	.118	-	-	-	-
FSE x MARRIED	.247	-	-	-	-
FSE x GENDER x MARRIED	.047	-1.002	.544	.000	.367
GENDER x AGE	.929	-	-	-	-
GENDER x MARRIED	.105	-	-	-	-
GENDER x ETHNICITY	.095	-2.719	1.588	.202	.240
Final Model Fit					
-2 log-Likelihood		381.643			
Nagelkerke r^2		.177			

Consistent with our expectations, self-efficacy beliefs in the domain of non-financial environmental uncertainties were strongly related with the probability of being a nascent entrepreneur. The nonsignificant effect of the interaction terms NFSE x Gender, NFSE x Marital Status, and NFSE x Marital Status x Gender in the log-likelihood function indicates that this result is robust for men and women regardless of their marital status.

For married women, financial self-efficacy was negatively associated with probability of starting a new business. This seemingly counterintuitive result might have an intuitive explanation. Financial self-efficacy is likely to be higher for individuals who feel that they are more credit-worthy, and since women are more likely to be the "primary parent, emotional nurturer and housekeeper" (Unger & Crawford, 1992, p. 474), they are more likely to prefer activities that involve fewer risks, such as non entrepreneurial activities, particularly if they feel financially secure. On the other hand, prior studies have reported that women are

likely to be more proactive than men if they have to care for their families but lack sufficient financial means, especially in transition economies (e.g., Lauxen-Ulbrich & Leicht, 2002). For men, financial self-efficacy was unrelated to probability of starting a new business.

Discussion

As others have suggested (e.g., Chen et al., 1998; DeNoble et al., 1999), we found that self-efficacy for resolving non-financial environmental uncertainties seems to make a difference in whether individuals become entrepreneurs. In other words, when individuals believe themselves capable of attracting customers and workers, managing materials, competing with other businesses, and maintaining their business skills, they will more likely undertake entrepreneurial efforts. In fact, beliefs in these capabilities and not in one's financial skills appeared to cast the stronger vote for whether participants would pursue their own business. Our findings confirm what psychologist Albert Bandura (2000) has long contended, that "efficacy beliefs affect self-motivation through their impact on goals and aspirations" (p. 120).

Now that evidence is in place to show the importance self-efficacy in predicting entrepreneurial aspirations and behaviors, researchers and Extension agents will likely be interested in developing a clearer understanding of interventions that could help boost individuals' self-efficacy. We suggest that these interventions should be aligned with Bandura's (1997) theorized four main sources of influence: mastery experience, vicarious experience, social persuasions, and physiological and affective states.

According to Bandura (1997) the most effective way of boosting self-efficacy beliefs is through mastery experiences, or the interpretation individuals make of their past performances. Experienced successes typically raise people's self-efficacy; failures typically undermine it. Individuals who are able to frame challenges and setbacks adaptively are more likely to feel confident about what they can do. As Bandura noted, "If people experience only easy successes they come to expect quick results and are easily discouraged by failure" (p. 3). Entrepreneurial educational programs can expose individuals to new experiences and to better ways of doing things by offering relevant classes, such as business design or obtaining community small business assistance. Such programs can also help teach entrepreneurs how to reframe common setbacks as growth opportunities.

Vicarious experiences from social models can also alter one's self-efficacy. Extension specialists, for instance, could provide an opportunity for nascent entrepreneurs to watch successful entrepreneurs in either actual or virtual environments. This approach might be particularly effective if budding entrepreneurs are able to come in contact with others with whom they share demographic characteristics and entrepreneurial goals (Bandura, 1997).

To incorporate social persuasion, a third source of influence, Extension educational programs could organize individual consultations with Extension instructors or with successful entrepreneurs. Positive feedback from those familiar with the demands of self-employment might prove particularly persuasive. Extension consultants who could serve the dual role of successful model and business coach might be in the best position for influencing nascent entrepreneurs sense of efficacy.

Results of our study suggest that, in a rural setting, interventions described above need to be targeted at enhancing self-efficacy for dealing with rural market barriers and, particularly, in situations characterized by high environmental uncertainty. People often read their own stress and emotional reactions as indicators of their competence; programs in stress reduction and management could convince tentative individuals that they can succeed in starting their own business. Such programs could prevent debilitating anxiety associated with various business stressors and thereby increase entrepreneurs' self-efficacy.

Targeted entrepreneurial support programs should take into account individuals' reasons for entering self-employment, and this may be particularly important for married women who are considering entrepreneurship. Educational programs and policies might need to consider gender differences between "push" motives for self-employment and entrepreneurial self-efficacy. If women entering self-employment due to "push" motives lack the requisite self-efficacy, they might be less likely to succeed in establishing and growing their new ventures. Consequently, programs that support women during the later stages of venture development might be effective for this growing group of entrepreneurs. Of course, it bears emphasizing that no amount of self-efficacy can compensate for a lack of skills needed to begin one's own business, so Extensions would do well to aim their interventions first and foremost at improving business starters' skills.

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