THE EFFECTS OF COLLEGIATE ENTREPRENEURSHIP EDUCATION ON POST-GRADUATION STARTUP OF NEW VENTURES: A FIRST LOOK

Benjamin J. Blackford  
University of Nebraska – Lincoln  
College of Business Administration  
CBA 275  
Lincoln, NE 68588  
(402) 472-6215  
blkfrd@unlserve.unl.edu

Terrence C. Sebora, University of Nebraska – Lincoln  
Todd Whitehill, University of Nebraska – Lincoln
ACADEMIC ABSTRACT

While extensive research has been performed regarding when, why, and how individuals identify potential opportunities, the findings are somewhat varied. Once a potential entrepreneur has discovered an opportunity, the individual must still take many factors into account, which will impact their decision of whether or not to actually pursue the opportunity they have discovered. This study empirically examines many factors that have previously been identified in the literature, including self-efficacy, networking, and education. In particular, the study examines whether the number of collegiate entrepreneurship courses taken is associated with the post-graduation startup of a new firm.

EXECUTIVE SUMMARY

This study seeks to identify the impact of formal collegiate entrepreneurship education on the post-graduation start-up of new ventures. Specifically, this study investigates whether, among those who chose to take entrepreneurship courses, the number of entrepreneurship courses is associated with post-graduate venture startup. Furthermore, it assesses whether the number of courses taken at the undergraduate level has a different impact than the number taken at the graduate level.

The study utilized a survey of all students who took at least one entrepreneurship course at a major public Midwestern university. Since the dependent variable was dichotomous, binary logistic regression was utilized and a variety of analyses were performed. The results of the regression identified several variables with an impact on the start of new ventures. Self-efficacy, the number of undergraduate courses, the number of graduate courses, and acceptance of risk were all identify in an analysis as being significant predictors of the start of new firms.

One implication from the results of this study is that entrepreneurship education does have an impact on the start-up of new firms. Thus, encouraging individuals to enroll in entrepreneurship courses may prove to be an effective way to increase the number of individuals starting new businesses. In addition, improving the self-efficacy of those taking such courses and identifying those individuals willing to accept the risks may also lead to additional firm start-ups. Some limitations of these findings are also discussed.
INTRODUCTION

“These then are the folks that are the target audience for this kind of educational or fresh educational approach that says your goal in life is not to settle for whatever the world deals you. Your goal is to create something that you are excited about, energized by and committed to.”

-Alan Webber, Co-Founder of Fast Company, discussing who could benefit from entrepreneurship education (Gendron, 2004)

Entrepreneurship education at the collegiate level has been expanding rapidly. The first known collegiate entrepreneurship course was taught to MBA students at Harvard in 1947 (Katz, 2003) and, as of 1970, there were only twenty-five known entrepreneurship programs at colleges and universities in the United States (Dana, 1992). That number increased to twenty times that size by 1992, with the number of entrepreneurship programs being offered reportedly reaching 500 (Dana, 1992). As of 2003, there were over 1,600 schools offering entrepreneurship courses (Katz, 2003).

According to Kuratko (2005), one possible explanation for this growth is the desire of a younger generation to become entrepreneurs. A recent survey found that more than sixty percent of eighteen to twenty-nine year-olds would like to own their own businesses (Tulgan, 1999). Charney and Libecap (2000) suggest the link provided among the business and academic communities by entrepreneurship and the way development of business plans provides an opportunity for the integration of other disciplines such as marketing and accounting are reasons for this growth. Entrepreneurship education has been proposed to provide many benefits, including introducing additional potential entrepreneurs to the field (Ronstadt, 1985), producing higher earnings for the self-employed (Robinson & Sexton, 1994), and helping revitalize the economy of communities that have lost jobs (Bender & Meli, 1990).

As entrepreneurship education has expanded, researchers have debated whether or not entrepreneurship can be taught and whether entrepreneurship education has any effect on entrepreneurs (Sexton & Upton, 1987; Chell & Allman, 2003). David Birch, founder of Cognetics and winner of the first International Award for Entrepreneurship and Small Business Research, was quoted as saying, “If you want to teach people to be entrepreneurs, you can’t” (Aronsson, 2004, p. 289). However, much of the recent literature suggests that it is possible to teach entrepreneurship. For example, DeTienne and Chandler found that students could be taught to identify more business opportunities and to be more innovative (2004). In light of studies like this, it has been expressed that at least certain aspects of entrepreneurship can be taught (Kuratko, 2005).

While the debate about whether entrepreneurship can be taught continues, determining what type of impact an educational program may have on entrepreneurs can be even more problematic (Chell et al., 2003). Is the expansion of the availability of entrepreneurship courses actually increasing the number of entrepreneurs or making those already in existence more successful? How to teach entrepreneurship may be the better question (Gendron, 2004).
Empirical work examining the effect of taking courses on the startup of new businesses has been rare; an area this paper seeks to address. It is hoped that this study will serve as a starting point for additional research into the impact of formal education on entrepreneurship. While the main focus is the effects of formal college entrepreneurship courses, some additional aspects such as access to resources and self-efficacy will also be examined. The primary question to be examined in this study is whether or not there is a significant relationship between taking formal college entrepreneurship courses and pursuing a new venture following graduation. This research may help determine education’s place in our understanding of this topic. The results of this study could provide educators and administrators additional insights into how education may be affecting whether or not students start businesses following graduation.

The next section of the paper will review some of the entrepreneurial education research. Following the literature review, a framework is proposed and several hypotheses presented regarding the effects of several factors on the decision to start a new venture. Next, the paper includes the methodology and results from the empirical study of college students who took entrepreneurship and small business courses. Concluding thoughts are offered, along with possible implications, in the final section of the paper.

ENTREPRENEURSHIP EDUCATION LITERATURE

While many individuals may identify what they feel is a business opportunity, a major area in the literature is what aspects of the situation or attributes of the person cause the potential entrepreneur to actually initiate a new venture (McMullen & Shepherd, 2006). Education is one such aspect discussed in the literature. The first of three categories of literature to be reviewed studies the effects of entrepreneurship education as it relates to various entrepreneurial outcomes and the effects of education in general on potential entrepreneurs and development of new ventures (i.e., do entrepreneurs appear to have more education in their background compared to non-entrepreneurs). The next to be considered is the literature surrounding the question “can entrepreneurship be taught or is it something a person is born to do?” The final category involves research into how education may be used to develop more potential entrepreneurs, including various methods and techniques developed and suggested in the literature for use in the education of entrepreneurs.

Effects of Education on Entrepreneurs

Clark, Davis, and Harnish (1984) found support for a relationship between entrepreneurship courses and the creation of new ventures. These authors note, however, that their study could not lead to an interpretation of cause and effect in the relationship and thus call for additional work in the area. In their evaluation of the entrepreneurship program at a major university, Charney and Libecap’s (2000) results found that graduates from the entrepreneurship education program were personally more successful, having a twenty-seven percent higher income than those who did not graduate from the entrepreneurship program. Additionally, small firms employing entrepreneurship graduates achieved higher performance, measured as a greater growth in sales when compared to competitors. Peterman and Kennedy (2003), utilizing Shapero’s (1975) model of intention, found support for their hypotheses that exposure to entrepreneurship education would increase high school students’ perceptions of entrepreneurship
as feasible and desirable. Clouse’s (1990) study sought to determine if taking an entrepreneurship course would actually affect the decisions and choices made by entrepreneurship students. The results showed the entrepreneurship course could affect how likely the students would be to pursue a new venture under certain circumstances. The decisions were simulated and the study did not examine the effects of the course on actual startup of new firms, only whether or not the students could be taught to think differently about the scenarios.

The effects of education in general on entrepreneurs have also been studied in the literature. Douglass (1976) found that entrepreneurs were better educated than the general population. However, no relationship was found between the amount of education and the eventual success of the entrepreneur. Self-employment and education have also been studied due to difficulties in differentiating small-business owners and entrepreneurs. In their study, Robinson and Sexton (1994), using earnings as a measure of success, showed a positive correlation between years of education and earnings in a self-employment situation. Additional education was also found to increase the likelihood of people becoming self-employed as opposed to entering wage and salary employment. In contrast, de Clercq and Arenius (2006) discovered additional education was present in entrepreneurs only to a certain point in their study. Secondary education was found to lead a person to be more likely to start a business as opposed to those who were less educated and no impact was found for more advanced degrees.

While all of the aforementioned studies were performed in the United States, other studies have examined entrepreneurs and education in other contexts. Autio, Keelyey, Klofsten, and Ulfstedt (1997) studied education as part of entrepreneurial intent and compared university settings in the United States, Finland, and Thailand. The results of the study showed a supportive university environment positively affected the conviction of respondents towards entrepreneurship, which was then positively related to the intent of the student to start working for their own firm within one year. Indonesia and Norway provided the context for another study which examined the impact of education on intentions (Kristiansen & Indarti, 2004). Kristiansen and Indarti found no correlation between the educational backgrounds of university students and their intention to become an entrepreneur. Differences and similarities in the relationship between education and intent are not the only aspects studied across borders. For example, a study on a variety of variables did not find a significant difference among American and Chinese students’ entrepreneurial orientation (Parnell, Shwiff, Lei, & Langford, 2003). Brockhaus (1991) reviewed and compared the entrepreneurial education environment in a multitude of countries including Japan, Egypt, South Africa, Korea and many others. Several common factors were identified, such as the need for the private sector to provide more jobs and the recognition that entrepreneurship can help to provide this (Brockhaus, 1991). Dana (1992) observed several differences between entrepreneurship education in Europe and the United States, such as the greater focus in Europe on practical aspects.

**Can Entrepreneurship Be Taught?**

Another area of the entrepreneurship education literature relates to whether or not entrepreneurship can be taught. This is based upon the larger issue of whether entrepreneurs are made or born (Henry, Hill, & Leitch, 2005). If entrepreneurs are born, then education will be ineffective. Adding to this is the difficulty of evaluating entrepreneurship education due to a
lack of common methods or criteria. Based upon literature stressing the importance of opportunity recognition as an essential capability of entrepreneurs, DeTienne and Chandler’s (2004) study sought to empirically study if teaching opportunity recognition was possible. Their study found that potential entrepreneurs could be taught to generate more ideas and education can help those ideas to be more innovative. As noted previously, some support the idea that some aspects leading a person to become an entrepreneur can be taught while other aspects cannot. For example, De Faoite, Henry, Johnston, and Sijde (2003) present that portions of entrepreneurship could be considered an “art” while other portions are a “science”. Utilizing work by Jack and Anderson in 1998, De Faoite et al. (2003) suggest that the “art” portion of entrepreneurship (the creative and innovative aspects of entrepreneurship) cannot be taught, but the “science” portion (the business and management functional skills) can be taught to potential entrepreneurs (De Faoite et al., 2003).

Entrepreneurship Education Approaches

Entrepreneurship education programs and methods in higher learning institutions have been a popular topic in the literature as well (Charney & Libecap, 2000; Collins, Smith, & Hannon, 2006; Hanke, Kisenwether, & Warren, 2005). Collins et al. (2006) developed and tested the effectiveness of what they termed a “synergistic” approach to teaching entrepreneurship based on collaborative learning among people at different stages in the entrepreneurial process. This method involved collaborative learning experiences amongst nascent entrepreneurs, existing entrepreneurs, and facilitators in which the participants learned from and with each other. A problem-based learning approach to entrepreneurship education is presented by Hanke et al. (2005). In this approach, the students develop solutions to problems rather than learning exclusively from lectures. Students in a class utilizing this approach displayed a higher tolerance for ambiguity and more entrepreneurial self-efficacy following the course as opposed to those students involved in a more traditional course. Due to the need to adapt in an entrepreneurial situation, a contingency-based method for teaching business planning has also been proposed (Honig, 2004). In this method, the focus is on tacit knowledge and the dynamic management of knowledge assets. Honig develops this method as an alternative to teaching entrepreneurship through business plans, which he feels have not been shown to provide any benefits to students who choose to pursue an entrepreneurial opportunity or to even teach students the important aspects of entrepreneurship. Gibb (2002) also supports this notion, stating that entrepreneurship education should be more about learning “for” becoming an entrepreneur rather than learning “about” entrepreneurship and should pursue an interdisciplinary approach.

Future Challenges

Several challenges that still lie ahead for entrepreneurship education are noted in the literature. Some of these include a lack of PhD trained educators, potential negative effects of the dotcom failures, and overuse of the word “entrepreneurship” to describe other fields (Kuratko, 2005). Bechard and Gregoire (2005) note that, due to the current state of entrepreneurship research in general and its focus on theory development and legitimacy among other paradigms, the educational applications and aspects of research are sometimes overlooked. They echo Kuratko’s sentiment that there is a lack of entrepreneurship training in PhD programs.
Many of the studies previously discussed examine the effects of entrepreneurship education on the thought processes of potential entrepreneurs or their intention to start a new business. However, few study the effects on the actual start of new firms. As noted by Honig and Davidsson (2000) in their review of how human capital affects startup of new firms, there has been little work done on the effects of such factors as taking specific courses. Additionally, Gorman and Hanlon (1997) suggest that more work on the effects of multiple courses in entrepreneurship is a worthwhile pursuit for future research. The lack of research which includes education and other exogenous factors (such as attitude towards risk) in an examination of the pursuit of starting a new venture has also been noted in the literature (Luthje & Franke, 2003).

FRAMEWORK AND HYPOTHESES

In this section, we draw upon the available prior work to develop testable hypotheses regarding how these areas may interact in an attempt to further understanding about the process inherent in the question “what effect does taking college courses in entrepreneurship and small business have on the startup of new firms?”

Framework Development

Figure 1 presents the guiding framework for the study. Entrepreneurial action is defined in the framework as the actual startup of a new venture. The framework presents the nascent entrepreneurs’ attitudes towards risk, self-efficacy, perceived resources and the network available to the individual as having a direct effect on the formation of new firms. Finally, the number of entrepreneurship and small business courses taken is expected to be directly related to start of new firms with MBA courses having a greater effect than undergraduate courses.

![Research Framework](image)

FIGURE 1
Research Framework
Effects of Education – Is More Better?

Education has been generally accepted as having an effect on the decision to start a new business (Delmar & Davidsson, 2000). Robinson et al. (1994) reported a higher mean level of education for entrepreneurs versus non-entrepreneurs. These authors posited that this was due to the amount of additional information available to the more educated individuals. Hao et al. (2005) found support for their hypothesis that formal education would lead to greater entrepreneurial intentions. As for types of education, Crant’s (1996) study of students revealed MBA students displayed higher entrepreneurial intentions than undergraduates. In addition, Bates (1995) found that post-graduate education was strongly associated with those who had chosen to be self-employed.

Generally, entrepreneurs and non-entrepreneurs do not differ in the level of their education (Douglass, 1976; Robinson, Stimpson, Huefner, & Hunt, 1991). However, research suggests that education specifically related to venture creation can affect an individual’s decision to start a business. Clark et al. (1984) discovered taking an entrepreneurship class had a significant effect on the motivation to actually start a venture. In the study, taking an introductory entrepreneurship/small business course was important in the decision of 67% of those who advanced from intending to start a small business to actually opening the venture. Studies have shown aspects such as opportunity recognition and innovation can be taught effectively in a course (DeTienne et al., 2004). In this study, all of the students took at least one entrepreneurship course. We assume their decisions to take more than one is related to their belief that “more is better.” We thus present the following formal hypotheses:

**Hypothesis 1a:** The post-graduation startup of a new firm by students who have taken at least one entrepreneurship course will be directly related to the number of courses taken taken.

**Hypothesis 1b:** The post-graduation startup of a new firm by students who have taken at least one entrepreneurship course will be influenced more by the number of graduate courses taken than undergraduate courses.

Self-Efficacy

Self-efficacy is defined as the belief a person has that they are capable of performing a certain task (Gist, 1987). Self-efficacy has been noted in entrepreneurship literature as being a potential distinguishing characteristic between entrepreneurs and non-entrepreneurs (Chen, Greene, & Crick, 1998). A potential entrepreneur will compare their perceived self-efficacy to that which they feel is required to successfully exploit an opportunity. An individual will only pursue an opportunity if they feel their self-efficacy is higher than the competency they feel is necessary to successfully exploit the opportunity (Boyd & Vozikis, 1994). Boyd and Vozikis also discovered that self-efficacy moderates the relationship between entrepreneurial intentions and entrepreneurial action. If the person does not feel they are capable of success, they will not act (Krueger Jr & Brazeal, 1994). Kristiansen and Indarti (2004) found that self-efficacy had a significant positive relationship with intent to start a firm in a study of Indonesian and Norwegian students. Chen, Green, and Crick (1998) introduced entrepreneurial self-efficacy (consisting of marketing, risk-taking, innovation, management, and financial control) in order to
develop a measure of self-efficacy that was more related to entrepreneurs. In their study of executives and students, Chen and associates discovered those executives involved in founding the firm displayed higher entrepreneurial self-efficacy than those executives who did not found firms. In the same study, students with higher self-efficacy showed higher entrepreneurial intentions. They also note greater self-efficacy can lead a person to be more likely to pursue an identified opportunity. In addition, they found support for their hypothesis that self-efficacy would be more prevalent in those who decided to become entrepreneurs versus those who did not. Entrepreneurial self-efficacy (ESE), as developed by Chen et al., has since been used and supported in additional studies (i.e. Hanke et al., 2005 and De Clercq and Arenius, 2006) This discussion leads to the following hypothesis.

**Hypothesis 2:** The post-graduation startup of a new firm by students who have taken at least one entrepreneurship course will be directly related to entrepreneurial self-efficacy.

**Willingness to Accept Risk**

Risk and entrepreneurs has been the subject of much scrutiny. Brockhaus (1987) noted that while it is a generally accepted notion that entrepreneurs are greater risk-takers, the empirical work done in the area is inconclusive and in need of additional work. Some studies have found entrepreneurs are more willing to take risks (Malach-Pines, Sadeh, Dvir, & Yafe-Yanai, 2002) while other studies have found entrepreneurs to be more risk-averse than the general population (Hongwei & Ruef, 2004). In a recent study, using a framework similar to the one developed in this paper, Luthje and Franke (2003) discovered risk-taking propensity to have a substantial influence on attitude towards entrepreneurship. More specifically, nascent entrepreneurs who start firms may be more willing to accept the risks than those who do not. We thus present the following proposition.

**Hypothesis 3:** The post-graduation startup of a new firm by students who have taken at least one entrepreneurship course will be directly related to their willingness to accept the risks involved.

**Resource Availability/Networks**

Krueger et al. (1994) presented several questions related to potential entrepreneurs, including how the potential entrepreneur’s perception of the availability of resources affects their feelings on the feasibility of the new venture. Using the resource-based view, Chrisman (1999) examined the influence of resource availability on starting a venture and found a positive correlation between resource availability and startup. An additional finding of the study was that those who obtain assistance from others (such as a network) are also more likely to actually start the new venture. It has been suggested that an extensive social network may be viewed by some as necessary before starting a new venture (Reynolds, 1991). In their study, Honig and Davidsson (2000) determined the entrepreneur’s network has a strong and positive effect on several steps taken towards starting a business. Networks can provide many benefits to the entrepreneur such as access to resources (financial, knowledge, emotional support etc.) and reduced perception of risk (Reynolds, 1991). Shane and Cable (2002) showed financing decisions were heavily influenced by networks and the information available through social relationships. Likewise,
Florin et al. (2003) found a positive relationship between networks and access to resources. Other benefits of networking, such as the support available from family and friends, have also been identified (Honig et al. 2000). Given the referenced work, we offer the following hypothesis:

**Hypothesis 4:** The post-graduation startup of a new firm by students who have taken at least one entrepreneurship course will be directly related to access to greater resources through a social network.

**METHOD**

**Sample and Procedure**

The sample selected for the survey was every student who had taken an entrepreneurship or small business course at a major public Midwestern university over the life of the entrepreneurship program, a time span of approximately 15 years. This sample was selected to guarantee that all potential respondents would have been involved in entrepreneurship courses. In addition, the program of the university provides an additional benefit. At this university, all entrepreneurship courses are taught by current or former business operators, 60-70% of which were consistent over the time that students in the sample attended the university. This provided an initial sample of 1,304 former students. All of the members of the sample were contacted by e-mail to request their participation in the survey. The e-mail included an invitation to participate, a link to the online survey instrument, and a completion deadline in the hope of reducing response time. A follow-up contact attempt was made via postcards to remind potential respondents of the survey. The online survey link outlined the purpose of the survey and presented a consent form and the survey instrument itself. Of the 1,304 e-mails sent, 203 of the e-mails were returned as undeliverable or account closed. This left an adjusted sample of 1,101 possible respondents. Of the remaining 1,101 possible respondents, 148 responded. Of these 148, 14 were missing significant portions of data and were discarded leaving 134 useable responses. Of these 134, some of the individuals who started firms had done so before taking courses. These respondents were dropped from the analysis due to the difficulty in determining causality. This resulted in a final sample of 127 (response rate of 11.5%). Appendix A provides a summary of the demographic data regarding the individuals in the sample.

Based on a literature review of prior research examining similar constructs, questions for the survey instrument were developed or adapted from previous works to study the following constructs. Specific sources for the questions in the survey are discussed with the appropriate construct in the following section. Following development, the survey was submitted to and approved by the two appropriate research boards for the university where the study was performed. A pilot test was conducted following approval by providing the survey to six members of the entrepreneurship field. After the pilot study participants had reviewed the survey, they were contacted and their opinions regarding the survey instrument were obtained. Based upon this feedback, some questions were modified and a few were eliminated.
Measurement and Constructs

This section briefly defines the constructs used in the study and discusses the development of measures used in the survey instrument. Most items were obtained through self-report measures on a five-point scale, ranging from strongly disagree to strongly agree.

Nascent Entrepreneur’s Startup. Nascent entrepreneurs are defined by Delmar and Davidsson as “individuals trying to start an independent business” (2000:6). Delmar and Davidsson go on to further define these entrepreneurs as having taken actual steps towards the development or creation of their independent business. The authors take this stance in order to avoid the disconnect between intent and action. As noted above, an individual is identified as a nascent entrepreneur if they have taken steps toward creating a new firm. For the purposes of this study, the step that identifies nascent entrepreneurs is taking courses in entrepreneurship. In addition, entrepreneurial action is the actual startup of a new business. Respondents to the survey were asked “Since graduation, have you ever started your own entrepreneurial venture?”

Education. A list of all graduate and undergraduate courses in entrepreneurship and small business available at the university where the study took place were provided in the survey. Respondents were asked to indicate the courses they had taken. These results were then used to tabulate the total courses taken for each respondent by course level (undergraduate or graduate).

Self-efficacy. Self-efficacy is a person’s belief that they are capable of performing a certain task (Gist, 1987). Entrepreneurs will only pursue opportunities if they feel they are capable of successfully exploiting those opportunities (Boyd et al., 1994). To measure this in the survey instrument, participants were asked to self-report their self-efficacy by the response on a five-point scale to the question “How confident do you feel that you could have become an entrepreneur and created a business if you had not taken any entrepreneurship courses at the Midwestern university?” with responses ranging from very certain to very uncertain.

Resource Availability/Networks. Chrisman (1999) found that those obtaining assistance from others were more likely to start a new venture. In addition, there was a positive correlation between resource availability and startup. One question in the survey instrument for this construct was taken from Macke and Markley (2003), while the others were developed for the survey. The items were developed to examine both the respondents’ attitude toward networks and the availability of resources through them as well as access to resources through other means. Examples of the items used include “I have the ability to acquire financial capital” and “I have an extensive resource network that I am constantly building.” Two of the items in the six-item scale did not load on the factor and were dropped. The resulting scale had a Cronbach Alpha of .692. While this is slightly below the .7 normally utilized, alpha’s slightly below the .7 level have been utilized in the Entrepreneurship literature (Hongwei et al., 2004) and related fields (Gaski, 1986; Ravinchandran & Lertwongsatien, 2005).

Risk Acceptance. The survey instrument included several items intended to examine the respondent’s attitudes toward risk. These items were presented with a five-point scale. Most of the items were developed by the researchers, but one item was obtained from a previous questionnaire (Kickul & D’Intino, 2005). For this study, the items focused on individuals’
willingness to take the risks associated with starting their own business (i.e., “I am willing to take the career risk of leaving a job to start my own business”). Since the items ask if the individual is willing to accept the risk, a positive relationship is hypothesized. The Cronbach’s Alpha for this scale was .804.

**Analysis**

The hypotheses were tested utilizing binary logistic regression in SPSS 14. This method was chosen due to the dichotomous dependent variable (started a new venture or did not). Logit or probit analysis is recommended for use in research where the dependent variable is dichotomous (Hoetker, 2007). Self-efficacy, the factor score for resource availability/networks, total undergraduate courses, total graduate courses, and the factor score for attitude towards risk were entered as the independent variables.

The data was checked for skewness and outliers. Variables exhibiting greater than .8 for skewness were cleaned by taking the square root of each value. The possibility of outliers was examined utilizing Tukey’s hinges. Those data points found to be outliers were Windsorized and recoded as the lowest or highest acceptable value.

**Results and Discussion**

The univariate statistics and bivariate correlations for the variables utilized in the study are presented in Table 1. The results from the binary logistic regression are presented in Table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>UGrad Courses</th>
<th>Grad Courses</th>
<th>Self-Efficacy</th>
<th>Accept of Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>.31</td>
<td>.469</td>
<td>.117</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UGrad Courses</td>
<td>1.2</td>
<td>.848</td>
<td></td>
<td>.117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grad Courses</td>
<td>.219</td>
<td>.454</td>
<td>.153</td>
<td>-.629**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>3.46</td>
<td>1.097</td>
<td>.353**</td>
<td>.001</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>Acceptance of Risk</td>
<td>-.019</td>
<td>1.00</td>
<td>.429**</td>
<td>.158</td>
<td>-.090</td>
<td>.380**</td>
</tr>
<tr>
<td>Social Resource Network</td>
<td>0.0189</td>
<td>.975</td>
<td>.218*</td>
<td>.044</td>
<td>.006</td>
<td>.193*</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

**Bold** items had data cleaning procedures or skewness reduction applied.

**TABLE 1**
Univariate Statistics and Bivariate Correlations
The regression obtained a Nagelkerke pseudo-$R^2$ of .399. As noted by Hoetker (2007), this $R^2$ value does not provide the same information as the $R^2$ in multiple regression and as such should be interpreted with caution. The model does correctly classify 79.8% of the respondents. Unfortunately, this is not consistent across the two possible outcomes. While this model would correctly classify 90.8% of those who did not start firms, only 54.1% of those who do start firms would be correctly classified. While this is above the 50% expected by chance in this situation, it is a disappointing outcome. In order to hopefully improve the predictive utility, the regression was also performed utilizing a different cutoff point for the reclassification. The default value for the cutoff is normally .5. However, the cutoff point has also been determined by utilizing the prior probabilities for the outcomes (Hadjicostas, 2006). In this case, the probability of starting a firm was .32 in the sample. When .32 is utilized as the cutoff, the overall reclassification percentage declines to 73.4%. However, the reclassification among the outcomes is much more balanced. With the adjusted cutoff, 74.7% of those who do not start and 70.3% of those who do start are correctly classified. This change does lead to slight alterations in the coefficients generated by the model, but does not alter the significance or direction of the effects observed.

TABLE 2
Binary Logistic Regression Results

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UGrad Courses</td>
<td>.880</td>
<td>.366</td>
<td>5.774</td>
<td>.016</td>
<td>2.410</td>
</tr>
<tr>
<td>Grad Courses</td>
<td>2.017</td>
<td>.700</td>
<td>8.299</td>
<td>.004</td>
<td>7.519</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>.505</td>
<td>.256</td>
<td>3.890</td>
<td>.049</td>
<td>1.657</td>
</tr>
<tr>
<td>Acceptance of Risk</td>
<td>1.165</td>
<td>.379</td>
<td>9.466</td>
<td>.002</td>
<td>3.207</td>
</tr>
<tr>
<td>Social Resource</td>
<td>-.220</td>
<td>.318</td>
<td>.480</td>
<td>.488</td>
<td>.802</td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-4.450</td>
<td>1.182</td>
<td>14.167</td>
<td>.000</td>
<td>.012</td>
</tr>
</tbody>
</table>

Hypothesis 1a posited a direct relationship between the number of undergraduate entrepreneurship courses taken and the start of new firms. The results of the study show mixed results for this hypothesis. While the bivariate analysis showed the relationship was not significant, undergraduate courses were significant in the regression. This may be due to a suppressor effect related to the inclusion of graduate and undergraduate courses. There was a strong and significant negative correlation between graduate courses and undergraduate courses ($r = -.629, p<.01$). In the model, there is support for the hypothesis ($B = .880, p<.05$). Additionally, the odds ratio (ExpB) indicates that the odds of starting a new firm increase by 2.410 for each additional undergraduate course taken. The mixed results lead us to be cautious regarding conclusions related to this hypothesis.

Hypothesis 1b was that graduate level courses would have a positive effect like undergraduate courses, but that this effect would be stronger. This hypothesis is supported. Graduate courses did have a significant positive effect in the model ($B = 2.017, p<.01$) and a positive correlation in the bivariate analysis ($r = .153, p<.1$). The significance in the bivariate correlation was not as high as we had hoped, but was deemed acceptable for an exploratory study of this nature. In addition, this effect was markedly larger for graduate courses ($B = 2.017$) than for undergraduate courses.
(B=.880) in the regression. The difference in the odds ratios for graduate (B=7.519) versus undergraduate (B=2.410) courses also support this hypothesis.

Hypothesis 2 stated the self-efficacy of a nascent entrepreneur would positively affect startup of a new firm. This hypothesis is supported in the binary logistic regression (B=.505, p<.05) and through a positive bivariate correlation (r=.353, p<.01). In addition, the odds ratio (ExpB) is 1.657, meaning that for each 1-unit increase in self-efficacy, the odds of an individual starting a new firm are expected to increase by 1.657. Thus, self-efficacy does have a positive impact on the start of a new firm.

The effect of the nascent entrepreneurs’ acceptance of the inherent risks on the startup of new firms was the focus of Hypothesis 3. There was strong support for this hypothesis based on the bivariate correlation (r=.429, p<.01) and the results in the model (B=1.165, p<.01). Those who were more willing to accept the risks were found to be more likely to start a new firm.

The fourth hypothesis was possessing a better social network would allow access to more resources and would be positively related to startup. While this was the case in the bivariate relationship (r=.218, p<.05), the same could not be said of the results in the binary logistic regression (B=-.220, p>.05). This may be due to a lack of unique contribution to the model (collinearity) given the correlation in the bivariate relationship with startup. It is noted that this may possibly be due to the variable’s correlation with self-efficacy and acceptance of risk. In this case, we are inclined to say there is no support for the hypothesis.

Because of the mixed results and disappointing initial reclassification for startups, a follow-up regression was performed to examine the effects of the independent variables on intention utilizing the default cutoff value (.5). The dependent variable was recoded to include those who had started a business or hadn’t started a business but still intended to do so as one outcome for the binary regression. The other possible outcome was “had not started a business and had no intention to do so in the future.” It was hoped that this would provide additional insights given that intention has been identified in the Entrepreneurship literature as a good indicator of eventual action (Krueger Jr & Carsrud, 1993).

This second regression obtained a Nagelkerke pseudo-$R^2$ of .479, but, as noted before, this should be interpreted with caution as it does not correspond to the $R^2$ in multiple regression. The percentage classified correctly was slightly lower at 82.3%. The group reclassification was vastly different. Only 34.4% of those who showed no intention were correctly classified, but 98.9% of those who did show intent were correctly classified. The similar overall percentage among the models with the radical change in classification among the groups is interesting and requires additional research. Because the group including those who have not yet started a firm but intend to do so has a higher reclassification in each regression, we believe these individuals should be the focus of this additional research. We also note that self-efficacy and undergraduate courses are no longer significant. The complete results from the second regression are presented in Table 3.
<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UGrad Courses</td>
<td>.711</td>
<td>.458</td>
<td>2.484</td>
<td>.115</td>
<td>2.058</td>
</tr>
<tr>
<td>Grad Courses</td>
<td>1.995</td>
<td>.856</td>
<td>5.430</td>
<td>.020</td>
<td>7.355</td>
</tr>
<tr>
<td>Self-Efficiency</td>
<td>.401</td>
<td>.260</td>
<td>2.371</td>
<td>.124</td>
<td>1.493</td>
</tr>
<tr>
<td>Acceptance of Risk</td>
<td>1.848</td>
<td>.418</td>
<td>19.553</td>
<td>.000</td>
<td>6.346</td>
</tr>
<tr>
<td>Social Resource</td>
<td>-0.417</td>
<td>.348</td>
<td>1.435</td>
<td>.231</td>
<td>.598</td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.848</td>
<td>1.057</td>
<td>.644</td>
<td>.422</td>
<td>.428</td>
</tr>
</tbody>
</table>

TABLE 3
Second Binary Logistic Regression Results

The second regression provides very similar results for graduate courses, networks, and acceptance of risk compared to the initial regression. The result for undergraduate courses is intriguing. When intention and start are combined in the recoding of the dependent variable, undergraduate courses are no longer a significant contributor. The same applies to self-efficacy. Because self-efficacy is significantly correlated with startup and contributes to the initial regression, it may be that self-efficacy is one factor that differentiates between those who intend to start and those who actually do.

A third analysis controlling for age and degree level of the respondents was also performed and produced similar results. These results are presented in Table 4 below.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UGrad Courses</td>
<td>.954</td>
<td>.366</td>
<td>6.792</td>
<td>.009</td>
<td>2.596</td>
</tr>
<tr>
<td>Grad Courses</td>
<td>.656</td>
<td>.707</td>
<td>.860</td>
<td>.354</td>
<td>1.927</td>
</tr>
<tr>
<td>Self-Efficiency</td>
<td>.697</td>
<td>.280</td>
<td>6.192</td>
<td>.013</td>
<td>2.008</td>
</tr>
<tr>
<td>Acceptance of Risk</td>
<td>1.189</td>
<td>.402</td>
<td>8.773</td>
<td>.003</td>
<td>3.285</td>
</tr>
<tr>
<td>Social Resource</td>
<td>-0.427</td>
<td>.336</td>
<td>1.609</td>
<td>.205</td>
<td>.653</td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.102</td>
<td>.062</td>
<td>2.745</td>
<td>.098</td>
<td>1.107</td>
</tr>
<tr>
<td>Degree Level</td>
<td>.437</td>
<td>.555</td>
<td>.621</td>
<td>.431</td>
<td>1.548</td>
</tr>
<tr>
<td>Constant</td>
<td>-8.525</td>
<td>2.257</td>
<td>14.264</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

TABLE 4
Third Binary Logistic Regression Results

Self-efficacy, undergraduate courses, and acceptance of risk remain significant predictors of who starts a new firm. However, it is interesting to note that controlling for age and degree causes graduate courses to no longer have a significant and unique contribution in the model. This leads us to believe age and experience may be the more applicable factors as those taking graduate courses are likely to be older and more experienced individuals.
LIMITATIONS

One limitation of this work is the sample used in the study. While students who have taken entrepreneurship and small business courses are an appropriate sample, only students who had taken such courses completed this survey, leaving us unable to compare those who have taken courses with those who have not. While this limits the causal interpretation, we hope the study can serve as a foundation for another study in the future which addresses this limitation. Noting the small standard deviations of the two course variables, range restriction of the number of courses could also be a limitation of the study. Because the sample was taken from only one university, the generalizability of the results is limited, with the results only being applicable to those institutions with similar programs. The higher response from more recent graduates (recency effect) provides another limitation to the study. The reclassification issues present in both models at the default cutoff also present a limitation. While both models performed well in overall reclassification, neither was able to effectively classify both categories with the default cutoff setting.

DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

The results of this study have implications for entrepreneurship education. One implication is that education does seem to matter. While not as conclusive as we had hoped, this study lends support to the body of evidence that education does matter in the startup of new firms. At the very least, it has implications for research by suggesting that the relationship deserves additional study. A potential focus on graduate courses is another implication. Because the graduate and undergraduate students are taught concurrently in the institution where the study took place, it is possible that this finding is due to differences among graduate and undergraduate students as opposed to differences in the course level. For example, it may be that graduate students have more work experience that allows them to start their own firm. Another implication relates to self-efficacy. This is another study producing results that show self-efficacy is important in the startup of new firms. Those educating potential future entrepreneurs should include activities that improve the self-efficacy of these individuals and either show them that they have the ability or help them obtain a belief in their abilities. A focus on those individuals willing to take the risks of starting a new venture could be another implication. Based on the results of this study, those who are unwilling to accept the risks will be less likely to start a new firm. Thus, programs should be directed to those willing to take the risk in order to be more effective.

Several future directions for research are available. The first proposal for future research we present is to replicate the study with a different sample. A study with a large sample of potential entrepreneurs, some of which took entrepreneurship courses and some of which did not, would be ideal for such a study. A longitudinal study would preferable and more effective, thanks in part to the ability to observe effects that occur over time (Brockhaus, 1987; Clouse, 1990). As noted by several other authors who have proposed similar frameworks, we do not claim to have examined all of the possible antecedents, moderators, characteristics, and so on which may be applicable to the relationships being studied (Autio et al., 1997; Luthje et al., 2003; Robinson et al., 1991). Another avenue for future research would be to identify these other factors, which may lead to a deeper understanding of the relationships studied in this paper. Future research
could also examine the causal relationships between some of the aspects considered here (Baum & Locke, 2004; Gist, 1987; Luthje et al., 2003). For example, do individuals who enroll in entrepreneurship courses develop a more positive view of entrepreneurship or do they self-select into courses because they already have a positive view of entrepreneurship. A longitudinal study would be beneficial in determining the nature of these causal relationships (Autio et al., 1997).

Since the precursors of intentions are not static, the possibility exists to affect an individual’s intent to engage in entrepreneurial activity (Krueger, et al., 1993). It may be possible through education to encourage more individuals to consider entrepreneurship as a viable career option. The intent of this paper is to enrich the extant literature that aims to answer the question of why some individuals choose to start a business while others do not. We have synthesized a variety of areas with the hope of providing additional insight into the many aspects involved in why individuals start new firms. We encourage others to continue the development of this often complicated area and look forward to the future insights yet to be revealed.
APPENDIX
Sample Demographics

Degree Obtained
- Bachelor's: 75%
- Master's: 17%
- PhD: 8%

Gender
- Male: 60%
- Female: 39%
- No Response: 1%

Major
- Business Adm: 26%
- Management: 29%
- Finance: 8%
- Marketing: 13%
- MBA: 13%
- Ag Business: 6%
- Other: 5%

Number of Undergraduate Courses Taken by Respondents
- 5: 1%
- 4: 6%
- 3: 21%
- 2: 51%
- 1: 21%
### Age of Respondents

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>23</td>
<td>12</td>
<td>9.4</td>
</tr>
<tr>
<td>24</td>
<td>15</td>
<td>11.8</td>
</tr>
<tr>
<td>25</td>
<td>20</td>
<td>15.7</td>
</tr>
<tr>
<td>26</td>
<td>13</td>
<td>10.2</td>
</tr>
<tr>
<td>27</td>
<td>16</td>
<td>12.6</td>
</tr>
<tr>
<td>28</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td>29</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>30</td>
<td>11</td>
<td>8.7</td>
</tr>
<tr>
<td>31</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>32</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>33</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>34</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>35</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Over 35</td>
<td>9</td>
<td>7.2</td>
</tr>
</tbody>
</table>

**Average Age** 28.03
REFERENCES


