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Gender, Entrepreneurial Self-Efficacy, and Entrepreneurial Career Intentions: Implications for Entrepreneurship Education¹

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The relationships between gender, entrepreneurial self-efficacy, and entrepreneurial intentions were examined for two sample groups: adolescents and adult master of business administration (MBA) students. Similar gender effects on entrepreneurial self-efficacy are shown for both groups and support earlier research on the relationship between self-efficacy and career intentions. Additionally, the effects of entrepreneurship education in MBA programs on entrepreneurial self-efficacy proved stronger for women than for men. Implications for educators and policy makers were discussed, and areas for future research outlined.

Introduction

Women play a substantial role in entrepreneurship throughout the world. In advanced market economies, women own 25% of all businesses and the number of women-owned businesses in Africa, Asia, Eastern Europe, and Latin America are increasing rapidly (Estes, 1999; Jalbert, 2000). In the United States alone, the 6.7 million privately held majority women-owned businesses account for \$1.19 trillion in sales and employ 9.8 million people. Moreover, the growth rate of women-owned businesses is impressive (Women-Owned Businesses, 2004). Between 1997 and 2004, employment in women-owned businesses increased by 39% compared to 12% nationally, and revenues rose by 46% compared to 34% among all privately held U.S. businesses. These data reinforce the value of studying women's entrepreneurship, and likely account for the increased attention being paid to this area by scholars and educators. However, current trends mask the fact that men continue to be more active in entrepreneurship than women worldwide.

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Recent data suggest that the largest gaps occur in middle-income nations where men are 75% more likely than women to be active entrepreneurs, compared with 33% in high-income countries and 41% in low-income countries (Minnitti, Arenius, & Langowitz, 2005).

In order to more fully capture the talents of women in new venture creation in the future, a vibrant “pipeline” of potential entrepreneurs is required. However, previous research has shown that this pipeline of women may be weak. Adult men in the United States are twice as likely as women to be in the process of starting a new business (Reynolds, Carter, Gartner, Greene, & Cox, 2002). Furthermore, research on the career interests of teens, the potential entrepreneurs of the next generation, has revealed significantly less interest among girls than among boys in entrepreneurial careers ([Kourilsky & Walstad, 1998](#); [Marlino & Wilson, 2003](#)).

Many factors undoubtedly contribute to the disparity between men and women in entrepreneurial career interests and behaviors. One factor in particular, entrepreneurial self-efficacy, or the self-confidence that one has the necessary skills to succeed in creating a business, has been demonstrated to play a key role in determining the level of interest in pursuing an entrepreneurial career. Interestingly, the effects appear to differ by gender. For example, Kickul, Wilson, and Marlino (2004) found that entrepreneurial self-efficacy had a stronger effect on entrepreneurial career interest for teenage girls than for boys. For teen girls, it appears that their perceptions that they have the abilities or skills to succeed as entrepreneurs are simply more important in considering future career options than for boys. These findings are consistent with previous research on adults that indicates that women are more likely than men to limit their ultimate career choices because of their lack of confidence in their abilities ([Bandura, 1992](#)), and that women in particular shun entrepreneurial endeavors because they think they lack the required skills ([Chen, Greene, & Crick, 1998](#)).

We are motivated to further explore these relationships by our belief that a more complete understanding of the interplay between gender, entrepreneurial self-efficacy, and entrepreneurial intention² is key to improving the participation rate of women in entrepreneurial activities. In this article, we explore these relationships at two important life stages for individuals who are, or are potentially, interested in entrepreneurship as a career. First, we look at teens in middle and high school, when career aspirations are first taking form. While existing research on the stability of early career aspirations over time is limited, the literature does strongly suggest that adult career expectations and intentions begin to be formed in the teen years, at least for college-bound students ([Low, Yoon, Roberts, & Rounds, 2005](#)). We also look at adults between 25 and 34 years old, who have already chosen a career in management and are actively pursuing their master of business administration (MBA) degrees. This age range is the most active in terms of entrepreneurial activity (Reynolds et al., 2002), and therefore of direct interest because they are likely to be a group that will act on their intentions in a relatively short time frame. Within these two different groups, do levels of entrepreneurial self-efficacy vary by gender, and is entrepreneurial self-efficacy related to entrepreneurial intention?

2. We draw our hypotheses primarily from two different but related bodies of research: career theory and entrepreneurship. In the career theory literature, self-efficacy and stated career preferences have been firmly linked. The entrepreneurship literature more frequently uses models of intentionality, with entrepreneurial intention used to refer to a conscious goal to become an entrepreneur. In our study, we use the terms entrepreneurial career preference and entrepreneurial intention interchangeably to reflect one's goal of becoming an entrepreneur.

We also explore the relationship between entrepreneurial training and entrepreneurial self-efficacy for MBA students. Previous research indicates that one of the key aspects of self-efficacy across domains is that it is not a static trait, but rather that it can be changed ([Hollenbeck & Hall, 2004](#)), a finding that supports the importance of targeted educational efforts. Do entrepreneurial education and entrepreneurial self-efficacy indeed go hand in hand, and if so, is this relationship moderated by gender? Ultimately, we hope that our examination of the interactions between entrepreneurial self-efficacy, entrepreneurial career intentions, entrepreneurial education, and gender will contribute meaningfully to the ongoing discussion of the role and effectiveness of entrepreneurship education for women.

Background

Self-Efficacy

Self-efficacy, or self-confidence in a given domain, is based on individuals' self-perceptions of their skills and abilities. This concept reflects an individual's innermost thoughts on whether they have the abilities perceived as important to task performance, as well as the belief that they will be able to effectively convert those skills into a chosen outcome ([Bandura, 1989, 1997](#)). As one group of researchers has noted, we are motivated throughout our lives by perceived self-efficacy, rather than by objective ability, and our perceptions deeply affect both our affective states and our behaviors ([Markham, Balkin, & Baron, 2002](#)). Research in this area has consistently emphasized the importance of self-efficacy as a key factor in determining human agency ([Bandura, 1989](#)), and has convincingly shown that those with high self-efficacy for a certain task are more likely to pursue and then persist in that task ([Bandura, 1997](#)).

An important aspect of self-efficacy is that it is seen to be task and domain specific ([Bandura, 1989, 1992, 1997](#)). In other words, a person can have high self-efficacy in one area, but low self-efficacy in another. Self-efficacy varies in important ways from the concept of "locus of control." Locus of control is a generalized construct that refers to individuals' overall belief in the power of their own actions across a variety of situations, while self-efficacy refers to an individual's self-confidence in specific tasks and situations ([Boyd & Vozikis, 1994](#)). In this sense, people may have strong internal locus of control (belief about their general ability to control outcomes), but low self-efficacy for certain very specific tasks/skills. [Eccles \(1994\)](#) reiterates that self-efficacy is domain specific, and that we must assess expectations for success (or personal efficacy) for specific areas.

Self-Efficacy as an Antecedent to Career Choice

Not surprisingly, the concept of self-efficacy has been extensively employed in the career theory literature to explain perceived career options, stated career preferences, and ultimately, career-oriented behaviors ([Betz & Hackett, 1981, 1983](#); [Eccles, 1994](#); [Hackett & Betz, 1981](#)). Recently, [Bandura, Barbaranelli, Caprara, and Pastorelli \(2001\)](#) included self-efficacy as one of a variety of sociocognitive influences on the career aspirations of children, and found that academic self-efficacy had the strongest direct effect. Research by [Markham et al. \(2002\)](#) further suggests that self-efficacy reliably predicts scope of career options considered, occupational interests, perseverance in difficult fields, and personal effectiveness.

While the relationship between self-efficacy and career choice has been well established in the career theory literature, most studies have not included specific career options

around entrepreneurship. Certainly, it would seem logical that the same effects of self-efficacy would exist in entrepreneurial careers. Indeed, given the complex tasks involved for an individual to locate an opportunity, assemble the resources, set up a business, and build it into a successful entity, self-efficacy or the belief in one's ability to succeed as an entrepreneur would seem to be especially important. As DeNoble, Jung, and Ehrlich (1999) note, often the entrepreneurial role is not clearly defined, and many uncertainties may exist regarding the success of one's venture. These uncertainties, they claim, can well serve as barriers to entrepreneurs, especially in the start-up phase. One's uncertainty surrounding the likelihood of success would seem to be inextricably linked to the belief that one has the abilities to succeed (self-efficacy).

A robust body of research in the field of entrepreneurship has explicitly investigated the relationship between entrepreneurial self-efficacy and entrepreneurial career preferences. Clear patterns emerge: Individuals with higher entrepreneurial self-efficacy have higher entrepreneurial intentions (Chen et al., 1998; DeNoble et al., 1999; Krueger, Reilly, & Carsrud, 2000; Scott & Twomey, 1988; Segal, Borgia, & Schoenfeld, 2002; Wang, Wong, & Lu, 2002). Respondents with high entrepreneurial self-efficacy also have higher degrees of belief that they possess a viable idea for a new business. In short, those with high entrepreneurial self-efficacy are more likely to believe they also have an actionable idea.

Early research by Bird (1988) on intentionality has been refined further by Boyd and Vozikis (1994) in their proposal that self-efficacy influences the development of both entrepreneurial career intentions and subsequent actions. Incorporating self-efficacy into Bird's model is seen as appropriate because ultimate actions are selected by people based on their judgments or perceptions of personal self-efficacy. Boyd and Vozikis (1994) go on to suggest that individuals with higher degrees of entrepreneurial self-efficacy in the early stages of career development will have higher entrepreneurial intentions, and that those with both higher self-efficacy and higher intentions will have a higher probability of being involved in entrepreneurial activity later in life. Similar incorporation of self-efficacy into proposed models of entrepreneurial career intentions (Krueger, Reilly, & Carsrud, 2000; Shapero & Sokol, 1982) have been rigorously tested (Krueger, 1993) and shown to have strong predictive ability. Still other researchers have focused on creating and testing scales (see Methodology section) for entrepreneurial self-efficacy, and have been successful in demonstrating that these have good predictive value in differentiating those with entrepreneurial intentions from those who do not (Chen et al., 1998; DeNoble et al., 1999; Kickul & D'Intino, 2003).

Gender and Career Self-Efficacy

The career psychology literature provides a substantial amount of evidence that gender is a significant variable in understanding differences in career self-efficacy (Lent & Hackett, 1987; Nevill & Schleckler, 1988). Overall, empirical evidence suggests that women are likely to have lower expectations than men for success in a wide range of occupations (Eccles, 1994). Not surprisingly, significantly lower levels of self-efficacy among women have been found in careers historically perceived as "nontraditional" for women (Bandura et al., 2001; Betz & Hackett, 1981; Scherer, Brodzinski, & Wiebe, 1990). These differences appear in adolescence as well. A recent study of U.S. teens showed that, while females and males have comparable levels of self-confidence in aggregate, there are important gender differences in key areas. Specifically, girls have reported lower confidence levels than boys in areas related to math, finance, decision making, and problem solving (Marlino & Wilson, 2003). As in the studies with adults,

these gender differences are primarily observed in domains that are stereotypically associated with “male” skills, including business/entrepreneurial careers.

In addition to these findings on gender differences in self-efficacy, there is significant evidence to suggest that women are more likely than men to limit their career aspirations and interests because they believe that they lack the necessary capabilities ([Bandura, 1992](#)). In citing recent evidence that girls are moving toward academic parity in subjects such as math and science, but still shunning careers in these fields, Bandura suggests that these perceived inefficacies, as well as other sociostructural encumbrances, weigh more heavily with girls than does background preparation when considering careers ([Bandura et al., 2001](#)).

While there is little specific research examining the interactions between entrepreneurial self-efficacy, entrepreneurial intentions, and gender, preliminary evidence suggests that women have both lower entrepreneurial self-efficacy and lower entrepreneurial intentions ([Chen et al., 1998](#); [Chowdhury & Endres, 2005](#); [Gatewood, Shaver, Powers, & Gartner, 2002](#); [Kourilsky & Walstad, 1998](#)). Additionally, as suggested by the research of [Bandura et al. \(2001\)](#), women may be more strongly influenced than men by any perceived skill deficiencies in the entrepreneurial realm. As mentioned earlier, these differences seem to appear before adulthood. In one study, Kourilsky and Walstad (1998) compared perceptions of knowledge with actual knowledge of entrepreneurial skills, and showed that while skill levels of boys and girls were comparable, girls were more likely to feel ill prepared. Research by Kickul et al. (2004) supported these findings by demonstrating a direct relationship between self-efficacy and intentions in adolescent girls, including specifically their entrepreneurial aspirations. There is additional evidence that lower levels of entrepreneurial self-efficacy among women and subsequent lower levels of entrepreneurial intentions exist well outside the cultural and political boundaries of the United States. The most recent Global Entrepreneurship Monitor study reported that these patterns occur globally among adult women, i.e., women professed lower levels of confidence and preparedness in their ability to succeed as entrepreneurs. As suggested earlier, the perception of having the needed skills is shown to be a dominant variable that has an effect independent of other contextual variables ([Minniti et al., 2005](#)).

The research on self-efficacy, career intentions, and gender has led us to our first four hypotheses:

Hypothesis 1: There will be significant gender differences on entrepreneurial self-efficacy such that teen girls will have lower self-efficacy than teen boys.

Hypothesis 2: There will be significant gender differences on entrepreneurial intentions such that teen girls will have lower intentions than teen boys.

Hypothesis 3: The relationship between entrepreneurial self-efficacy and intentions will be moderated by gender such that this relationship will be stronger for teen girls than for teen boys.

Hypothesis 4: There will be significant gender differences on entrepreneurial self-efficacy such that MBA women will have lower self-efficacy than MBA men.

The Role of Education in Enhancing Self-Efficacy

Theory indicates that targeted education can play an important role in developing levels of self-efficacy. [Bandura \(1992\)](#) suggests that self-confidence in our abilities to successfully perform specific tasks comes from four key sources: mastery experiences,

modeling, social persuasion, and judgments of our own physiological states. These mastery experiences, or simply put, “learning by doing,” appear to be basic in determining our self-confidence to successfully perform future tasks that are perceived to be similar or related (Cox, Mueller, & Moss, 2002). Providing opportunities to conduct feasibility studies, develop business plans, and participate in running simulated or real business through entrepreneurship education can therefore potentially play an important role in developing self-efficacy in individuals.

Along these lines, entrepreneurship guru David Birch, in a recent interview, advocates strongly for the increased use of mastery experiences in encouraging entrepreneurship, especially lengthy and meaningful apprenticeships, and argues that most entrepreneurship programs fall short in this area (Aronsson, 2004). However, the typical teaching methods in most entrepreneurship educational programs, which include the use of guest speakers and case studies, can also target self-efficacy through the use of role models. These help individuals form judgments of their own capabilities through personal comparison (Cox et al., 2002). Self-efficacy can also be enhanced through social persuasion, or from the positive encouragement and feedback that individuals are given by professors and instructors in entrepreneurship education programs. Importantly, consistent with research on the early formation of career interests, additional studies indicate that entrepreneurship education at precollege levels may be particularly effective in increasing interest in entrepreneurial careers (Dyer, 1994; Kourilsky, 1995).

Despite the theoretical connections between entrepreneurial education and outcomes, extensive work that has attempted to examine the effectiveness of formal entrepreneurship education has been inconclusive (Cox et al., 2002). One reason may be that research on entrepreneurship education has been limited by the educational “preoccupations” of the researchers, and that social-cognitive and psychocognitive perspectives have been under-explored (Bechard & Gregoire, 2005). It also may be that the lack of clear positive connections between entrepreneurship education and outcome is linked to methodological issues. Specifically, the outcome measures used in many studies, such as student satisfaction and performance in the course, may be insufficient indicators of educational effectiveness (Cox et al., 2002).

Interestingly, self-efficacy is rarely used as an outcome measure. Although a small number of studies have examined the effectiveness of entrepreneurship programs in enhancing self-efficacy (Chowdhury & Endres, 2005; Cox et al., 2002), these studies have been limited in scope and, as mentioned earlier, inconclusive in their findings. In one such study, Peterman (2000) found that participation in an entrepreneurship program significantly increased perceived feasibility of starting a business. In addition, those who perceived their entrepreneurship education to be a positive experience showed higher scores of perceived feasibility than those who thought their educational experience was negative. And, importantly for our research, a recent but limited study examining the role of education on entrepreneurial self-efficacy has suggested a gender interaction, with education playing a more significant role for females than for males (Chowdhury & Endres, 2005).

Given the important gender differences in self-efficacy in general and entrepreneurial self-efficacy suggested by the literature, we were motivated to test an additional hypothesis:

Hypothesis 5: The relationship between entrepreneurial education and entrepreneurial self-efficacy will be moderated by gender. That is, there will be a greater increase in entrepreneurial self-efficacy for MBA women than for MBA men when they have entrepreneurial training and education.

Methodology

Overview and Participants

In order to test our hypotheses, we analyzed data gathered in separate studies conducted between 2002 and 2004 with two age groups representing different points in the educational and career pipeline. In the first, over 5,000 middle/high school students in four geographic states or regions (New England, Illinois, California, and Texas/Florida/Tennessee) answered questions on their attitudes, skills, career perceptions, and career aspirations. The sampling unit was the individual school. In total 29 middle and high schools participated, ranging in type from public and private, coed and single sex, and urban, suburban, and rural.³ Each participating school administered an eight-page written survey to boys and girls across grades 7 through 12 in April to June of 2002. In order to ensure statistically valid sample numbers from each of several subgroups, quota sampling was used. A total of 4,292 surveys were analyzed, 3,028 from female students and 1,264 from male students (males were underrepresented in the analysis due to a research focus on teen girls). The sampling error at 95% confidence for this sample was $\pm 1.5\%$.

In the second study, MBA students in seven graduate programs were given a reduced version of the teen questionnaire. As before, the sampling unit was the individual school. The participating schools represented a convenience sample of business schools in the United States and included Wharton School/University of Pennsylvania, Tuck School of Business/Dartmouth College, Darden School of Business/University of Virginia, University of Michigan, Goizueta Business School/Emory University, McCombs School of Business/University of Texas at Austin, and Babcock/Wake Forest University. As with the middle/high school study, nonprobability sampling was used. Students from participating schools were contacted by e-mail and invited to complete the survey online, and data collection was conducted between November 2003 and April 2004. Out of 1,132 completed surveys, 933 were analyzed, for a response rate of 18.2%. In all, responses from 410 women and 523 men were included in the analysis. It should be noted that responses from international students were omitted from the analysis in order to make comparisons with the U.S.-based teen sample more valid. The sampling error at 95% confidence for this sample was $\pm 3.2\%$.

Sample Limitations

For practical purposes, a nonprobability method of sampling was used, and therefore the final results could not be viewed as representative of the relevant populations in the United States. Specifically, in the middle/high school sample, students living in middle-income zip codes, students from private schools, and Hispanic and white/Caucasian students were overrepresented when compared to the general population. African-American students, however, were underrepresented. In the MBA samples, upper ranges of the socioeconomic levels, as well as white/Caucasians, were overrepresented. Not surprisingly, given the makeup of graduate student populations, the MBA samples were skewed toward the upper range of the socioeconomic status. More than half of the respondents in the sample (54.1%) described their parents' socioeconomic status while they were growing up as upper income. Approximately 74.4% of the respondents indicated they were white/Caucasian.

3. Pooling tests were conducted to discern any significant differences on our key measures based on region or school type. None were found.

Measures

Entrepreneurial Self-Efficacy. Entrepreneurial self-efficacy was measured by a 6-item self-assessment scale. The items on this scale represent competencies related to business/entrepreneurial success, and were developed based on expert interviews with business leaders (Marlino & Wilson, 2003). In each sample, the respondents were asked to compare themselves in these skill areas to relevant peers. Middle/high school respondents were asked to compare themselves to the “other kids in their grade”; MBA respondents were asked to compare themselves to “others in the business world.” The items included “being able to solve problems,” “making decisions,” “managing money,” “being creative,” “getting people to agree with you,” and “being a leader.” The respondents in all samples rated their self-efficacy level on a 5-point Likert scale (1 = a lot worse; 5 = much better). Internal reliability was .79 (middle/high school), and .82 (MBA). Self-ratings in each area were summed and the overall mean used to create a composite entrepreneurship self-efficacy measure for the analyses.

Given the multifaceted nature of the entrepreneurial process, it is widely recognized that multi-item measures for entrepreneurial self-efficacy covering different aspects of venture creation are important (Anna, Chandler, Jansen, & Mero, 1999; Chen et al., 1998; DeNoble et al., 1999). However we believed it was important to utilize measures that were appropriate to, and could be adequately comprehended by, the younger middle school- and high school-aged sample. While simplified and reduced, the 6-item measure used in this study broadly relates to the entrepreneurial self-efficacy measures of Chen et al. (1998) and DeNoble et al. (1999) which have been compared and validated by Kickul and D’Intino (2003). For example, our item related to managing money is representative of Chen et al.’s (1998) measures for financial control and Anna et al.’s (1999) measures for economic management. Given previous research (Jones & Tullous, 2002; Marlino & Wilson, 2003) that demonstrated gender differences in math-related self-efficacy, we believed inclusion of this measure was important. Our item related to being creative is representative of Chen et al.’s (1998) measures for innovation and DeNoble et al.’s (1999) measures for originating and improving products and ideas. Our measures for being a leader and getting people to agree with you were representative of Anna et al.’s measures for human competence, Chen et al.’s (1998) measures for management, and DeNoble et al.’s (1999) measures related to defining core purpose, the ability to lead and inspire all constituencies around a common vision, and developing critical human resources. Lastly, our measures for being able to solve problems and making decisions were also related to Chen et al.’s (1998) measures for making and taking responsibility for decisions. As with the measures related to financial management, we believed it was important to include measures around decision making and problem solving given gender differences in self-efficacy these areas (Marlino & Wilson, 2003).

Entrepreneurial Intentions. For both the middle/high school and MBA samples, entrepreneurial intentions were measured by asking participants to rate their interest in starting/owning their own business on a 5-point Likert scale (1 = definitely not interested, 5 = extremely interested). Their responses were coded as “1” (somewhat or extremely interested) or “0” for purposes of analysis.

Entrepreneurial Education. Entrepreneurial education was only measured for the MBA sample by asking participants in the MBA study to select the concentration of their program. The respondents were allowed to select from a list of commonly available MBA

Table 1

Means and Standard Deviations (SDs): Measures in Middle/High School Sample

	Mean	SD	1	2	3
Gender	—	—	1.00		
Self-efficacy	3.67	0.63	.06*	1.00	
Intentions	0.46	0.49	.14*	.11*	1.00

* Indicates significance at $p < .01$.

Table 2

Means and Standard Deviations (SDs): Measures in MBA Sample

	Mean	SD	1	2	3	4
Gender	—	—	1.00			
Self-efficacy	2.61	0.32	.17*	1.00		
Intentions	0.72	0.44	.16*	.23*	1.00	
Entrepreneurship education	0.07	0.26	.00	.12*	.20*	1.00

* Indicates significance at $p < .01$.
MBA, master of business administration.

concentrations, one of which was “entrepreneurial.” Their responses were coded as “1” (entrepreneurial) or “0” (entrepreneurial not selected) for purposes of analysis. Please see Appendix for further descriptions of all three measures.

Results

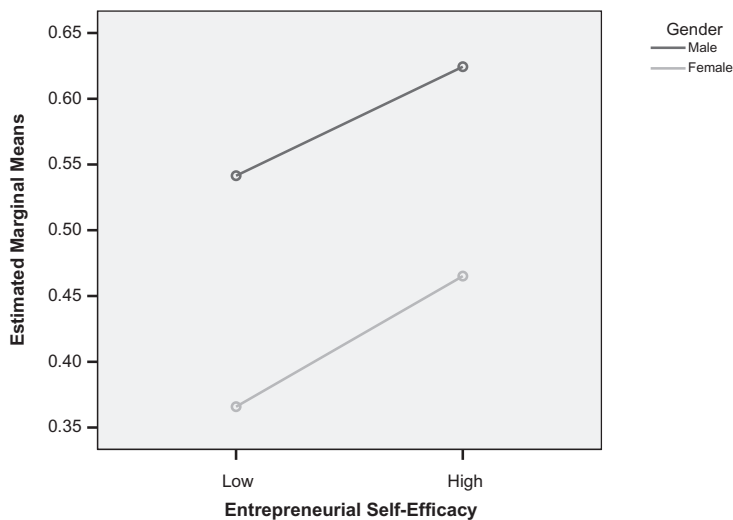
The means, standard deviations, and zero-order correlations for our constructs for both our groups are reported in Tables 1 and 2.

Hypotheses 1–3: Middle/High School Sample

In order to test our first hypothesis on whether entrepreneurial self-efficacy differed by gender, we conducted t -tests with gender as the independent variable and self-efficacy as the dependent variable. Results revealed a significant difference between gender on self-efficacy ($t = 3.48$; $p < .001$) with males reported as having higher scores on self-efficacy (mean = 3.69) than females (mean = 3.61). Similarly, t -tests were also used to investigate if entrepreneurial intentions differed by gender (hypothesis 2). Again, we found significant differences ($t = 9.72$; $p < .001$) in which males had higher intentions (mean = .58) than females (mean = .42).

Figure 1

Entrepreneurial Intentions



For our third hypothesis, we employed univariate analyses of variance to test for the interaction of gender and self-efficacy on entrepreneurial intentions. A median split was conducted on entrepreneurial self-efficacy (separating high and low groups). Although we did not find a significant interaction ($F = .23$; $p = .63$), there was a significant main effect for gender (as already indicated in hypothesis 2) and a main effect for self-efficacy ($F = 29.12$; $p < .001$). Figure 1 displays the main effects and plot for entrepreneurial self-efficacy (horizontal axis) by gender (separate lines).

Hypotheses 4 and 5: MBA Sample

The first three hypotheses were tested with our middle/high school sample. We also wanted to investigate whether similar results would also be seen in our MBA sample. Our fourth hypothesis again investigated entrepreneurial self-efficacy by gender. Similar to our previous tests, we found significant differences in the MBA sample ($t = 5.21$; $p < .001$) with males reporting higher means on self-efficacy (mean = 2.66) than females (mean = 2.54).

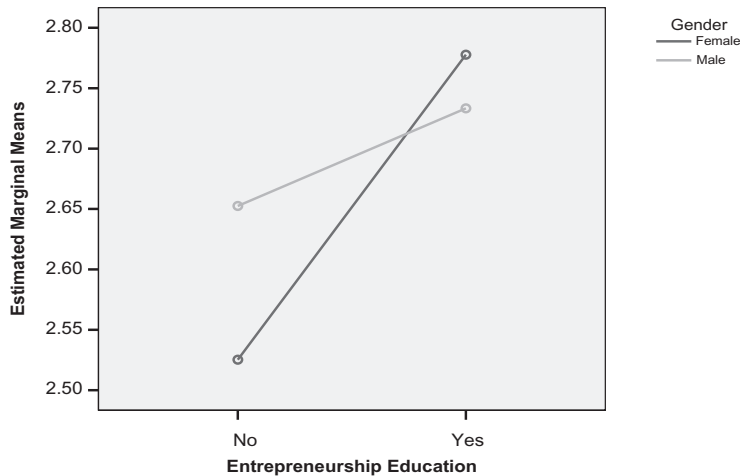
Finally, in our last hypothesis, we examined the role of entrepreneurship education and how it might interact with gender to influence entrepreneurial self-efficacy. We found a significant two-way interaction of gender by education on self-efficacy ($F = 4.32$; $p < .05$); that is, entrepreneurship education significantly increased and heightened the self-efficacy of females in comparison to the males in our MBA sample. Figure 2 displays the interaction effect along the discernable difference education plays for females in increasing self-efficacy. Discussion on these findings and implications for entrepreneurship educators are presented in the following section.

Discussion

Overall, our analysis supports earlier research on gender, self-efficacy, and career intentions, specifically in the realm of entrepreneurship. As hypothesized, females showed

Figure 2

Entrepreneurial Self-Efficacy



significantly lower entrepreneurial self-efficacy than males in both middle/high school and in MBA programs. The similarity in self-efficacy patterns across these two very different life stages is of particular interest. Notably, teen girls—with far fewer life experiences—demonstrate the same pattern in this regard as do adult female MBA students. While gender stereotypes and expectations were not directly measured in this study, we can posit, along with others, that differing expectations imposed by society may well shape self-efficacy at an early age, long before actual experiences take place that may further shape or solidify one’s self-confidence in different domains ([Eddleston, Veiga, & Powell, 2006](#)). However, even with work and/or life experience, differences in entrepreneurial self-efficacy persist. Since our female MBA students purposely selected a career path historically dominated by men, their lower entrepreneurial self-efficacy is particularly noteworthy. Even at these top-ranked schools, women who qualify for admission still feel less confident than their male counterparts, at least in some domains. As suggested earlier, actual skill levels⁴ seem to matter less than self-perceptions of those skills ([Bandura et al., 2001](#); [Betz & Hackett, 1981](#); [Scherer et al., 1990](#)), especially when those self-perceptions may in turn be shaped by gender stereotypes.

A robust body of research supports the link between entrepreneurial self-efficacy and entrepreneurial intentions, and there is even more support for the relationship between self-efficacy and career preferences across domains ([Betz & Hackett, 1981, 1983](#); [Eccles, 1994](#); [Hackett & Betz, 1981](#); [Kourilsky & Walstad, 1998](#)). While our results indicate that entrepreneurial intentions were higher for teen boys than for teen girls, we could not test causality, that is, we cannot claim the lower observed self-efficacy in girls led to their lower entrepreneurial intentions. However, the more interesting comparisons may be instead not across gender, but within gender. Expanding on this point, [Eccles \(1994\)](#)

4. While it is possible that actual skill levels did differ significantly between males and females in our samples, it seems unlikely given the nature of the sample pool and the robust size of both samples.

proposes the notion of a “hierarchy of expectations and efficacy,” in which the choice of occupation is guided by where individuals feel they have the highest chance of success. For example, even if women believe that they have some of the skills needed to be an entrepreneur, they are likely to choose another career path if they believe they possess stronger skills in that area. In this way, self-efficacy can be seen as a potential barrier to entrepreneurship for even the brightest and most confident women; at best, young women may be placing starting their own business lower on the list of options than other career options for which they feel more prepared, and at worse, they are excluding entrepreneurship from their list of possible career options altogether. In other words, they may self-limit in gathering career information and experiences that lead to becoming an entrepreneur.

What happens when these women do choose a managerial career path, and have both the background and the resources to prepare appropriately? While indeed we did find an overall main effect for gender on entrepreneurial self-efficacy, we also found that targeted education (an entrepreneurial concentration within the MBA program) makes more of a difference on self-efficacy for women than it does for men. This strongly supports the importance of well-designed education in expanding the perceived entrepreneurial career options of women. As discussed earlier, one of the key aspects of self-efficacy is that it can be changed (Hollenbeck & Hall, 2004) and that it is domain and task specific. Individuals may be highly confident overall, but may feel that they do not have what is needed to be successful in certain specific areas, such as starting their own business (Boyd & Vozikis, 1994). Relevant mastery experiences (Bandura, 1992) are a key way of increasing self-efficacy in those areas. It is notable that our sample of MBA students was drawn from seven different MBA programs, helping eliminate to some extent the research bias that might have been present in earlier single-school research examining the effects of entrepreneurship programs on entrepreneurial self-efficacy. More importantly, our research contributes new understanding of the value of focused entrepreneurship education for women in building entrepreneurial self-efficacy.

Implications for Entrepreneurship Education

Access to Entrepreneurship Education

In terms of policy, our findings suggest that providing access to entrepreneurship education is especially important in fueling the pipeline of aspiring women entrepreneurs, because of the strong role education plays in raising their levels of self-efficacy, and ultimately their interest in starting their own venture. This is consistent with other research that suggests that the lower observed gender gap between women and men’s participation rates in entrepreneurship in the United States (versus other countries) may be a result of targeted programs and entrepreneurial education for women (Minnitti et al., 2005). While we agree with this assessment, we also recognize that the entrepreneurship education provided through MBA programs and undergraduate management programs reaches only a very small (and specific) percentage of the population. We believe it is especially important to ensure that entrepreneurship training is available to women of diverse socioeconomic and racial/ethnic identities.

Additionally, our research implies that self-efficacy may play an important role in shaping (or limiting) perceived career options as early as the middle and high school years. Providing entrepreneurial training at an early age is therefore potentially important in order to prevent the entrepreneurial career option from being discounted by girls

early in their lives. Other research also indicates the importance of entrepreneurship education at precollege levels in order to increase both interest in the area and the level of overall preparedness (Dyer, 1994; Kourilsky, 1995). It is interesting to note that Kourilsky and Walstad (1998) provided evidence that young people of both sexes believe that their lack of understanding of entrepreneurship can be addressed with future training, and are therefore likely to be highly receptive to educational offerings.

Effectiveness of Entrepreneurship Education

While access to education for women in specific entrepreneurial competencies is important, it may not be sufficient. The trainee/student needs to perceive that those competencies have been mastered (Krueger, 1993). The key issue then is the effectiveness of the education in raising self-efficacy levels. We recognize that designing entrepreneurship education that truly enhances entrepreneurial self-efficacy is a complicated issue. For example, in one study, a negative relationship was observed between education and self-efficacy (Cox et al., 2002). In discussing these results, the authors suggested that one potential reason for lower self-efficacy scores following an entrepreneurship program might be related to the fact that the course itself exposed students to the complexities of starting a business about which they had previously been unaware. The question of whether entrepreneurship educators should “burst bubbles” or “build steam” is therefore of interest. We suggest that thinking holistically and programmatically about a sequence of entrepreneurship education experiences may provide a solution to this dilemma. Designing a complete program that can both give a realistic sense of what it takes to start a successful business and the necessary skills, as well as the self-confidence that it is achievable, should be a top priority for educators.

Gender-Sensitive Programming

Our findings imply that entrepreneurship education is more important to women than to men in increasing self-efficacy. As Scherer et al. (1990) suggest, women need the self-confidence and the expectation of success in order to fully participate in venture creation. Kourilsky and Walstad (1998) also concluded that educational initiatives addressing both entrepreneurial knowledge and self-efficacy are critical and especially important for females because of their observed self-efficacy bias. Additionally, it is also important to examine the different motivations and aspirations that women have in the creations and development of their own firms. The motivational factors, both at the “push” and “pull” levels that contribute to women’s desire to start their own should be considered. That is, the need for independence, self-actualization, financial benefits, and the desire to achieve a more comfortable balance between family and work responsibilities “pull” women into entrepreneurship. Alternatively, unemployment, underemployment, and unsatisfactory work conditions and prospects have more recently “pushed” a growing number of women into their own businesses (Kickul, Gundry, & Sampson, in press). For many, entrepreneurship is the vehicle by which they can achieve substantial wealth while creating a lasting impact on society. Overall, these findings and perspectives point to the importance of recognizing that a “one size fits all” approach to curricula may not be appropriate, and that gender-sensitive programming, especially related to their motivations, coupled with building their self-efficacy, may be needed (Wilson, Marlino, &

Kickul, 2004). We should not assume that identical pedagogical methods would raise self-efficacy for students across gender.

Outcome Measurement

As noted earlier, the entrepreneurship education field has witnessed explosive growth over the last three decades (Fiet, 2000), but research into the effectiveness of entrepreneurship courses has proved inconclusive at best (Cox et al., 2002). Ensuring that entrepreneurship education is both relevant and effective for our potential young entrepreneurs should be a top priority for educators (Kickul et al., 2004). Explicitly incorporating entrepreneurial self-efficacy into the pre- and post measurement of entrepreneurship training programs and courses appears to be important, and will serve to provide educators with better information about continuous improvement and effectiveness.

Directions for Future Research

The Value of Replication and Validation at Other Levels/Stages within the Entrepreneurship Education Process

Although access to two parallel studies allowed us to compare related issues at two different educational stages, our study remains cross-sectional study, and hence causality can be inferred, but not established (Spector, 1981). By replicating this study among undergraduate-level students, we can potentially gain insight on how the relationships between gender, entrepreneurial self-efficacy, and entrepreneurial interest flows and changes over time. It would also allow an examination of the role of entrepreneurial education at an intervening stage on self-efficacy and intentions.

The growth in educational programs designed to give people the skills and abilities for new venture creation has been strong and is growing stronger (Fiet, 2000). With ever-increasing amounts of assessment and evaluative information on entrepreneurship education comes the opportunity to better understand what works and what does not, and to establish best programmatic practices. However, as discussed earlier, entrepreneurship education should not be viewed as one size fits all. We have demonstrated that these educational efforts, at least at the MBA level, are moderated by gender. Additionally, earlier research also showed that significant differences in self-efficacy and entrepreneurial intentions exist among teen girls of different racial and ethnic identities (Marlino & Wilson, 2003; Wilson et al., 2004). Future efforts to develop appropriate and effective educational programs should fully consider the complexities inherent in these findings.

Entrepreneurial Self-Efficacy and Mastery Experiences

Interestingly, our results show that women interested in business careers and actively pursuing an MBA in preparation for those careers had lower entrepreneurial self-efficacy than MBA men, mirroring the results for the middle/high school sample. Previous research (Bandura, 1992 and others) suggests that additional mastery experiences would erode these gender-based differences. One way to test this would be to examine the entrepreneurial self-efficacy of women versus men entrepreneurs at similar stages in their careers and with similar experiences and educational backgrounds.

Does this difference disappear with further education and postgraduate career experiences?

Entrepreneurial Self-Efficacy and Career Behaviors

Given that our ultimate interest is in the development of future entrepreneurs, can we demonstrate a relationship between entrepreneurial self-efficacy, entrepreneurial career preference, and ultimate career choice? Longitudinal research is needed in this area and early efforts are underway, although this research is not specifically related to entrepreneurship (Bandura et al., 2001). In the meantime, cross-sectional research can give us some important insights regarding the connection between entrepreneurial self-efficacy and behavior. Research conducted using a sample of founders and nonfounders of businesses show evidence that people who have started businesses have higher entrepreneurial self-efficacy. Interestingly, among the group of practicing entrepreneurs (but not among the group of nonentrepreneurs), gender did not have a significant effect on self-efficacy. This suggests that women who ultimately choose an entrepreneurial path have higher entrepreneurial self-efficacy than those who do not (Chen et al., 1998). Similarly, Shaver, Gatewood, and Gartner (2001) found that nascent practicing women entrepreneurs did not have significantly different expectations about entrepreneurial success than their male counterparts. In both studies, it is unclear if these similarities in self-efficacy across gender precede or result from actual entrepreneurial experiences. In other words, are women with higher self-efficacy in relevant areas more likely to choose entrepreneurship, or does their self-efficacy grow after embarking on their careers? In examining a younger age cohort, Wilson et al. (2004) found that adolescent girls and boys interested in entrepreneurship did not have significantly different entrepreneurial self-efficacy. In fact, girls with high levels of interest in entrepreneurship had higher self-efficacy than boys interested in the same career path, suggesting that high entrepreneurial self-efficacy may in part be due to antecedent factors, which can include both educational experiences and factors such as parental occupation.

Self-efficacy may have an impact even after a career decision to pursue an entrepreneurial career has been taken. For example, what impact does self-efficacy have on persistence? As Bandura implies, making a decision is not the same as implementing the decision, and self-efficacy can have an even greater effect throughout the implementation stages (Bandura et al., 2001). Similarly, Markham et al. (2002) suggests that given the difficulty of entrepreneurial ventures, high self-efficacy is important throughout the full cycle of the endeavor. That is, entrepreneurs with high self-efficacy may be more successful in their entrepreneurial pursuits than those with low self-efficacy.

Finally, and related to this concept, it would be interesting to explore the connection between self-efficacy and new venture growth. Does self-efficacy impact the venture ambitions and/or success of those with lower self-efficacy? Cliff (1998) refers to the substantial empirical evidence that shows that women-owned businesses tend to be smaller than male-owned businesses. Her study, which sought to provide additional insights into the reasons for these differences, included the finding that women are more likely than men to establish growth limits that reflect personal comfort thresholds. Additionally, women entrepreneurs in the same study showed greater concern about the risks of fast-paced growth. Anna et al. (1999) also sought to better understand the disparity in the average size of firms created by women, as compared to those created by men, and found different levels of entrepreneurial self-efficacy between women in “traditional” and “nontraditional” industries.

Conclusions

We began this study motivated by a belief in the importance of a vibrant pipeline of future women entrepreneurs and with the desire to better understand the interactions of gender with entrepreneurial self-efficacy and entrepreneurial career intentions. We found strong gender effects on both entrepreneurial self-efficacy and intentions at the middle/high school level, supporting earlier research on self-efficacy differences in those career areas that seem to reflect gender-based role expectations. While we did not measure gender stereotyping for different career paths, our results, taken together with previous research on self-efficacy and career intentions, suggest that entrepreneurship may still be perceived as a “male” field, and that young women may be limiting their career aspirations because they feel that they do not have the requisite skills and abilities. Even among women who have chosen a management career path and are actively pursuing their MBA degrees, these differences in entrepreneurial self-efficacy persist. And yet, we see that entrepreneurship education may reduce these gender differences for those women with entrepreneurial aspirations. In this way, entrepreneurship education can be positioned as an equalizer, possibly reducing the limiting effects of low self-efficacy and ultimately increasing the chances for successful venture creation by women.

Appendix

Measures

A. Entrepreneurial Self-Efficacy

Entrepreneurial Self-Efficacy was measured by asking respondents (Middle/High School and MBA samples) to rate themselves against their peers on the following measures. The overall mean was used as a composite score of self-efficacy.

	Much worse	A little worse	About the same	A little better	Much better
Being able to solve problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Managing money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being creative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Getting people to agree with you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being a leader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Entrepreneurial Intentions

Entrepreneurial Intentions were measured by asking participants (Middle/High School and MBA samples) how interested they were in different careers, including starting/owning their own business. Respondents rated their interest level on a 5-point Likert scale (1 = definitely not interested; 5 = extremely interested). Respondents were then coded as “1” if they selected somewhat interested or extremely interested in entrepreneurship (4 or 5, respectively) and “0” if they selected definitely not, probably not or possibly interested (1, 2, or 3).

Career:	Definitely not interested	Probably not	Possibly interested	Somewhat interested	Extremely interested
Business or management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doctor, nurse, or other medical professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actor/actress or other performer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artist/graphic designer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lawyer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Starting/owning your own business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientist/engineer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Professional athlete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Journalist/writer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working with computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Military	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sales/marketing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nonprofit/government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there any other careers that you are <i>very interested</i> in that we have missed?					
Please list _____					

C. Entrepreneurship Education

MBA students were asked to indicate their concentration from the list below. Respondents could select up to two concentrations. Responses were coded as “1” if the concentration was selected and “0” if it was not.

- a. Finance
- b. Marketing
- c. International Business
- d. Management
- e. Entrepreneurial
- f. Business strategy
- g. Accounting
- h. E-commerce
- i. Management information systems
- k. Other, please specify _____

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