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The Mediating Role of Self-Efficacy in the Development of Entrepreneurial Intentions

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The purpose of this study was to investigate the mediating role of self-efficacy in the development of students' intentions to become entrepreneurs. The authors used structural equation modeling with a sample of 265 master of business administration students across 5 universities to test their hypotheses. The results showed that the effects of perceived learning from entrepreneurship-related courses, previous entrepreneurial experience, and risk propensity on entrepreneurial intentions were fully mediated by entrepreneurial self-efficacy. Contrary to expectations, gender was not mediated by self-efficacy but had a direct effect such that women reported lower entrepreneurial career intentions. The authors discuss practical implications and directions for future research.

Keywords: entrepreneurship, self-efficacy, career intentions

Entrepreneurship is important because it leads to increased economic efficiencies, brings innovation to market, creates new jobs, and sustains employment levels (Shane & Venkataraman, 2000). However, despite decades of research, scholars currently have only a limited understanding of the factors and decision processes that lead an individual to become an entrepreneur (Markman, Balkin, & Baron, 2002). Previous research in this area has tended to lack a strong theoretical orientation; variables have been examined in isolation and have sometimes been included with no clear theoretical rationale. This approach has resulted in an extensive list of possible antecedents but few consistent findings, leading some scholars to doubt that individual-level antecedents of entrepreneurship can ever be found (Gartner, 1989b).

The purpose of this study is to develop and test a set of hypotheses in which entrepreneurial self-efficacy mediates the relationship between individual-level antecedent factors and entrepreneurial intentions. In previous work, Boyd and Vozikis (1994) developed a theoretical model in which self-efficacy was proposed as a critical antecedent of entrepreneurial intentions and behavior. C. C. Chen, Greene, and Crick (1998) provided empirical evidence that entrepreneurial self-efficacy, defined as an individual's confidence in his or her ability to successfully perform entrepreneurial roles and tasks, was positively related to students' intentions to start their own business. To date, however, researchers have not examined the central theoretical role self-efficacy might play in explaining the relationship between the previously identified antecedents and entrepreneurial behavior.

This study makes three contributions to entrepreneurship research. First, it provides a theoretical explanation, grounded in social–cognitive theory (SCT; Bandura, 1986), for the influence of a number of individual-level antecedents on the intention to become an entrepreneur. SCT was used to select the antecedent variables used in this study and may guide future research toward a consistent set of findings in this area. The second contribution of this study concerns an ongoing discussion regarding the relative malleability of entrepreneurial intentions. We address this issue by assessing the influence of two stable individual-difference factors (gender and risk propensity) and two relatively malleable factors (perceptions of formal learning in entrepreneurship and previous entrepreneurial experience) in a single theoretical model. The third contribution of this study is our specific focus on the impact of entrepreneurial education. Despite the spread of entrepreneurship courses and programs in U.S. universities over the past few decades (Soloman, Duffy, & Torabishy, 2002), doubts about the effectiveness of formal entrepreneurship education continue to arise (Clark, Davis, & Harnish, 1984; Wallenstein, 1993). We seek to assess the influence of entrepreneurial education on entrepreneurial intentions and to provide a better understanding of the theoretical mechanism linking the two constructs.

In sum, we propose a model in which entrepreneurial self-efficacy plays a critical mediating role (see Figure 1). We use self-reported data collected from master of business administration (MBA) students across five universities at two points in time to test our hypotheses. We include students' entrepreneurial intention

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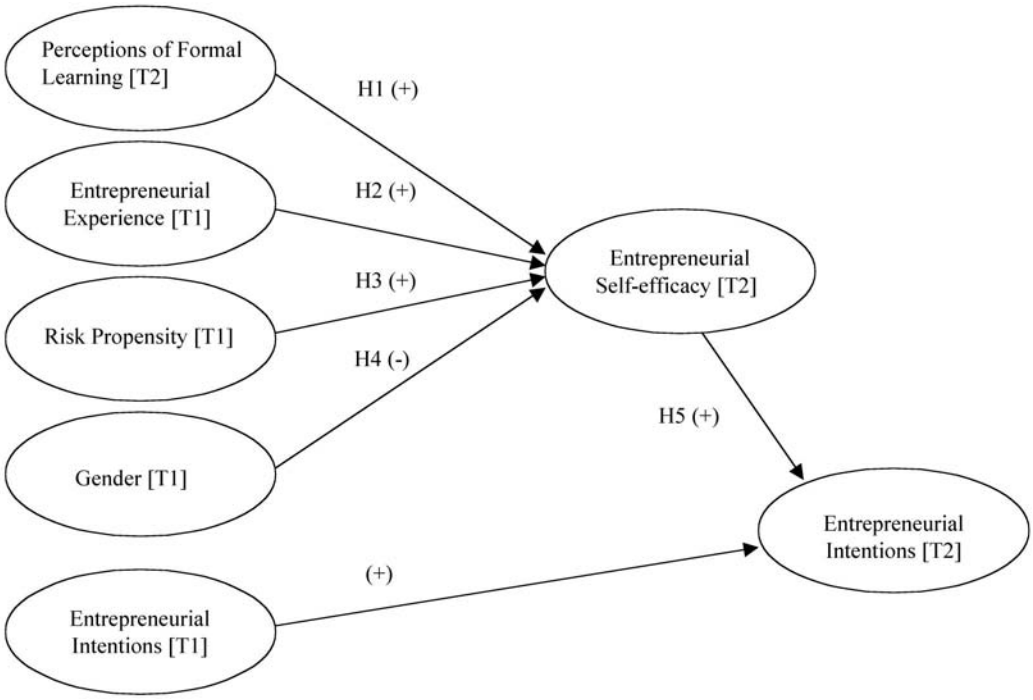

Figure 1. Hypothesized model. Arrows represent hypothesized paths. H = Hypothesis; T = Time.

measured when they began their MBA program (Time 1) as a control variable.

Factors Affecting Entrepreneurial Self-Efficacy

Self-efficacy is a motivational construct that has been shown to influence an individual's choice of activities, goal levels, persistence, and performance in a range of contexts. An important component of SCT concerns the malleability of self-efficacy judgments and the process through which these judgments are formed. According to SCT, an individual's sense of self-efficacy can be influenced through four processes: (a) enactive mastery, (b) role modeling and vicarious experience, (c) social persuasion, and (d) judgments of one's own physiological states, such as arousal and anxiety (Bandura, 1986).

We expect students' perceptions of formal learning in entrepreneurship courses to be positively related to their level of entrepreneurial self-efficacy. Various pedagogical practices typically used in entrepreneurship courses can be related to all four mechanisms of self-efficacy development. For example, enactive mastery experiences are promoted through simulated business exercises, best business case competition, and even the provision of venture capital to entrepreneurship students (Stumpf, Dunbar, & Mullen, 1991). Entrepreneurship courses also typically offer the opportunity to observe successful role models and thus the opportunity for vicarious learning to take place. These opportunities take the form of lectures given by local entrepreneurs, case studies of prestigious entrepreneurs, or work with an entrepreneur on a course project. Entrepreneurship educators also use social persuasion to enhance students' self-efficacy when evaluating students' course projects or mentoring students regarding their career goals. Finally, formal education can provide examples of the lifestyles and working styles of successful entrepreneurs that will help individuals develop their own psychological coping strategies. Psychological coping strategies may help individuals maintain motivation and control work or career-related anxiety, leading to higher expectations of success (Stumpf, Brief, & Hartman, 1987). All of these learning opportunities are likely to be tailored to provide positive outcomes that individuals will attribute to their own ability, effort, and performance strategies. Such attributions should lead to increased self-efficacy for entrepreneurial tasks. Because, even within the same formal educational program, not every individual will avail themselves of the relevant learning opportunities to the same extent, we focus not on the number of classes taken but on the amount of entrepreneurship-related learning the individuals themselves report.

> *Hypothesis 1:* Perceptions of formal learning in entrepreneurship-related courses will be positively related to entrepreneurial self-efficacy.

We also expect previous entrepreneurial experience to increase one's entrepreneurial self-efficacy because it provides opportunities for enactive mastery and role modeling. Skills and performance strategies useful for the entrepreneurial role are likely to be acquired from previous experience as an entrepreneur, even in the case of past failure (Minniti & Bygrave, 2001). Thus, previous experience can be seen as a form of enactive mastery. Previous entrepreneurial experience may also expose individuals to other entrepreneurs on occasions such as training, club meetings, or business dealings. Individuals with previous entrepreneurial expe-

rience will thus have had more chances to observe and learn from successful models.

Hypothesis 2: Previous entrepreneurial experience will be positively related to the level of entrepreneurial self-efficacy.

Numerous scholars have proposed a direct relationship between risk propensity and entrepreneurial intentions. In our model, we view entrepreneurial self-efficacy as the mediating mechanism relating risk propensity to entrepreneurial intentions. That is, individuals with higher risk propensity are more likely to want to pursue an entrepreneurial career because they feel more confident that they can fulfill the roles and accomplish the tasks necessary to succeed as an entrepreneur. In terms of the theoretical mechanisms influencing self-efficacy, we expect risk propensity to be related to the individual's judgment of his or her own likely physiological state while pursuing an entrepreneurial venture, including levels of anxiety and arousal (Gist & Mitchell, 1992). Individuals with high risk propensity tend to be more comfortable dealing with situations of risk and in fact perceive the objectively same situation as less risky than do others (Sitkin & Weingart, 1995). They are therefore likely to anticipate experiencing less debilitating anxiety about an entrepreneurial career, perceive a greater sense of control over outcomes, judge the likelihood of receiving positive rewards more highly, and thus possess higher self-efficacy.

Hypothesis 3: Risk propensity will be positively related to entrepreneurial self-efficacy.

The final determinant of entrepreneurial self-efficacy included in our model is gender. The prototypical entrepreneur is perceived as possessing stereotypically masculine traits (Baron, Markman, & Hirsa, 2001) and most entrepreneurs are in fact men (Moore & Buttner, 1997). Scherer, Brodzinski, and Wiebe (1990) provided initial empirical evidence showing that female undergraduate students had lower entrepreneurial self-efficacy than male undergraduate students. Several scholars have speculated that women have fewer early career experiences, social support, or role models related to entrepreneurship than their male counterparts (Dyer, 1994). These are direct examples of the social–cognitive mechanisms of enactive mastery, social persuasion, and role modeling, respectively, and lead us to expect women to have lower entrepreneurial self-efficacy than men.

Hypothesis 4: Women will have lower levels of entrepreneurial self-efficacy than men.

Entrepreneurial Self-Efficacy and Entrepreneurial Intentions

According to SCT, self-efficacy represents a central mechanism of personal agency. It is thought to influence not only one's level of effort and persistence on a specific task but one's very choice of activities and behavioral settings. High self-efficacy expectations regarding performance in a specific behavioral setting lead individuals to approach that setting, whereas low self-efficacy expectations lead individuals to avoid that setting (Wood & Bandura, 1989). As reviewed earlier, C. C. Chen et al. (1998) found support for a positive relationship between entrepreneurial self-efficacy and entrepreneurial intentions with a sample of business and psychology students. Although this hypothesis is a replication of that earlier finding, we note the value of testing a model in which self-efficacy is the theoretical linkage between antecedents and entrepreneurial intentions.

Hypothesis 5: Entrepreneurial self-efficacy will be positively related to entrepreneurial intentions.

Method

Sample and Procedure

This research is based on part of a study designed and conducted through the cooperation of business faculty at five U.S. universities. A variety of institutions were selected including top-ranked private and public schools; smaller, technical–engineering-oriented schools; and a large urban, public university.

Two waves of data collection were conducted. The Time 1 survey was administered in 1998 to incoming MBA students by faculty members at each of the five universities, generating 778 usable responses. A Time 2 survey was administered in 2000 when the original cohort of MBA students was graduating. A total of 267 matched responses were collected at Time 2. Two responses were eliminated because of incomplete responding resulting in a sample size of 265 respondents (a 34% response rate). Subjects' average age at Time 1 was 28, and 66% of the sample was male. Fifty-eight percent of the students reported a focus in finance followed in frequency by marketing, entrepreneurship, and management. A multivariate analysis of variance showed no significant differences on the Time 1 variables between subjects lost through attrition and subjects remaining in the study at Time 2.

Measures

Perceptions of formal learning. We asked subjects four questions concerning how much they had learned during their MBA education regarding typical areas of entrepreneurship (opportunity recognition, opportunity evaluation, starting a business, and corporate entrepreneurship). A 5-point Likert scale was used to measure responses to each item, ranging from 1 (*very little*) to 5 (*a great deal*). It was measured at Time 2, and an overall score was obtained by averaging responses to the four items. Cronbach's alpha for this scale was .79.

Previous entrepreneurial experience. This variable was measured by three items asking subjects about their level of experience in various entrepreneurship-related activities (new venture start-up, new market development, and new product development). Again, a 5-point Likert scale was used to measure this variable at Time 1, and an overall score was obtained by averaging the three items ($\alpha = .60$).

Risk propensity. Risk taking is a behavior influenced by trait, task, cognitive, and situational factors (Sitkin & Pablo, 1992). We chose to focus on risk propensity as a general personality trait for this study, because it has been shown to be a stable individual difference (Jackson, 1994). We developed six items based on a review of existing personality scales reflecting generalized risk propensity (e.g., Gomez-Mejia & Balkin, 1989). Two example items are "I enjoy the excitement of uncertainty and risk" and "I am willing to take significant risk if the possible rewards are high enough." It was measured at Time 1, and respondents were asked to indicate the extent to which they agreed or disagreed with each statement using a 5-point Likert scale, ranging from 1 (*disagree completely*) to 5 (*agree completely*). An overall score was obtained by averaging the responses to each item ($\alpha = .68$). The Appendix reports a validity data set collected to assess the convergent and discriminant validity of the measures developed in this study. The correlation between our risk propensity measure and the 20-item Risk Taking scale from the Jackson Personality Inventory—Revised (Jackson, 1994) in the validity data set was significant

($r = .68$, $p < .01$), providing evidence for the construct validity of our measure as a trait scale.

Gender. Subjects were asked to report their gender at Time 1. Men were coded as 1, and women were coded as 2. We conservatively assumed perfect reliability in subsequent analyses.

Entrepreneurial self-efficacy. Theorists have argued that self-efficacy expectations generalize to a set of interrelated tasks (Gist, 1987). We therefore developed items to measure self-efficacy regarding specific entrepreneurial tasks and averaged over those specific tasks to form a more general measure of self-efficacy for the overall entrepreneurial task domain. We asked subjects at Time 2 how confident they were in successfully identifying new business opportunities, creating new products, thinking creatively, and commercializing an idea or new development ($\alpha = .78$). A Likert scale ranging from 1 (*no confidence*) to 5 (*complete confidence*) was used.

C. C. Chen et al. (1998) published a set of measures conceptually related to a number of variables used in our research when our Time 1 data collection was already in progress. We included these variables in a subsequent data set (see the Appendix) to assess the validity of our measures. Our measure of entrepreneurial self-efficacy was significantly and moderately related to general self-efficacy but was more strongly related to C. C. Chen et al.'s (1998) alternative measure of entrepreneurial self-efficacy, providing evidence of convergent and discriminant validity. Both our measure and C. C. Chen et al.'s (1998) measure of entrepreneurial self-efficacy were significantly correlated with entrepreneurial intentions in the validity data set, providing evidence of predictive validity for both measures, although the general self-efficacy measure had no significant relationship with entrepreneurial intentions, providing further evidence of discriminant validity.

Entrepreneurial intention. We used four items to measure entrepreneurial intention. We asked students how interested they were in engaging in prototypical entrepreneurial activities (starting a business, acquiring a small business, starting and building a high-growth business, and acquiring and building a company into a high-growth business) in the next 5 to 10 years. A 5-point Likert scale was used, ranging from 1 (*very little*) to 5 (*a great deal*). The four items were averaged to form an overall measure. This measure was collected at Time 1 ($\alpha = .85$) and Time 2 ($\alpha = .88$). The correlation of our measure with the alternative measure of entrepreneurial intentions developed by C. C. Chen et al. (1998) and included in the validity study was strong.

Analyses

We conducted confirmatory factor analysis and structural equation modeling using LISREL 8 (Jöreskog & Sörbom, 1993). We conducted the confirmatory factor analysis to establish the discriminant validity among our perceptual variables. Evidence that common method variance does not account for the observed relationships would be provided if a five-factor model, representing each variable as a separate construct, is superior to a one-factor model. We conducted structural equation modeling to assess the hypothesized theoretical model. In order to optimize sample size relative to the parameter estimates and correct for measurement error, we used single-scale score indicators to measure the latent variables of the model (Bollen, 1989). We also compared our hypothesized model with four alternative models to assess the possibility that entrepreneurial self-efficacy is a partial mediator rather than a full mediator as we proposed (Kelloway, 1998).

Results

Means, standard deviations, and correlations for all variables are shown in Table 1. Each of the independent variables in the model has a significant direct relationship with entrepreneurial intentions measured at Time 2. In addition, entrepreneurial self-efficacy is significantly related to Time 2 entrepreneurial intention.

We conducted a confirmatory factor analysis to check for common method variance among the perceptual variables in our study: formal entrepreneurial learning, previous entrepreneurial experience, risk propensity, entrepreneurial self-efficacy, and entrepreneurial career intentions. The result showed that the five-factor model provides a significantly better fit to the data, indicating the absence of severe common method variance.

The results of the structural equation modeling analysis are presented below. The model fit indexes are presented in Table 2. Our hypothesized model (full mediation model) fits the data well: $\chi^2(4, N = 265) = 10.96$, $p < .05$, comparative fit index = .98, standardized root-mean-square residual = .02, and root-mean-square error of approximation = .08, meeting the goodness-of-fit criteria suggested by Hu and Bentler (1999).

Table 2 also shows the fit statistics for each of the alternative models testing for partial mediation. Only Alternative Model 4, which includes a direct path from gender to career intention, displayed a significantly improved fit to the data, $\Delta\chi^2(\Delta 1, N = 265) = 8.35$, $p < .01$. Other indices also showed evidence of an improved fit for this model. Thus, Alternative Model 4 was retained as the best-fitting solution and used to examine our hypotheses. The standardized path estimates are presented in Figure 2.

Hypotheses 1, 2, and 3, relating perceptions of formal entrepreneurship learning ($\gamma = .45$, $p < .01$), entrepreneurial experience ($\gamma = .35$, $p < .01$), and risk propensity ($\gamma = .18$, $p < .05$) to entrepreneurial self-efficacy, respectively, are each supported. Individuals who report more learning about entrepreneurship in their academic programs and those who report more entrepreneurial

Table 1
Means, Standard Deviations, Correlations, and Reliabilities of Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Perceptions of formal learning (T2)	3.23	0.90	(.79)						
2. Entrepreneurial experience (T1)	2.51	1.09	.09	(.60)					
3. Risk propensity (T1)	3.33	0.61	.28**	.18**	(.68)				
4. Gender[a] (T1)	1.34	0.48	.02	−.15*	−.16**	(1.00[b])			
5. Entrepreneurial self-efficacy (T2)	3.41	0.70	.44**	.32**	.27**	−.06	(.78)		
6. Entrepreneurial intentions (T1)	3.20	1.14	.20**	.19**	.40**	−.20**	.25**	(.85)	
7. Entrepreneurial intentions (T2)	3.15	1.16	.31**	.27**	.43**	−.28**	.31**	.56**	(.88)

Note. $N = 265$. Internal reliabilities are in parentheses. T = Time.
[a] Male = 1; female = 2. [b] Reliability estimated.
* $p < .05$. ** $p < .01$.

Table 2
Goodness-of-Fit Indexes for Structural Equation Models

Model	$\chi^2(df)$	$\Delta\chi^2(\Delta df)$	AGFI	CFI	NFI	SRMR	RMSEA
Hypothesized model	10.96 (4)*		.92	.98	.97	.02	.08
ALT1: Learning direct path	8.40 (3)*	2.56 (1)	.92	.98	.97	.02	.08
ALT2: Experience direct path	10.96 (3)*	0 (1)	.89	.97	.97	.03	.10
ALT3: Risk propensity direct path	8.23 (3)*	2.73 (1)	.92	.98	.98	.02	.08
ALT4: Gender direct path	2.61 (3)	8.35 (1)**	.97	1.00	.99	.01	.00

Note. ALT = Alternative Model; AGFI = adjusted goodness-of-fit index; CFI = comparative fit index; NFI = normed fit index; SRMR = standardized root-mean-square residual; RMSEA = root-mean-square error of approximation.
* $p < .05$. ** $p < .01$.

work experience each reported higher levels of entrepreneurial self-efficacy. Likewise, those who report a higher propensity to take risks judge themselves to be more capable of performing tasks related to entrepreneurship. Among the determinants of entrepreneurial self-efficacy, perceptions of formal learning had the largest effect. Examination of the path estimates from the final model fail to provide support for Hypothesis 4. Gender is not significantly related to entrepreneurial self-efficacy. Gender was, however, significantly related directly to entrepreneurial intentions ($\gamma = -.17$, $p < .01$) such that women were less likely to intend to become an entrepreneur than were men. Hypothesis 5 is also supported. Entrepreneurial self-efficacy is positively related to entrepreneurial intention ($\beta = .49$, $p < .01$).

Together, support for Hypotheses 1, 2, 3, and 5 provide evidence of a mediating role for self-efficacy in the relationship of those three variables to entrepreneurial intentions. The rejection of alternative models that included a direct path from each of those variables to entrepreneurial intention shows that the effect of each is fully mediated by entrepreneurial self-efficacy. The failure to find support for Hypothesis 4 shows that self-efficacy does not play this mediating role for gender and therefore cannot account for the existing gender differences in intention to become an entrepreneur. The final model explained 48% of the variance in the entrepreneurial self-efficacy and 42% of the variance in the entrepreneurial intention.

Discussion

Carter, Gartner, Shaver, and Gatewood (2003) found no difference between nascent entrepreneurs and nonentrepreneurs in their

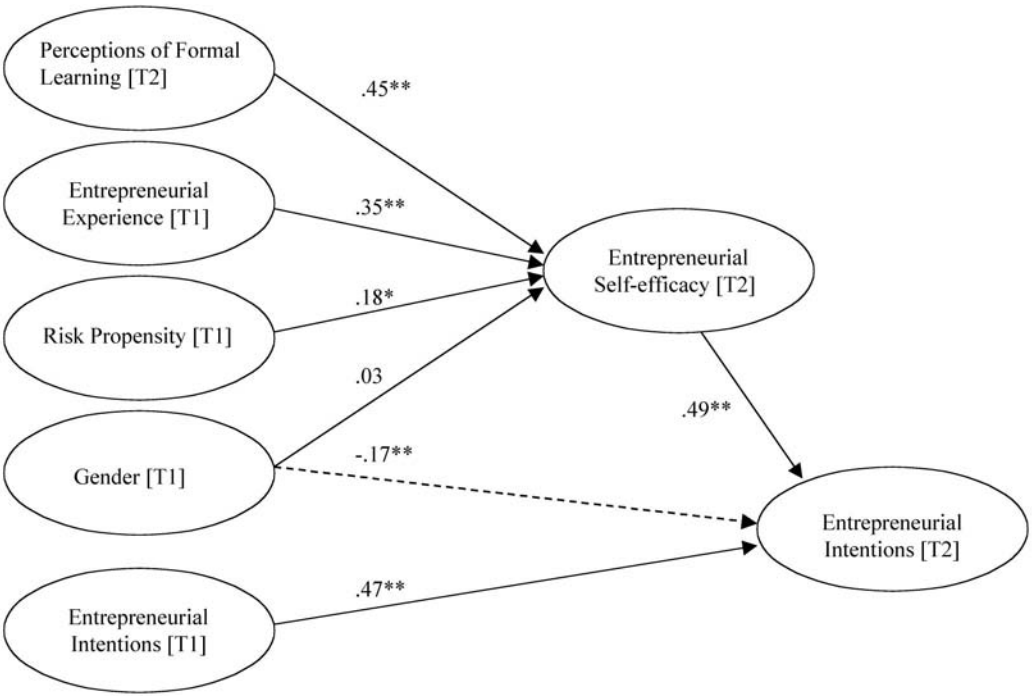

Figure 2. Final model (Alternative Model 4). Parameter estimates are from the fully standardized solution. Solid arrows represent hypothesized paths; dotted arrow represents a path that was not hypothesized. T = Time.
* $p < .05$. ** $p < .01$.

desire for financial success, self-realization, and independence, and they called for investigating other kinds of cognitive and behavioral factors that affect an individual's decision to start a business. Our study focused on one such cognitive factor: self-efficacy. Our results provided evidence that individuals choose to become entrepreneurs (or at least formulate the intentions of doing so) most directly because they are high in entrepreneurial self-efficacy—the belief that they can succeed in this role. Further, our results supported the critical mediating role of entrepreneurial self-efficacy in entrepreneurial intentions for three of the four antecedent variables. These results indicate that entrepreneurial self-efficacy provides a theoretical explanation for the relationship between three of the most frequently identified individual-level antecedents of entrepreneurship and subsequent intentions to become an entrepreneur. The factors most amenable to change—learning and experience—each had stronger influence on self-efficacy and entrepreneurial intention than did the relatively stable characteristics of risk propensity and gender. This result suggests that efforts to increase entrepreneurial activity that are focused at the individual level may indeed be worthwhile. Gender was not related to entrepreneurial self-efficacy but was directly related to entrepreneurial intentions such that women reported lower intentions to become an entrepreneur than men. Thus, our results suggest that the relationship of gender to entrepreneurial intentions is more complex than previously assumed. We discuss our study's implications for entrepreneurial research and practice below.

Theoretical and Practical Implications

Perceptions of formal learning were significantly related to entrepreneurial self-efficacy and had the largest indirect effect on entrepreneurial intentions among the independent variables in our model. This finding provides empirical support for the idea that formal academic courses can have a positive impact on students' intentions to initiate an entrepreneurial venture. Some scholars have observed that entrepreneurship education tends to focus on the technical aspects of entrepreneurship with insufficient attention paid to the cognitions of entrepreneurs, including perceptions, beliefs, and intentions (e.g., C. C. Chen et al., 1998). Our current findings support and extend this view but at the same time suggest possible boundary conditions. Strengthening students' confidence to become an entrepreneur through the mechanisms known to affect self-efficacy beliefs—mastery experiences, role modeling, social persuasion, and physiological states—appears to have an important impact at the early, prelaunch stage of an entrepreneurial venture that we focus on in this study. In our hypothesis, we discuss a number of pedagogical techniques and learning experiences related to each of the four mechanisms influencing self-efficacy. Examination of the exact features of an entrepreneurship program and their relative influence on entrepreneurial self-efficacy was beyond the scope of the current study. However, greater attention to these design features in entrepreneurial education, with particular attention to their correspondence with the mechanism identified by SCT, appears to be justified by our current findings. Our best current recommendation for entrepreneurship education is to incorporate as many diverse types of learning experiences related to the promotion of greater entrepreneurial self-efficacy as is practical.

The fact that these self-efficacy mechanisms are important does not, however, suggest that the technical knowledge and the informational content of an entrepreneurship program are unimportant. Indeed, we expect the quality and usefulness of the information conveyed in the courses to have a strong impact on students' perceptions of formal learning and thus their evaluation of their ability to take on the role of an entrepreneur. Thus, our results suggest that, in the early, prelaunch stage of an entrepreneurial venture, the informational content of the course is important primarily because it gives the nascent entrepreneur the confidence to undertake a new venture. If the decision to undertake a new venture is never made, then, obviously, the content of the course is irrelevant. The quality of information conveyed in the course may have a more direct impact on outcomes at later stages of the new venture, such as the speed of launch or employment growth. At these later stages, self-efficacy perceptions may be much less important or may be driven by actual experiences of success and failure. Future research is necessary to verify this speculation and establish the boundary conditions of our model.

Previous entrepreneurial work experience was positively related to entrepreneurial self-efficacy. We hypothesized this relationship on the basis of the processes of enactive mastery and role modeling affecting self-efficacy. Future research is needed to determine whether direct experience or vicarious experience through role modeling provides the more important contribution to this effect. Our results suggest that those interested in encouraging the emergence of more entrepreneurs should seek to provide both internship opportunities with established firms seeking to develop and market new products and more direct opportunities for students to try starting and managing their own business.

Risk propensity was positively associated with students' entrepreneurial intentions. Empirical evidence for risk propensity's impact on entrepreneurship has been inconsistent (Miner & Raju, 2004; Stewart & Roth, 2001). The lack of a clear theoretical logic has long been one of the key criticisms of trait-based approaches to entrepreneurship (Gartner, 1989a). Our findings go beyond previous work by providing a theoretical explanation for the effect of risk propensity. The findings show that risk propensity plays a role in the emergence of entrepreneurial intentions through its influence on entrepreneurial self-efficacy. We formed this hypothesis on the basis of the idea that high risk propensity individuals expect that they will be able to tolerate the stress of an uncertain situation such as an entrepreneurial start-up. One direction for future research would be to verify the central role of stress tolerance in this explanation by directly assessing this variable and its relationship to entrepreneurial self-efficacy, intentions, and behavior.

The process perspective on entrepreneurship (Baron & Shane, 2004) may also help to reconcile our results with previous inconsistent results. Our results show that risk propensity is a significant influence at the early, prelaunch stage of entrepreneurship. The risk propensity level of an entrepreneur may have no influence or even a negative influence on outcomes at other stages of an entrepreneurial venture (Baron & Markman, in press). If this is true, then studies that include firms at different venture stages may produce inconsistent results. Future research on risk propensity and entrepreneurship should therefore pay explicit attention to the stage of the venture firms in the sample.

Finally, an unexpected finding in our study showed that women did not differ from men in terms of entrepreneurial self-efficacy and yet were less likely to intend to become an entrepreneur. This finding was inconsistent with previous research (e.g., C. C. Chen et al., 1998; Scherer et al., 1990). One possible explanation for this inconsistent finding concerns the sample of our study and the role of formal learning. Our study assessed entrepreneurial self-efficacy among graduating MBA students at the end of 2 years of academic training in business. Note that the correlation in Table 1 indicates no significant differences between the levels of formal learning about entrepreneurship reported by men and women. It may be that this formal learning experience eliminates the gender differences found in previous studies based on undergraduate or nonbusiness students. Yet the significant direct relationship between gender and entrepreneurial intentions remains after controlling for all of the other variables in the model, including learning and self-efficacy. This finding suggests that there are theoretical mechanisms other than self-efficacy relating gender to entrepreneurial intentions. SCT does include other theoretical constructs such as outcome expectations and perceived social supports–barriers that represent cognitive appraisals of the task environment rather than oneself. These constructs may help to explain the gender differences found in the current study because women may feel as capable of performing entrepreneurial tasks as men (i.e., they have the same level of entrepreneurial self-efficacy) but still perceive the task environment as more difficult or less rewarding than do men. Inclusion of these cognitive appraisals of the task environment in entrepreneurship research may help to explain the gender findings we report here and is thus an important direction for future research.

Limitations and Directions for Future Research

One limitation of this study is the use of only self-report measures. Although some of the constructs are conceptualized as self-reports (e.g., self-efficacy), a second source of data would be particularly useful for other variables, such as the extent of learning from formal education. Class grades or performance on an objective test could be used in future research to gauge students' actual learning.

A second limitation is the use of a behavioral intention measure as the dependent variable. The link between behavioral intention and subsequent behavior, even for complex behaviors requiring planning and a coordinated sequence of activities, is well established in theory and supported by extensive empirical research (Ajzen, 1991). Because becoming an entrepreneur is widely viewed as an intentional behavior (Bird, 1988), it is important to understand the factors that produce this intention, regardless of the factors that may subsequently prevent the intention from becoming a reality. Nonetheless, longitudinal research that examines who actually becomes or succeeds as an entrepreneur is an important direction for future research.

Finally, detailed assessment of the content, design, and delivery of each entrepreneurial education program was beyond the scope of the current study. Some attempt to control for initial differences among the sample population was made through our use of the Time 1 intention measure, but future research using experimental or a quasi-experimental design would be necessary to fully evaluate the effectiveness of different program components. The supportive results of our study, especially with regard to perceptions of formal learning, suggest that future research on entrepreneurial education is justified because entrepreneurs can be at least encouraged if not made.

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Appendix

Validity Study

A second data set was collected to assess the convergent and discriminant validity of a number of the variables included in this study. Surveys were administered to 112 undergraduate and MBA students enrolled in introductory level management courses at a large, urban university in the midwestern United States. Missing or incomplete responses resulted in a final sample of 108 (a 96% response rate). This survey included the measures of risk propensity, entrepreneurial self-efficacy, and entrepreneurial intentions developed for the current study. It also included alternative measures of the same or related variables where established scales could be found. These included the Risk Taking scale from the Jackson Personality Inventory—Revised (Jackson, 1994) and previously published measures of entrepreneurial self-efficacy and entrepreneurial intentions (C. C. Chen et al., 1998) as well as general self-efficacy (G. Chen, Gully, & Eden, 2001). See Table A1 showing the full results from this validity study. Results are reported in the Method section where appropriate.

Table A1
Means, Standard Deviations, Correlations, and Reliabilities for Validity Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Risk propensity	3.16	0.66	(.71)						
2. JPI-R Risk Taking	10.44	4.81	.68**	(.84)					
3. Entrepreneurial self-efficacy	3.61	0.79	.41**	.39**	(.82)				
4. C. C. Chen et al.'s (1998) entrepreneurial self-efficacy	3.71	0.51	.42**	.43**	.70**	(.91)			
5. General self-efficacy	4.20	0.61	.27**	.10	.32**	.37**	(.91)		
6. Entrepreneurial intention	3.72	1.15	.32**	.40**	.42**	.43**	.00	(.92)	
7. C. C. Chen et al.'s (1998) entrepreneurial intention	3.15	1.21	.41**	.50**	.38**	.37**	.09	.79**	(.93)

Note. $N = 108$. Internal reliabilities are in parentheses. JPI-R = Jackson Personality Inventory—Revised.
** $p < .01$.

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