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Are You an Innovator or Adaptor? The Impact of Cognitive Propensity on Venture Expectations and Outcomes

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In this study we confirm the often assumed but largely untested belief that entrepreneurs think and behave differently than others. We examine a group of more than 700 nascent entrepreneurs and 400 nonentrepreneurs. We determine the entrepreneurs' cognitive style propensity for problem solving (Innovator versus Adaptor); we compare their expectations; and, we examine the outcomes (performance and start-up) of their ventures. We find that nascent entrepreneurs are more likely to be overly optimistic Innovators, most people are Adaptors, and one's cognitive style can indeed play a role in the initial development and outcome for the venture, but not always as expected.

“Most, if not all, new ventures begin as a great idea” (Mattei and Hellebusch 2006, p. 9). Indeed, a variety of reasons for start-ups have been explored ranging from basic financial pursuits to loftier desires of self-realization (Carter, Gartner, and Shaver 2004). However, irrespective of motivations, many new start-ups still fail. Indeed, “business failure is explained to a large degree by the owner-managers' inability to solve problems” (Brenner et al. 2006, p. 26).

If this problem-solving factor is true, then it is important for the nascent entrepreneur to understand their own problem solving (i.e., cognitive) ability and how it pertains to the needs of the venture. Specifically, is the nascent entrepreneur's problem-solving ability well suited to the challenges of the initial start-up? Furthermore, if one's problem-solving ability is not conducive to the venture, what options might exist for a new or even experienced entrepreneur?

At start-up, entrepreneurs are primarily concerned with developing a vision for their organizations, finding customers, obtaining financing, and recruiting employees (Alpander, Carter, and Forsgren 1990). To be successful at this stage, they must have an intense belief in their vision to convince others of its viability. They should also possess flexibility and be willing to take control of unstructured situations and act without full information as they seek to solve the problems and meet the challenges of their new venture.

The focus of this article is on the entrepreneur's cognitive style and the relationship between cognitive style and venture outcomes. We adopted this specific focus because it goes beyond personal/demographic traits. Also, we believe under-

standing the relationship between cognitive style and venture outcome represents an important contribution to entrepreneurial research, development, and understanding.

The Nascent Entrepreneur

Entrepreneurs have long been viewed as innovators and creators. Most efforts to uncover differences in personality and personal/demographic traits between entrepreneurs and others have met with disappointing results (Baron 1998; Busenitz and Barney 1997). However, this study examines the nascent entrepreneur's problem-solving ability using a cognitive style approach. By doing so, it moves closer to what entrepreneurs actually do rather than who they are.

A growing body of research suggests that entrepreneurs differ from other people with respect to cognitive processes, which can impact how and why individuals discover and exploit business opportunities (Mark, Susan, and Karl 2000). Prior work focused on cognitive biases and heuristics but there has been little systematic examination of individual cognitive style (Buttner and Gyskiewicz 1993). Thus, we begin by asking whether aspiring entrepreneurs actually differ from other people with respect to their cognitive style of problem solving.

Previous work has established that entrepreneurs are notoriously overconfident of their prospects for success, and that this bias has both positive and negative consequences (Cooper, Woo, and Dunkelberg 1988; Simon, Houghton, and Aquino 2000). However, we do not know whether specific cognitive styles are more strongly associated with this bias and how (if at all) the subsequent problem-solving ability might impact venture formation and/or survival. Therefore, using this cognitive approach we also examine the widespread (though not widely tested) assumption that entrepreneurs operate in more innovative ways than others. Additionally, we explore whether cognitive differences in problem solving among nascent entrepreneurs are linked to performance expectations and eventual actual start-up success.

Adaptation-Innovation Theory in Problem-Solving Cognitive Style

This study employs the Adaptation-Innovation theory (AI theory based on the KAI inventory, named for the originator

Michael Kirton) as a framework for examining whether nascent entrepreneurs differ from other people with respect to cognitive style. The measure has been validated in several languages and has high construct validity (i.e., the relationship between the measure and the underlying construct), content validity (i.e., the adequacy with which the measure assesses the domain of interest), and criterion validity (i.e., the relationship between the measure and another independent measure; Bobic, Davis, and Cunningham 1999). AI theory was introduced by Kirton (1976) and has spawned a large and growing body of research in fields such as creativity and problem solving (Dollinger and Danis 1998), management and entrepreneurship (Buttner and Gryskiewicz 1993), leadership (Church and Waclawski 1998), marketing and consumer behavior (Foxall and Bhate 1993a, 1993b), and organizational development (Mudd 1995). As the scope of AI theory's application has broadened, evidence of its validity has also accumulated, as has its relationship to other measures, classifications, and/or dimensions of cognitive style (Bobic, Davis, and Cunningham 1999). There are many measures and classifications of cognitive style; for example, Allinson Hayes Cognitive Style Index, Gregorc Style Delineator, Kolb's Learning Style Inventory, Christensen's Lifescrpts, Social Style Profile, and Myers-Briggs Type Indicator. The common link between these cognitive style measures is the KAI Inventory (Bokoros and Goldstein 1992). Because the KAI Inventory measures differences in cognitive style along the Innovator-Adaptor dimensions, it is well suited for entrepreneurial studies and is thus used in this study—especially given the underlying creative aspects of entrepreneurship and the uncertain and challenging nature of problem solving in new ventures.

AI theory posits that individuals are either Adaptors (summarized as those who prefer “doing things better”) or they are Innovators (summarized as those who prefer “doing things differently”). People instinctively operate in the mode (or style) that is most comfortable for them. There is an increase in stress and strain when a person behaves in a mode that is inconsistent with their style. Therefore, people will primarily rely on their most comfortable cognitive style when faced with a complex or difficult decision, problem, or situation with a risky outcome such as starting a new venture. Furthermore, evidence to date supports the assumption that a person's style is both highly stable and set at an early age (Clapp 1993; Kirton 2003).

AI theory does not suggest that either of the two styles (innovator v. adaptor) is superior. Innovators and Adaptors may have differing levels of success depending on the situation. For instance, when a novel and unique approach is required, the Innovator style may be more appropriate and effective. However, when a more proven, incremental approach is required, the Adaptor style may be more appro-

priate and effective. Let's consider the two styles of problem solving.

Adaptor Cognitive Style

Adaptors are characterized by precision, reliability, efficiency, prudence, methodical-ness, discipline, and conformity. They are concerned with resolving problems rather than finding them. Adaptors seek solutions to problems in tried and understood ways and prefer to reduce problems through improvement and greater efficiency with a maximum of continuity and stability. Adaptors are viewed as sound, conforming, safe, dependable, and liable to make goals of means. They can seem impervious to boredom since they are able to maintain high accuracy during long periods of detailed work. Adaptors rarely challenge rules, and only when assured of strong support. They tend to higher levels of self-doubt and react to criticism by closer outward conformity. They can be vulnerable to social pressure and authority, and compliant, but are essential to the ongoing functioning of organizations.

Innovator Cognitive Style

Innovators are characterized as undisciplined, thinking tangentially, and approaching tasks from unsuspected angles. They are problem and solution finders. They are likely to query a problem's concomitant assumptions and manipulate problems. Innovators are catalysts to established groups, irreverent of their consensual views, and are frequently seen as abrasive, unsound, impractical, and often shocking and creating dissonance. They are capable of detailed routine work only for short bursts and are quick to delegate routine tasks. They tend to take control of unstructured situations and often challenge rules and traditions. Innovators appear to have lower self-doubt when generating ideas, and do not need consensus to maintain certitude in the face of opposition. They can be insensitive to people, threaten group cohesion, and provide the dynamics to bring about radical change without which institutions tend to ossify (Danis and Dollinger 1998).

The Expected Relationship Between Problem Solving Styles and New Venture Outcomes

The theory and practice of entrepreneurship have long been associated with creativity and innovation. Beginning with Schumpeter (1934), the entrepreneur has been characterized as the force behind the “creative destruction” of low yielding economic assets. This image of the entrepreneur is typically that of a creative person who transforms new ideas into commercially successful applications in the form of, for example, innovative products, services, or processes. But the assumption that entrepreneurs operate cognitively in more creative ways has not been widely tested and it may be that not all entrepreneurs fit the Schumpeterian archetype.

AI theory posits that people will naturally operate in the style that is most comfortable for them. Cognitive style is an antecedent of behavior, a viewpoint supported by empirical work (Danis and Dollinger 1998; Kirton 1994). We suggest that individuals with a tendency for the Innovator cognitive style will find entrepreneurship to be an attractive activity, and will be predisposed to new venture creation because of the suitability of the task and work environment of an entrepreneur. For example, entrepreneurs must make decisions where there is limited information and a great deal of uncertainty about the market's acceptance of a new product. Whereas Adaptors are more cautious and prefer structured situations without ambivalent information, the Innovators are comfortable with the unstructured situations that typify starting a business and often thrive on them. Likewise, Innovators have lower self-doubt, and do not need consensus to maintain certitude in the face of opposition. Therefore, Innovators' confidence can help them to overcome many obstacles that often arise in starting a business, as well as to convince stakeholders (e.g., investors, employees) of their opportunities (Busenitz and Barney 1997; Cooper, Woo, and Dunkelberg 1988). Lastly, because Innovators appear to be more comfortable than Adaptors with uncertainty; and entrepreneurs must also deal with a lot of uncertainty, we believe Innovators will gravitate to the challenges of start-ups. Thus our fundamental hypothesis:

H1: There will be a greater likelihood of the Innovator cognitive style among nascent entrepreneurs than among nonentrepreneurs.

As an entrepreneur, one must engage in an ongoing process of appraising prospects for success. These assessments are important because they affect the preparations and decisions concerning whether and how to establish and manage new ventures (Cooper, Woo, and Dunkelberg 1988). Entrepreneurial cognition research has established that perceptions do play a major role in the decision to proceed with a new venture (Simon, Houghton, and Aquino 2000). For example, a number of scholars have suggested that perceptions of feasibility and desirability lead to the creation of new ventures and other entrepreneurial activities (Krueger 2000, 1993).

Research has further demonstrated that entrepreneurs are predisposed to a high degree of optimism in their assessments (Cooper, Woo, and Dunkelberg 1988; Palich and Bagby 1995). This can have both positive and negative consequences. High confidence may cause the entrepreneur to underestimate or fail to perceive risks (Baron 1998; Simon, Houghton, and Aquino 2000), to not recognize and acknowledge problems, or to fail to assimilate new information regarding the direction of the venture. On the positive side,

high confidence may encourage an entrepreneur to see opportunity where others do not, to be more proactive, to attract potential investors, or to continue to invest the personal time and energy required for start-ups (Busenitz and Barney 1997; Cooper, Woo, and Dunkelberg 1988; Palich and Bagby 1995).

While most of the research seeks to distinguish entrepreneurs from nonentrepreneurs (Lowe and Ziedonis 2006; Palich and Bagby 1995), we know from other research that entrepreneurs are also not a homogeneous group and may be as different from one another as they are from the general population (Gartner 1985; Wortman 1987). We anticipate that Innovators will have higher levels of confidence and optimism than Adaptors, which will be reflected in higher performance expectations for their ventures. This hypothesis is consistent with research showing that Innovators have lower self-doubt, are less conservative, are more self-assured, and have higher self-esteem than Adaptors (Kirton 1994, 2003). Field research in equivocal decision contexts, such as those faced by many nascent entrepreneurs, has found that managers who introduce innovative pioneering products are more apt to express extreme certainty about their prospects for success than those who pursue incremental (i.e., adaptive) product introductions (Simon and Houghton 2003). Thus we hypothesize:

H2: The cognitive style of problem solving will have a bearing on performance expectations in that the Innovator nascent entrepreneur will have higher performance expectations of their venture than the Adaptor nascent entrepreneur.

An entrepreneur's actual start-up success may also be a function of cognitive style. We see start-up success as firstly achieving and maintaining an operating status; and, secondly, as having positive operating revenues and worth. In other words, the venture has successfully moved from the idea stage to an existing new business that can create value. When style is translated into action Adaptors and Innovators will behave differently. The Adaptor's tendency is to pay close managerial-like attention to detail, make incremental adjustments, and apply traditional solutions. The Innovator's tendency is to examine the big picture, make sweeping changes, and apply nonroutine, more adventurous solutions. Given the descriptions of Innovators and Adaptors provided earlier, we argue that the problem-solving style of the Innovator is better suited to the start-up phase than that of the Adaptor. Although little work has been done in this area, Buttner and Gryskiewicz (1993) have provided some empirical evidence for this hypothesis. In their study of 300 established entrepreneurs, they found that entrepreneurs who had been in business two years or less were more innovative than those in

business more than eight years. On the basis of this work, Kirton (2003) has suggested that innovation may be a positive factor in setting up an entrepreneurial business.

H3: Among nascent entrepreneurs, the Innovator nascent entrepreneur will achieve greater start-up success than the Adaptor nascent entrepreneur.

Methods

Data Collection

The data for this study were collected by the Entrepreneurial Research Consortium (Reynolds 2000), also known as the Panel Study of Entrepreneurial Dynamics (PSED), using random telephone dialing across the United States. The PSED dataset comprises one of the most representative samples of nascent entrepreneurs currently in existence. A nascent entrepreneur was defined as an individual who was still in the most embryonic phase of a start-up. This meant the pre-business had no sales or profits.

The design of the PSED sample was based on two critical factors: (1) the definition of the population of interest and (2) the method by which elements in that population were selected (Gartner et al. 2004). If a sample is truly representative of a population, then results can be generalized to that population. In practice, however, sampling procedures, even in the absence of systematic biases, seldom yield perfect representations of true population demographics (e.g., age, gender). Certain groups may be over or underrepresented in the sample. For this reason, weight calculations were developed to correct sample distributions such that they matched information contained in the U.S. census. This procedure corrected for any coverage bias and also corrected for any systematic bias due to nonresponse, panel attrition, or other reporting errors (Gartner et al. 2004). Using these procedures, we applied weighting formulas to account for differences in sample design and nonresponse (Gartner et al. 2004, Appendix B). This yielded 1,114 valid responses (i.e., 715 nascent entrepreneurs and a comparison group of 399). The nascent entrepreneur group was comprised of 455 males and 260 females and the comparison group was comprised of 176 males and 223 females. The overrepresentation of females in the control group was also handled statistically by the application of a separate weighting variable that was provided by the creators of the PSED dataset for examining nascent entrepreneurs versus the comparison group.

The research was executed in three stages. The first stage involved a large-scale screening to create two samples of the population of U.S. adults. One sample comprised those involved in attempting to start a new business. The second sample was drawn to represent the general adult population. This was the control group. The second stage involved detailed telephone interviews followed by the completion of

self-administered questionnaires mailed to the respondents. The third stage consisted of follow-up telephone interviews and mailings to determine the outcome of their efforts. Reynolds (2000) provides a comprehensive account of the extensive three-stage data collection and screening procedures.

Sample Details

The nascent entrepreneurs represented new entrepreneurs who had committed to starting a new business but had not yet generated revenues or profits. Thus, their businesses were still in the most embryonic stage. When asked whether their venture represented an independent start-up, corporate sponsor, franchise/MLM (multilevel marketing), purchase/takeover, or other, 95 percent replied that their venture was an independent start-up, 3 percent indicated a purchase/takeover, and 2 percent noted other.

In terms of preparation and seriousness of their start-up intentions, approximately 75 percent indicated that a business plan was in process. Also, 19 percent noted that a start-up team would be organized. The nascent entrepreneurs averaged 17.5 years of paid full-time work experience with an average of 8 years in managerial or supervisory work. Level of education was assessed as follows: up to the eighth grade, some high school, high school degree, some college, community college degree, college degree, graduate training, master's degree, and doctoral degree. The most frequently reported educational level was "some college." The comparison group averaged about 16.5 years of full-time work experience with 7 years in managerial or supervisory work. Where teams were indicated, the teams had an average of 8 years of industry experience.

The resulting sample consisted of 715 nascent entrepreneurs and a comparison group of 399 nonentrepreneurs in the United States. Respondents ranged from 18 to 74 in age (18 to 93 in the comparison group) with the average age 39. In addition to containing one of the most representative samples of individuals in the most embryonic phase of a start-up currently in existence, this dataset also represents data (more than 300 variables) collected as close to the point of entrepreneurial decision as is practically possible.

Measures

Cognitive Style. Our cognitive style measure was based on the Kirton Adaption-Innovation Inventory, a 32-item self-report measure with an internal consistency and test-retest reliability of 0.82 to 0.88 (Kirton 1987). Because the PSED data collection effort screened more than 64,000 individuals on about 300 variables, proxies were commonly employed by the research consortium in an effort to reduce the time demanded of subjects and keep costs within reasonable limits. Our proxy comprised a very carefully crafted and tested

paragraph that captures the Innovator and Adaptor styles:

Some people can be characterized as being precise, reliable, efficient, and well-disciplined—the kind of person who prefers “doing things better.” Others can be described as more nonconforming, questioning, and challenging of authority. Such people, comfortable with unstructured situations, prefer “doing things differently.” If someone asked you which kind of person you are, would you say that you preferred “doing things better” or “doing things differently?”

Within this paragraph we presented the respondents with five items from the original scale that pertained to each of the cognitive styles. Unlike the Likert and Thurstone scales that are often used in survey research where respondents indicate agreement to multiple items separately, our proxy approach is analogous to a Guttman scale (Vogt 1999). Specifically, the respondent was provided a set of items but they were ordered such that consecutive agreement was established thus requiring the respondent to mark just one. A limitation of such a proxy paragraph is its inability to efficiently identify items that are not internally consistent. Fortunately, identifying such items was not an issue because our proxy utilized already established and internally consistent items that had been validated in a number of contexts.

Furthermore, we also validated our measure independently via a pilot study using business students at a large Midwestern university. Using a group of MBA students, a strong, highly significant positive correlation was found ($r = .78$, $p < .001$) between our proxy and the original 32-item scale. We repeated the test with undergraduates and obtained the same results. The results also held using the more conservative, nonparametric Spearman's rho correlation. Thus, in every test we found a significant convergence toward the original construct, suggesting that our proxy captures the essence of the Innovator/Adaptor distinction. Finally, an analysis of subject verbal response times indicated that respondents spent a reasonable amount of time thinking about and answering the question with no significant difference between nascent entrepreneurs (12.54 seconds) and the comparison group (13.62 seconds). This suggested that the proxy was also clear and easily answered by both groups.

Performance Expectations. Performance expectations for the business were measured using anticipated dollar sales in the venture's first and fifth years of operation. Respondents were also asked to estimate the likelihood that the business would be operating in five years.

Venture Outcomes. Respondents were contacted approximately 12 months after the initial interview to determine the

operating status of their venture. For businesses that were still active, respondents were asked to estimate the net worth of the venture. Reported first-year sales data were also gathered as performance measures. Following Lyles, Saxton, and Watson (2004) we classified respondents that could not be contacted as “out of business.” A comparative analysis of these individuals to those who remained in the sample revealed no systematic differences.

Venture Type. Although we explicitly considered industry, the PSED data did not allow us to accurately measure industry features such as risk, environmental dynamism, etc., except in a very crude fashion. Respondents were asked to indicate the type of venture they were pursuing. To maintain the integrity of the dataset, we retained all categories generated by the PSED provided that at least 10 respondents classified their business as that type. Only three categories (insurance, mining, and utilities) had very low frequencies and were therefore combined with the closest related category. The resulting categories were: retail; restaurant, tavern, and nightclubs; consumer services; health, education, and social services; manufacturing; construction and mining; agriculture, forestry, and fishing; wholesale distribution; transportation; utilities and communications; finance and insurance; real estate; and, business consulting.

Gender and Age. Some extant research suggests the potential for gender differences among entrepreneurs (Anna et al. 2000; Fischer, Reuber, and Dykes 1993). Throughout our research we examined and appropriately controlled for age and gender.

Analysis and Results

We constructed our analysis using multiple analytical techniques to test our hypothesized relationships. This gave us the ability to corroborate the findings and the potential to gain additional insights via multiple analytical techniques.

Cognitive Predominance

Binary logistic regression was used to test our fundamental hypothesis that the Innovator cognitive style would be more likely among the nascent entrepreneurs than comparison group of nonentrepreneurs. Binary logistic regression is appropriate when the dependent variable is dichotomous and is applicable to a broader range of situations than basic discriminant analysis. Controlling for both gender and age, the results (Table 1) show that the odds of a nascent entrepreneur having an Innovator cognitive style are nearly twice as high as for the nonentrepreneur group ($\text{Exp}(B) = 1.93$, $p < .001$). Thus, results show strong support for our first hypothesis regarding the prevalence of Innovators among nascent entrepreneurs. This also answers our fundamental question

**Table 1. Cognitive Predominance
Likelihood of Innovator Cognitive Style Among Nascent Entrepreneur Group v. Nonentrepreneur
Comparison Group (N=1051)**

<i>Binary Logistic Regression</i>						
	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
Gender	-.324	.130	6.191	1	.013	.723
Age	-.004	.005	.549	1	.459	.996
Cognitive style	.658	.152	18.814	1	.000	1.931***
Constant	.694	.235	8.742	1	.003	2.001

Cognitive style, Adaptor=0, Innovator=1; Gender, Male=0, Female=1

- ^t p < .10
- * p < .05
- ** p < .01
- *** p < .001

of whether aspiring entrepreneurs tend to differ from other people with respect to cognitive style. They do.

Within the comparison group, nearly 80 percent were Adaptors. This suggests that within the general population most people are Adaptors; that is, some of us “will do things differently” but most of us prefer to “do things better.” Of the identified Innovators, 74 percent were nascent entrepreneurs, again providing support for our first hypothesis and overall research question.

Cross-tabulations were conducted to further analyze the greater than expected occurrence of Innovators and gain additional insight (Table 2). Also, to control for gender and age and still have meaningful and manageable cross-tabulations, five age groups were used for the age variable (18-24,

25-34, 35-44, 45-54, and over). Using Cramer’s V to measure the strength of association between cognitive style and propensity for entrepreneurship, we found a significant association (Pearson’s Chi-Square = 20.92, Cramer’s V = .14, p < .001; for males, Cramer’s V = .15; for females, Cramer’s V = .13). As shown in Table 3, age was a significant factor for female nascent entrepreneurs between 35 and 44 and over 54 (p < .05). The younger 25-to-34 age group as well as the over 54 group approached significance for the male nascent entrepreneurs (p < .10) indicating some gender and age effects.

Having established substantive differences between entrepreneurs and nonentrepreneurs based on cognitive style, our next hypotheses examined whether the difference in cogni-

**Table 2. Cognitive Predominance
Expected v. Actual Counts of Innovators and Adaptors
Among Nascent Entrepreneurs and Nonentrepreneurs**

<i>Cross-tabulation</i>				
		<i>Comparison Group</i>	<i>Nascent Entrepreneur</i>	<i>Total</i>
Innovators	Count	79	226	305
	Expected Count	111.5	193.5	305
Adaptors	Count	308	446	754
	Expected Count	275.5	478.5	754
Total	Count	387	672	1059

Cramer’s V = .14

Chi-Square Tests

	<i>Value</i>	<i>df</i>	<i>Exact Sig. (1-sided)</i>
Pearson Chi-square	20.922	1	.000
Continuity correction	20.282	1	
Likelihood ratio	21.631	1	
Fisher’s exact test			
Linear-by-linear association	20.902	1	
N of valid cases	1059		

**Table 3. Cognitive Predominance
Innovators and Adaptors Among Nascent Entrepreneurs and Nonentrepreneurs
Given Gender and Age Group**

<i>Chi-Square Test Results</i>								
<i>Age</i>	<i>Gender</i>		<i>Value</i>	<i>df</i>	<i>Exact Sig. (2-sided)</i>			
18–24 yrs	Males	Pearson chi-square	.037	1	1.000			
		Likelihood ratio	.037	1				
		Fisher's exact test						
		Linear-by-linear association	.037	1				
		N of valid cases	62					
	Females	Pearson chi-square	.604	1				
		Continuity correction	.209	1				
		Likelihood ratio	.597	1				
		Fisher's exact test						
		Linear-by-linear association	.591	1				
		N of valid cases	47					
		25–34 yrs	Males	Pearson chi-square		3.528	1	.066 ^t
				Likelihood ratio		3.758	1	
				Fisher's exact test				
Linear-by-linear association	3.503			1				
N of valid cases	141							
Females	Pearson chi-square		.141	1				
	Likelihood ratio		.142	1				
	Fisher's exact test							
35–44 yrs	Males	Pearson chi-square	3.131	1	.837			
		Likelihood ratio	3.263	1				
		Fisher's exact test						
		Linear-by-linear association	3.109	1				
		N of valid cases	142					
	Females	Pearson chi-square	5.380	1				
		Likelihood ratio	5.695	1				
		Fisher's exact test						
		Linear-by-linear association	5.349	1				
		N of valid cases	173					
		45–54 yrs	Males	Pearson chi-square		2.453	1	.021*
Likelihood ratio	2.571			1				
Fisher's exact test								
Linear-by-linear association	2.432			1				
N of valid cases	113							
Females	Pearson chi-square		.928	1				
	Likelihood ratio		.949	1				
	Fisher's exact test							
	Linear-by-linear association		.921	1				
	N of valid cases		129					

(continued)

(Table 3 continued)

55+ yrs	Males	Pearson chi-square	3.011(a)	1	.102 ^t	
		Likelihood ratio	3.277	1		
		Fisher's exact test				
		Linear-by-linear association	2.959	1		
		N of valid cases	58			
	Females	Pearson chi-square	5.988(b)	1		.019*
		Likelihood ratio	6.202	1		
		Fisher's exact test				
		Linear-by-linear association	5.896	1		
		N of valid cases	65			

a . 1 cell (25.0%) has expected count less than 5. The minimum expected count is 4.55.

b . 1 cell (25.0%) has expected count less than 5. The minimum expected count is 4.46.

^t p < .10

* p < .05

** p < .01

*** p < .001

tive style among entrepreneurs played a significant role in their venture expectations and their venture outcomes.

Venture Expectations

Support was also found for our second major hypothesis, which predicted that Innovator nascent entrepreneurs would have higher venture performance expectations than the Adaptor nascent entrepreneurs. We used a general linear model (GLM), multivariate analysis on sales expectation for year one, sales expectation for year five, and the belief that the venture would be operating in five years (Table 4). The GLM Multivariate procedure provides regression analysis and analysis of variance for multiple dependent variables such as multiple performance measures by one or more factor variables (i.e., age, gender, and business sector) or covariates (i.e., cognitive style). We entered controls for age, gender, and dummy variables for the business sectors. The emphasis was particularly on sales expectations for years one and five since those are clear performance metrics.

Both first-year and fifth-year sales expectations were significant with Innovators displaying consistently higher performance expectations than Adaptors for both time periods. As shown in Table 4, for year one, Innovators' dollar sales expectations significantly exceeded those of Adaptors by more than \$100,000 (F-Statistic = 4.61, p < .001) and, in year five, the difference had ballooned to nearly \$2 million (F-Statistic = 2.74, p < .001). With regard to the estimated odds that the venture would still be operating in five years there were no significant differences between Innovators and Adaptors. So although both Innovators and Adaptors expect to achieve start-up, Innovators clearly expect to make more money.

Curious as to the level of conviction entrepreneurs had about these performance expectations, we looked at

whether these optimistic Innovators had, as the saying goes, "put their money where their mouth was." We found that, among male nascent entrepreneurs, the Innovator actually had significantly less equity and debt invested (p < .05) despite higher expectations for the venture than the Adaptor. Whereas, among the female nascent entrepreneurs, the Innovator had significantly more debt (equity was not significant) invested (p < .05). Thus, even risk levels differed.

Individual regression models were also run for expected first-year sales and fifth-year sales (Table 5, Models 1 and 2), as well as for the estimated odds of the venture operating in five years (Table 6, Model 3) to examine possible industry effects. Controls for venture type were first entered followed by the cognitive style. Models 1 through 3 allowed us to identify business sectors that might significantly contribute to performance expectation differences. The retail sector served as the reference category. Model 1 demonstrated that first-year expectations were significantly influenced by the manufacturing sector (p < .001) and the wholesale distribution sector (p < .05). Fifth-year expectations were only influenced by the wholesale distribution (p < .01) sector (Model 2). The odds of operating in five years were influenced by consumer services (p < .05) sector (Model 3). Given the lack of multivariate significance, the support for Model 3 should be viewed cautiously. Although the other models showed support, overall cognitive style was most significant for fifth-year sales expectations (Model 2, p < .01).

Venture Outcome

Our final hypothesis predicted that Innovators would have greater initial start-up success with their ventures. Although the opposite could also be argued, we believed that among other attributes, the enthusiasm (and perhaps charisma) of

Table 4. Performance Expectations Controlling for Gender, Age, and Sector Mean Expected Sales at Years One and Five and 5-Year Operating Odds (N=508)				
<i>GLM Multivariate Analysis</i>				
		<i>Expected Sales 1st Year</i>	<i>Expected Sales 5th Year</i>	<i>Est. Odds Will Be Operating in 5 Years</i>
Innovators	Mean	359,552	2,968,826	79
	Std. Deviation	1714458	11076607	27
Adaptors	Mean	192,204	983,109	83
	Std. Deviation	848275	5058128	23
<i>p</i> -value		.000	.001	.212
<i>R</i> -Square		.12	.07	.04
<i>F</i> statistic		4.61***	2.74***	1.29

^t p < .10
 * p < .05
 ** p < .01
 *** p < .001

Table 5. Performance Expectations EXPECTED First and Fifth-Year Sales						
<i>Regression Models</i>						
<i>Variable</i>	<i>Model 1</i>			<i>Model 2</i>		
	<i>First-Year Sales Expectations</i>			<i>Fifth-Year Sales Expectations</i>		
	<i>Beta</i>	<i>t</i>	<i>Sig.</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)		.289	.773		1.461	.145
Restaurant/tavern/nightclub	-.009	-.202	.840	-.042	-.932	.352
Consumer services	.063	1.276	.202	.015	.292	.770
Health/education/social services	-.013	-.288	.774	-.059	-1.268	.205
Manufacturing	.155	3.560***	.000	.011	.238	.812
Construction/mining	.034	.763	.446	.012	.275	.784
Agriculture/forestry/fishing	-.004	-.097	.923	-.028	-.643	.521
Wholesale distribution	.100	2.292*	.022	.122	2.771**	.006
Transportation	.004	.092	.927	.025	.576	.565
Utilities/communications	-.007	-.154	.878	-.021	-.477	.634
Finance/insurance	-.007	-.154	.878	-.009	-.217	.828
Real estate	.001	.018	.986	-.022	-.509	.611
Business consulting	.029	.636	.525	.037	.818	.414
COGNITIVE STYLE	.070	1.648 ^t	.100	.136	3.168**	.002

Cognitive style, Adaptor=0, Innovator=1; Gender, Male=0, Female=1; Reference sector = retail

^t p < .10
 * p < .05
 ** p < .01
 *** p < .001

Table 6. Performance Expectations (Odds Expectations)

<i>Regression Model</i>			
<i>Variable</i>	<i>Model 3</i>		
	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)		45.728	.000
Restaurant/tavern/nightclub	.007	.163	.871
Consumer services	.096	2.113*	.035
Health/education/social services	.059	1.388	.166
Manufacturing	-.011	-.287	.774
Construction/mining	.002	.046	.964
Agriculture/forestry/fishing	.019	.469	.639
Wholesale distribution	-.074	-1.858 ^t	.064
Transportation	.019	.484	.629
Utilities/communications	-.001	-.033	.973
Finance/insurance	-.040	-1.010	.313
Real estate	.005	.116	.908
Business consulting	.033	.797	.426
COGNITIVE STYLE	-.110	-2.813**	.005

Cognitive style, Adaptor=0, Innovator=1; Gender, Male=0, Female=1;
 Reference sector = retail
^t p < .10
 * p < .05
 ** p < .01
 *** p < .001

the Innovator might make the difference in venture outcomes. However, cognitive style was not a significant factor in performance outcomes. Start-up performance was evaluated on the basis of actual reported sales after one year and a current estimate of net worth (Table 7). Significant effects were only found in business consulting for “first-year sales” and “net worth.” Also, the manufacturing sector was only significant in the estimated net worth (Table 8, Models 4 and 5). Overall, sector/industry continued to be an insignificant factor.

Although no differences were found in terms of actual sales or net worth, our final assessment of venture outcomes also examined venture status after 12 months (i.e., operating, still in an active start-up, an inactive start-up, no longer being worked on, or something else). Consequently, Multinomial

Logistic Regression was used since it is not restricted to two categories. This allowed us to determine any significant impact from age, gender, and cognitive style on the status of the venture after the first 12 months.

As shown in Table 9, cognitive style is a significant predictor of venture status for male nascent entrepreneurs (p < .001) but not for females. Using a conservative approach, we then assessed whether the venture was either an operating business after 12 months or not (Table 10). Among Adaptor males, more achieved start-up than expected and fewer than expected Innovators achieved start-up (p < .10). In contrast, there was no association between start-up success and cognitive style among females. In sum, there was mixed support for our final hypothesis.

Discussion

Our findings are largely consistent with the few studies that have explored the link between AI theory and entrepreneurship. For instance, Tandon (1987) found that only half his sample of entrepreneurs were comprised of what he called high innovators, with the remainder consisting of mild innovators and adaptors. And while we found no studies that compared entrepreneurs to general population samples, some researchers have found significant differences between entrepreneurs and general managers with entrepreneurs expressing a higher preference for the Innovator style. But the magnitudes of such differences and reports of correlations between problem solving style and occupational status tend to be rather low (Buttner and Gryskiewicz 1993).

Innovators in general have greater growth expectations for their firms. However, we found that male entrepreneurs had invested less of their own funds into the start-up than the females. Nevertheless, all entrepreneurs appear confident about their chances for survival in five years. This supports common notions about the highly optimistic nature of entrepreneurs, especially given that greater than half of new ventures actually fail within five years (Cooper, Woo, and Dunkelberg 1988). One possible conclusion is that, while Innovators do have a higher propensity to become entrepreneurs than Adaptors, the nascent entrepreneur population in

Table 7. Venture Outcome Performance Results: ACTUAL Reported First-Year Sales and Estimated Net Worth at Year One

<i>ANOVA</i>						
		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Reported 1 st year sales	Between groups	2E+010	1	2.058E+010	.013	.909
	Within groups	1E+014	92	1.581E+012		
	Total	1E+014	93			
Estimated net worth at year one	Between groups	2E+009	1	2105564230	.039	.844
	Within groups	5E+012	101	5.435E+010		
	Total	5E+012	102			

Table 8. Venture Outcome Performance Results: ACTUAL Reported First-Year Sales and Estimated Net Worth at Year One						
<i>Regression Models</i>						
<i>Variable</i>	<i>Model 4</i>			<i>Model 5</i>		
	<i>Reported First-Year Sales</i>			<i>Estimated Net Worth at Year One</i>		
	<i>Beta</i>	<i>t</i>	<i>Sig.</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)		1.046	.299	.658		.512
Restaurant/tavern/nightclub	-.016	-.149	.882	.064	.617	.539
Consumer services	.009	.073	.942	.137	1.179	.242
Health/education/social services	-.043	-.364	.717	.027	.238	.813
Manufacturing	.037	.332	.741	.225	2.125*	.036
Construction/mining	-.034	-.300	.765	-.008	-.081	.936
Agriculture/forestry/fishing	-.021	-.193	.847	.006	.059	.953
Wholesale distribution	.005	.043	.966	.042	.412	.681
Transportation	-.002	-.014	.989	-.013	-.126	.900
Utilities/communications	-.013	-.116	.908	.000	.005	.996
Finance/insurance	-.010	-.093	.926	a	a	a
Real estate	-.011	-.097	.923	.092	.865	.390
Business consulting	.366	3.217**	.002	.286	2.716**	.008
COGNITIVE STYLE	-.048	-.397	.692	-.061	-.536	.593
Model Statistics	R-square	F-Stat	Sig.	R-square	F-Stat	Sig.
Venture type	.142	1.06	.405	.121	1.09	.380
Venture type and cognitive style	.144	.98	.478	.124	1.01	.444

a. Deleted from Model 5 analysis due to missing information

Cognitive style, Adaptor=0, Innovator=1; Gender, Male=0, Female=1; Reference sector = retail

^t p < .10

* p < .05

** p < .01

*** p < .001

the United States is comprised of a large number of Adaptors or perhaps mild Innovators. We suspect that this may also help to explain the poor start-up success of many ventures, particularly when the style best suited for start-up success and survival is not the predominant style of the entrepreneur. In fact, this may be most pronounced among male entrepreneurs given that we found greater start-up success among males who were Adaptors.

Our results may be partly explained by the tendency of individuals to bolster the attractiveness of an opportunity (Cooper, Woo, and Dunkelberg 1988), and the tendency of entrepreneurs to believe they can control their own destinies (Brockhaus 1982). Yet as noted by Busenitz and Barney (1997) entrepreneurs must typically convince numerous stakeholders of the credibility of their ventures, and without generous levels of enthusiasm, many ventures might never even be started. So while entrepreneurs may be overly optimistic about their prospects, particularly if they are innova-

tors, this bias may have some utility for them. On the other hand, overconfidence may encourage action before it makes sense, or hinder the incorporation of new information.

It is possible that the lack of general differences in actual start-up success is due to the fact that we examined nascent entrepreneurs in the very early stages of setting up their businesses, perhaps before differences had a chance to emerge. However, an intriguing discovery is that among males, the Adaptor appears more successful in actual start-up. In retrospect, one might attribute the Adaptor's success to factors such as an orientation to detail and the utilization of proven methods for solving problems. Also, given our finding that entrepreneurs are indeed more likely to be Innovators (or mild Innovators), we may have discovered an explanation for the high failure rate of new ventures—at least among men. That is, for men, cognitive style is associated with venture start-up success. Additionally, as a venture develops a new style of problem solving may be required, which the entre-

**Table 9. Venture Outcome
Reported Operating Status at Year One**

<i>Multinomial Logistic Regression</i>										
<i>Start-up Status^a</i>	<i>Variable</i>	<i>B</i>	<i>Std. Error</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>	<i>95% Confidence Interval for Exp(B)</i>		
								<i>Lower Bound</i>	<i>Upper Bound</i>	
Male	Operating business	Intercept	1.95	.965	4.09	1	.043			
		Cognitive Style	16.80	.396	1799.62	1	.000	19797607	9109559	43025712
		18-24 year old	17.06	.974	306.63	1	.000	25669313	3802687	173275787
		25-34 year old	.221	1.293	.029	1	.864	1.248	.099	15.736
		35-44 year old	.585	1.281	.208	1	.648	1.794	.146	22.097
		45-54 year old	17.61	.648	737.85	1	.000	44614244	12517851	159007385
	Active start-up	55 and older	0(b)	.	.	0	.	.	.	.
		Intercept	1.31	1.005	1.70	1	.192			
		Cognitive Style	17.33	.387	2002.15	1	.000	33457288	15663873	71463178
		18-24 year old	18.40	.905	413.11	1	.000	97970605	16615644	577662810
		25-34 year old	.797	1.322	.363	1	.547	2.218	.166	29.580
		35-44 year old	.975	1.313	.551	1	.458	2.651	.202	34.782
	Inactive start-up	45-54 year old	17.73	.711	621.01	1	.000	49905060	12379080	201187392
		55 and older	0(b)	.	.	0	.	.	.	.
		Intercept	1.11	1.025	1.18	1	.277			
		Cognitive Style	17.22	.448	1479.57	1	.000	30043801	12494886	72239948
		18-24 year old	17.79	1.027	300.42	1	.000	53515464	7154073	400318100
		25-34 year old	.917	1.338	.469	1	.493	2.501	.181	34.464
	No longer worked on	35-44 year old	-.028	1.367	.000	1	.983	.972	.067	14.158
		45-54 year old	17.35	.779	496.28	1	.000	34347514	7462554	158089542
		55 and older	0(b)	.	.	0	.	.	.	.
Intercept		1.31	1.005	1.69	1	.193				
Cognitive Style		17.34	.000	.	1	.	33821244	33821244	33821244	
18-24 year old		17.57	.000	.	1	.	42545387	42545387	42545387	
25-34 year old	.409	1.331	.094	1	.759	1.505	.111	20.437		
35-44 year old	.506	1.323	.146	1	.702	1.659	.124	22.204		
45-54 year old	17.32	.000	.	1	.	33235969	33235969	33235969		

(continued)

preneur may not possess. This supports work that indicates that the skills and styles appropriate at the start of the venture are different from those needed later (Boeker and Karichalil 2002).

Practical Implications/Conclusions

Entrepreneurs have long been viewed as Innovators. However, contrary to what we might have first thought or been led to believe, these creative Innovators do not typically have the patience and meticulous attention to detail needed for a successful start-up. Likewise, Adaptors do not have the level of excitement and determination that can most inspire initial investors and customers. Thus, the implications are obvious for the entrepreneur: To increase one's prospects for success, one solution might be to partner with (or hire) someone with a complementary and supportive cognitive style. When collaborating with Innovators, the Adaptor supplies stability, order, and continuity; maintains group cohesion and cooperation; and provides a safe base for the

Innovator's operations. Similarly, when collaborating with others, Innovators supply the task orientations and frequently break with the past and accepted theory. The Innovator's inattention to detail is perhaps more pronounced among men (who are routinely assumed to be less detail oriented than women), resulting in the additional difference discovered among Adaptors.

Educators, advisors, consultants, and business associates who work with new businesses will benefit from this information. Just as teachers need to be aware of different learning styles among their students, business consultants are advised to ascertain the cognitive styles of their client entrepreneurs and take these into consideration as they develop more customized programs to help the entrepreneur solve problems, develop their businesses, and improve their prospects for success. Likewise, entrepreneurs themselves need to be aware of their own strengths and weaknesses as they pertain to their problem-solving style and the needs of their venture.

(Table 9 continued)

		55 and older	0(b)	.	.	0	.	.	.	.
Female	Operating business	Intercept	19.58	1.244	247.87	1	.000	.	.	.	
		Cognitive Style	.142	1.068	.018	1	.894	1.152	.142	9.343	
		18-24 year old	-.08	11124	.000	1	1.000	.919	.000	.	
		25-34 year old	-17.97	1.353	176.40	1	.000	2E-008	1E-009	2E-007	
		35-44 year old	-16.52	1.711	93.21	1	.000	7E-008	2E-009	2E-006	
		45-54 year old	-17.51	.902	377.14	1	.000	2E-008	4E-009	2E-007	
		Active start-up	55 and older	0(b)	.	.	0	.	.	.	
	Intercept		19.23	1.267	230.21	1	.000	.	.	.	
	Cognitive Style		.41	1.065	.149	1	.699	1.508	.187	12.153	
	18-24 year old		.18	11124	.000	1	1.000	1.196	.000	.	
	25-34 year old		-17.89	1.379	168.42	1	.000	2E-008	1E-009	3E-007	
	35-44 year old		-15.97	1.722	85.96	1	.000	1E-007	4E-009	3E-006	
		Inactive start-up	45-54 year old	-17.18	.930	341.00	1	.000	3E-008	6E-009	2E-007
	55 and older		0(b)	.	.	.	0	.	.	.	
Intercept	18.14		1.449	156.74	1	.000	.	.	.		
Cognitive Style	.069		1.101	.004	1	.950	1.071	.124	9.277		
18-24 year old	1.39		11124	.000	1	1.000	3.998	.000	.		
25-34 year old	-17.36		1.568	122.65	1	.000	3E-008	1E-009	6E-007		
	No longer worked on	35-44 year old	-15.43	1.870	68.07	1	.000	2E-007	5E-009	7E-006	
45-54 year old		-16.32	1.176	192.80	1	.000	8E-008	8E-009	8E-007		
55 and older		0(b)	.	.	.	0	.	.	.		
Intercept		19.02	1.014	351.67	1	.000	.	.	.		
Cognitive Style		-.764	1.175	.422	1	.516	.466	.047	4.663		
18-24 year old		-17.29	12227	.000	1	.999	3E-008	.000	.		
	No longer worked on	25-34 year old	-17.81	1.165	233.76	1	.000	1E-008	1E-009	1E-007	
35-44 year old		-16.59	1.578	110.44	1	.000	6E-008	2.84E-009	1E-006		
45-54 year old		-17.58	.000	.	1	.	2E-008	2E-008	2E-008		
55 and older		0(b)	.	.	.	0	.	.	.		

a. The reference category is: Something Else

b. This parameter is set to zero because it is redundant

Cognitive style, Adaptor=0, Innovator=1; Gender, Male=0, Female=1

For those who work with entrepreneurs, they should expect extreme optimism; and while they should be aware of the benefits of such optimism (e.g., convincing stakeholders of the venture's viability), it may be helpful to provide entrepreneurs with objective assessments of success and help them identify and diagnose potential problems, which the entrepreneurs may have difficulty seeing (Cooper, Woo, and Dunkelberg 1988).

Not knowing whether cognitive style would indeed play a significant role in venture outcomes, we examined a group of nascent entrepreneurs during the start-up process. Given the findings of this study, we encourage others to perhaps take on the challenge of a longer study to examine more closely the start-up success of female and male entrepreneurs based on cognitive style.

A Final Word Regarding Your Great Idea

We think a more in-depth analysis would reveal that not all Innovators (nor Adaptors) are alike. Many may be mild inno-

vators. This distinction probably can be made with those nascent entrepreneurs who scored in the middle of the scale (i.e., the "hybrids"). Additionally, the match between style and industry is intriguing. While the industry categorizations in the PSED dataset are too broad to permit detailed analysis, our study does provide tentative evidence regarding the type of business pursued. Furthermore, the combination of Innovator and Adaptor entrepreneurial teams seems a viable next step in the research.

Regardless of the type of business pursued, it is not easy to get a business idea going. Simon and colleagues (2000) have suggested that biases such as overconfidence, illusions of control, and a belief in small numbers impact one's perception of risk and hence the decision to start a new venture. Overall, the results of this study are consistent with prior research that has shown entrepreneurs to be overconfident about their prospects for success and that Innovators are more optimistic than Adaptors (Busenitz and Barney 1997; Cooper, Woo, and Dunkelberg 1988).

Table 10. Operating v. Not Operating at Year One					
Cross-tabulation					
			Not Operating	Operating	Total
Male	Adaptors	Count	100	57	157
		Expected count	105.1	51.9	157.0
	Innovators	Count	60	22	82
		Expected count	54.9	27.1	82.0
	Total count			160	79	239
Female	Adaptors	Count	75	37	112
		Expected count	75.4	36.6	112.0
	Innovators	Count	34	16	50
		Expected count	33.6	16.4	50.0
	Total count			109	53	162

Chi-Square Tests					
		Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (1-sided)
Male	Pearson chi-square	2.186(b)	1	.139	
	Continuity correction ^a	1.779	1	.182	
	Likelihood ratio	2.227	1	.136	
	Fisher's exact test				.090 ^t
	Linear-by-linear association	2.177	1	.140	
	N of valid cases	239			
Female	Pearson chi-square	.017(c)	1	.897	
	Continuity correction ^a	.000	1	1.000	
	Likelihood ratio	.017	1	.897	
	Fisher's exact test				.524
	Linear-by-linear association	.017	1	.897	
	N of valid cases	162			

a. Computed only for a 2X2 table

- ^t p < .10
- * p < .05
- ** p < .01
- *** p < .001

Successful investors say that they ultimately invest in the people over the idea. Of course, both are important. In this study we have shown that a person's cognitive style has a clear association with the decision to become an entrepreneur, has a strong influence on their expectations, and may even play a role in the outcome of the venture—particularly if the person is a male nascent entrepreneur with an exciting new “great idea.”

In our introduction we questioned whether a person's cognitive style might be conducive to their venture efforts. We believe we can now advance tentative answers to that question. Cognitive style is not inconsequential. Our data show that the Adaptor is more prevalent among the general

population. In general, nascent entrepreneurs are ordinary people, but the Innovator style of problem solving is twice as likely to be represented in a group of nascent entrepreneurs versus nonentrepreneurs. Thus, Innovators do have a higher propensity to pursue start-ups. Also, the Innovator and Adaptor bring different abilities to the challenges of a start-up. Both Innovators and Adaptors display high expectations for their ventures—particularly Innovators—whose enthusiasm may help them to build initial interest in their venture. But when it comes to achieving operating status, the male Adaptors' attention to detail has the advantage.

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