

## **So You Thought the Intentions Model Was Simple?**

### **Cognitive Style and the Specification of Entrepreneurial Intentions Models**

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### **ABSTRACT (204)**

Intentions are central to entrepreneurial thinking and thus entrepreneurial action. We understand the critical antecedents of intentions, yet we have not yet explored the pathways by which entrepreneurs arrive at this intent. Entrepreneurial cognition research has only begun to explore the role of cognitive style which would seem capable of playing a major role in entrepreneurial thinking. In specific, how does a relatively stable measure cognitive style influence nascent entrepreneurs' development of their perceptions of intentionality? This is not just differences in intentions but differences in the model itself. Here we examine the complex interaction of cognitive style with entrepreneurial intentions, controlling for social norms, location and gender, finding evidence that there are indeed multiple pathways to an entrepreneurial intent. In particular, we found that cognitive style has a dramatic effect on the specification of the formal intentions model, the first evidence that the formal intentions model need not be universal. That is, we can argue vigorously that entrepreneurs' intentions can evolve along different pathways: Two entrepreneurs might arrive at the same intention but through very different processes, possibly only because they differ on cognitive style. Given these findings, we discuss practical implications for entrepreneurship pedagogy and training and explore directions for future research.

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## **So You Thought the Intentions Model Was Simple?: Cognitive Style and the Specification of Entrepreneurial Intentions Models**

Research into entrepreneurial cognition offers a way to bring the entrepreneur back into entrepreneurship. While there remains little substance to the notion of a so-called “entrepreneurial personality” it always seemed counterintuitive to ignore all individual differences, especially psychological differences. Entrepreneurs need not differ in risk taking propensity, but (almost by definition) they see more opportunities. Cognition research offers us multiple mechanisms, both theory-driven and empirically-robust, to build a deeper, richer understanding of how individuals learn to see opportunities and further assess their environment along the path to potential venture creation. As defined by Mitchell, et al. (2002), “entrepreneurial cognitions are the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth” (pg. 97). Researchers have postulated that cognition has the potential to make a significant contribution to the study of entrepreneurship but it will require thinking critically about theory and methods (e.g., Mitchell et al., 2002, Baron, 1998; Baron 2006; Baron & Ensley i.p., Busenitz & Barney, 1997, Allinson et al, 2000; Allinson & Hayes, 1996).

A prominent contribution of entrepreneurial cognition research has been the widespread adoption of formal models of intentions to entrepreneurial decision making. With the fast-growing interest in potential entrepreneurs and the nascency period prior to launching a venture (e.g., the GEM studies; Delmar 2000), it has been invaluable to have a robust theory-driven model of intent that is seemingly universal in terms of the critical antecedents and linkages (e.g., Krueger 2000; Krueger, Reilly & Carsrud 2000). However, given the wide differences among entrepreneurs (e.g., necessity versus opportunity-driven), we would expect some significant difference in how intentions evolve and coalesce in entrepreneurs' thinking.

Cognition research has indicated that intentions appear to develop through both rational analytic processes and through holistic, intuitive contextual thinking (Cox, Mueller & Moss, 2002), our study deepens this investigation by analyzing how cognitive style influences intentionality, in specific, how entrepreneurial intentions (and critical antecedents) evolve. That is, how does cognitive style influence the specification of the intentions models that we test. Formal models of intent have proved to be powerful tools for understanding the evolution of entrepreneurial action. However, too few have studied the limits to applying these robust models (Krueger 2000, 2003; Krueger, et al. 2000). As shown in Figure 1, we propose and test a series of models that analyze how cognitive style, culture, social norms,

entrepreneurial intensity and gender interact to influence the process by which entrepreneurial intentions evolve. However, in this particular study we focus on the impact, if any, of cognitive style on the intentions process. Past researchers have used cognitive style fruitfully to address important contingencies in entrepreneurial activity (Brigham 2001; Brigham, deCastro & Shepherd 2006; Sadler-Smith 2004). Cognitive style is considered to reflect deep beliefs and tends to be stable over one's lifetime (Allinson & Hayes 1996) and thus should influence intentions only through mediating constructs. That is, such deeply held beliefs might not affect what we intend, but might well affect how we arrive at that intention. Let us next explore existing research and theory as it applies to our fundamental research question.

### **Formal Models of Intent: Entrepreneurial Intentions**

Interest in intentions toward some target behavior has long been a subject of study in many domains from philosophy to marketing to rural sociology to political science to careers (e.g., Kim & Hunter 1993). Intentionality is important as intentions, by definition, are the proximal cognitive state that is temporally and causally prior to the intended behavior. That is, there may well be moderating influences that intervene between intent and behavior, but no variable mediates that linkage. Moreover, any planned behavior (versus stimulus-response) is inherently intentional.

What has been striking is that as different fields conceptualized and tested formal models of intentions, the models demonstrated a remarkable convergence. The single most dominant model of intentions is Ajzen's Theory of Planned Behavior (1991) which grew out of Fishbein and Ajzen's Theory of Reasoned Behavior (e.g., 1975). The Theory of Reasoned Action (TRA) posits that intentions are driven by one's attitude toward the action (how desirable it is to the decision maker) and subjective norms (how supportive are the significant others in your life). TRA also posits the antecedents of the two predictors. The Theory of Planned Behavior added a third predictor, perceived behavioral control (PBC), as not all intentional behaviors are strictly within our personal control. More recently, Ajzen has argued that self-efficacy is a key antecedent of PBC. Virtually all other relevant variables influence intentions only by first influencing one of these critical antecedents (Krueger 1993).

Interestingly, again it is striking to see that when other domains developed formal models of intent, the same variables tend to surface. As such, it would not be oversimplifying to argue that Ajzen's TPB dominates and any other variables are only "bells and whistles" such as Bagozzi has found (e.g., Bagozzi, Baumgartner, & Yi, 1992). Nor would it be much of an overstatement that TPB has not seen a serious challenge.

In entrepreneurship, there had been much discussion of “budding” entrepreneurs without much theoretical or empirical analysis of the construct, though Shapero (1975, 1982) made a powerful case to look at the social and cognitive psychological drivers of entrepreneurial action, Shapero argued that the “entrepreneurial event” was driven by the decision maker perceiving a credible opportunity, having some sort of propensity to act on credible opportunities and some sort of precipitating event that moderates the linkage between an actionable opportunity. For Shapero, a credible opportunity is a course of action that the decision maker perceives as both desirable and feasible, with desirability reflecting both personal desirability and the social support identified by Fishbein and Ajzen. That is, Shapero's model maps closely onto TPB. The key differences are separate consideration of social norms in TPB and that Shapero adds propensity to act. A competing models test of Shapero and TPB found both models held strongly, but that the optimal *post hoc* model would include desirability, feasibility, propensity to act and social norms (Krueger, Reilly & Carsrud 2000).

However, while the robustness of the formal intentions model has made it highly useful (regardless of which incarnation) for researchers, that very robustness has made the model border on being sacrosanct. Disconfirming evidence is easily explained away; the Krueger et al. (2000) study found little impact from social norms but easily rationalized the finding. Attempts to limit and delimit the applicability of the model have been rare.

While the model is driven by sound theory, is empirically robust even to misspecification, and has shown practical utility (e.g., as a diagnostic), there is absolutely nothing in either philosophy or psychology that would suggest that the process by which we formulate intentions would necessarily be uniform. That is, even if two people arrive at exactly the same intentions, they might reach those identical intentions through completely different pathways. As noted at the outset, this research seeks to push the limits of the model. The authors stumbled across one cognitive variable that could lead decision makers down different pathways.

### **Cognitive Style and Entrepreneurial Intentions**

Sarasvathy (2001) posits that constructs such as entrepreneurial intention represent the ‘surface’ layer of cognition, the “semantic.” Underneath is the more abstract representation that reflects how we structure our knowledge, the “symbolic” layer. Intent and its antecedents are dependent on deeper knowledge structures. The symbolic layer handles how we filter and organize the signals (what we may notice) in terms of deep beliefs and cognitive structures such as maps and scripts, which in turn get translated into attitudes at the semantic level (such as intentions). We have learned that the symbolic layer

(e.g., maps and scripts) adds immensely to our understanding of constructs such as self-efficacy and entrepreneurial intent.

For example, one can think of entrepreneurial identification of opportunities as a sophisticated exercise in pattern recognition, embedded in both internal beliefs (such as prototypes) and external cues (Baron 2006; Baron & Ensley in press). As such, it is important to study entrepreneurial intent where we can assess both internal and external factors.

In order to better comprehend this underlying symbolic layer, researchers have developed a cognitive style model with multiple dimensions (e.g., Allinson & Hayes, 1996, Leonard, Scholl, & Kowalski, 1999). Early on, Ornstein (1977) referred to two modes of awareness that reflect the rational and intuitive sides of an individual. This super-ordinate dimension of cognitive style is identified as intuition-analysis (Allison et al, 2000). Drawing upon the work of a number of theorists and empirical researchers who have argued that the dimensions of cognitive style can be ordered within a unitary framework, Allinson & Hayes (1996) reported the development and validation of a new instrument, the Cognitive Style Index (CSI). Based on research with the CSI, Allinson, Chell, and Hayes (2000) found that people showing entrepreneurial behavior tend to score high on the intuition pole of the intuition-analysis dimension. Thus, an individual's cognitive style may influence their preference for different types of learning, knowledge gathering, information processing, and decision making, many of the critical intentions and actions an entrepreneur is confronted with on a daily basis.

Saravathy's work (2001) described above has one particularly critical – and useful – implication for this analysis. Our mental models of the entrepreneurial process, especially how it is manifested in planning, tend to suppose a relatively linear, rational process. It would surprise few practicing entrepreneurs (or even nascent) that the process is in actuality highly complex, nonlinear, noisy, fuzzy and iterative. However, much of our pedagogy is structured as if we have a 'cook book' model of how to plan and implement a new venture. This does appeal to those with a more analytic cognitive style but that might deter them from understanding the need to effectuate (e.g., Meyer 2005). All this suggests that we would be well served to assess the impact of cognitive style on measures such as entrepreneurial intent, both directly and indirectly in conjunction with other critical variables.

### **An Additional Layer of Complexity: Gender, Entrepreneurial Intensity and Self-Efficacy**

If perceptions that the venture is feasible are a predictor of intentions to launch, then it is critical to examine the key component of perceived feasibility: Entrepreneurial self-efficacy. Self-efficacy, the academic term for the belief that one can execute a target behavior, is firmly based in a person's self-perceptions of their skills and abilities. The concept reflects an individual's innermost thoughts on

whether they have what is needed to successfully perform a certain task. Actual abilities only matter if a person has self-confidence in those abilities, and also the self-confidence that they will be able to effectively convert those skills into a chosen outcome (Bandura, 1989, 1997). Evidence suggests that general self-efficacy is central to most human functioning and is based more on what people believe than on what is objectively true (Markham et al, 2002). Research in this area has consistently emphasized the importance of self-efficacy as a key factor in determining human agency (Bandura, 1989), and has shown that those with high self-efficacy for a certain task are more likely to pursue and persist in that task (Bandura, 1997).

In this context, self-efficacy has proved to be a remarkable predictor of opportunity perception (Krueger & Dickson 1993) and entrepreneurial intent (Krueger, et al. 2000; Cox, et al. 2002; Zhao, et al. 2005). As such, high levels of self-efficacy serve as a potent motivational lever for entrepreneurial action. However, low levels often explain why a population subgroup differs greatly from another on career interest and intent. *Inter alia*, Betz and Hackett (1983) report that gender differences in math self-efficacy more than explains the gender difference in career interest in science and engineering. Overall, the empirical evidence suggests that women are likely to have lower expectations for success in a wide range of occupations (Eccles, 1994). Using a younger sample, studies with U.S. teens have shown that, while females and males have comparable levels of self-confidence in aggregate, there are important gender differences in key areas. Specifically, girls have lower confidence levels than boys in areas related to math, finance, decision making and problem-solving (Marlino & Wilson, 2003). It is interesting to note that these gender differences are seen in areas that are stereotypically associated with “male” skills and also with business/entrepreneurial careers. Previous research suggests that adult women are more likely than are men to limit their ultimate career choices because of their lack of confidence in relevant skills (Bandura, 1992), and that women in particular shun entrepreneurial endeavors because they *think* they lack the required skills (Wilson, Marlino, & Kickul, 2004; Chen et al., 1998).

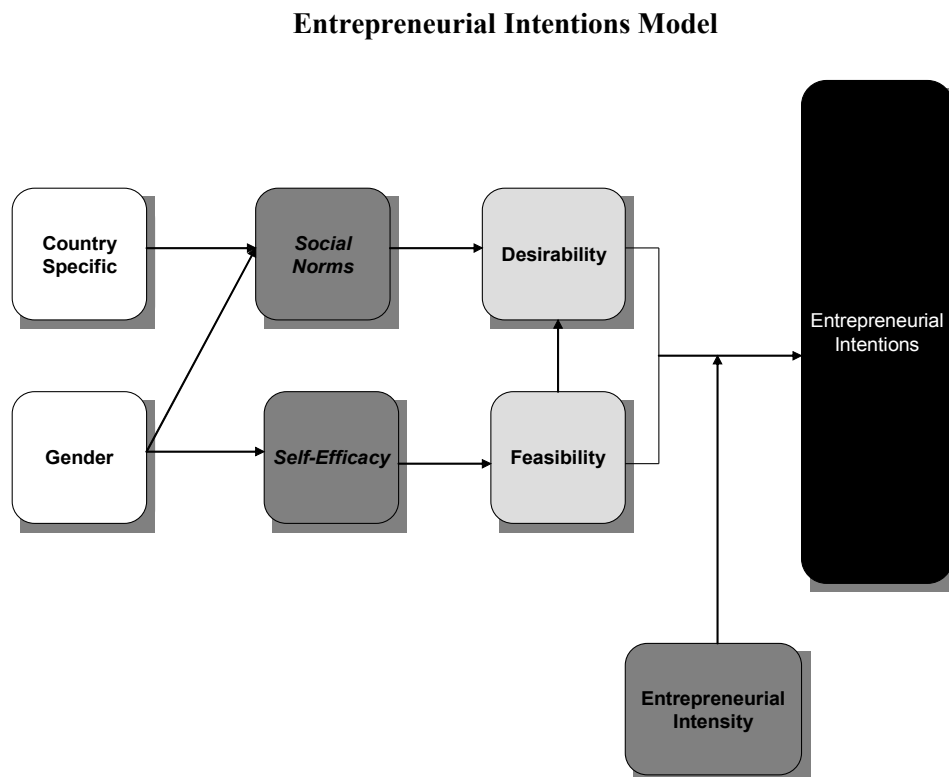
We also will control here for entrepreneurial intensity, using Pistrui's measure of commitment to being an entrepreneur (Pistrui, Liao, and Welsch, 1998). As such, faced with a personally-significant opportunity, those with high intensity will strongly prefer to pursue that opportunity via entrepreneurial activity. In Shapero's original model, he proposed that entrepreneurial intent required not only perceived a personally-viable opportunity but also a significant personal propensity to take action.

### **Combining Previous Research with New Perspectives: Testing Our Proposed Model**

As mentioned earlier, the purpose of our paper is to propose and test a series of models that analyze how cognitive style, culture, gender, social norms, and entrepreneurial intensity interact to

influence the entrepreneurial intentions process, but that our key focus here is the impact of cognitive style. Given the tantalizing hints from prior research (Krueger & Kickul, 2005) we focus directly here on the role of cognitive style, if any, on entrepreneurial intentions. As you will see, we add two specific exogenous variables of interest, nationality (presumably influencing social norms) and gender (presumably influencing self-efficacy, as suggested by research).

**Figure 1**



*\*Adapted from Shapero, 1982; Krueger & Brazeal, 1994; Krueger, 2000*

This research presents the first attempt to test models that examine the interrelationships between cognitive style and intent that incorporate how other factors, including gender, social norms, and intensity within the framework of the new venture creation process. First, Baum (1995) showed how important it is to research both internal and external influences of entrepreneurial decision making because pathways do tend to be complex. Similarly, Davidsson and Wiklund (2001) argue specifically that it is absolutely critical in researching the entrepreneur at the individual level of analysis, “it is the study of what actions

‘nascent entrepreneurs’ take, and in what sequence, in order to get their business up and running...is perhaps the most promising development to be expected.” Second, the design of a new firm evolves over time (e.g., Sarasvathy 2001), so any insight we can reap as to the key dynamics of how intentions evolve would be invaluable. The approach deployed here is cross-sectional but the modification indices should at least give us a sense of how intentions change for nascent entrepreneurs. Moreover, subjects will be available for longitudinal follow up.

Incorporating cognitive approaches along with personal, social, and motivational perspectives into international entrepreneurship research enables educators to foster the development of curricula and practices to assist entrepreneurs, and to provide the field with new conceptual tools and techniques across and within our cultural and international borders. Moreover, the results here should offer insights to the broader literature on intentions, especially for more distal behaviors such as career choice..

## METHODOLOGY

Sampling Frame: Five-hundred twenty-eight (528) university students who were all facing career decisions and who all were enrolled in entrepreneurship programs in three countries (Finland, Norway, and Russia) were sampled. Not only were these subjects facing imminent career decisions, they were expected to be available for follow up analysis. Also, they should reflect the likely subtle differences in perceptions of social norms with respect to entrepreneurship, thereby increasing the potential cognitive diversity of subjects as well as differences in local setting (which affords the opportunity for future analysis to explore cross-national differences). In order to evaluate how different cultural values have an impact on entrepreneurial cognition (self-efficacy, intensity, and entrepreneurial intention) it is useful to sample entrepreneurship students from settings that have significant differences and significant similarities in terms of the diversity of their mental models (e.g., mental prototypes) of entrepreneurial activity. Finland and Norway are developed economies, albeit with different economic drivers (to oversimplify, natural resources versus high tech) versus Russia as a developing economy. Despite their relative proximity, cultural values in these three countries often differ. Participants completed measures of cognitive style, self-efficacy, entrepreneurial intentionality, and entrepreneurial intensity.

## MEASURES

**Cognitive Style:** Participants completed the Cognitive Style Index (CSI; Allinson and Hayes, 1996) that assesses respondents on a continuum from highly analytic and rational to highly intuitive in one's

decision making. The CSI is a 38-item measure that was scored here in a true-false response mode (true coded as '1' and false coded as '0')<sup>1</sup>. The nearer the total score is to 0, the more intuitive the respondent, and the nearer to the theoretical maximum of 38, the more analytic the respondent<sup>2</sup>. The internal consistency (reliability) of the CSI is good (range from .86 to .92 (Allinson and Hayes, 1996) on various student and professional groups).

**Entrepreneurial Intensity:** Entrepreneurial intensity is the degree to which entrepreneurs are willing to exert maximum motivation and effort towards the success of their venture. The EI scale has been implemented in a variety of research studies in the United States, Central America, and Eastern Europe (Pistrui, Liao, and Welsch, 1998; Gundry and Welsch, in press) and consists of four items (e.g. "my business is the most important activity in my life") measured using a five-point Likert-type scale.

**Entrepreneurial Self-Efficacy:** A total of 18 items were included in the original entrepreneurial self-efficacy scales: (1) coping with unexpected challenges (DeNoble et al, 1999), risk-taking (Chen et al., 1998), developing new product and market opportunities (DeNoble et al., 1994), economic management (Anna et al., 2000), and (5) initiating investor relationships (DeNoble et al, 1999). One self-constructed item was added to the DeNoble et al. (1999) investor relationship scale. Following the recommendations made by Betz & Hackett (1998) and Bandura (2001) concerning the measurement of self-efficacy, respondents were asked to indicate their degree of confidence in performing the various tasks successfully along a 11-point scale from 0="no confidence at all", through 5="some confidence", to 10="complete confidence."

**Perceived Desirability and Feasibility:** We measured perceived desirability to start a business by asking, "How attractive is starting your own business?" on a 7-point Likert scale. We also measured their perceived feasibility by asking, "How feasible would it be for you to start your own business?" For this question, participants assigned a rating on a 7-point Likert scale.

**Entrepreneurial Intentions:** Entrepreneurial intentions to become self-employed were measured by a single 7-point Likert scale: "How likely are you to be working full-time for the new business in one year

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<sup>1</sup> More typically, this is scored trichotomously, with an intermediate/neutral response, hence the actual maximum score would normally be 78. Here we collapsed the scoring into the force-choice format to more clearly delineate the Intuitives and Analytics.

<sup>2</sup> While Allinson & Hayes (and others) consider the CSI to be unidimensional, a strong case can be made for Intuitive and Analytic to be separate, if highly correlated dimensions (Hodgkinson & Sadler-Smith 2003).

from now?” This a self-predictive measure of intentions, somewhat different from measures of behavioural desires (for example, “I would prefer a career as self-employed to a career as employed in an organization”) and behavioural intentions (for example, “I intend to become self-employed within a year”).

## **DATA ANALYSIS**

### **Preliminary Analyses**

Before we tested our proposed model, we first conducted a number of preliminary tests to better understand how cognitive style varied between our three countries and how gender and social norms influenced entrepreneurial intentions. A series of analysis of variance (ANOVAs) and profile plots were used to examine variations and differences based on these factors.

### **Structural Equation Modeling**

The next step in our analyses was to submit our proposed model into structural equation modeling. This provides a more rigorous test of the proposed relationships and allows for better comparisons of differences between types of cognitive style. A covariance matrix was used as input for estimation of the structural models. As with the model analyses on intentions, LISREL VIII was utilized to analyze the structural models of the intuitive and analytical groups. Aggregation was conducted for each common construct in order to have unidimensional composite scales for the structural models (Anderson & Gerbing, 1988).<sup>3</sup>

### **Structural Equation Analysis**

In order to determine the structural relationships and to test our hypothesized differences between the intuitive and analytical groups, we used the approach recommended by Joreskog and Sorbom (1993) and Jaccard and Wan (1996). Specifically, we tested a sequence of "multiple group" models that examined the effects of the two groups on the relationships (paths) in our proposed model on

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<sup>3</sup> To adjust for measurement error in the scale scores, the path from the latent variable to its indicator is set equal to the product of the square root of the scale's internal reliability. The error variance is set equal to the variance of the scale score multiplied by 1 minus the reliability. This approach has been explained by Williams and Hazer (1986), Joreskog and Sorbom (1993), and has been demonstrated as a reasonable approximation in determining error variance (Netemeyer, Johnston, & Burton, 1990).

intentionality. Once an overall goodness of fit measure for both groups was assessed (i.e., the first model tested), equality constraints were then imposed on these paths to determine if such constraints would adversely affect the overall fit of the model. If the path coefficients are equal, then these constraints should not adversely influence the fit of the first model. Based on the results, additional analyses and tests were then conducted to investigate which of our proposed relationships differed by type of group. Moreover, the significance of the individual paths in the theoretical model was assessed to demonstrate which structural paths described the associations found in the model.

## RESULTS

### Structural Equation Model Results for the Intuitive and Analytical Groups

A two-step structural model comparisons analyses were conducted to test our two hypotheses and ancillary research questions. As a preliminary step, we divided the sample into two groups based on cognitive style observations on the upper and lower one-half (median split) of the sample<sup>4</sup>. In our first step, a "multiple group" solution is calculated in which LISREL derives estimates for both the intuitive and analytical groups separately. A measure of goodness of fit for these two groups together is also estimated (i.e., pooling of the fit measures from both groups).

This overall model had a chi-square of 156.23 with 34 degrees of freedom (GFI=.91; CFI=.86). In the second step, we re-estimated the model by imposing equality constraints on the solution. Specifically, we imposed constraints on the paths between all efficacy stages of the life-cycle and entrepreneurial intentions. The results of this constrained model were then compared to the unconstrained model that was conducted in step one. This model had a chi-square of 180.75 with 47 degrees of freedom (GFI=.90; CFI=.84). The chi-square difference between the structural model without equality constraints and the structural model with equality constraints was significant (chi-square= 24.52,  $df = 13$ ,  $p < .05$ ). Therefore, from these overall analyses, we conclude that one or more of the relationships investigated differ across the intuitive and analytical groups.

### Significance of Individual Paths

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<sup>4</sup> We also ran the analysis using a tertile split; the outer tertiles would be dominated by subjects with relatively extreme scores. If the CSI is indeed really two correlated subscales, these outer tertiles would be comprised of those who scored high on one scale and low on the other. Interestingly, the tertile split yielded the same results as the median split. We report the median split as an *a fortiori* result.

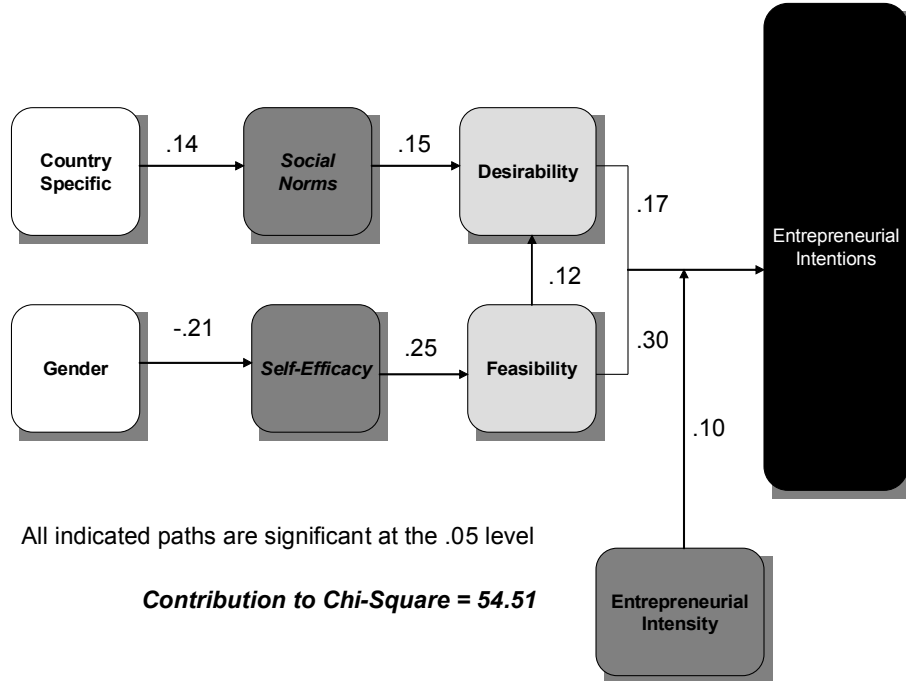
The model comparisons discussed above were conducted to test the aggregate, and not the individual relationships as proposed in our model. Figures 9 and 10 both reveal the significant relationships for each of the cognitive styles. Although there were many similar relationships found in both models, there were some striking differences between each of the styles. For intuitives, country but not gender influenced social norms and both desirability and feasibility influenced intentions (as predicted by previous research and models). Intuitives also relied on their entrepreneurial intensity and motivation in determining their own intentions. This intensity was not seen as a critical factor in the analytical group and assessment of feasibility (not desirability) played an important role in determining intentionality. Also for the analytical group, neither country nor gender influenced social norms.

Finally, because of the high contribution to chi-square for the analytical group, we looked further at the modification indices to find what key relationships were possibly misspecified and differed from the intuitive group. The modification indices revealed that analytics were more comfortable in making judgments and perceptions of the norms around them *after* assessing the overall feasibility of launching a business (a similar pattern was also revealed for desirability).

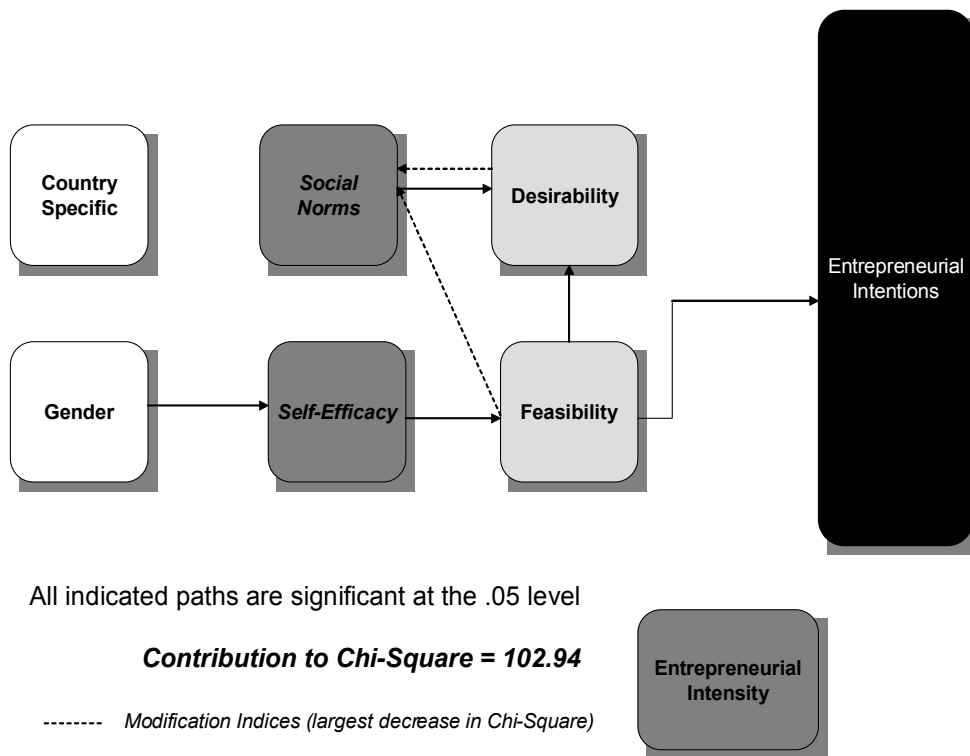
### **Key Differences**

For intuitives, the intentions model basically holds (Figure 2); for analytics, the model proved a bit more complicated. For analytics, perceived social norms toward entrepreneurial activity are less driven by country and more interrelated with perceived desirability and perceived feasibility, but entrepreneurial intensity is not significant. That is, analytics need not have a strong propensity to act on a credible opportunity; presumably, the quality of the opportunity is motive enough. In turn, intuitives appear to need passion to move from a perceived opportunity to an expressed intent. Intuitives also exhibit perceptions of social norms that vary by country.

**Figure 2: Entrepreneurial Intentions Model for Intuitive Cognitive Style**



**Figure 3: Entrepreneurial Intentions Model for Analytic Cognitive Style**



## DISCUSSION

The results suggest that, indeed, cognitive style differences can lead to different pathways toward entrepreneurial intent, especially in conjunction with key contextual factors (reflected here in gender and geography) and with perceptions of supportive social norms. From these findings we can make some tentative conclusions about how intuitives and analytics differ and how they are similar. It is increasingly evident that both researchers and educators need to understand the cognitive style of entrepreneurs and entrepreneurship students/trainees.

*Intuitives* who rely more on heuristics and simple rules appear to have their intentions be less influenced by country specific factors. In terms of social norms (key antecedent of perceived desirability) we see that country is significantly (but unsurprisingly) associated with perceived social norms, but gender does not have a significant impact on social norms. In terms of the intentions model, their intentions do depend on both perceived feasibility and perceived desirability. Finally, entrepreneurial intensity, a proxy for entrepreneurial passion, is associated with intentions for intuitives. That is, passion may drive the intentions of intuitives significantly more than for analytics.

*Analytics*, on the other hand, show a different pattern (Figure 3). As one might expect from the analytics' preference for more systematic processing, social norms are not associated with either country or gender. Social norms do follow the intentions model's prediction of influencing perceived desirability, yet desirability plays an insignificant role in intentions. That is, analytics appear to emphasize perceived feasibility over other predictors such as perceived desirability. This is not to say that perceptions of desirability are necessarily unimportant to analytics, as they may have already concluded that the particular venture is desirable and make their decisions based on feasibility.

Both groups were consistent on other dimensions. Entrepreneurial self-efficacy strongly influences perceived feasibility which, in turn, drives intent. There was also a consistent pattern that women scored lower on entrepreneurial self-efficacy, regardless of other variables in the analysis. This reinforces prior research that argues for considering self-efficacy in any entrepreneurial research setting and this reinforces the central role of self-efficacy in the nurturing of entrepreneurial thinking (e. g., Krueger 2000).

**Limitations:** Allinson and Hayes's Cognitive Style Index enjoys great popularity, but it is far from the only such instrument available to measure this general construct. Validating these results with alternate measures (e.g., from Epstein) would seem quite worthwhile. Moreover, recent evidence suggests

that CSI be calculated as two inter-correlated subscales and future analyses should take that into account more explicitly. We would also seek to broaden the range of cultural norms in future samples.

The intentions model may remain robust but if cognitive style is such a significant moderator, it behooves us to be aware of the underlying processes by which intentions evolve. It also behooves us to take advantage of these findings to further limit and delimit the model and to take cognitive style into strong consideration in teaching and training.

### **Implications and New Directions for Research**

If cognitive style evokes different pathways to entrepreneurial intent, research should begin seeking other cognitive influences that also result in differing pathways. Despite its success and popularity (or because of its popularity?), we need to further limit and delimit the intentions model. What we see in Figures 2 and 3 is not predicted by the broader intentions literature (essentially only Lent's meta-model (1994) of career choice has argued vigorously for a potentially complex pathway. However, Douglas & Shepherd (1990) demonstrate that from the perspective of expected utility, it is clear that entrepreneurs potentially derive utility from multiple sources -income, autonomy, etc.) Might intuitives and analytics derive utilities differently?

We see moderating variables that influence the importance of different predictors upon intent (Bagozzi, et al., 1992), but there is precious little research that even suggests that the model itself might require significant re-specification. Indeed, extant meta-analyses of intentions models suggests the basic model is quite robust to mis-specification (e.g., Kim & Hunter, 1993), making these finding even more striking. The formal modeling of intentions assumes that the process (being inherently person by situation variables) channels exogenous influences (especially variables that only vary across person or situation, but also environmental cues such as experience (e. g., Shapero & Sokol 1982, Krueger 1993)). Which exogenous influences play a role in formulating intentions may well be a function of cognitive style. An obvious, testable example: Do analytics prefer more 'hard' data while intuitives are open to more impressionistic inputs?

These results suggest that we should look for other variables that might have comparable impact on the intentions process. One 'usual suspect' are the cultural and social norms in which all economic activity is embedded.

### **Other Influences on the Intentions Process: Cultural and Social Norms**

Entrepreneurs across cultures share a great deal; as McGrath & MacMillan (1994) pointed out, “they are more alike than different”. However, two entrepreneurs may arrive at the same beliefs, yet do so by very different paths. Previous researchers have also shown that different cultures influence entrepreneurial cognition (Dana 1995). The pattern of country representation within an empirically developed set of entrepreneurial archetypes does indeed differ among countries. (Mitchell, Smith, Morse, Seawright, Peredo, McKenzie, 2002).

Although Mitchell, Smith, Seawright, and Morse (2000) suggests that some part of entrepreneurial thinking may indeed be “universal”, the generalized values and norms of entrepreneurship “within” countries/cultures (Busenitz, Gomez & Spencer 2000) may be dramatically influenced by pervasive local culture (Mitchell, Smith, Morse, Seawright, Peredo, McKenzie, 2002). Busenitz and Lau (1996) and Mitchell et al (2000) found cross-cultural support for a model in which the decision to create a new venture, the dependent variable, was influenced by three sets of cognitions as independent variables: arrangements cognitions, willingness cognitions, and ability cognitions. Thus, new venture subscripts, which are subsets of the major cognitive categories—arrangements, willingness, and ability cognitions—are expected to be culturally specific at the national level (Mitchell Morse, Smith, & Seawright, 1999).

In addition to cognitive style being potentially influenced by cultural settings, each culture also has unique values and norms about venture creation and the intentions process (Busenitz et al., 2000). In the history of formal intentions models, the addition of social norms in Ajzen & Fishbein’s theory of reasoned action proved a powerful addition, as it captures the reality that we rarely make even ‘purely’ economic decisions on a purely rational basis. We are influenced by our perceptions of the cultural norms in which we are embedded.

Yet, in applying such models to entrepreneurial intentions, we find mixed results. The most common finding is that social norms explain little additional variance. In some cases, social norms as perceived by subjects have little variance themselves as the subjects typically perceive that significant others in their lives are very supportive (e. g., Krueger, Reilly & Carsrud 2000). One could also certainly argue persuasively that entrepreneurs should be sufficiently focused upon the venture that they ignore social norms. One could argue that we may not be addressing the proper referents (who do entrepreneurs really listen to?) However, consider that social norms are a reflection of the unavoidable embeddedness of entrepreneurial activity (e.g., Dana 1995). If social norms are a valid construct, they should reflect or maybe proxy for cultural, political and other contexts. As an external factor, they may not be easily influenced by training (e. g., Souitaris 2005). Moreover, if social norms are indeed a proxy for important contextual forces, it behooves the cross-national researcher to identify locations that offer cultural

differences that are neither trivial nor swamp other effects. In any event, it would be invaluable to identify social or cultural variables that affect not intentions, but the intentions process.

### **Implications for Teaching and Training**

It would seem strikingly obvious that these findings have direct application to how we interact with entrepreneurs, especially how we teach and train. Sadler-Smith (2004) and others have addressed the implications of cognitive style in teaching and training; it is increasingly clear that cognitive fit with entrepreneurial role demands has important consequences (Brigham, et al. 2006). Much as we design pedagogy to serve different learning styles, how can we serve learners whichever cognitive style is dominant? However, most academic training in business is tailored almost exclusively to analytics (while Brigham suggests that entrepreneurial populations tend to tilt significantly toward scoring as Intuitives). Contrast that to the growing evidence that the essence of entrepreneurial planning is not linear and well-structured, but instead ill-structured and effectuated (Saravathy 2001) and that we serve our students very badly if we do not provide the skills needed for effectuation (Meyer 2005). Again, two well-tested approaches to convey effectuation skills are action learning and problem-based learning. However, it is vital that we provide students and trainees with pedagogy that serves their differing needs, just as we provide for differing learning styles. Simply knowing which of our students and trainees are analytics or intuitives could enhance their learning experience dramatically.

### **Other Research Directions**

Entrepreneurship scholars have found great value in having a formal model of intentions that applies broadly, but these findings suggest that we cannot ignore the cognitive processes that lay beneath the model. Demonstrating that the pathways to intent can differ opens the door to an array of fascinating research questions.

*Digging deeper into cognitive style:* While Allinson's CSI measure has been well-received by practitioners as well as scholars, the strength of its impact here suggests that the CSI could be tapping into deeper cognitive structures worth exploring such as scripts, schemas, maps and mental prototypes. Baron's model of how entrepreneurs 'connect the dots' to identify opportunities places cognitive structures such as prototypes at the very heart of intentionality (Baron 2006, Baron & Ensley, in press.). Alternately, is it possible that cognitive style as measured by Allinson's scale serves as a proxy for a preference for a dominant problem-solving style (e.g., linear versus nonlinear)?

*Effectual thinking?* In addition, these findings strongly hint that effectuation is indeed important, particularly for intuitives, for whom effectuation may well be the preferred mode of planning. Future

research needs to examine whether intuitives are more prone to effectual thinking, or prefer it or maybe simply more skilled. This argues for perhaps developing measures of effectual thinking and skills thereof. As suggested above, it would be useful to assess whether a strong preference for effectual thinking actually underlays what Allinson describes as “intuitive”? Also, we would anticipate that the subjects' intentions (and their antecedents) will change over time. Does cognitive style have any association with the nature of these changes? Do intuitives change more?

*Social cognition and entrepreneurial teams?* Far beyond the scope of this effort, it is nonetheless intriguing to consider how entrepreneurial teams (broadly defined) formulate intentions for a new venture (Shepherd & Krueger 2002). What does the path to intent look like if two co-founders differ significantly in cognitive style? (Advantages? Disadvantages?) If the founder is intuitive and their investors are analytic, how does that affect intent? Investors (and other key stakeholders) might be well served to understand their investees' cognitive style?

*Passion and propensity to act?* Finally, we use here Pistrui's short measure of entrepreneurial intensity, but other measures have served well in the past such as Seligman's learned optimism (Krueger et al., 2000) and we may wish to also explore richer measures of passion available in the literature (e. g., Vallerand's instrument that captures both positive and negative aspects of passion). Still, this study adds to the evidence that entrepreneurs are a fruitful sample for studying passion. However, the truly intriguing question is: If analytics do not need passion, might passion actually be problematic? Alternately, Pistrui's measure reflects passion toward starting a business. Do intuitives focus their passion elsewhere?

For intuitives, a propensity to act on a personally-viable opportunity appears critical, but not necessarily for analytics. Practitioners scoff at entrepreneurship scholars who ignore passion, while scholars may find 'passion' to be poorly operationalized. Having reasonably sound measures such as Pistrui's entrepreneurial intensity allows us to move forward. While it is plausible to argue that one cannot teach passion, we can find ways to nurture it. For example, we can work to remove perceived barriers. In the classroom, we can provide a safety net in case one's passion is misdirected or simply unrealized. We should be careful that we do not stir up the dark side of passion where perseverance turns into obsession. Nor should we allow this to confound analytics who may well find passion to be irrelevant, even distracting. As such, deeper research into the nature of entrepreneurial passion (and its impacts) will pay dividends in the classroom.

*Other Moderators?* A seemingly universal model such as the intentions model may appear universal on the surface, yet the processes behind it are anything but universal. We believe this is the first study to demonstrate such significant moderator effects. We also believe this argues for exploring other

moderators of the model; such efforts are likely to be rewarded by a richer understanding of how entrepreneurs come to be.... entrepreneurial.

## **Conclusion**

Results such as those in this research and in past studies (e.g., Krueger & Kickul 2005) argues that Allinson's construct of cognitive style is either playing a very important role in entrepreneurial thinking or is a potent marker for an even deeper set of beliefs. However, what really matters here is that entrepreneurial intent can arise along more than one pathway. The differences may appear subtle, yet it appears that simply understanding how two entrepreneurs can reach the same intent through starkly different processes should open our eyes to further possibilities. The mere existence of different pathways is also a powerful contribution to the broader research literature on intentions, opening the door for intentions scholars to look at entrepreneurs as exemplars of constructs such as effectuation.

Although much work remains, we hope that entrepreneurial scholars and educators will take advantage here and further enrich our understanding of entrepreneurial intentions and better appreciate the processes behind how they evolve. Finding evidence that the pathways to entrepreneurial intent can differ significantly offers us broad, rich opportunities to explore.

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