

CENTER FOR GENDER IN ORGANIZATIONS

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**TOWARD A NEW MODEL OF INTENTIONS:
THE COMPLEXITY OF GENDER, COGNITIVE STYLE,
CULTURE, SOCIAL NORMS, AND INTENSITY ON THE
PATHWAY TO ENTREPRENEURSHIP**

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While we have learned that intentions are central to entrepreneurial thinking and thus entrepreneurial action, we have not yet explored the pathways to intent. Despite previous research identifying many of the antecedents associated with entrepreneurial intentions, little systematic research examines the role of cognitive style in entrepreneurial cognition. In specific, we need a better, richer understanding of how cognitive style influences a nascent entrepreneur's development of his or her own perceptions of intentionality. In this study we examine the complex interaction of cognitive style with social norms, location, and gender, finding evidence that there are multiple pathways to an entrepreneurial intent.

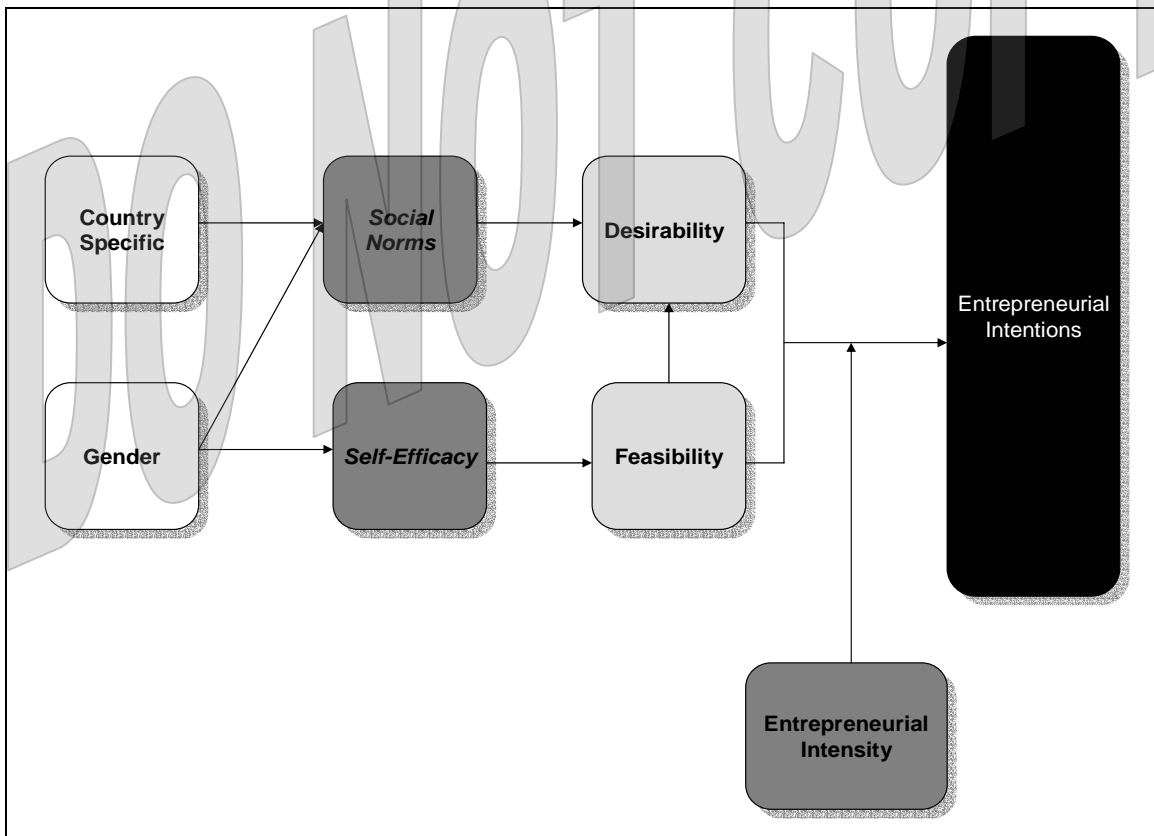
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I. INTRODUCTION

Research into entrepreneurial cognition offers a way to bring the entrepreneur back into the theories of entrepreneurship. While there is still little substance to the notion of a so-called “entrepreneurial personality,” it always seemed counterintuitive to ignore all individual differences, especially psychological differences. Entrepreneurs may not differ significantly from non-entrepreneurs in terms of propensity for risk-taking, 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. While previous research has indicated that intentions develop through *both* rational analytic processes and holistic, intuitive contextual thinking (Cox et al., 2002), our study deepens this investigation by analyzing how cognitive style influences perceptions of intentionality across the differing contexts of three national settings. As shown in Figure 1 below, 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. In the following section we discuss the roles and connections of many of the factors and new relationships within our model.

Figure 1. Entrepreneurial Intentions Model.



**Adapted from Shapero (1982); Krueger and Brazeal (1994); Krueger (2000).*

A. COGNITIVE STYLE IN THE NEW VENTURE FORMATION PROCESS

Sarasvathy (2001) posits that constructs such as entrepreneurial intention represent the “surface” layer of cognition, the “semantic”. Underneath the surface layer 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.

In order to better comprehend this underlying symbolic layer, researchers have developed a cognitive style model with multiple dimensions (e.g., Allinson and Hayes, 1996; Leonard et al., 1999). Early on, Ornstein (1977) referred to two modes of awareness that reflect the rational and intuitive sides of an individual. This superordinate 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 and Hayes (1996) reported the development and validation of a new instrument, the Cognitive Style Index (CSI). Based on research with the CSI, Allinson et al. (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 his or her 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.

B. EFFECTUATION VERSUS LINEAR PLANNING

Sarasvathy’s work (2001) described above has one particularly critical implication. 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 “cookbook” 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). Worse, it may “convert” those with a strongly intuitive cognitive style to believe in the linear approach (again, recall that more entrepreneurs tend to share the intuitive mindset). 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.

C. CULTURAL PERSPECTIVES ON ENTREPRENEURIAL COGNITION

Entrepreneurs across cultures share a great deal; as McGrath and MacMillan (1992) pointed out, “they are more alike than different.” However, two entrepreneurs may arrive at the same beliefs via very different paths. Previous researchers have shown that cultural contexts have a differential influence on entrepreneurial cognition; the representation pattern of entrepreneurs’ nationalities within an empirically developed set of entrepreneurial archetypes varies from one

country to another (Mitchell et al., 2002). Although Mitchell et al. (2000) suggest that some part of entrepreneurial thinking may indeed be “universal”, the generalized values and norms of entrepreneurship “within” countries/cultures (Busenitz et al., 2000) may be dramatically influenced by pervasive local culture (Mitchell et al., 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. Just as national cultures have unique values and norms about venture creation (Busenitz et al., 2000), 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 (Morse et al., 1999).

D. GENDER, SELF-EFFICACY, AND INTENTIONS

Self-efficacy, the academic term for self-confidence, is firmly based in a person’s perceptions of their own 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 self-efficacy is central to most human functioning and is based more on what people believe than on what is objectively true (Markman 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).

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 and 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 and entrepreneurial careers. Previous research suggests that adult women are more likely than adult 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 et al., 2004; Chen et al., 1998).

E. SOCIAL NORMS AND INTENTIONS

In the history of formal intentions models, the addition of social norms in Ajzen and Fishbein’s (1975) theory of reasoned action captured the reality that we rarely make even “purely” economic decisions on an entirely rational basis. We are influenced by our perceptions of the social norms in which we are all embedded.

In applying such models to entrepreneurial intentions, however, 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 et al., 2000). One could also certainly argue persuasively that entrepreneurs should be so sufficiently focused upon their ventures that they ignore outside influences like social norms. One could argue that we may not be addressing the proper referents (to whom do entrepreneurs really listen?). However, consider that social norms are a reflection of the unavoidable embeddedness of entrepreneurial activity. Social norms, if they are a valid construct, should reflect—maybe proxy for—cultural, political, and other contexts. As such, they may not be easily influenced by training (e.g., Souitaris, 2005). Moreover, as social norms are perceived, how they are perceived is also critical; hence, it should be quite enlightening to assess the direct and indirect impact of cognitive style.

F. ENTREPRENEURIAL MOTIVATION: THE ROLE OF ENTREPRENEURIAL INTENSITY

While commitment to the entrepreneurial endeavor can be described as the passion required for success of the enterprise, the degree of commitment exhibited by the entrepreneur is identified here as *entrepreneurial intensity*. It is characterized in this study as a single-minded focus to work toward the growth of the venture, often at the expense of other worthy goals. The difference between general personality traits and indicators of entrepreneurial intensity were highlighted by Baum (1995), whose study indicated that while measures of general traits and personality were a poor indicator of venture growth, more specific applications of these traits such as “growth specific motivation” showed far stronger relationships with growth performance. Davidsson and Wiklund (2001) specifically state that among the new directions for research of 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...[that] is perhaps the most promising development to be expected.” Entrepreneurial intensity has been measured in several cross-cultural investigations (Pistrui et al., 1998; Welsch and Pistrui, 1993), and results showed its relation to intentions. Thus, given the previous research and new directions, we wanted to examine what role entrepreneurial intensity plays in our overall model.

G. 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. Using three international perspectives, this research presents the first attempt to test models of cognitive style that incorporates how factors such as gender, social norms, and intensity impact intention to launch within the framework of the new venture creation process. 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; it also provides the field with new conceptual tools and techniques across and within our cultural and international borders.

Participants were 528 university students enrolled in entrepreneurship programs across three countries (Finland, Norway, and Russia). Participants completed measures of cognitive style, self-efficacy, entrepreneurial intentionality, and entrepreneurial intensity. The sample frame of the current research focuses on university students. In order to evaluate how different cultural values have an impact on entrepreneurial cognition, intensity, self-efficacy, and intention, Finland and Russia were chosen as the geographical boundaries for the current study, since these adjacent countries (Finland as a developed economy versus Russia as a developing economy) hold rather contrasting cultural values.

A. MEASURES

1. *Cognitive style*

Cognitive style was assessed on the basis of the analytic-intuitive dimensions. Participants completed the Cognitive Style Index (CSI; Allinson and Hayes, 1996), a 38-item measure that has a true-false response mode (true coded as “1” and false coded as “0”). 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. The internal consistency (reliability) of the CSI is good (range from .86 to .92) on various student and professional groups (*Ibid.*).

2. *Entrepreneurial intensity*

Entrepreneurial intensity (EI) is the degree to which entrepreneurs are willing to exert maximum motivation and effort toward 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 et al., 1998; Gundry and Welsch, forthcoming) 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.

3. *Entrepreneurial self-efficacy*

A total of five items were included in the original entrepreneurial self-efficacy scales: 1) coping with unexpected challenges (De Noble et al., 1999); 2) risk-taking (Chen et al., 1998); 3) developing new product and market opportunities (De Noble et al., 1999); 4) economic management (Anna et al., 1999); and 5) initiating investor relationships (De Noble et al., 1999). One self-constructed item was added to the De Noble et al. (1999) investor relationship scale. Following the recommendations made by Betz and Hackett (1983) 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 an 11-point scale, where possible responses ranged from 0 = “no confidence at all,” to 5 = “some confidence,” to 10 = “complete confidence.”

4. *Perceived desirability and feasibility*

We measured perceived desirability to start a business by asking, “How attractive is starting your own business?” Participants assigned a rating on a 7-point Likert scale, where 1 = “not at all attractive” and 7 = “very attractive.” We also measured their perceived feasibility of starting a business 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, where 1 = “not at all feasible” and 7 = “very feasible.”

5. *Entrepreneurial intention*

Entrepreneurial intention—that is, the intention to become self-employed—was measured by a single item: “How likely are you to be working full-time for the new business in one year from now?” Responses were given along a 7-point scale, which ranged from 1 = “very unlikely” to 7 = “very likely.” This is a self-predictive measure of intentions, somewhat different from measures of behavioral desires (e.g., “I would prefer a career as self-employed to a career as employed in an organization”) or behavioral intentions (e.g., “I intend to become self-employed within a year”).

B. DATA ANALYSIS I: PRELIMINARY ANALYSES

Before we tested our proposed model, we first conducted a number of preliminary tests to better understand how cognitive style varied among 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.

C. DATA ANALYSIS II: STRUCTURAL EQUATION MODELING

The next step in our analysis was to submit our proposed model to 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 and Gerbing, 1988). In order to adjust for measurement error in the scale scores, the path from the latent variable to its indicator was set equal to the product of the square root of the scale’s internal reliability. The error variance was set equal to the variance of the scale score multiplied by one minus the reliability. This approach has been explained by Williams and Hazer (1986) and Jöreskog and Sörbom (1993), and has been demonstrated as a reasonable approximation in determining error variance (Netemeyer et al., 1990).

D. 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 Jöreskog and Sörbom (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 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.

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A. PRELIMINARY ANALYSES

As indicated earlier, we first wanted to better understand how each specific cognitive style varied among our three countries of study, as well as how gender and social norms influenced entrepreneurial intentions. Using analysis of variance and profile plots, we were able to test variations and differences based on these factors. Cognitive style, country, and gender all served as the independent variables and intentions was our dependent variable. Throughout the analyses and profiles, we covaried social norms.

Results revealed a significant three-way interaction between country, cognitive style, and gender (see Table One, p. 21). The profile plots as shown in Figures 2-8 below reveal the differences across countries and gender.

Figure 2. Country by Cognitive Style on Intentions.

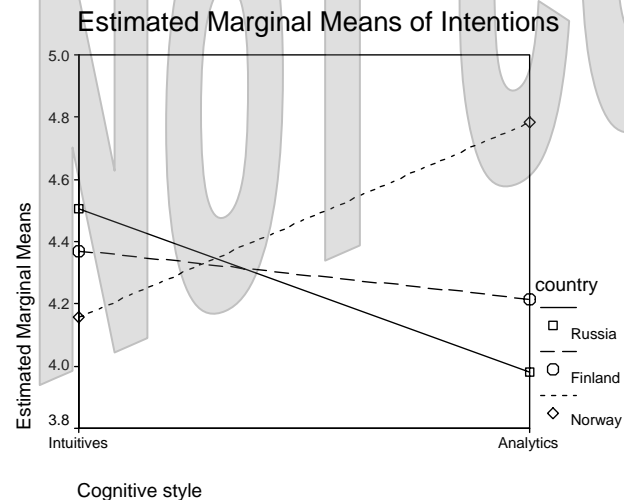


Figure 3. Country by Cognitive Style by Gender on Intentions (Male).

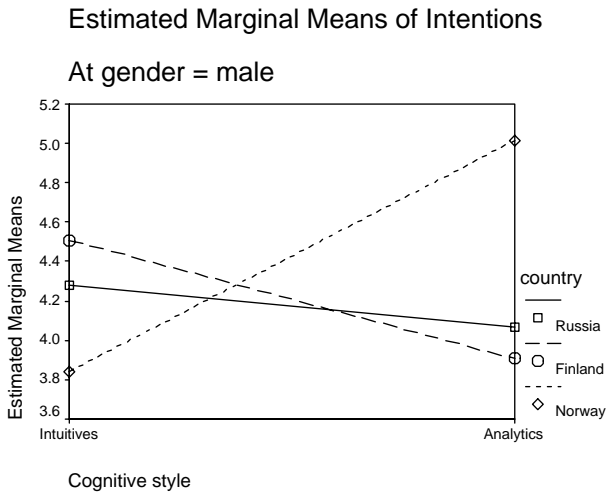


Figure 4. Country by Cognitive Style by Gender on Intentions (Female).

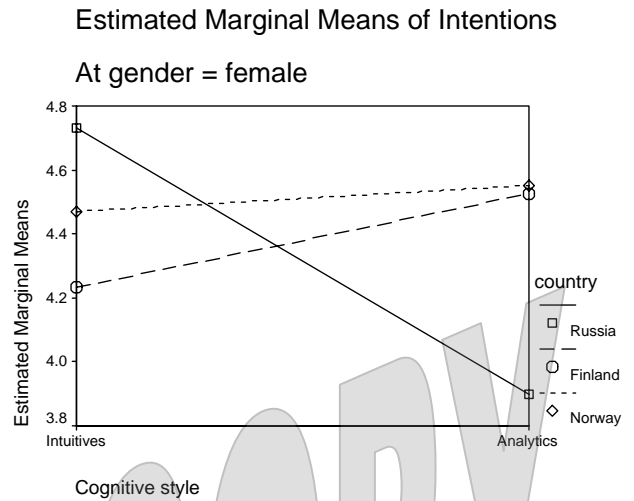


Figure 5. Cognitive Style by Gender on Intentions.

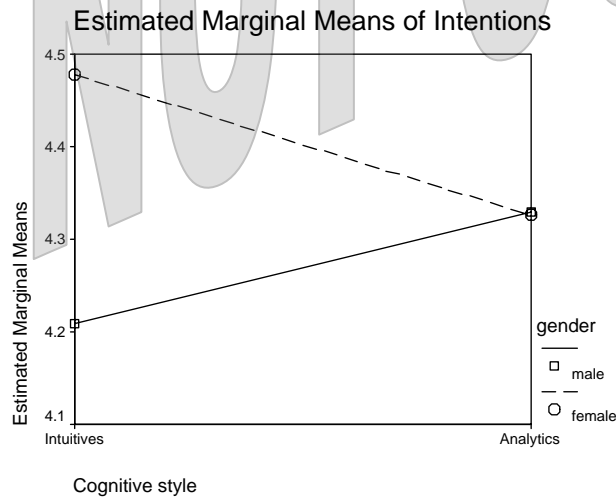


Figure 6. Cognitive Style by Gender by Country on Intentions (Russia).

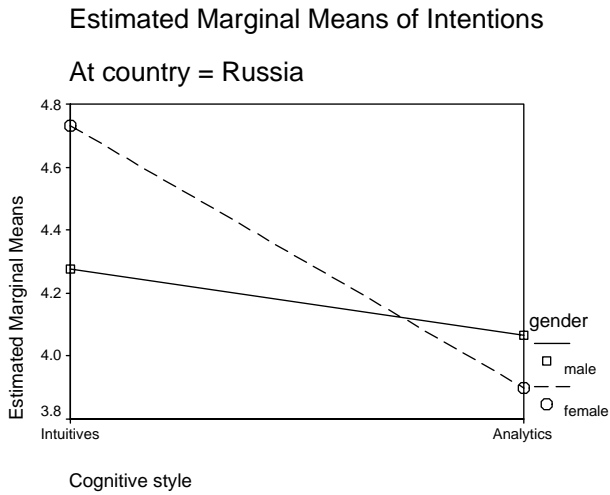


Figure 7. Cognitive Style by Gender by Country on Intentions (Finland).

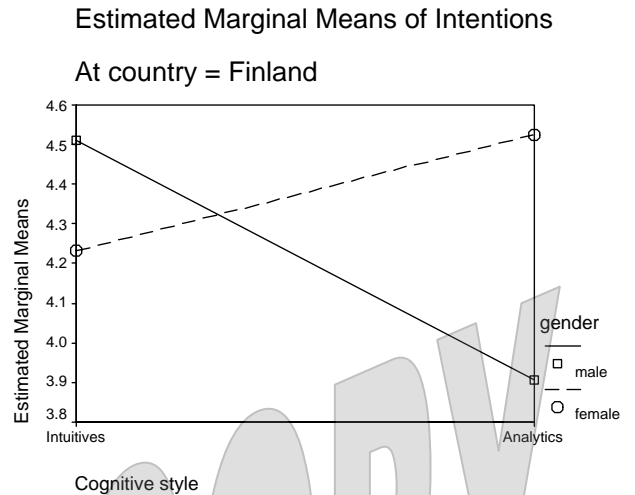
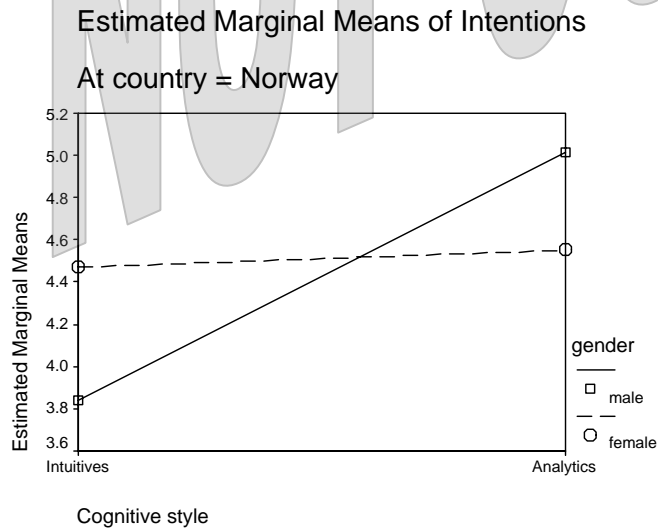


Figure 8. Cognitive Style by Gender by Country on Intentions (Norway).



B. STRUCTURAL EQUATION MODEL RESULTS FOR THE INTUITIVE AND ANALYTICAL GROUPS

A two-step structural model comparisons analysis was conducted to test each of 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 halves (median split) of the sample. In our first step, a “multiple group” solution was calculated in which LISREL derived separate estimates for the intuitive and analytical groups. A measure of goodness-of-fit for these two groups together was also estimated (i.e., pooling of the fit measures from both groups).

This overall model had a χ^2 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 χ^2 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 ($\chi^2 = 24.52$, $df = 13$, $p < .05$). Therefore, from these overall analyses, one or more of the relationships investigated differ across the intuitive and analytical groups.

C. SIGNIFICANCE OF INDIVIDUAL PATHS

The model comparisons discussed above were conducted to test the aggregate, rather than the individual relationships as proposed in our model. Figures 9 and 10 below reveal the significant relationships for each of the two cognitive styles. Although there were many similar relationships found in both models, there were some striking differences between the two styles. For intuitives, country—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 for 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 determine which 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).

Figure 9. Entrepreneurial Intentions Model for Intuitive Group.

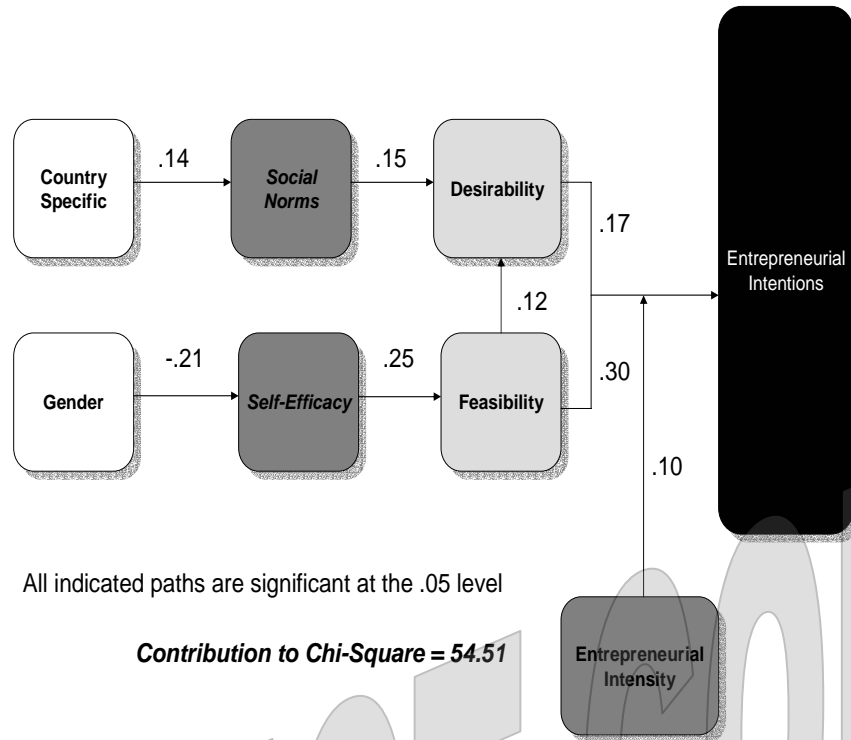
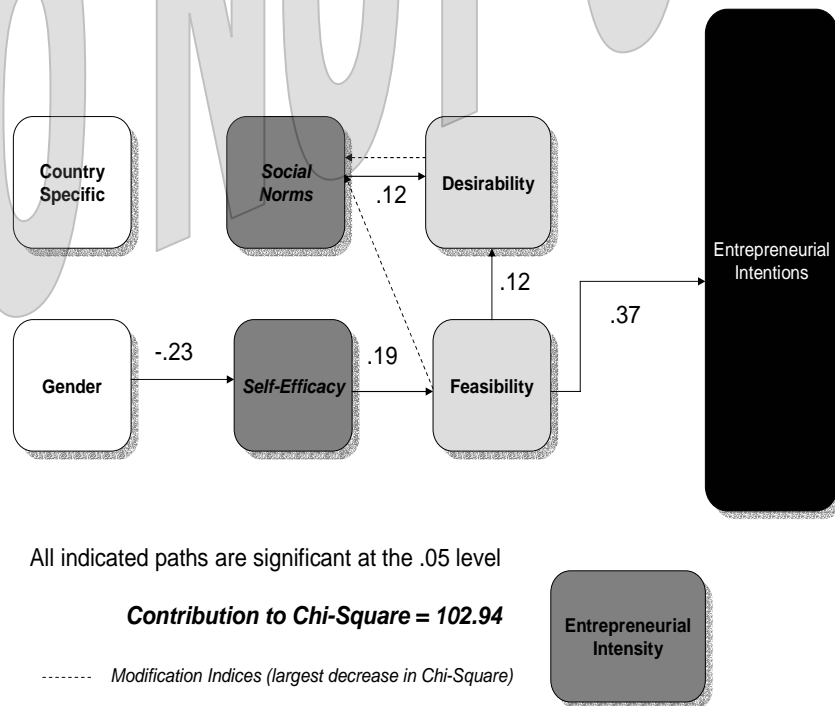


Figure 10. Entrepreneurial Intentions Model for Analytic Group.



IV. DISCUSSION

Our results suggest that, indeed, cognitive style differences can lead to alternate 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.

The intentions of *intuitives*, who rely more on heuristics and simple rules, appear to be less influenced by country-specific factors. In terms of social norms (a key antecedent of perceived desirability), we see that country is significantly (but unsurprisingly) associated with perceived social norms, but that gender does not have a significant impact on social norms. In terms of the intentions model, intuitives' intentions 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 more than it drives analytics' intentions.

Analytics, on the other hand, showed a different pattern. 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 a particular venture is desirable and then 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. We also found a consistent pattern that women scored lower on entrepreneurial self-efficacy, regardless of other variables in the analysis. This finding reinforces prior research that argues for considering self-efficacy in any entrepreneurial research setting; it also this reinforces the central role of self-efficacy in the nurturing of entrepreneurial thinking (e.g., Krueger, 2000).

Let us now turn to the differences among countries that emerged. Given the relative proximity of the subsamples, especially Norway and Finland, we had anticipated complex, relatively subtle effects, if any. What we found raises some fascinating questions that future research can explore in great depth. Let us first consider differences in mean intent for both intuitives and analytics, but broken out by country. The Finnish sample is particularly intriguing.

For Russia and Finland, intuitives had significantly higher mean intent than analytics; for Norway, analytics averaged higher reported intentions. However, Finnish women scored higher than Finnish men on intent *if they were analytics*. Controlling for perceived social norms, Finnish female analytics again scored higher on intent than all Finnish intuitives. Meanwhile,

Finnish men averaged higher intentions than all Finnish women *if they were intuitives*, the opposite pattern than emerged for Finnish women (e.g., see Figure 7, p. 10).

Another interesting finding from the Finnish sample derives from taking a median split on social norms. For less supportive social norms, intuitives scored higher on the intention measure than did analytics. For more supportive social norms, analytics scored higher. Do the analytics pay more attention to the low social norms? Given that analytics appear less influenced by social norms in general, this seems curious and worthy of further investigation. Is there something we have missed in the Finnish subsample? Or is this an artifact of the gender differences in the cognitive style-intentions relationship?

A. IMPLICATIONS AND NEW DIRECTIONS

1. Remediating self-efficacy beliefs

Self-efficacy beliefs have long been linked to career interest and choice, either directly or indirectly (e.g., Lent et al., 1994). That is, it is not enough to have the requisite skills; one must also believe in one's ability to deploy the skills effectively. For example, Hackett and Betz (1981) found that gender differences in career interest in scientific and engineering careers were more than explained by differences in math self-efficacy. Across cultures, why might women feel less efficacious in their entrepreneurial abilities? Lower levels of self-confidence of young women in quantitative areas have been well documented (e.g., Bowen and Hisrich, 1986; Catalyst Research Staff et al., 2000). Evidence suggests that this gender gap continues into later life; for example, 45% of women, versus only 19% of men, cite a "lack of confidence in math abilities" as a key reason why they may not pursue an MBA degree (*Ibid.*). What is more, Jones and Tullous (2002) found that nascent adult female entrepreneurs indicated a significantly higher need for financial and accounting help than men. Although not directly measuring self-efficacy, this further supports the finding of lower self-confidence of women for entrepreneurial endeavors, especially in the quantitative areas.

Recent research on the topic of women entrepreneurs (e.g., Wilson et al., 2004) reinforces the need to not only transfer skills and knowledge to potential women entrepreneurs, but to also take care that our students and trainees internalize that skills acquisition. It is hardly novel to suggest that we need to deliver audience-specific knowledge, but the recurring gap in entrepreneurial self-efficacy identified in potential women entrepreneurs suggests that it might be fruitful to study entrepreneurial education in gender-specific schools.

2. Pedagogy targeting self-efficacy

Most educators have become aware that students are much less likely to deploy new knowledge and especially new behaviors if they have not internalized a corresponding level of self-efficacy beliefs. In entrepreneurial terms, the stronger the entrepreneurial self-efficacy beliefs, the more likely students are to perceive self-employment as an opportunity (Krueger and Dickson, 1994). To be blunt: No self-efficacy, no new behavior.

As such, we see increasing efforts to assess self-efficacy and even stronger efforts to help students raise their self-efficacy in desired directions. Self-efficacy beliefs are increased by four

methods (Bandura, 1989), but the most potent method by far is enactive mastery. That is, students need true hands-on learning in which they not only practice the skills realistically, but also change their beliefs about their own abilities to implement new skills and knowledge. The action learning (or problem-based learning) approach is perhaps the most valuable. Still, the keys are to measure self-efficacy and address relevant gaps.

3. The role of entrepreneurial intensity

Practitioners scoff at entrepreneurship scholars who ignore passion, while scholars may find passion to be poorly operationalized. Having reasonably sound measures such as Pistrui et al.'s (2000) 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, and in the classroom we can provide a safety net in case one's passion is misdirected or simply unrealized.

4. How do we teach both intuitives and analytics?

Table Two (p. 22) shows how we can serve all learners, regardless of which cognitive style is dominant, much as we design pedagogy to serve different learning styles. However, most academic training in business is tailored almost exclusively to analytics. Contrast this reality to the growing evidence that the essence of entrepreneurial planning is not linear and well-structured, but instead ill-structured and effectuated (Sarasvathy, 2001), and we find that we serve our students very badly if we do not provide the skills needed for effectuation (Meyer, 2005). Again, one well-tested approach to convey effectuation skills is action learning.

V. CONCLUDING THOUGHTS: A NEGLECTED COROLLARY?

Finally, research on entrepreneurial cognition offers several attractive opportunities, both theory-driven and empirically robust, to develop a deeper, richer understanding of how we view our environments and our cultures and how we assess our skills and motivations along the entrepreneurial intentions process. Results such as those in this research and in past studies (e.g., Krueger and Kickul, 2005) show that Allinson et al.'s (1996) 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. By incorporating cognitive style, we are better able to examine multiple perspectives of intentionality that give us a more nuanced and complex view of how entrepreneurs' intentions can evolve along different pathways. Researchers studying entrepreneurial learning can fruitfully adapt this construct to enrich their own work. For consulting and teaching, it gives us a powerful diagnostic. We encourage entrepreneurial scholars and educators to take advantage of our findings.

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REFERENCES

- Ajzen, I. and Fishbein, M. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley Publishing.
- Allinson, C.W., Chell, E., and Hayes, J. 2000. Intuition and entrepreneurial behavior. *European Journal of Work and Organizational Psychology*, 9(1): 31-43.
- Allinson, C.W. and Hayes, J. 1996. The cognitive style index: A measure of intuition-analysis for organizational research. *Journal of Management Studies*, 33(1): 119-135.
- Anna, A.L., Chandler, G.N., Jansen, E., and Mero, N.P. 1999. Women business owners in traditional and non-traditional industries. *Journal of Business Venturing*, 15(3): 279-303.
- Anderson, J.C. and Gerbing, D.W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3): 411-423.
- Bandura, A. 1989. Human agency in social cognitive theory. *American Psychologist*, 44(9): 1175-1184.
- Bandura, A. 1992. Exercise of personal agency through the self-efficacy mechanism. In R. Schwarzer (Ed.), *Self-Efficacy: Thought Control of Action*. Washington, DC: Hemisphere Publishing.
- Bandura, A. 1997. *Self-Efficacy: The Exercise of Control*. New York, NY: W.H. Freeman.
- Bandura, A. 2001. Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1): 1-26.
- Baum, R. 1995. The relation of traits, competencies, motivation, strategy and structure to venture growth. Paper presented at the Babson College Entrepreneurship Research Conference, London, UK.
- Betz, N.E. and Hackett, G. 1983. The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior*, 23(3): 329-345.
- Bowen, D.D. and Hisrich, R.D. 1986. The female entrepreneur: A career development perspective. *Academy of Management Review*, 11(2): 393-407.
- Busenitz, L.W. and Lau, C.M. 1996. A cross-cultural cognitive model of new venture creation. *Entrepreneurship: Theory and Practice*, 20(4): 25-39.
- Busenitz, L.W., Gomez, C., and Spencer, J.W. 2000. Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal*, 43(5): 994-1003.

- Catalyst Research Staff, Hollenshead C., and Wilt, J. 2000. *Women and the MBA: Gateway to Opportunity*. New York, NY: Catalyst and the Center for the Education of Women at the University of Michigan, University of Michigan Business School.
- Chen, C.C., Greene, P.G., and Crick A. 1998. Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *Journal of Business Venturing*, 13(4): 295-316.
- Cox, L.W., Mueller, S.L., and Moss, S.E. 2002. The impact of entrepreneurship education on entrepreneurial self-efficacy. *International Journal of Entrepreneurship Education*, 1(2): 229-245.
- Davidsson, P. and Wiklund, J. 2001. Levels of analysis in entrepreneurship research: Current research practice and suggestions for the future. *Entrepreneurship: Theory and Practice*, 25(4): 81-99.
- De Noble, A.F., Jung, D., and Ehrlich, S.B. 1999. Entrepreneurial self-efficacy: The development of a measure and its relationship to entrepreneurial action. In R.D. Reynolds, W.D. Bygrave, S. Manigart, C. Mason, G.D. Meyer, H.J. Sapienza, and K.G. Shaver (Eds.), *Frontiers of Entrepreneurship Research*. Waltham, MA: P&R Publications Inc., pp. 73-87.
- Eccles, J.S. 1994. Understanding women's educational and occupational choices: Applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly*, 18(4): 585-609.
- Gundry, L.K. and LaMantia, L. 2001. *Breakthrough Teams for Breakneck Times: Unlocking the Genius of Creative Collaboration*. Chicago, IL: Dearborn Trade.
- Gundry, L.K. and Welsch, H.P. Forthcoming. The ambitious entrepreneur: High growth strategies of women-owned enterprises. *Journal of Business Venturing*.
- Hackett, G. and Betz, N.E. 1981. A self-efficacy approach to the career development of women. *Journal of Vocational Behavior*, 18(3): 326-339.
- Jaccard, J. and Wan, C.K. 1996. *LISREL Approaches to Interaction Effects in Multiple Regression*. Thousand Oaks, CA: Sage Publications.
- Jones, K. and Tullous, R. 2002. Behaviors of pre-venture entrepreneurs and perceptions of their financial needs. *Journal of Small Business Management*, 40(3): 233-249.
- Jöreskog, K.G. and Sörbom, D. 1993. LISREL VIII: A guide to the program and applications. Chicago, IL: SPSS.
- Krueger, N.F., Jr. and Brazeal, D.V. 1994. Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship: Theory and Practice*, 18(3): 91-104.

- Krueger, N.F., Jr. and Dickson, P.R. 1994. How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences*, 25(3): 385-400.
- Krueger, N.F., Jr. 2000. The cognitive infrastructure of opportunity emergence. *Entrepreneurship: Theory and Practice*, 24(3): 5-23.
- Krueger, N.F., Jr., Reilly, M.D., and Carsrud, A.L. 2000. Entrepreneurial intentions: A competing models approach. *Journal of Business Venturing*, 15(5/6): 411-432.
- Krueger, N.F., Jr. and Kickul, J. 2005. Discrete choice modeling of venture preferences: The impact of mental prototyping. Paper presented at the Babson College Entrepreneurship Research Conference, Babson Park, MA.
- Lent, R.W., Brown, S.D., and Hackett, G. 1994. Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1): 79-122.
- Leonard, N.H., Scholl, R.W., and Kowalski, K.B. 1999. Information processing style and decision making. *Journal of Organizational Behavior*, 20(3): 407-420.
- Markman, G.D., Balkin, D.B., and Baron, R.A. 2002. Inventors and new venture formation: The effects of general self-efficacy and regretful thinking. *Entrepreneurship: Theory and Practice*, 27(2): 149-165.
- Marlino, D. and Wilson, F. 2003. *Teen Girls on Business: Are They Being Empowered? Full Report*. Boston, MA and Chicago, IL: Simmons School of Management and The Committee of 200.
- McGrath, R.G. and MacMillan, I.C. 1992. More like each other than anyone else? A cross-cultural study of entrepreneurial perceptions. *Journal of Business Venturing*, 7(5): 419-429.
- Meyer, G.D. 2005. The fallacy of business plans: Effectuation, real options and focused alertness. Paper presented at the Babson College Entrepreneurial Research Conference, Babson Park, MA.
- Mitchell, R.K., Smith, J.B., Seawright, K.W., and Morse, E.A. 2000. Cross-cultural cognitions and the venture creation decision. *Academy of Management Journal*, 43(5): 974-993.
- Mitchell, R.K., Smith, J.B., Morse, E.A., Seawright, K.W., Peredo, A.M., and McKenzie, B. 2002. Are entrepreneurial cognitions universal? Assessing entrepreneurial cognitions across cultures. *Entrepreneurship: Theory and Practice*, 26(4): 9-32.
- Morse, E.A., Mitchell, R.K., Smith, J.B., and Seawright, K.W. 1999. Cultural values and venture cognitions on the Pacific Rim. *Global Focus*, 11(4): 135-153.

- Netemeyer, R.G., Johnston, M.W., and Burton, S. 1990. Analysis of role conflict and role ambiguity in a structural equations framework. *Journal of Applied Psychology*, 75(2): 148-157.
- Ornstein, R.E. 1977. *The Psychology of Consciousness*. New York, NY: Harcourt Brace Jovanovich.
- Pistrui, D., Liao, J., and Welsch, H. 1998. Entrepreneurial expansion plans: An empirical investigation of infrastructure predictors. Paper presented at Research in Entrepreneurship (Rent XII), Lyon, France.
- Pistrui, D., Welsch, H.P., Wintermantel, O., Liao, J., and Pohl, H.J. 2000. Entrepreneurial orientation and family forces in the new Germany: Similarities and differences between East and West German entrepreneurs. *Family Business Review*, 13(3): 251-263.
- Prather, C.W. and Gundry, L.K. 1995. *Blueprints for Innovation: How Creative Processes Can Make You and Your Company More Competitive*. New York, NY: American Management Association.
- Sarasvathy, S.D. 2001. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2): 243-263.
- Shapero, A. 1982. Social dimensions of entrepreneurship. In Kent, C., Sexton, D.L., and Vesper, K.H. (Eds.), *The Encyclopedia of Entrepreneurship*. Englewood Cliffs, NJ: Prentice-Hall, pp. 72-90.
- Souitaris, V. 2005. The value-added of entrepreneurship education. Paper presented at the Academy of Management annual meetings, Honolulu, HI.
- Welsch, H. and Pistrui, D. 1993. Entrepreneurship commitment and initiative in Romania. Paper presented at Research in Entrepreneurship (Rent VII), Budapest, Hungary.
- Williams, L.J. and Hazer, J.T. 1986. Antecedents and consequences of satisfaction and commitment in turnover models: A reanalysis using latent variable structural equation methods. *Journal of Applied Psychology*, 71(2): 219-231.
- Wilson, F., Marlino, D., and Kickul, J. 2004. Our entrepreneurial future: Examining the diverse attitudes and motivations of teens across gender and ethnic identity. *Journal of Developmental Entrepreneurship*, 9(3): 177-197.

Tests of Between-Subjects Effects

Dependent Variable: Intentions

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	122.697 ^a	12	10.225	4.591	.000
Intercept	1874.394	1	1874.394	841.564	.000
SOCIAL	77.558	1	77.558	34.822	.000
COUNTRY	2.782	2	1.391	.625	.536
GENDER	1.386	1	1.386	.622	.431
COGNITIVE STYLE	.021	1	.021	.009	.923
COUNTRY * GENDER	.081	2	.041	.018	.982
COUNTRY * COGNITIVE	18.128	2	9.064	4.070	.018
GENDER * COGNITIVE	1.448	1	1.448	.650	.421
THREE-WAY	13.098	2	6.549	2.940	.054
Error	1120.319	503	2.227		
Total	10470.000	516			
Corrected Total	1243.016	515			

a. R Squared = .099 (Adjusted R Squared = .077)

TABLE TWO

Pedagogical Techniques and SAMPLE Tools for the Entrepreneurship Classroom

	Cognitive Style	
	<u>Intuitives</u>	<u>Analytics</u>
Self-Efficacy Stage		
Searching Stage	Intuitives ← — — — — — Analytics	
Tools	<ul style="list-style-type: none"> • Scenario Analysis • Why-diagrams • Backward Thinking 	
Planning Stage	Intuitives — — — — — → Analytics	
Tools		<ul style="list-style-type: none"> • Strategic Visioning • TOWS
Marshalling Stage	Intuitives — — — — — → Analytics	
Tools		<ul style="list-style-type: none"> • CPS: Creative Problem Solving
Implementing Stage	Intuitives ← — — — — — Analytics	
Tools	<ul style="list-style-type: none"> • Idea Grids 	<ul style="list-style-type: none"> • ALUO

Notes:

Scenario Analysis: Structured method of identifying key features of the opportunity, and then developing a continuum upon which the entrepreneur’s current situation is indicated. **Why-diagrams:** Root Cause Analysis; begin with the observed situation, and then explore the causes of each of the observed symptoms. **Backward Thinking:** An opportunity generation tool that guides the entrepreneur to begin at the end, or “ideal state or condition” for the business. This tool allows for non-linear leaps of thought that enable the development of innovative paths to reach a desired goal. **TOWS:** Similar to SWOT Analysis, with preliminary analysis placed on the external environment before internal strengths and weaknesses. **Strategic Visioning:** During planning, qualitative questions guide this inquiry, including asking entrepreneurs to think about what obstacles or pitfalls might block progress, for what do they wish to be known, what difference would they like to make, and what are their personally meaningful goals (Gundry and LaMantia, 2001). **CPS:** An eight-stage process that can be applied to ways in which resources can be marshaled, including the generation of many alternative courses of action that are measurable. **Idea Grids:** A convergent process that requires entrepreneurs to categorize courses of action according to two criteria: 1) organizational capabilities (high or low), and 2) degree to which the course of action captures the opportunity or solves the problem (high or low) (Prather and Gundry, 1995). **ALUO:** A process of evaluating courses of action by determining the advantages (A) and limitations (L) associated with each one, the uniqueness (U) of each alternative, and the opportunity (O) upon which the entrepreneur will capitalize when the alternative is implemented (Gundry and LaMantia, 2001).