

Understanding entrepreneurial intentions of students in agriculture and related sciences

Leonidas A. Zampetakis^{1,2}, Afroditi Anagnosti³, Stelios Rozakis³

¹ Department of Production Engineering & Management Technical University of Crete, 73100, Chania, Crete, GR.

² Department of Psychology, University of Crete. {lzabetak@dpem.tuc.gr}

³ Innovation & Entrepreneurship Unit, Agricultural University of Athens, Iera Odos 75, 11855 Athens, GR, {s.rozakis, a.anagnosti}@aua.gr

This series contains preliminary manuscripts which are not (yet) published in professional journals



Agricultural University of Athens ·
Department of Agricultural Economics
& Rural Development · <http://www.aoa.aua.gr>

Understanding entrepreneurial intentions of students in agriculture and related sciences

Leonidas A. Zampetakis^{1,2}, Afroditi Anagnosti³, Stelios Rozakis³

¹ Department of Production Engineering & Management Technical
University of Crete, 73100, Chania, Crete, GR.

² Department of Psychology, University of Crete.
{lzabetak@dpem.tuc.gr}

³ Innovation & Entrepreneurship Unit, Agricultural University of Athens,
Iera Odos 75, 11855 Athens, GR
{s.rozakis, a.anagnosti}@aua.gr

Abstract: There is a growing body of literature arguing that an individual's intention to start an enterprise is a strong predictor of individual entrepreneurial action. The present research uses Ajzen's (1991) theory of planned behavior (TPB) to investigate entrepreneurial intent of agricultural students. The TPB offers a parsimonious explanation of purposeful behavior and has been used with success in previous research studies to explain the entrepreneurial intent of business and engineering students. However, research studies that examine the application of the theory to students from agricultural universities are scarce. In the present research, we empirically examine the TPB using data from 65 students from the Agricultural University of Athens, Greece. Results, using path analysis, support previous studies that used TPB to predict entrepreneurial intentions, which suggest that students' attitudes towards entrepreneurship are related to their intention (INT) to start a business. In addition perceived behavioral control (PBC) is a strong predictor of INT. As far the role of subjective norm (SN) is concerned, results of the present study suggest that it has a small negative, and statistically significant effect. Furthermore, in line with recent theoretical and empirical studies about the potential role of emotions in entrepreneurship, we investigated the role of anticipated emotional ambivalence in students' entrepreneurial intent. Results suggest that anticipated emotional ambivalence from nascent entrepreneurship (that is, students' future oriented emotions relating to the expectancy of feeling both positive and negative affect) relates negatively to perceived behavioral control.

Keywords: *Agricultural university, entrepreneurship education, entrepreneurial intentions*

JEL codes: A22, C39

1. INTRODUCTION

Entrepreneurship and entrepreneurial culture are receiving an increased amount of attention in both academic research and practice. Entrepreneurship is linked with value creation and as such, it is thought to have a significant impact on economic growth, continuous business renewal, and employment. Empirical research supports positive links between entrepreneurial activity, economic growth and innovation. Thus, it is apparent why there is an increased interest in educational programmes designed to encourage entrepreneurship and to provide a better infrastructure for business start-ups [Kuratko, 2005]. However, the role of entrepreneurship and innovation has not been given much emphasis in the field of university agricultural education [Knudson, et al, 2004]. Agricultural education has to prepare the future generation of leaders, researchers, professionals, technicians and last but not least, innovative farmers, who collectively can meet the challenges of global food security. Although emphasis is placed in the continuous education of farmers, it is agricultural university students, in comparison to individuals without university education, who are more likely to pursue self-employment and start a business in the agrifood sector which has significant impact on economic growth (Robinson & Sexton, 1994). Agricultural universities can work as facilitator factors towards students business start ups through the introduction of entrepreneurship research and education programmes.

Behavior and decision making of agricultural students for participating in entrepreneurial activities can be addressed by their entrepreneurial intentions. The importance of entrepreneurial intentions as antecedents of planned behavior (such as founding a new business) has been emphasized in recent years (e.g. Krueger, et al., 2000; Peterman and Kennedy, 2003). According to Thompson (2009, p.676) entrepreneurial intention is “a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future”.

In the present paper, we use the Theory of Planned Behavior-TPB (Ajzen, 1991) to empirically assess factors affecting agricultural students' entrepreneurial intent. Furthermore, in line with recent theoretical and empirical studies, about the potential role of emotions in entrepreneurship (Baron, 2008) we investigated the role of anticipated emotional ambivalence from entrepreneurship as a career choice (that is students' future oriented emotions relating to the expectancy of feeling both positive and negative affect) in their intention to start a business.

2. LITERATURE REVIEW

2.1. THE THEORY OF PLANNED BEHAVIOR -TPB

Cognition-behavior models have identified intention as the most immediate and important cognitive antecedent of behavior. Intention refers to an individuals' decision to act and is assumed to reflect the effort that that person is likely to exert in order to achieve a goal or perform a behavior. .

One of the most influential theory driven models for intentions that have been proposed in the literature is Ajzen's (1991) TPB (see Figure 1). According to the TPB, there are three key factors that influence an individual's intention (INT) to perform a given behavior, these being (i) the attitude towards the act (ATT), (ii) subjective norms (SN), and (iii) perceived behavioral control (PBC). ATT refer to a person's overall assessment of the advantages and disadvantages of performing a given behavior. In the TPB, SN refer to people's perceptions of approval or disapproval from significant others (i.e. normative expectations) for performing the behavior (i.e. starting a business in our case). Despite support for the TPB, research shows that SN often exert only limited influence on people's intentions. In the area of entrepreneurship, the influence of SN on intentions is not clear. Some studies have simply omitted SN (e.g., Peterman & Kennedy, 2003), while others found it to be non-significant (e.g., Krueger et al., 2000). The existence of interactions could be explaining these results. The final component of the TPB is perceived behavioral control (PBC) which refers to people's beliefs that they are capable of performing a given behavior (Ajzen, 1991). PCB and self-efficacy (SE) (Bandura, 2001) share conceptual similarities since both refer to the sense of capacity regarding the fulfillment of firm-creation behaviors.

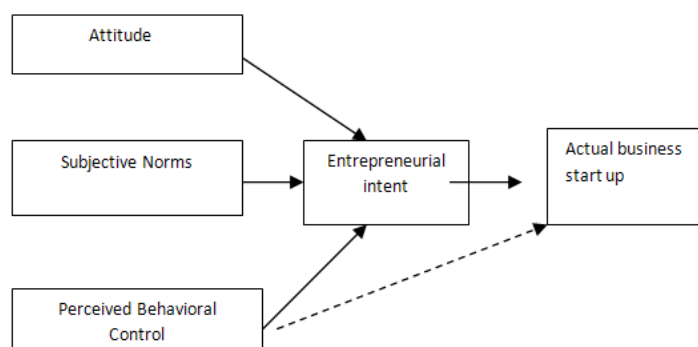


Figure 1: Theory of Planned Behavior, adapted from (Ajzen 1991)

2.2. BROADENING AND DEEPENING THE TPB

Although the TPB is considered a parsimonious model with a good predictive ability several researchers have proposed that *broadening* and *deepening* the model with new variables would increase its predictive value. In their meta-analysis concerning the efficacy of the TPB, Armitage and Conner (2001) found that the TPB accounted for 27% and 39% of the variance in behavior. Prior applications of the TPB in the entrepreneurship literature suggest that attitude, subjective norms, and PBC typically explain 30%–45% of the variance in intentions (Linan & Chen, 2009). This suggests that there exists room for improvement.

Conner and Armitage (1998) in their study about the extension of TPB, proposed that some evidence exists across behaviors to support a role for anticipated affect (i.e., what respondents would expect to feel about the consequences of a behavior) within the TPB. The authors state that “such anticipated affective reactions to the performance or nonperformance of a behavior may be important determinants of attitudes and intentions” (p. 1446). According to Baumgartner et al. (2008) "anticipated affect" is future oriented affect that refers to the prospect of feeling positive or negative affect after performing or not performing a behavior. The researchers distinguished anticipated from anticipatory affect, with the latter referring to currently experienced affect due to the prospect of a future event.

In the context of entrepreneurship, Li (2011) using a Chinese sample, found that the anticipated surprise, regret, and fear significantly influence value judgment; whereas individual differences in probability judgment are significantly influenced by the anticipated surprise, regret, contempt, and anger of failure of the new venture.

2.3. ANTICIPATED AFFECTIVE AMBIVALENCE FROM ENTREPRENEURSHIP

Generally, anticipated affect can be distinguished as positive and negative. Previous research addressing anticipated emotion in the context of the TPB has focused primarily on negative anticipated emotion, such as anticipated regret because people place greater weight on avoiding losses, risks, and negative consequences than approaching gains and positive consequences.

In the present research we focus on both positive and negative anticipated affect. Specifically we theorize that when students face entrepreneurship as a career choice both starting a business and not starting should generate positive affect from one source (e.g., starting a business and feel happy because “I am my own boss” or not starting and feel happy because “I have no bank debts”) but also negative affect from the other source (e.g., not starting a business and a lost opportunity to exploit or develop my idea or starting a business and an unpleasant feeling of the “risks I am taking”). This conflict that is induced by the pleasure evoked from satisfying ones desires versus negative emotions from such satisfaction creates “mixed emotion” contexts (Siemer, et al., 2007). Mixed emotions (or ambivalence)

refer to emotional states defined by both positive and negative emotions (Williams and Aaker, 2002). Although there still exists an interesting controversy in the literature on whether people can experience positive and negative affect at the same time we have no reasons to believe that this will not also be true for anticipated affect in the context of entrepreneurship, an emotionally complex process.

We examined students' anticipated affect when asked to imagine nascent entrepreneurship. Nascent entrepreneurs (i.e. individuals that are involved in on-going but not yet operational business start-up efforts in which they are going to be owners) engage in a wide variety of gestation activities vastly varying in duration and in composition, that may be grouped into different categories of behavior. In this situation no money has been invested, no income has been made and the business is not a legal entity (Carter, et al., 1996).

3. OVERVIEW OF STUDY AIMS

The study aimed to investigate the extent to which, the TPB holds for agricultural university students. Furthermore, we investigated the relationship between the core variables of the TPB and anticipated affective ambivalence from nascent entrepreneurship.

4. MATERIALS AND METHODS

We used a cross-sectional survey design and applied a structured questionnaire to collect data. Survey data were collected from 65 students from the Agricultural University of Athens (AUA). These students participated in the entrepreneurship program organized by the Innovation & Entrepreneurship Unit of AUA. Surveys were administered to students' class at the beginning of the programme (October 2012). In sum, the sample consisted of 29 male students (44.6%), the mean sample age was 24.11 years ($SD = 2.61$ years). Six participants (9.2%) were postgraduate students. Thirty three percent of the participants reported that one of their parents owned full time business most of the time, while they were growing up, almost eighty percent reported that they know an entrepreneur in their close environment. It is noteworthy that various disciplines of agricultural related sciences are represented in the participants, namely Crop Science (12 students), Biotechnology (9), Food Science (9), Agricultural Economics and Rural Development (31) and Animal Science (4).

The questionnaire contained constructs (i.e. variables) that were assessed with self-report measures based on multi-item scales. Specifically, we assessed students' entrepreneurial intent (INT) using the scale originally developed by Thompson (2009). Attitudes towards

entrepreneurship (**ATT**), subjective Norm (**SN**) and perceived behavioural control (**PBC**) were assessed using the five, three and five item scales respectively from Linan and Chen (2009). Anticipated Positive (**PA**) and Negative Affect (**NA**) were assessed using 20 items (ten positive and ten negative) from the Positive Affect and Negative Affect Schedule (PANAS) (Watson et al., 1988). Finally, we used the Gradual Threshold Model (GTM) of ambivalence and the GTM formula suggested by Priester and Petty (1996), to assess anticipated affective ambivalence (**AMB**). Responses to the ATT, INT and PBC items were made on 7-point Likert-type scales (1 = strongly disagree, 7 = strongly agree). For SN, PA and NA items responses were made on 5-point Likert-type scales. Cronbach's reliability coefficients for the scales were acceptable (range from 0.61 to 0.93).

We used path analysis with INT as the dependent variable. Path analysis is a multivariate statistical technique and like multiple regression, is used for estimating the relationship between dependent and independent variables. The main advantage of path analysis is that overall model goodness of fit indexes can be estimated to examine the model-data fit discrepancy and that parameter estimates are computed simultaneously. Analysis of Moment Structures (AMOS software, version 7.0) with maximum likelihood estimation was used, for the parameter estimation. We used several indexes to assess model fit (Shook et al., 2004): (a) Root Mean Square Error Approximation (RMSEA): 0 = an exact fit, < 0.05 = a close fit, 0.05 – 0.08 = a fair fit, 0.08 – 0.10 = a mediocre fit, and > 0.10 = a poor fit (AMOS also computes a 90% confidence interval around RMSEA); (b) Comparative Fit Index (CFI): best if above 0.9; (c) Akaike Information Criterion (AIC). For model comparisons, smaller values in AIC represent a better fit of the model.

5. RESULTS & DISCUSSION

In Table 1, we present means, standard deviations and correlations across selected variables. Our results suggest that agricultural students' entrepreneurial intent (INT) is strongly and positively related to attitudes towards entrepreneurship (ATT) ($r = 0.70$, $p < 0.01$, two tailed) and perceived behavioral control (PBC) ($r = 0.74$, $p < 0.01$, two tailed). SN correlated significantly only with PA. Furthermore, anticipating positive affect from nascent entrepreneurship (PA) correlates positively with all the TPB model variables, while anticipating negative affect relates negatively only to PBC. This suggests that anticipating negative affect relates to students' beliefs that they not are capable of performing a given behaviour (i.e. start a business in our case).

Table 1: Descriptive statistics and inter-correlations for the total sample (N=65)

	Mean	SD	1	2	3	4	5	6	7
1. ATT	4.83	1.48	(0.93)						
2. SN	3.80	0.67	0.22	(0.61)					
3. PBC	3.05	1.20	0.49 **	0.17	(0.88)				
4. INT	3.46	1.59	0.70 **	0.03	0.74**	(0.92)			
5. PA	3.81	0.63	0.54 **	0.25**	0.54**	0.55**	(0.88)		
6. NA	1.83	0.56	0.09	-0.09	-0.24*	-0.07	-0.12	(0.81)	
7. AMB	3.64	1.07	0.11	-0.11	-0.25*	0.07	-0.06	0.98**	-

Reliabilities are in parentheses * $p < 0.05$ (two tailed) ** $p < 0.01$ (two tailed)

In Figure 2, we present the path analysis model, with INT as the dependent variable. Examining the findings, the path model for the whole sample postulated that ATT and PBC have statistically significant direct effects on INT (0.48, $p < 0.001$, two tailed and 0.53, $p < 0.001$, two tailed, respectively). The standardized direct effect of SN on INT was found to be statistically significant (-0.17, $p < 0.001$, two tailed) and negative. In summary, the proportion of variance (squared multiple correlations) in INT that was explained by the collective set of predictors was 72 percent, which is highly satisfactory compared to previous research that used the TPB to explain student entrepreneurial intentions.

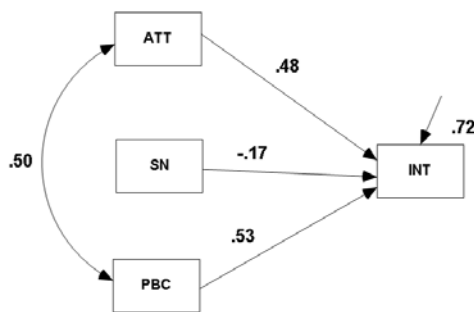


Figure 2: Standardized results of the path analysis. Regression weights (all statistically significant at 0.001 level) appear along arrows. The percentage of variance explained appears above boxes.

We entered in the path model, PA, NA and AMB; their direct effects to INT were not statistically significant. It is plausible that these affective variables moderate the effects of ATT, SN and PBC on INT. This provides a fruitful avenue for future research. One important finding is that for the first time in the literature, the effect of SN on INT is negative. Reference

people in our measure of SN were close family, friends, and fellow students. SN reflects the perceived social pressure to start a firm. We believe this negative relationship between SN and INT largely echoes the current socioeconomic situation in Greece, where large sectors of the Greek population are in a state of poverty, since they are not only in desperate need of the most basic facilities of a household but earn annually less than 60% of the median annual income of a Greek citizen. Thus, results suggest that during the Greek financial crisis reference people have no role to play in students' decision to start a business. It is important to know that participants had already demonstrated their interest in entrepreneurship by choosing the elective course on Strategic Management, in other words they are already positively biased or interested. This could explain some results, for instance the remarkably high predictive capacity of the model.

Furthermore, it would be interesting to expand the survey group to lay students. Also the analysis could be enriched using dummy variable in order to distinguish between agricultural disciplines oriented to technical matters (crop, animal and food science and biotechnology) and agricultural economics students that counts for about half the sample population. Last but not least two sub-groups based on entrepreneurial influence within the close family could lead to clarify some findings of the analysis.

6. REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40(4), 471-499.
- Bandura, A. (2001). Social cognitive theory: an agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Baron, R. A. (2008). The role of affect in the entrepreneurial process. *Academy of Management Review*, 32(2), 328-340.
- Baumgartner, H., Pieters, R., & Bagozzi, R. P. (2008). Future-oriented emotions: Conceptualization and behavioral effects. *European Journal of Social Psychology*, 38(4), 685-696.
- Carter, N. M., Gartner, W. B., & Reynolds, P. D. (1996). Exploring start-up event sequences. *Journal of Business Venturing*, 11(3), 151-166.
- Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, 28(15), 1429-1464.
- Knudson, W., Wysocki, A., Champagne, A., & Peterson, H. C. (2004). Entrepreneurship and innovation in the agri-food system. *American Journal of Agricultural Economics*, 86, 1330-1338.
- Krueger, N. F. J., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intention. *Journal of Business Venturing*, 15, 411-432.

- Kuratko, D. F. (2005). The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship Theory and Practice*, 29(5), 577-598.
- Li, Y. (2011). Emotions and new venture judgement in China. *Asia Pac J Manag*, 28, 277-298.
- Linan, F., Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33(3), 593-617.
- Peterman, N., & Kennedy, J. (2003). Enterprise education: influencing students' perceptions of entrepreneurship. *Entrepreneurship Theory and Practice*, 28(2), 129-144.
- Priester, J. R., & Petty, R. E. (1996). The gradual threshold model of ambivalence: Relating the positive and the negative bases of attitude to subjective ambivalence. *Journal of Personality and Social Psychology*, 71(3), 431-449.
- Robinson, P. B., & Sexton, E. A. (1994). The effect of education and experience on self-employment success. *Journal of Business Venturing*, 9, 141-157.
- Shook, C. L., Ketchen, D. J. J., Hult, G. T. M., & Kacmar, K. M. (2004). An assessment of the use of structural equation models in strategic management research. *Strategic Management Journal*, 25, 397-404.
- Siemer, M., Mauss, I., & Gross, J. (2007). Same situation-different emotions: How appraisals share our emotions. *Emotions*, 7(3), 592-600.
- Thompson, E. R. (2009). Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric. *Entrepreneurship Theory and Practice*, May, 669-694.
- Williams, P., & Aaker, J. L. (2002). Can mixed emotions peacefully coexist? *Journal of Consumer Research*, 28, 636-649.

APPENDIX

The survey data were collected using a structured questionnaire which was completed by 65 senior students at the undergraduate level in the Agricultural University of Athens (AUA). These students participated in the Unit Innovation and Entrepreneurship at the Agricultural University of Athens by attending the introductory course to Entrepreneurship entitled "Strategic Planning in Food and Agriculture industry" (9th semester).

The questionnaire was completed by students at three different moments: a) just before the first lesson (time zero), b) about the middle of the course and c) at the end of the course (after examinations). This paper presents the results from the first lesson. Completion of the questionnaire was done in three consecutive moments in order to examine the effect of the course to students. At the end of the text the questionnaire used in this investigation is presented .

How calculated the variables of the model?

The following variables were used in the model:

- Attitude towards entrepreneurship (ATT)

The variable is calculated as the average of questions B1-B5 of the questionnaire.

- Entrepreneurial Intention (INT)

The intention to start his own business is calculated as the average of questions B6, B9, B11, B12, B14, B15.

- Subjective Norms (SN)

Subjective Norms determined as the average of questions D1-D3.

- Perceived Behavioral control (PBC)

Perceived behavioral control is calculated as the average of questions E1-E5.

- Anticipated Positive Affect (PA)

The variable is calculated as the average of questions C1, C3, C5, C9, C10, C12, C14, C16, C17, C19.

- Anticipated Negative Affect (NA)

This variable is calculated as the average of questions C2, C4, C6, C7, C8, C11, C13, C15, C18, C20.

- Anticipated affective ambivalence (AMB)

The formula used was $5Cp - D$ / C , where C is equal to the magnitude of conflicting reactions, D is equal to the magnitude of dominant reactions, p is less than 1 (0.5 in the present instance), and a constant of 1 is added to C and D (Priester and Petty, 2001).

RESEARCH ON THE EFFECTIVENESS OF COURSE

WAVE 1

A. GENERAL INFORMATION-IDENTITY OF RESEARCH

1. Your age:
.....

2. Gender
1. Male

2. Female

3. Are you:
1. Undergraduate

2. Postgraduate

4. Your department

5. Has anyone from his/her parents
own business?
1. Yes

2. No

6. Do you know personally an
entrepreneur?
1. Yes

2. No

7. Have you worked as an employee
in the past?
1. Yes

2. No

NAME

B. INSTRUCTIONS: Please rate each of the following sentences according to the degree of disagreement (closer to 1) or the degree of your agreement (Closer to 7).

		1	2	3	4	5	6	7
1	Being entrepreneur has more advantages than disadvantages							
2	I like to make a career as an entrepreneur							
3	If I had the opportunity and resources I would start my own business							
4	Being a entrepreneur I think it gave me great satisfaction							
5	Among several options,I would rather choose to become an entrepreneur							
6	I intend to start my own business in the future							
7	I plan my future very carefully							
8	I read newspapers with business news							
9	Constantly looking for business opportunities							
10	Read books on financial matters							
11	Put away money to start my own business							
12	Read books on procedures for initiating business							
13	I plan my finances very carefully							
14	Make plans to start my own business							
15	I dedicate time to learn how to create a business							

C. INSTRUCTIONS: Think of yourself that has begun the process of running his own business. So you're in the early stages of preparation without yet you get any cash inflow from the company's operation. I would like to record the extent to which you feel each emotion for the situation you described.

		minimal	some	moderate	much	intense
1	Interest					
2	Distressful					
3	anxious					
4	Upset					
5	Powerful					
6	Guilt					
7	Scared					
8	hostile					
9	Excited					
10	proud					
11	irascible					
12	alert					
13	shame					
14	inspired					
15	nervous					
16	determined					
17	dedication					
18	panic					
19	full of energy					
20	afraid					

D. INSTRUCTIONS: If you decide to start your own business people in your narrow circle would approve such a decision? Your answer is closer to one if not approved and closer to 5 if approved it perfectly.

		1	2	3	4	5
1	Your family					
2	Your friends					
3	Your fellow students					

E. INSTRUCTIONS: Please rate each of the following sentences according to the degree of disagreement (closer to 1), or the degree of agreement (Closer to 7).

		1	2	3	4	5	6	7
1	It seems easy to start my own business and keep it in operation							
2	I'm ready to start a sustainable business							
3	I think I can deal with the process of creating a new business							
4	I know the necessary details to start my own business							
5	If I start a business I would have a high probability of success.							

G. DIRECTIONS: Write on a scale of 0-100 the likelihood of your own company deceiving the following options:

It is my intention to create my own business:

1. Directly (eg a month from now) _____
2. Medium term (eg 6 months from now) _____
3. Long term (eg three years from now) _____

H. INSTRUCTIONS: Please rate each of the following sentences according to the degree of disagreement (closer to 1) or degree of your agreement (Closer to 7).

		1	2	3	4	5	6	7
1	How strong would you describe your desire to start your own business?							
2	I want to start my own business							
3	The start of my business is something I like to do							