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Development of entrepreneurial intention in higher education and the effect of gender - a latent growth curve analysis

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### Article information:

To cite this document:

Joensuu Sanna Viljamaa Anmari Varamäki Elina Tornikoski Erno , (2013), "Development of entrepreneurial intention in higher education and the effect of gender – a latent growth curve analysis", Education + Training, Vol. 55 Iss 8/9 pp. 781 - 803

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# Development of entrepreneurial intention in higher education and the effect of gender – a latent growth curve analysis

Development of  
entrepreneurial  
intention

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## Abstract

**Purpose** – The objectives of this study are threefold: first, to analyze the development of intentions of individuals over time; second, to explore potential gender differences in intention development; and third, to analyze the relatedness of the initial level and development of the antecedents of intentions to the initial level and the development of intentions.

**Design/methodology/approach** – Ajzen's Theory of Planned behavior is applied. Longitudinal data were collected in the fall of 2010, 2011 and 2012 in seven different universities of applied sciences, with students representing seven different study fields. In our data, there are 192 individuals with all three measurement waves and 104 individuals with two measurement waves. The analysis of change on multi-wave panel data is done using latent growth curve analysis with structural equation modeling.

**Findings** – Our empirical results are threefold. First, entrepreneurial intentions of higher education seem to decrease during their studies. Second, there is a gender difference in the initial level of entrepreneurial intentions and how intentions develop over time. Third, the initial level of intentions does not affect the future development of intentions.

**Practical implications** – In sum, the authors believe that the paper makes an important contribution to the field of entrepreneurial education by concluding that intention development in higher educational context is not a simple matter, but a rather complicated process during which young people can realize their true potential *vis-à-vis* entrepreneurial opportunities. From an educators' point of view, such realization generally means a decrease in an individual's entrepreneurial intentions, which is a phenomenon that does not provide much encouragement for educators. On the other hand, one of the aims of any entrepreneurship education is to give younger people a more realistic picture about entrepreneurship. When someone is willing to start a new business in this kind of context, the authors, as educators, can be a degree more confident that such an individual is not launching his/her venture because of idealistic dreams.

**Originality/value** – By using a longitudinal design, the paper is one of the first to provide empirical evidence about the intention development over time. Ultimately, the paper hopes to have added richness to the ongoing discussion among academics and educators alike regarding the importance of intention development in entrepreneurship education.

**Keywords** University, Entrepreneurship, Entrepreneurial intention, Latent growth curve analysis, Longitudinal data, Student

**Paper type** Research paper



This research project has been funded by European Regional Development Fund and the support is gratefully acknowledged.

Education + Training  
Vol. 55 No. 8/9, 2013  
pp. 781-803

© Emerald Group Publishing Limited  
0040-0912  
DOI 10.1108/ET-06-2013-0084

## Introduction

A dynamic business environment requires a constant input of new start-ups, preferably innovative high growth start-up firms. At the same time, in developed countries with high general levels of education, there seems to be a lack of entrepreneurial drive (e.g. Xavier *et al.*, 2013). As societies struggle to find a continuous supply of new entrepreneurs to fuel economic growth and to maintain or increase the level of education needed in a high-tech world, the question of how higher education affects formation of entrepreneurial intentions is becoming a crucial one.

Entrepreneurial intentions refer to the commitment of starting a new business (Krueger and Carsrud, 1993) by a graduate, either directly after graduation or in the future. Some studies suggest that higher education reduces the likelihood of entrepreneurship (Kangasharju and Pekkala, 2002; Henley, 2005; Pihkala, 2008; Wu and Wu, 2008; Nabi *et al.*, 2010) while others suggest the opposite (Blanchflower and Meyer, 1994; Ertuna and Gurel, 2011; Lanero *et al.*, 2011; Zhang *et al.*, 2013). Reasonable arguments exist in favor of both views. On one hand, participating in higher education gives a person a resource advantage which may enable a successful career in entrepreneurship; on the other hand, with a higher education degree a person becomes a more desirable employee and may view salaried employment a more attractive alternative than entrepreneurship.

Another intriguing issue relates to how higher education and gender impact entrepreneurial intentions. In Finland, 25 percent of men and 31 percent of women have a higher education degree; while, only a third of entrepreneurs are female (Tilastokeskus, 2013). It would be simplistic to argue that higher education is to blame for the low proportion of female entrepreneurs. The differences suggest that gender differences in the development of entrepreneurial intentions in higher education deserve attention.

The development of entrepreneurial intentions has been extensively studied, but the overwhelming majority of studies have been cross-sectional, comparing, e.g. students in different age cohorts or different fields of study. Longitudinal studies are challenging from the point of view of data collection (e.g. Harte and Stewart, 2010), and few exists (e.g. Matlay and Carey, 2007) to help us create an understanding of how an individual's intentions develop over time spent in higher education.

This research paper presents the results of tracking the changes in entrepreneurial intentions of students during their higher education studies in Finland. The objectives of this study are threefold: first, to analyze the development of intentions of individuals over time; second to explore potential gender differences in intention development; and third to analyze the relatedness of the initial level and development of the antecedents of intentions to the initial level and the development of intentions. The analysis of change on multi-wave panel data is done using latent growth curve (LGC) analysis with structural equation modeling.

The remainder of the paper is organized as follows. The following section will present our theoretical model. Thereafter we discuss our methodological choices before presenting the statistical analysis. Lastly, we discuss the implications of our study.

## Review of literature and theoretical model

### *Intentions and their antecedents*

In order to study the development of intentions, we will adopt an existing intention model, namely the Theory of Planned Behavior (TPB) by Ajzen (1991), which has become one of the most widely used psychological theories to explain and predict

human behavior (Kolvereid, 1996; Tkachev and Kolvereid, 1999). The TPB suggests that intention is the immediate antecedent of behavior and, thus, the stronger the intention to engage in a specific behavior, the more likely its actual performance should be (Ajzen, 1991). The linkage between intentions and actual behavior has received support in the entrepreneurial context (e.g. Kautonen *et al.*, 2013). The core of the TPB is the idea that intentions have three conceptually independent determinants, namely attitude towards the behavior, subjective norm and perceived behavioral control (Ajzen, 1991, p. 188).

Attitude towards the behavior refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question. The more positive an individual's perception regarding the outcome of starting a business is (see e.g. Shapero and Sokol, 1982; Autio *et al.*, 1997; Krueger *et al.*, 2000; Segal *et al.*, 2005; van Gelderen and Jansen, 2006; Pruett *et al.*, 2009) the more favorable their attitude towards that behavior should be and, consequently, the stronger the individual's intention to go ahead and start a business should be.

Subjective norm refers to the perceived social pressure to perform or not to perform a behavior, i.e. starting a business. Subjective norm is based on beliefs concerning whether important referent individuals or groups approve or disapprove of an individual establishing a business, and to what extent this approval or disapproval matters to the individual (Ajzen, 1991, p. 195). Generally speaking, the more the opinion and the encouragement for enterprising activity of a particular referent group or individual matters to the individual the stronger the individual's intention to start a business should be. Cialdini and Trost (1998) suggested that social norms have the greatest impact when conditions are uncertain. Pruett *et al.* (2009) operationalized social norms as family experience and support in addition to knowledge of others who had started businesses.

Perceived behavioral control refers to the perceived ease or difficulty of performing the behavior. It is based on beliefs regarding the presence or absence of requisite resources and opportunities for performing a given behavior (see Bandura *et al.*, 1980; Swan *et al.*, 2007). In general, the greater this perceived behavioral control, the stronger the individual's intention to start up in business should be. According to Ajzen (1991) this is most compatible with Bandura's (1977) concept of perceived self-efficacy.

According to Ajzen and Fishbein (2004), the three theoretical antecedents should be sufficient to predict intentions, but only one or two may be necessary in any given application. In other words, the TPB posits that the relative importance of the three factors can vary from one context to another. In most of the studies the best predictor of intentions has been perceived behavioral control (Shapero and Sokol, 1982; Boyd and Vozikis, 1994; Krueger *et al.*, 2000; Autio *et al.*, 2001; Melin, 2001; Kristiansen and Indarti, 2004; Linan, 2004; Henley, 2005; Segal *et al.*, 2005; Urban, 2006; Sequeira *et al.*, 2007; Wilson *et al.*, 2007; Prodan and Drnovsek, 2010; Chen and He, 2011; Drost and McGuire, 2011; Finisterra Do Paco *et al.*, 2011; Lee *et al.*, 2011; Lope Pihie and Bagheri, 2011). The second-most common predictor has been attitudes (Zampetakis *et al.*, 2009; Moi *et al.*, 2011) followed by subjective norm (Aizzat *et al.*, 2009; Lope *et al.*, 2009; Engle *et al.*, 2010; Siu and Lo, 2013).

Although there are very few previous longitudinal studies of changes in entrepreneurial intentions in higher education over time, we claim that changes in perceived behavioral control, in attitudes, and in subjective norm are the key ingredients in understanding the development of entrepreneurial intentions in higher education. As such, our theoretical model will reflect this emphasis on changes in these central antecedents of intention formation and development.

*Gender*

As both existing enterprise statistics and research on intentions (e.g. Crant, 1996; Kourilsky and Walstad, 1998; Shay and Terjesen, 2005; Wilson *et al.*, 2004; Wang and Wong, 2004; Sequeira *et al.*, 2007; Linan and Chen, 2009; cf. Pruett *et al.*, 2009; Yordanova and Tarrazon, 2010; Kautonen *et al.*, 2010; Lee *et al.*, 2011; Zhang *et al.*, 2013) have shown that women have less desire to start a new businesses than men, gender is included in our theoretical model as a factor influencing the initial level of entrepreneurial intentions and the development of intentions. Also and Isaksen (2012) found that among female Norwegian pupils at upper secondary school, youth enterprise experience had an indirect positive effect on entrepreneurial intentions through its effect on subjective norm and perceived behavioral control. A recent European Commission (2012) study on alumni of entrepreneurship programs found that female alumni score lower on entrepreneurial self-efficacy than their male counterparts, but higher than the control group (cf. Wilson *et al.*, 2007; Kickul *et al.*, 2008). In Zhao *et al.*'s (2005) study, gender was not related to entrepreneurial self-efficacy but was directly related to entrepreneurial intentions. In their study women also had lower entrepreneurial intentions than men. Yordanova and Tarrazon (2010) found that gender effect on entrepreneurial intentions is fully mediated by perceived behavioral control and partially mediated by perceived subjective norms and attitudes. Zhang *et al.*'s (2013) study also offers evidence that if both men and women receive entrepreneurship education, men have a higher log-chance of entrepreneurial intentions than females. Some earlier studies have also found differences in learning styles between men and women (Gallos, 1993; Kaenzig *et al.*, 2007; Varamäki *et al.*, forthcoming). According to these studies, women are not as happy with group work or active-based pedagogies as men are.

*Impact of education on intention development*

The impact of education on entrepreneurial intentions has been studied by Lee *et al.* (2011), Wilson *et al.* (2007), Sandhu *et al.* (2011), Millman *et al.* (2010), Nabi *et al.* (2010), Henley (2005), Franco *et al.* (2010), Fayolle *et al.* (2005), Blanchflower and Meyer (1994), and Kristiansen and Indarti (2004). At the general level, some studies suggest that higher education reduces the likelihood of entrepreneurship (Henley, 2005; Pihkala, 2008; Wu and Wu, 2008; Nabi *et al.*, 2010). Others seem to show the opposite effect. For example, it was observed among Spanish university students that education had a positive effect on perceived entrepreneurship feasibility, which in turn affected entrepreneurial intention and behavior (Lanero *et al.*, 2011). In Zhang *et al.*'s (2013) study students from technological universities reported cross-sectionally higher entrepreneurial intentions, and if all students would have received entrepreneurship education, students from technological universities had a higher log-chance of entrepreneurial intentions than those from other universities. Blanchflower and Meyer (1994) found that additional years of schooling had a positive impact on the probability of being self-employed in the USA but not in Australia. Turkish senior students are more likely to have entrepreneurial intentions than freshmen (Ertuna and Gurel, 2011).

Instead of general impact of education, more effort has been put towards understanding the effects of entrepreneurship education in particular (Matlay and Carey, 2007; Mwasalwiba, 2010; Zhang *et al.*, 2013). Studies show positive impacts of entrepreneurship education on intentions, attitudes and self-efficacy (e.g. Zhao *et al.*, 2005; Souitaris *et al.*, 2007; Jones *et al.*, 2008; Wilson *et al.*, 2009; Zhang *et al.*, 2013), but negative impacts have also been reported (e.g. Pihkala and Miettinen, 2004; Oosterbek *et al.*, 2010; Walter *et al.*, 2013).

### *The intention development model*

Based on the above review, we built a structural intention model for empirical exploration. Figure 1 presents the conceptual model of our study.

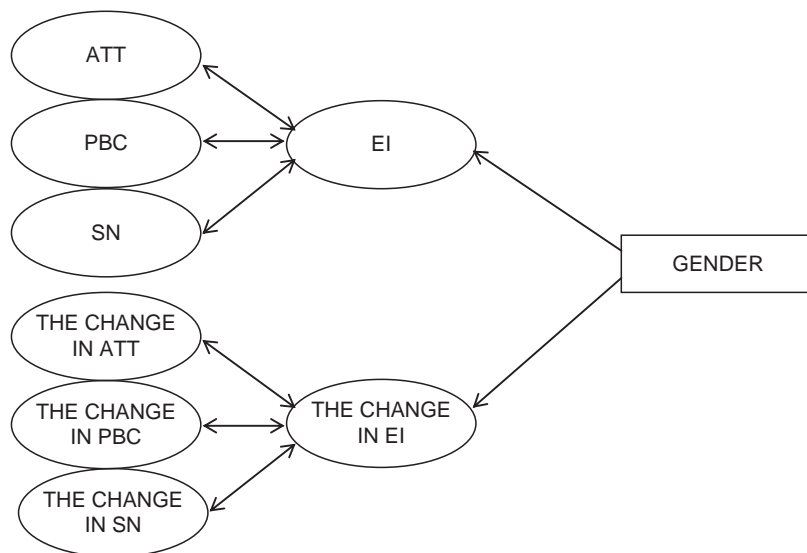
## Development of entrepreneurial intention

### Methodology

#### *Instrument and data collection method*

The instrument used in this study has been developed and piloted in Finland. The scales are largely based on Kolvereid (1996). The data were collected using a self-administered questionnaire in the autumn of 2010, 2011 and 2012. Students from seven different universities of applied sciences representing seven different study fields were administered the questionnaire. There is always difficulty with data loss in longitudinal studies. For the analysis we accepted those individuals who had answers for at least two waves. In our data there are 192 individuals with all three measurement waves and 104 individuals with two measurement waves. We compared those students with all waves to those who were missing one wave on demographic variables (age, gender, mother's or father's professional background as an entrepreneur). Given no statistically significant differences between the groups, selective attrition did not appear to be operating in this longitudinal data. For missing data we used estimation of means and intercepts with Amos. Respondents who had already begun preparing for a business venture of their own before the first survey were excluded from the final data, because their entrepreneurial intentions had already been realized in preparatory actions before the follow-up. In the final analysis there were 296 responses. 60 percent of the respondents were female. The mean age for the respondents was 21 in year 2010.

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**Notes:** ATT, attitudes; SN, subjective norm; PBC, perceived behavioral control; EI, entrepreneurial intentions

**Figure 1.**  
The theoretical intention development model

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*Variables*

*Entrepreneurial intentions.* An index of entrepreneurial intention was created by averaging eight items.

*Subjective norm.* The variable subjective norm has three items. Originally each item had a seven-point scale from 1 to 7. For the statistical analysis the scales were transformed to a  $-3$  to  $+3$  scale. In addition, motivation to comply was measured by three items (seven-point scale from 1 to 7) referring to each of the aforementioned belief questions. The belief based items (coded as ranging from  $-3$  to  $+3$ ) and the corresponding motivation to comply items (coded as ranging from 1 to 7) were multiplied, and then added to create an index of Subjective Norm.

*Perceived behavioral control.* An index of perceived behavioral control was created by averaging five item scores.

*Attitudes towards entrepreneurship.* An index of entrepreneurial attitude was created by averaging nine-item scores.

All the variables and their items are presented in Appendix 1. Table I presents Cronbach's  $\alpha$ , minimum and maximum scores, means and standard deviations for the scales (EI = entrepreneurial intentions, SN = subjective norm, PBC = perceived behavioral control, ATT = attitudes).

*Common method variance*

We tested the possible effects of common method variance for the variables collected using Harman's one factor test (Harman, 1976). If common method variance was a serious problem in the study, we would expect a single factor to emerge from a factor analysis or one general factor to account for most of the covariances in the independent and dependent variables (Podsakoff and Organ, 1986). All the items used to create the main variables, a total of 29 items, were factor analyzed using principal axis factoring where the unrotated factor solution was examined, as recommended by Podsakoff *et al.* (2003, p. 889). Kaiser's criterion for retention of factors was followed. The sample size seemed to be large enough for the factor analysis, at least based on the Kaiser-Meyer-Olkin measure of sampling adequacy ( $KMO = 0.88$ ).

Factor analytic results indicated the existence of nine factors with Eigenvalues  $> 1.0$ . The seven factors explained 62 percent of the variance among the 29 items, and the first factor accounted for 29 percent of the variance. Since several factors, as opposed to one single factor, were identified and since the first factor did not account

**Table I.**  
Cronbach's  $\alpha$ , minimum  
and maximum scores,  
means and standard  
deviations for the scales

	Cronbach's $\alpha$	Minimum	Maximum	Mean	SD
EI 2010	0.86	1.0	6.8	3.3	1.1
EI 2011	0.89	1.0	6.6	3.2	1.2
EI 2012	0.88	1.0	6.8	3.0	1.2
SN 2010	0.76	-63	45	-2.0	15.8
SN 2011	0.74	-63	34	-3.1	14.1
SN 2012	0.70	-54	36	-3.8	14.8
PBC 2010	0.74	1.0	7.0	4.0	1.0
PBC 2011	0.73	1.0	6.0	3.9	0.9
PBC 2012	0.78	1.0	6.6	3.9	1.1
ATT 2010	0.75	1.8	6.9	4.9	0.8
ATT 2011	0.80	2.4	6.9	4.8	0.8
ATT 2012	0.82	1.0	7.0	4.7	0.9



for the majority of the variance, a substantial amount of common method variance does not appear to be present. Thus, we conclude that common method variance bias is not a threat to the validity of the results. One should bear in mind though that this procedure does nothing to statistically control for the common method effect: it is just a diagnostic technique (Podsakoff *et al.*, 2003, p. 889). Hence, the possibility of common method issues cannot be fully discarded.

## Results

### *Latent growth analysis*

LGC modeling was utilized to test the model of development of entrepreneurial intent. LGC is a useful analytic tool for analyzing longitudinal data, because in addition to means, it accounts for both within person and between person variance in the statistical model. Multi-wave data allows for more effective testing of systematic inter-individual differences in change. The model includes two growth parameters: first, an intercept parameter representing an individual's score on the outcome variable at the initial state, and second a slope parameter representing the individual's rate of change over the time period of interest. (Byrne, 2010, p. 305). In this study we used three measurement waves at one-year intervals.

First we focused on modeling individual differences in growth. In order to examine growth of entrepreneurial intentions, a two-factor Latent Growth Model (LGM) was used. The Intercept factor describes the initial level of entrepreneurial intention (intercept mean) and individual differences at the initial level (intercept variance). The factor loadings for intentions were set at 1 for each time because the intercept is a constant for individuals across time. The Slope factor represents the rate of change (slope mean) and individual differences in growth patterns (slope variance). For testing a linear growth model, these factor loadings were fixed to correspond to a linear time scale (0, 1, 2). The parameters of growth were estimated using structural equation modeling with Amos 19.

The goodness of fit is presented with the following indices:  $\chi^2$ -value,  $p$ -value, the root mean square error of approximation (RMSEA), normed fit index (NFI) and comparative fit index (CFI). The basic linear model of growth produced an excellent fit:  $\chi^2 = 0.024$ ,  $p = 0.877$ , RMSEA = 0.000, NFI = 1.000, CFI = 1.000.

### *Characteristics of latent curve of intentions*

The estimates of growth parameters of the linear model are presented in Table II (Intercept, Slope and Error terms). The estimated mean for intercept is 3.3, which is the mean estimate for entrepreneurial intention at the beginning of studies. The mean estimate for the slope mean is  $-0.103$ . That indicates a negative and a significant growth rate. Covariance between the initial state and growth rate ( $-0.020$ ) was not significant, which indicates that initial level is unrelated to the rate of change. The variance related to intercept is significant. The finding reveals strong inter-individual differences in initial scores. The variance related to slope is not significant. There are no inter-individual differences in growth trajectories.

### *Effect of gender on LGC*

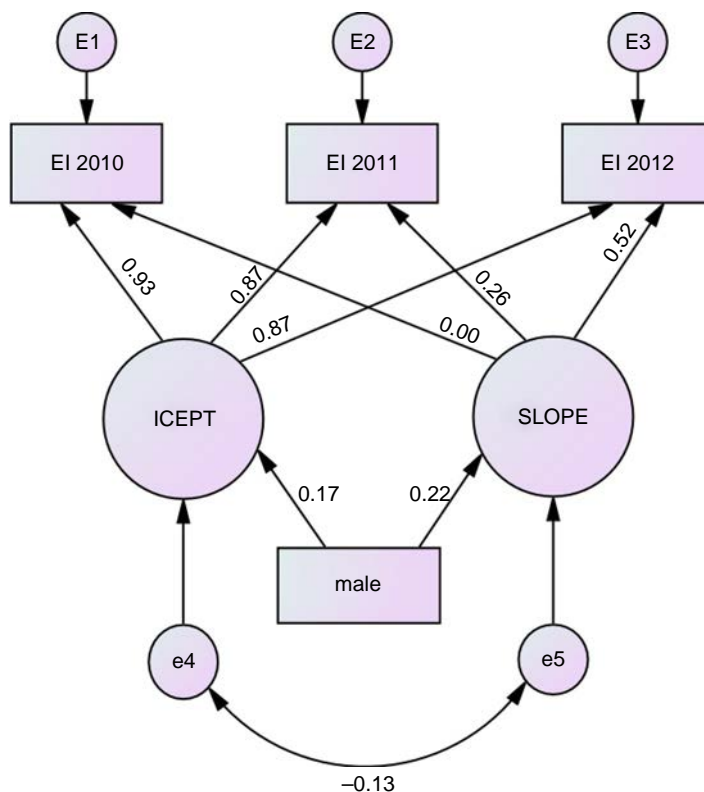
Gender (male) was used as a person covariate in the model. The model with standardized regression weights is presented in Figure 2. Gender has a significant effect on both the intercept and the slope parameters. For male students the initial level

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**Table II.**  
Estimates of growth  
parameters of the  
linear model

	Estimate	SE	CR	<i>p</i>
<i>Means</i>				
ICEPT	3.255	0.064	51.137	***
SLOPE	−0.103	0.022	−4.588	***
<i>Covariances</i>				
ICEPT ↔ SLOPE	−0.020	0.051	−0.386	0.700
<i>Variances</i>				
ICEPT	1.039	0.126	8.246	***
SLOPE	0.084	0.047	1.781	0.075
E1	0.169	0.094	1.808	0.071
E2	0.280	0.053	5.240	***
E3	0.093	0.100	0.928	0.354

**Note:** \*\*\* $p < 0.001$ **Figure 2.**  
Gender (male) effect on  
latent growth curve of  
entrepreneurial intentions**Note:** Standardized regression weights

of intention is higher. Gender (if male) also has a positive effect on the development of intentions over three years. The estimates of growth parameters of the linear model are presented in Table III. The model produced an excellent fit:  $\chi^2 = 1.098$ ,  $p = 0.578$ , RMSEA = 0.000, NFI = 0.998, CFI = 1.000.

There is a strong difference between male and female students in the development of intentions. Female students' mean estimate for the initial state is 3.1, the following year 3.0 and the third year 2.8. Estimates for the male students over the same time period are 3.5, 3.4 and 3.4. Male students have a higher initial level and intentions do not decrease as much as with the female students. The result supports our theoretical model with gender effect on the initial level and the development of entrepreneurial intentions.

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### *Means, covariance structures and variances between intention, attitudes, subjective norm and perceived behavioral control*

We tested the relatedness of the initial level and development of attitudes, subjective norm and perceived behavioral control to the initial level and the development of intentions. A multi-domain LGC model was created for testing (see Appendix 3). As Willett and Sayer (1996) suggest, covariation among the growth parameters across domains was included. Table IV presents the results related to entrepreneurial intention development. Other covariance structures are presented in Appendix 4. The mean estimates for slopes show that attitudes develop significantly in a negative direction. Also perceived behavioral control has a small negative development.

	Estimate	SE	CR	<i>p</i>	Standardized regression weight
ICEPT ← male	0.366	0.130	2.817	**	0.174
SLOPE ← male	0.136	0.046	2.970	**	0.214

**Note:** \*\**p* < 0.01

**Table III.**  
Estimates of growth parameters with gender

	Estimate	SE	CR	<i>p</i>
<i>Means</i>				
ATT ICEPT	4.876	0.043	113.378	***
ATT SLOPE	−0.072	0.022	−3.293	***
SN ICEPT	−2.061	0.893	−2.307	*
SN SLOPE	−0.866	0.491	−1.763	0.078
PBC ICEPT	4.030	0.055	73.023	***
PBC SLOPE	−0.065	0.028	−2.341	*
<i>Covariances</i>				
ATT ICEPT ↔ EI ICEPT	0.471	0.055	8.639	***
ATT SLOPE ↔ EI SLOPE	0.049	0.009	5.413	***
SN ICEPT ↔ EI ICEPT	1.574	0.983	1.601	0.109
SN SLOPE ↔ EI SLOPE	0.292	0.190	1.536	0.125
PBC ICEPT ↔ EI ICEPT	0.589	0.070	8.471	***
PBC SLOPE ↔ EI SLOPE	0.048	0.011	4.317	***
<i>Variances</i>				
ATT ICEPT	0.348	0.061	5.755	***
ATT SLOPE	0.041	0.027	1.551	0.121
SN ICEPT	135.230	28.569	4.733	***
SN SLOPE	11.662	12.815	0.910	0.363
PBC ICEPT	0.567	0.089	6.367	***
PBC SLOPE	0.044	0.037	1.209	0.227

**Notes:** \**p* < 0.05; \*\*\**p* < 0.001

**Table IV.**  
Estimates of intercept and slope factors related to attitudes (ATT), subjective norm (SN) and perceived behavioral control (PBC); and covariances with entrepreneurial intentions (EI)

Subjective norm remains almost at the same level during studies. Covariance structures reveals that intercept of attitudes and perceived behavioral control are strongly related to the intercept of intentions. This means that the initial level of intentions is related to the initial level of attitudes and perceived behavioral control. Individuals with high values in entrepreneurial intentions also have high values in attitudes and perceived behavioral control. The initial level of subjective norm, however, does not seem to be related to the initial level of intentions; nor is the development of subjective norm related to the development of entrepreneurial intentions. The slope of attitudes and the slope of perceived behavioral control are strongly related to the development of entrepreneurial intentions. This result indicates that as students' perceptions of their entrepreneurial ability and attitudes towards entrepreneurship undergo a moderate increase, so do their entrepreneurial intentions as well.

Variances show that there are strong inter-individual differences in the initial level of attitudes, subjective norm and perceived behavioral control. There are no inter-individual differences in the growth trajectories related to attitudes, subjective norm and perceived behavioral control.

The tested model produced a good fit: RMSEA = 0.072, NFI = 0.95, CFI = 0.97. Although the fit statistics with  $\chi^2$ -distribution (86.720,  $p = 0.000$ ) is not good, the problems with  $\chi^2$ -statistics is widely known when the sample size is large (Byrne, 2010, p. 76).

The results give support for the hypothesized model except for the relatedness of subjective norm with entrepreneurial intentions. The initial level with subjective norm and the development of subjective norm seems to be unrelated to the initial level and the development of entrepreneurial intentions.

## Discussion

We have made an attempt in this study to increase our understanding about the development of entrepreneurial intentions during first to third year university studies and the role of gender. Our empirical sample consisted of a unique panel data from seven different universities of applied sciences in Finland and students representing seven different study fields. The analysis of change on multi-wave panel data was conducted using LGC analysis with structural equation modeling.

In summary, our empirical results are threefold. First, entrepreneurial intentions of higher education seem to decrease during their studies. Second, there is a gender difference in the initial level of entrepreneurial intentions and how intentions develop over time. Third, the initial level of intentions does not affect the future development of intentions. Below we comment on each of these findings, relate them to the existing literature, and propose avenues for future research.

### *Intentions decrease during studies*

The first objective of our study was to analyze the development of intentions of individuals over time. Our empirical observations over two and a half years confirm that, generally speaking, entrepreneurial intentions of a student of higher education institute seem to decrease. This observation is in line with earlier empirical studies concerning student populations (e.g. Fayolle *et al.*, 2005; Henley, 2005; Pihkala, 2008; Wu and Wu, 2008; Nabi *et al.*, 2010). Based on our study, it seems that individuals at the beginning of their studies seem to have greater self-confidence and will in starting their own businesses than they do after studying two and a half years. It is, however, quite typical that people overrate their intention to perform a distant action. Hence, in the

beginning of their studies a student may overrate their intent to start a business after graduation, whereas, by the time of graduation the student is more realistic about their own competencies, the requirements of starting their own businesses and other career options. More interestingly, people have a tendency to rate temporally distant actions based on positive aspects (pros), and temporally near actions based on negative aspects (cons) (Eyal *et al.*, 2004). When students start their studies, the entrepreneurial act is temporally distant, so it is evaluated based on pros, therefore more positive intentions towards entrepreneurship. When the students are about to graduate, however, the probable entrepreneurial action is temporally closer. In these situations, students are more attached to the cons than pros, therefore, entrepreneurial intentions decrease compared to the initial level. Future studies could explore this phenomenon by comparing the kinds of attributes student attach to entrepreneurship and how these attributes, potentially, change during the studies.

#### *The non-importance of initial intention level*

According to empirical observations the initial level of intentions does not influence the development of intentions over three years of study (see also Pihkala, 2008). That is, the initial level of intentions does not condition the subsequent development of intentions. This is contradictory to some other studies (e.g. Varamäki *et al.*, forthcoming). There are no significant differences between individuals in intention development. However, strong inter-individual differences can be found in the initial level of intentions.

#### *Females have a lower level of initial intentions, and intentions decrease more than among males*

The second objective of our study was to explore potential gender differences in intention development. Our empirical observations clearly demonstrate a gender difference in both initial level of intentions and the way in which intentions evolve over time. Indeed, male students seem to have higher intentions to begin with (see also Wang and Wong, 2004; Zhao *et al.*, 2005; Sequeira *et al.*, 2007; Linan and Chen, 2009; cf. Lee *et al.*, 2011). More interestingly, the level of intentions among male students does not seem to decrease as much as the intentions of female students. Similar results have been observed earlier by other scholars (e.g. Zhang *et al.*, 2013; cf. Wilson *et al.*, 2009; Also and Isaksen, 2012). While it was out of the scope of our study, future studies could explore why the level of intentions among women decreases more than males. It might well be that there are difference in the way women and men learn in the higher educational setting. In some earlier studies differences in learning styles between men and women have been found. For example, women might react differently to pedagogical methods than males. As such, there might be differences in learning styles between men and women (Gallos, 1993). Also, the effectiveness and value of team-based pedagogical exercises for women students has been called into question, because women seem to be less happy with team-based exercises in business classes (e.g. Kaenzig *et al.*, 2007). We encourage future studies to pay attention to learning styles of individuals to discover whether the differences observed in this study can be attributed to difference in learning styles of individuals.

#### *The change in antecedents is related to the change in intentions*

The third objective of our study was to analyze the relatedness of the initial level and development of the antecedents of intentions to the initial level and the development of

intentions. The results show that the initial level of intentions is related to the initial level of attitudes and perceived behavioral control but not to the initial level of subjective norm. Moreover, the change in attitudes and perceived behavioral control is related to the change in intentions. Once again, the change in subjective norm has no effect on the change in intentions.

These results mean that our empirical observations also seem to confirm the validity of the intention model put forward by Ajzen. More particularly, the model seems to have predictive relevance when the development of intentions is examined over time. While the model has been tested extensively, most empirical studies have been cross-sectional. Our three-point data supports the model as a whole, and identifies the non-significant role of subjective norm on the development of entrepreneurial intentions, conforming to some earlier studies (e.g. Zhang *et al.*, 2013; cf. e.g. Siu and Lo, 2013; Engle *et al.*, 2010; Aizzat *et al.*, 2009).

### Limitations and conclusion

While we believe that the results presented herein add to our understanding of the role of entrepreneurship education in the development of entrepreneurial intentions in higher education contexts, we acknowledge that the present research is not entirely beyond reproach.

From a theoretical standpoint, we limited our efforts to investigate the effect of higher education in general in entrepreneurial intentions and role of gender in this process. We do acknowledge that entrepreneurial education may have an impact on intention development during higher education studies although the earlier results are controversial. An interesting extension of our study would be to investigate whether participation in entrepreneurship education and different entrepreneurial pedagogy have effects on students' entrepreneurial intentions. Furthermore, we limited our focus on one intention model when other possible approaches could have been available to study the development of entrepreneurial intentions. Again, future scholarly work could complement our results by investigating the same phenomenon through other theoretical lenses.

From an empirical standpoint, our sample was limited to higher education students in one country. Increasing our knowledge of the potential effects of the general environmental and cultural contexts on the formation of entrepreneurial intentions requires further research using versatile samples comprising university students in other countries. In addition, longitudinal designs are always demanding. The loss of data is problematic as seen in our study with three-point data collection during three years' time. The missing data can bias conclusions drawn from the study and the obvious disadvantage in the loss of information resulting from the reduced sample size. On the other hand, longitudinal panel data are very rare. The strength of our data is its longitudinal nature and the fact that we were able to follow the development of entrepreneurial intentions at the individual level. There is, however, an opportunity for someone to improve data collection methods to minimize the loss of respondents between subsequent data collection phases.

In conclusion, we believe that our study makes an important contribution to the field of entrepreneurial education by concluding that intention development in higher educational context is not a simple matter, but rather complicated process during which young people can realize their true potential *vis-à-vis* entrepreneurial opportunities. From an educators' point of view such realization generally means a decrease in an individual's entrepreneurial intentions, which is a phenomenon

that does not provide much encouragement for educators. On the other hand, one of the aims of any entrepreneurship education is to give younger people a more realistic picture about entrepreneurship. When someone is willing to start a new business in this kind of context, we as educators can be a degree more confident that such an individual is not launching his/her venture because of idealistic dreams. By using a longitudinal design, our study is one of the first to provide empirical evidence about the intention of development over time. Ultimately, we hope to have added richness to the continuing discussion among academics and educators alike regarding the importance of intention development in entrepreneurship education.

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(The Appendices follows overleaf.)

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## Appendix 1

Variable (all measured on a seven-point Likert scale; translated from Finnish)

*Entrepreneurial intention*

How likely are you to start your own business and work as an entrepreneur after graduation (or while still studying)?

If you were supposed to choose between entrepreneurship and salaried work after graduation, which one would you choose?

How strong is your intention to embark on entrepreneurship at some point of your professional career?

How likely are you to embark on entrepreneurship after you have gathered a sufficient amount of work experience?

If you were supposed to choose between entrepreneurship and unemployment after graduation, which one would you choose?

*Subjective norm<sup>a</sup>*

I believe that *my closest family members* think I should not/should strive to start my own business and to work as an entrepreneur after graduation.

How much attention do you pay to what your closest *family members* think if you strive to start your own business and to work as an entrepreneur after graduation?

I believe that *my best friends* think I should not/should strive to start my own business and to work as an entrepreneur after graduation.

How much attention do you pay to what *your best friends* think if you strive to start your own business and to work as an entrepreneur after graduation?

I believe that *my significant others* think I should not/should strive to start my own business and to work as an entrepreneur after graduation.

How much attention do you pay to what *your significant others* think if you strive to start your own business and to work as an entrepreneur after graduation?

*Perceived behavioural control*

If I established a business and started to work as an entrepreneur after graduation, my chance of success would be (good/bad)

If I really wanted to, I could easily start a business and work as an entrepreneur after graduation

There are very few/numerous things that are beyond my own control but could prevent me from starting my own business and working as an entrepreneur after graduation.

For me, starting my own business and working as an entrepreneur after graduation (very easy/very difficult)

If I established my own business and started to work as an entrepreneur after graduation, my risk of failure would be (very small/very big)

*Attitudes towards entrepreneurship*

To what extent do the following attributes correspond to your perceptions of entrepreneurship (i.e. establishing a business and working as an entrepreneur)? (not at all – completely)

Interesting

Esteemed

Worth pursuing

Boring

Fascinating

Despised

Good income level

**Notes:** In addition, motivation to comply was measured by three items (seven-point scale from 1 to 7) referring to each of the aforementioned belief questions. The belief based items (coded as ranging from -3 to 3) and the corresponding motivation to comply items (coded as ranging from 1 to 7) were multiplied, and then added to create an index of Subjective Norm. <sup>a</sup>For the statistical analysis the scales were transformed to -3- +3 scale

**Table A1.**  
Variables and their items

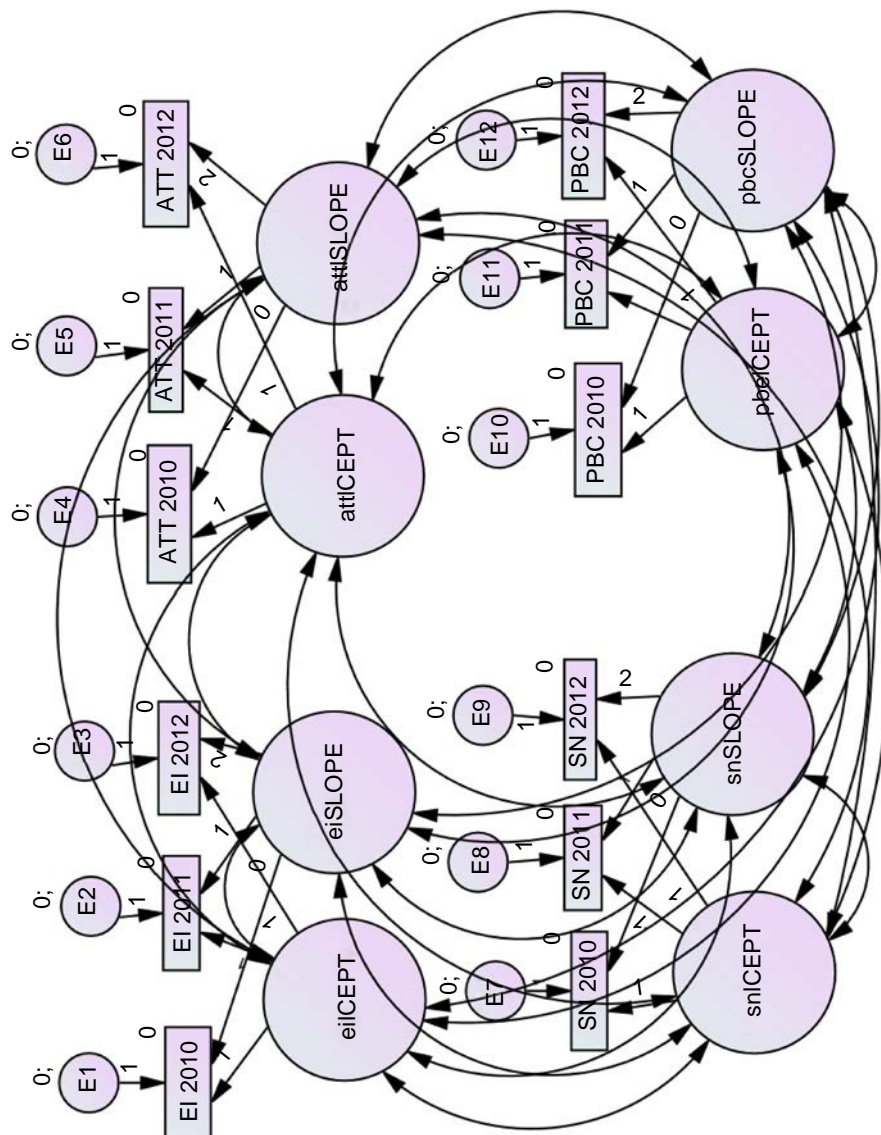
Appendix 2

	EI 2010	SN 2010	PBC 2010	ATT 2010	EI 2011	SN 2011	ATT 2011	PBC 2011	EI 2012	SN 2012	PBC 2012	ATT 2012	gender
<i>EI 2010</i>	1												
<i>SN 2010</i>		1											
Pearson correlation	0.090	1											
Significance (two-tailed)	0.122												
<i>PBC 2010</i>			1										
Pearson correlation	0.561**	-0.046	1										
Significance (two-tailed)	0.000	0.429											
<i>ATT 2010</i>				1									
Pearson correlation	0.544**	0.008	0.496**	1									
Significance (two-tailed)	0.000	0.886	0.000										
<i>EI 2011</i>					1								
Pearson correlation	0.795**	0.036	0.501**	0.509**	1								
Significance (two-tailed)	0.000	0.625	0.000	0.000									
<i>SN 2011</i>						1							
Pearson correlation	0.138	0.516**	-0.002	-0.059	0.144*	1							
Significance (two-tailed)	0.058	0.000	0.973	0.421	0.048								
<i>ATT 2011</i>							1						
Pearson correlation	0.488**	-0.037	0.430**	0.592**	0.637**	0.121	1						
Significance (two-tailed)	0.000	0.608	0.000	0.000	0.000	0.098							

(continued)

Table AII.  
Correlations (Pearson)  
between the main  
variables

	EI 2010	SN 2010	PBC 2010	ATT 2010	EI 2011	SN 2011	ATT 2011	PBC 2011	EI 2012	SN 2012	PBC 2012	ATT 2012	gender
<i>PBC 2011</i>													
Pearson correlation	0.490 <sup>***</sup>	-0.066	0.671 <sup>***</sup>	0.456 <sup>***</sup>	0.624 <sup>***</sup>	-0.016	0.528 <sup>***</sup>	1					
Significance (two-tailed)	0.000	0.363	0.000	0.000	0.000	0.831	0.000						
<i>EI 2012</i>													
Pearson correlation	0.771 <sup>***</sup>	0.107	0.526 <sup>***</sup>	0.424 <sup>***</sup>	0.835 <sup>***</sup>	0.171 <sup>*</sup>	0.495 <sup>***</sup>	0.583 <sup>***</sup>	1				
Significance (two-tailed)	0.000	0.067	0.000	0.000	0.000	0.019	0.000	0.000					
<i>SN 2012</i>													
Pearson correlation	0.040	0.400 <sup>***</sup>	-0.044	0.004	0.089	0.462 <sup>***</sup>	0.004	0.010	0.133 <sup>*</sup>	1			
Significance (two-tailed)	0.495	0.000	0.453	0.945	0.223	0.000	0.958	0.889	0.023				
<i>PBC 2012</i>													
Pearson correlation	0.449 <sup>***</sup>	-0.009	0.557 <sup>***</sup>	0.278 <sup>***</sup>	0.484 <sup>***</sup>	0.055	0.382 <sup>***</sup>	0.699 <sup>***</sup>	0.578 <sup>***</sup>	-0.020	1		
Significance (two-tailed)	0.000	0.872	0.000	0.000	0.000	0.453	0.000	0.000	0.000	0.738			
<i>ATT 2012</i>													
Pearson correlation	0.490 <sup>***</sup>	0.023	0.464 <sup>***</sup>	0.595 <sup>***</sup>	0.564 <sup>***</sup>	0.121	0.705 <sup>***</sup>	0.468 <sup>***</sup>	0.567 <sup>***</sup>	0.060	0.444 <sup>***</sup>	1	
Significance (two-tailed)	0.000	0.690	0.000	0.000	0.000	0.096	0.000	0.000	0.000	0.309	0.000		
<i>Gender</i>													
Pearson correlation	0.170 <sup>***</sup>	-0.107	0.226 <sup>***</sup>	0.045	0.191 <sup>***</sup>	-0.048	0.041	0.248 <sup>***</sup>	0.268 <sup>***</sup>	-0.013	0.252 <sup>***</sup>	0.055	1
Significance (two-tailed)	0.004	0.069	0.000	0.445	0.009	0.515	0.574	0.001	0.000	0.829	0.000	0.350	
<b>Notes:</b> *, **Correlation significant at 0.05, 0.01 levels, respectively (two-tailed)													



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## Appendix 4

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	Estimate	SE	CR	<i>p</i>
<i>Covariances</i>				
eiICEPT ↔ eiSLOPE	0.040	0.041	0.987	0.324
eiICEPT ↔ attICEPT	0.471	0.055	80.639	***
eiICEPT ↔ attSLOPE	0.014	0.024	0.587	0.557
eiICEPT ↔ snSLOPE	−0.305	0.539	−0.566	0.572
eiICEPT ↔ pbcICEPT	0.589	0.070	80.471	***
eiICEPT ↔ pbcSLOPE	−0.037	0.031	−1.200	0.230
eiSLOPE ↔ attICEPT	−0.038	0.017	−2.266	0.023
eiSLOPE ↔ attSLOPE	0.049	0.009	5.413	***
eiSLOPE ↔ snSLOPE	0.292	0.190	1.536	0.125
eiSLOPE ↔ pbcICEPT	0.005	0.021	0.248	0.804
eiSLOPE ↔ pbcSLOPE	0.048	0.011	4.317	***
attICEPT ↔ attSLOPE	0.030	0.029	1.008	0.313
attICEPT ↔ snICEPT	0.020	0.659	0.031	0.975
attICEPT ↔ snSLOPE	−0.011	0.363	−0.029	0.977
attICEPT ↔ pbcICEPT	0.377	0.046	8.149	***
attICEPT ↔ pbcSLOPE	−0.066	0.021	−3.146	0.002
attSLOPE ↔ snICEPT	0.274	0.340	0.807	0.420
attSLOPE ↔ snSLOPE	0.147	0.187	0.785	0.432
attSLOPE ↔ pbcICEPT	0.010	0.021	0.487	0.626
attSLOPE ↔ pbcSLOPE	0.040	0.011	3.682	***
snICEPT ↔ snSLOPE	−20.397	15.697	−1.299	0.194
snICEPT ↔ pbcICEPT	−0.736	0.847	−0.869	0.385
snICEPT ↔ pbcSLOPE	0.357	0.429	0.833	0.405
snSLOPE ↔ pbcICEPT	0.234	0.466	0.501	0.616
snSLOPE ↔ pbcSLOPE	−0.073	0.235	−0.308	0.758
pbcICEPT ↔ pbcSLOPE	0.007	0.043	0.152	0.879
eiICEPT ↔ snICEPT	1.574	0.983	1.601	0.109
eiSLOPE ↔ snICEPT	0.240	0.345	0.695	0.487
<i>Variances</i>				
eiICEPT	0.946	0.111	8.497	***
eiSLOPE	0.027	0.034	0.791	0.429
attICEPT	0.348	0.061	5.755	***
attSLOPE	0.041	0.027	1.551	0.121
snICEPT	1,35.230	28.569	4.733	***
snSLOPE	11.662	12.815	0.910	0.363
pbcICEPT	0.567	0.089	6.367	***
pbcSLOPE	0.044	0.037	1.209	0.227
E1	0.298	0.070	4.252	***
E2	0.221	0.037	5.973	***
E3	0.195	0.069	2.818	0.005
E4	0.220	0.051	4.338	***
E5	0.244	0.033	7.357	***
E6	0.192	0.061	3.154	0.002
E7	1,13.746	27.723	4.103	***
E8	90.366	13.688	6.602	***
E9	1,20.097	26.204	4.583	***
E10	0.400	0.072	5.595	***
E11	0.218	0.035	6.282	***
E12	0.342	0.077	4.429	***

Note: \*\*\**p* < 0.001

## Table AIII.

The covariances and variances of the multi-level LGC model for entrepreneurial intentions, attitudes, subjective norm and perceived behavioral control



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1. Sanna Joensuu-Salo, Elina Varamäki, Anmari Viljamaa. 2015. Beyond intentions – what makes a student start a firm?. *Education + Training* 57:8/9, 853-873. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]