

Starting Up a Firm or Not: Differences in Antecedents of Entrepreneurial Intentions

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Abstract

Entrepreneurial intentions and their antecedents have been extensively studied in student populations, with results suggesting that higher education does not promote formation of entrepreneurial intentions by students. In this study, we examine the antecedents of intentions in two different student populations: those who are currently starting a firm and those who are not. Gender and entrepreneurial role-models are used as control variables. Further, we examine the utility of applying intention measures for individuals already acting upon their intention. As a framework we use the Theory of Planned Behavior by Ajzen (1991). The data of 3754 responses was collected using a self-administered questionnaire in seven different universities of applied sciences from students representing eight different study fields. The results show that the Ajzen's model explains better the intentions of those who are not in the process of starting a firm than of nascent entrepreneurs.

Keywords

Entrepreneurial intentions, antecedents of intentions, students, higher education, start-up activities

Introduction

New start-ups and new entrepreneurs are needed in any economic system. Public discourse tends to focus on innovative high growth firms, but at the same time, simply maintaining a dynamic business ecosystem requires input of new entrepreneurs. At the same time, as economies rely increasingly on a highly educated workforce, there is pressure to increase levels of education. The question of how higher education affects the formation of entrepreneurial intentions is thus becoming a crucial one.

Higher education, according to some studies, reduces the likelihood of entrepreneurship (Kangasharju and Pekkala, 2002; Henley, 2007; Pihkala, 2008; Wu and Wu, 2008; Nabi et al., 2010; Joensuu et al., 2013). Other studies (Blanchflower and Meyer, 1994; Ertuna and Gurel, 2011; Lanero et al., 2011; Zhang et al., 2013) suggest the opposite. While higher education can contribute personal resources that support a successful career in entrepreneurship, a higher education diploma also makes a person a more desirable employee who might find salaried employment a more attractive alternative than entrepreneurship. In countries with high general levels of education, a lack in entrepreneurial drive has been noted (e.g. Xavier et al., 2012). Davey et al. (2011) find that particularly in developed nations higher education students are less likely to view entrepreneurship as an attractive career compared to students in less developed nations.

Entrepreneurial intentions of higher education graduates are thus a popular research issue. Entrepreneurial intentions refer here to the commitment to starting a new business (Krueger and Carsrud, 1993) by a graduate, either directly after graduation or later. Much of the preceding entrepreneurial intention research has focused on testing entrepreneurial

intention models. Longitudinal settings, however, are lacking (e.g. Matlay and Carey, 2007; Fayolle and Liñán, 2013) and in particular the link between intentions and behavior, i.e. actual start-up, remains largely unexplored (Sequeira et al., 2007; Carsrud and Brännback, 2011; Schlaegel and Koenig, 2014). Furthermore, few studies have addressed the actual entrepreneurial efforts of students except where the efforts are a part of entrepreneurship curriculum (e.g. Rae, 2012).

In this study, we examine the antecedents of intentions in two different student populations: those who are currently starting a firm and those who are not. The objectives of this study are: (1) to analyze the antecedents of intentions with higher education students who are currently starting a firm (nascent entrepreneurs); (2) to analyze the antecedents of intentions with higher education students who are not currently starting a firm; and (3) to examine the utility of applying intention measures for individuals already acting upon an intention. We use theory of planned behavior for analyzing the intentions. In addition to basic components of TPB (attitudes, subjective norm and perceived behavioral control) we test the impact of entrepreneurial characteristics of the student for intentions. Gender and entrepreneurial role-models are used as control variables.

The analysis is done by using linear regression analysis for intentions with SPSS 21.

The rest 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. Last, we discuss the implications of our study.

Review of literature and theoretical model

Intentions and their antecedents

We apply an established intention model, the Theory of Planned Behavior by Ajzen (1991), which is one of the most widely used psychological theories to explain and predict human behavior (Kolvereid, 1996; Tkachev and Kolvereid, 1999). According to the Theory of Planned Behavior (TPB), intention is the immediate antecedent of behavior, meaning that the stronger the intention to engage in a specific behaviour, 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., 2013b). Further, according to TPB intentions themselves have three conceptually independent determinants: attitude towards the behavior, subjective norm and perceived behavioral control (Ajzen, 1991).

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 & Sokol, 1982; Krueger et al., 2000; Segal et al., 2005; van Gelderen and Jansen, 2006; Pruett et al., 2009) the more favourable their attitude towards that behaviour 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). Generally speaking, the more the opinion of a particular referent group or individual matters to the individual, and the more encouraging of enterprising activity the individual believes it, 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 behaviour (see Bandura et al., 1980; Swan et al., 2007). In general, the greater this perceived behavioural 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 (1980) concept of perceived self-efficacy.

According to TPB, the three antecedents should be sufficient to predict intentions, but the relative importance of the three factors can vary from one context to another, and only one or two antecedents might be needed in a given application (Ajzen and Fishbein, 2004). In most of the studies the best predictor of intentions has been perceived behavioral control (Armitage and Conner 2001; 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; Finis-terra Do Paco et al., 2011; Lee et al., 2011; Lope Pihie and Bagheri 2011). In other studies

attitudes (Zampetakis et al., 2009; Moi et al., 2011) and sometimes subjective norm have had more importance (Aizzat et al., 2009; Lope, et al., 2009; Engle et al., 2010; Siu and Lo, 2013). Kautonen et al., 2013a) found that attitude, subjective norm and PBC jointly explain 59 percent of the variation in intention. In a meta-analytic review from Armitage and Conner (2001), the TPB accounted for 27 percent and 39 percent of the variance in behavior and intention, respectively.

In addition to attitudes, subjective norm and perceived behavioral control, we test the student's *entrepreneurial characteristics* as an antecedent of entrepreneurial intentions. Fayolle and Liñán (2013), for example, have called for proposals of new scales for entrepreneurial intention studies. Identifying entrepreneurial traits within an individual has been criticized (see Holmgren et al., 2004), and some studies suggest that TPB provides more predictive power than personality traits (Kautonen et al., 2013b; see also Krueger et al., 2000), yet we suggest that entrepreneurial characteristics present a worthwhile avenue to explore in the context of entrepreneurial intentions. The better one judges his/her entrepreneurial characteristics in carrying out entrepreneurial task, the more positive impact this should have on the development of entrepreneurial intentions as well as actual entrepreneurial behavior. In general entrepreneurial characteristics refer to abilities usually linked to entrepreneurs, such as risk taking propensity (Cantillon), ability to organize (Say) and innovativeness (Schumpeter). There is, however, some variation in which entrepreneurial characteristics the different authors have taken into account. In Marques et al.'s (2013) study, individuals who had previously created a firm had particular psychological and cognitive characteristics conducive to entrepreneurial activity; they find that entrepreneurs have common personal attributes such as the need for achievement, self-

control, propensity to risk exposure, tolerance of ambiguity, self-confidence and innovation. Vrdoljak and Dulcic (2011) argue that the most important characteristics of an entrepreneur are desire to achieve, locus of control, risk taking, tolerance of ambiguity, self-confidence and innovativeness whereas Uddin and Bose (2012) find tendency to take risks and need for achievement significant in determining the intentions of students. Kumara and Vasantha (2009), who tested entrepreneurial characteristics among business students, included as characteristics innovativeness, tolerance of ambiguity and creative problem solving. In this study, we apply these same entrepreneurial characteristics (innovativeness, tolerance of ambiguity, creative problem solving) and also the ability to organize as an antecedent of intentions.

Control variables

Gender

In previous entrepreneurial intention studies, gender has received the greatest attention among control variables, followed by roles modes (Fayolle and Liñán, 2013). In Finland, 25% of men and 31% of women have a higher education degree; at the same time, only a third of entrepreneurs are female (Suomen virallinen tilasto, 2013). 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 new businesses than men, *gender* is included in our theoretical model as a factor influencing on entrepreneurial intentions. Also and Isaksen (2012) found that among Norwegian female 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.

Entrepreneurial role-models

Role models have been found to be a significant factor in entrepreneurial intentions (Kolvereid, 1996; Van Auken et al., 2006; Bosma et al., 2012). In cases of Uygun's and Kasimoglu's (2013) study, entrepreneurs who started their enterprises in sectors where their role models were already active, role model firstly affected self-efficacy, and then self-efficacy caused a positive effect on perceived feasibility. In cases where entrepreneurs chose different sectors than their role models, Uygun and Kasimoglu argue that role model had a direct influence on perceived desirability and self-efficacy. Engle et al. (2011) examined the relative social influence of family, friends, and role models on entrepreneurial intent in 14 countries. They found that each of the individual social groups is a significant predictor of entrepreneurial intent. As previous studies suggest, we include role models as a control variable in our study. We test specifically the effect of mother's or father's professional background as an entrepreneur in the model.

The Intention model

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

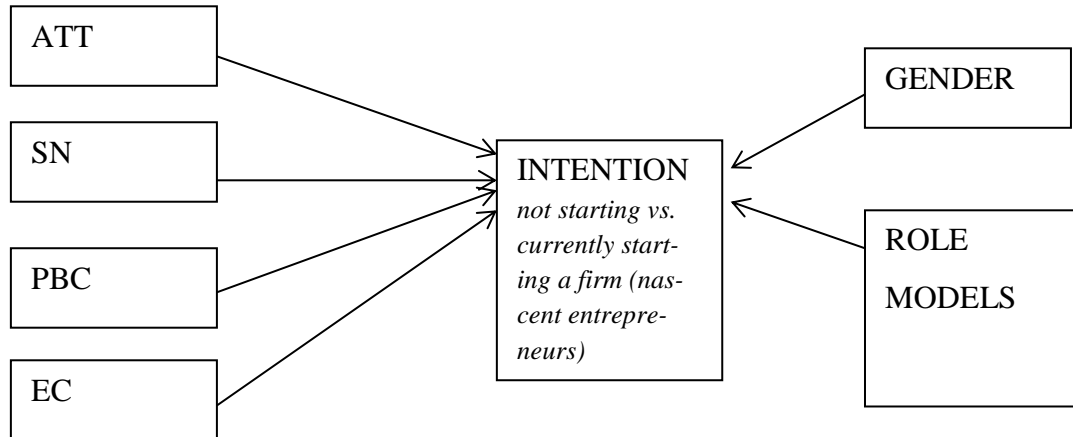


Figure. 1. The Theoretical Intention Development model (ATT=Attitudes, SN=Subjective Norm, PBC=Perceived Behavioral Control, EC=Entrepreneurial Characteristics).

Methodology

Instrument and data collection method

The instrument used in the study has been developed and piloted in Finland. The scales are largely based on Kolvereid (1996). The data was collected using a self-administered questionnaire in fall 2012 in seven different universities of applied sciences, with students representing eight different study fields. In the data we have 3754 responses. Among these respondents there are 182 students who were starting their own business in time of the

study. The intention is analyzed with linear regression modeling with 3572 students. Behavior related to starting up a firm is analyzed with logistic regression modeling with 182 students.

57 percent of the respondents were female. The mean age of the respondents were 23 in fall 2012. 2062 respondents were on their 1st study year, 895 on their 2nd, 537 on their 3rd and 260 on their 4th study year. As a basic education, 25 percent of the respondents had a vocational education, 64 percent had upper secondary school education and 6 percent had a double degree. Rest of the respondents had something else for basic education. 15 percent had a mother with a professional background as an entrepreneur and 32 percent had a father with professional background as an entrepreneur. Most of the responses were students from Social services, Health and Sports (22 percent), Technology, Communications and Transport (24 percent) and Social sciences, Business and Administration (26 percent). Other study fields were Humanities and Education (0.4 percent), Culture (9 percent), Natural Sciences (0.7 percent), Natural Sources and the Environment (11 percent) and Tourism, Catering and Domestic Services (7 percent).

Variables

Entrepreneurial Intentions. An index of entrepreneurial intention was created by averaging five items.

Subjective Norm. Originally the support from persons close to the individual (belief items) was measured with three items (seven-point scale from 1 to 7) and motivation to comply was measured by three items (seven-point scale from 1 to 7) referring to each of the aforementioned belief questions (three items). For statistical analysis the motivation to comply

items were transformed to -3 - +3 scale. The belief based items (coded as ranging from 1 to 7) and the corresponding motivation to comply items (coded as ranging from -3 to +3) were multiplied, and then added to create an index of Subjective Norm (ranging from -63 to +63). This coding is based on Ajzen (1991). He suggests that the strength of each normative belief is multiplied by the person's motivation to comply with the referent in question, and the subjective norm (SN) is directly proportional to the sum of the resulting products across the salient referents.

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.

Entrepreneurial Characteristics. An index of Entrepreneurial Characteristics was created by averaging seven item scores.

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

Table 1. Correlations, Cronbach's alphas, range, means and standard deviations for the scales.

	EI	SN	EC	PBC	ATT
EI	1				
SN	.14***	1			
EC	.32***	.03	1		
PBC	.53***	.00	.36***	1	
ATT	.56***	.14***	.29***	.40***	1
Cronbach's alpha	0.88	0.76	0.86	0.75	0.79
Range	1.0-7.0	-54-63	1.0-7.0	1.0-7.0	1.0-7.0
Mean	3.3	-3.7	4.8	4.0	4.9
Sd	1.2	15.5	0.9	1.0	0.8

According to Tabachnick and Fidell (1996) the independent variables with a bivariate correlation more than 0.70 should not be included in multiple regression analysis. Although correlations are quite high between some variables (ATT and PBC), this does not exceed this cut value. Tolerance and VIF-values were also analyzed to see that there was not a threat of multicollinearity between independent variables.

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 38 items, were factor analysed using principal axis factoring where

the unrotated factor solution was examined, as recommended by Podsakoff *et al.* (2003). 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 ($KMO = 0.93$).

Factor analytic results indicated the existence of eight factors with eigenvalues greater than 1.0. The eight factors explained 60 percent of the variance among the 38 items, and the first factor accounted for 26 percent of the variance. Since several factors, as opposed to one single factor, were identified and since the first factor did not account 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). Hence, the possibility of common method issues cannot be fully discarded.

Results

In the whole sample there were 3754 respondents. 182 students were currently starting a firm and 3572 not. We compared the intentions, perceived behavioral control, subjective norm, attitudes and entrepreneurial characteristics of those two groups. Table 2 presents the means, standard deviations and min/max values of those variables. As expected, intentions are significantly higher with students who are currently taking steps for starting a firm. These can be called nascent entrepreneurs, i.e. they possess the desire to start a new business and they are involved in specific activities that can bring those desires to

fruition (Carter et al., 1996). However, it is interesting that the mean of intentions with this group is just 4.9 and minimum value is 2.0. One would expect the values to be much higher. Students who are currently starting a firm have also significantly higher values of perceived behavioral control, attitudes towards entrepreneurial career and entrepreneurial characteristics. Their evaluation of the subjective norm is a little less negative compared to other students.

The differences of these two student groups are significant. Students who are involved with start-up activity have higher intentions, have greater beliefs in succeeding in entrepreneurial career, have more positive attitudes towards entrepreneurship and are more innovative, tolerate more ambiguity and are more creative in problem solving compared to other students.

Table 2. Means, standard deviations and min/max values of variables with two groups of students.

	EI (Mean, SD, Min/Max)	PBC (Mean, SD, Min/Max)	ATT (Mean, SD, Min/Max)	SN (Mean, SD, Min/Max)	EC (Mean, SD, Min/Max)
Students starting a firm	4.9 (1.0) 2.0/7.0	4.8 (0.9) 2.0/7.0	5.3 (0.8) 3.3/7.0	-0.8 (22.8) -63/63	5.4 (0.8) 3.0/7.0
Students not start- ing a firm	3.3 (1.2) 1.0/7.0	4.0 (1.0) 1.0/7.0	4.9 (0.8) 1.0/7.0	-3.7 (15.5) -54/63	4.8 (0.9) 1.0/7.0
Sig.	***	***	***	-	***

Intentions with students not starting a firm

There were 3572 respondents who were not starting their own firm in time of the study. With these students 55 percent were on their 1st study year, 24 percent on their 2nd, 14 percent on their 3rd and 7 percent on their 4th study year. 58 percent were female students. 25 percent had a vocational school as basic education, 65 an upper secondary school, 6 percent a double degree education and the rest something else. 14 percent had a mother with a professional background as an entrepreneur and 31 percent had a father with professional background as an entrepreneur. 25 percent of the respondents were from Social sciences, Business and Administration field of study, 24 percent from Technology, Communication and Transport, 23 percent from Social Services, Health and Sports, 11 percent from Natural Sources and the Environment, 7 percent from Tourism, Catering and Domestic Services, 0.7 percent from Natural Sciences and 0.4 percent from Humanities and Education.

We tested how well the antecedents of entrepreneurial intentions explain the formation of intentions by using standard linear regression. Multiple linear regression analysis was used to assess the relationship between the independent variables and the dependent variable. Table 3 presents the regression results among the students who were not starting a firm in time of the study. In model 1 we included only the control variables in to the model (gender, father's and mother's professional background as an entrepreneur). Gender was included as a dummy-variable with zero coding for female students and one for male students. Mother's and father's professional background was coded zero for "not an entrepreneur" and one for "entrepreneur".

As can be seen from the table, the model that includes only control variables explains 12 percent of the variance of entrepreneurial intentions. In the next step we added the four independent variables in to the model (perceived behavioral control, attitudes, subjective norm, and entrepreneurial characteristics). The explained variance of entrepreneurial intentions rose to 47%. As can be seen, the best antecedent of intentions seems to be attitudes followed by perceived behavioral control. Entrepreneurial characteristics and subjective norm are significant but their role is quite small in the model. Also all control variables are significant predictors in the model.

Table 3. Linear regression analysis (students not starting a firm).

	Model 1	Model 2
Control variables		
Gender (male)	0.17***	0.12***
Father's professional background as an entrepreneur	0.23***	0.12***
Mother's professional background as an entrepreneur	0.14***	0.08***
Independent variables		
PBC		0.31***
ATT		0.37***
SN		0.09***
EC		0.07***
Model fit statistics		
Adjusted R ²	0.12	0.47
F-statistics	150.618***	313.963***
F Change		570.163***

* p< .05. ** p< .01. *** p<.001 Standardized coefficients reported.

Intentions with students currently starting a firm

There were 182 respondents who were starting their own firm in time of the study. With these students 55 percent were on their 1st study year, 20 percent on their 2nd, 13 percent on their 3rd and 12 percent on their 4th study year. 67 percent were male students. 36 percent had a vocational school as basic education, 47 an upper secondary school, 9 percent a double degree education and the rest something else. 20 percent had a mother with professional background as an entrepreneur and 40 percent a father with a professional background as an entrepreneur. 35 percent of the respondents were from social sciences, business and administration field of study, 23 percent from technology, communication and transport, 15 percent from culture and 14 percent from natural resources study field. Only few were from other study fields.

We tested how well the antecedents of entrepreneurial intentions explain the formation of intentions by using standard linear regression. Multiple linear regression analysis was used to assess the relationship between the independent variables and the dependent variable. Table 4 presents the regression results among the students who were currently starting a firm. In model 1 we included only the control variables in to the model (gender, father's and mother's professional background as an entrepreneur). Gender was included as a dummy-variable with zero coding for female students and one for male students. Mother's and father's professional background was coded zero for "not an entrepreneur" and one for "entrepreneur".

As can be seen from the table, the model that includes only control variables explains 6 percent of the variance of entrepreneurial intentions. In the next step we added the four independent variables in to the model (perceived behavioral control, attitudes, subjective norm, and entrepreneurial characteristics). The explained variance of entrepreneurial intentions rose to 29%. As can be seen, the best antecedent of intentions seems to be attitudes followed by entrepreneurial characteristics. Perceived behavioral control and subjective norm are not significant in the model. Father's professional background as an entrepreneur and gender have some role in the model.

Table 4. Linear regression analysis (students currently starting a firm).

	Model 1	Model 2
Control variables		
Gender (male)	0.16*	0.12
Father's professional background as an entrepreneur	0.19*	0.17*
Mother's professional background as an entrepreneur	0.06	0.05
Independent variables		
PBC		0.12
ATT		0.35***
SN		-0.04
EC		0.19**
Model fit statistics		
Adjusted R ²	0.06	0.29
F-statistics	4.769**	11.229***
F Change		14.903***

* p< .05. ** p< .01. *** p<.001 Standardized coefficients reported.

Testing intention as a mediator

Theory of planned behavior suggests that intention is an immediate antecedent of behavior (Ajzen, 1991). It also suggests that perceived behavioral control, attitudes and subjective norm are antecedents of intention, thus intention is a mediator in the model. We tested this theory by using logistic regression analysis and linear regression analysis. We also added entrepreneurial characteristics in the model as an antecedent of intentions. Logistic regression is suited for situations where the dependent variable is dichotomous. In logistic regression, regression coefficients can be used to estimate odds ratios for each of the independent variables in the model. Start-up behavior was a dichotomous variable, 0 coded as no and 1 coded as yes.

For testing mediation Baron and Kenny (1986) propose a four step approach in which several regression analyses are conducted and significance of the coefficients is examined at each step. First a regression analysis is done where PBC, SN, attitudes and in our model also EC predicts behavior (starting up a firm). Second regression analysis tests a path from PBC, SN, attitudes and EC to intention. In steps 1-2 the regression analyses were made separately for each predictor. Third regression analysis tests the significance of path from intention to behavior. The purpose of steps 1-3 is to establish that zero-order relationships among the variables exist. If one or more of these relationships are nonsignificant, mediation is not possible or likely.

In the first step using logistic regression analysis, we found significant relationships between SN and behavior, PBC and behavior, attitudes and behavior and also between EC and behavior. In second step using linear regression analysis we found significant effect

of PBC, attitudes, EC and SN on intention. In the third step the relationship between intention and behavior was found also to be significant. After taking steps 1-3 we proceeded to step 4 like Baron and Kenny (1986) recommend.

In the Step 4 model, some form of mediation is supported if the effect of intention on behavior remains significant after controlling for PBC, SN, attitudes and EC. If the effects of PBC, SN, attitudes and EC are no longer significant when intention is controlled, the finding supports full mediation. If PBC, SN, attitudes and EC are still significant (i.e., both intention and PBC, SN, attitudes and EC both significantly predict behavior), the finding supports partial mediation.

Table 5 presents the results from step 4. As can be seen from the table, it suggests that intention fully mediates the effect of subjective norm and perceived behavioral control and partially mediates the effect of attitudes and entrepreneurial characteristics on behavior. That means that attitudes and entrepreneurial characteristics have also a direct effect and an indirect effect on start-up behavior mediated by intentions. Subjective norm and perceived behavioral control seem to act through intentions like Ajzen (1991) suggests. However, Ajzen also argued for a direct effect of perceived behavioral control which is not present in this study.

Table 5. Logistic regression analysis for testing the mediation of intention.

	B	S.E.	Wald	df	Sig.	Exp(B)
SN	,00	,00	,52	1	,47	1,00
INTENTION	-1,14	,08	233,60	1	***	,32
Constant	7,70	,37	442,67	1	***	2214,09
PBC	-,17	,10	2,77	1	,10	,84
INTENTION	-1,06	,08	160,96	1	***	,35
Constant	8,09	,45	317,95	1	***	3272,86
ATTITUDES	,31	,12	6,61	1	**	1,36
INTENTION	-1,24	,09	208,31	1	***	,29
Constant	6,51	,55	139,76	1	***	669,08
EC	-,48	,11	19,22	1	***	,62
INTENTION	-1,03	,08	183,12	1	***	,36
Constant	9,69	,62	247,06	1	***	16085,03

* p< .05. ** p< .01. *** p<.001 Standardized coefficients reported.

Discussion

In this study we have made an attempt to better understand the underpinnings of entrepreneurial intentions by contrasting two student groups, those actually involved in start-up activities and those whose intentions are still intentions only. Our empirical sample consisted of data from seven different universities of applied sciences in Finland and students representing eight different study fields. Our theoretical model is drawn mainly from Ajzen's theory of planned behavior with its three antecedents to intentions. In addition, entrepreneurial characteristics as an independent variable, and role models and gender as control variables, were analyzed.

Our results are twofold. *First*, for students not currently engaged in actual entrepreneurial behavior, i.e. start-up activities, attitude towards entrepreneurship and perceived behavioral control contribute most clearly to formation of entrepreneurial intentions. The result is in line with e.g. Zampetakis et al. (2009) and Moi et al. (2011). Subjective norm and entrepreneurial characteristics (innovativeness, tolerance of ambiguity, creative problem solving and the ability to organize) have also a small but significant role. Role models, i.e. father's or mother's professional background as an entrepreneur, also contribute to formation of intentions, as suggested by earlier results (e.g. Kolvereid, 1996; Van Auken et al., 2006; Engle et al. 2011). The impact of gender on entrepreneurial intentions, also found in our study, has been previously reported in most studies on the subject (e.g. Wang and Wong, 2004; Zhao et al., 2005; Sequira et al., 2007; Liñán and Chen, 2009).

Second, for students actually active in starting their own business, the best antecedent of intentions seems to be attitudes followed by entrepreneurial characteristics. Perceived behavioral control and subjective norm are not significant in explaining intentions for students already engaged in start-up activities. Taken together the results suggest that TPB as a whole works better for predicting intentions of individuals not yet engaged in the behavior in question than of those who have already taken active steps; at the same time our empirical observations also seem to partially confirm the validity of the intention model put forward by Ajzen. However, our results show that although intentions do fully mediate the effect of PBC and subjective norm, the mediation is partial regarding the effect of attitudes and entrepreneurial characteristics. The results also imply that entrepreneurial characteristics may have a larger role in actual behavior than in mere intent to

behave. Marques et al. (2013) also found that these psychological characteristics are stronger with people who have previously started a firm. Entrepreneurial characteristics can be viewed as more general abilities, applicable in all fields of life, whereas perceived behavioral control refers more to application of such skills in context of starting and running a business. Jones and Iredale (2010) distinguish between *enterprise* education with focus on personal attributes and skills that can be used in a variety of contexts and *entrepreneurship* education with focus on starting and running a business. In the context of higher education, individual's attributes and perceived skills related to entrepreneurship are something that education can more reasonably aim to influence rather than the final act of starting a business. The actual rate of startup creation is influenced by many factors outside the scope of educational institutions. Further, as attitudes are the best antecedent of intentions for both groups, educators should pay attention to improving the knowledge base of young people in order to change their attitudes.

However, our study raises some questions concerning the utility of measuring intentions. One would expect that students who are currently starting a firm have really high (maximum) intention values. However, in our sample the mean of intention with this group was not near maximum values and there were students with low scores on intention although they were already starting a firm. This raises several interesting possibilities. *For one*, it may be that actual start-up behavior precedes formation of intentions. Kautonen et al. (2013a) have argued that the intention to start a business is not necessarily the starting point of the entrepreneurial process. It is easily conceivable that, for some, entrepreneurship is not intentional in the sense of something carefully planned and long desired; a person may stumble into an opportunity and 'end up' starting a business without having

formed a stable intention to do so. For theoretical convenience we may choose to assume that intention always preceeds action by some unit of time, but in the case of entrepreneurial intention, for all practical purposes, intention and action might as well be simultaneous. *Second*, it is possible that intention to act can be meaningfully measured only prior to the action itself, making intention fully independent of action or, possibly, subject to transformation through action. If the latter is true, a person simply cannot conceive action he or she is engaged in as object of intention, making the simultaneous measurement of both futile. The fact that the students actively starting a business do have higher intentions than their non-starting counterparts suggest that this cannot be. Another alternative is that the active respondents are interpreting the questions in a parallel but somewhat distinctive manner. One possibility is that students already starting a firm do not consider their current start-up activities as their last and only entrepreneurial effort; it might only be a temporary endeavor not intended as a permanent career path. Hence, the students might be thinking of other, later entrepreneurial efforts in their responses and might, in light of their present experiences, not be 100 % intending to engage in start-up activities later. Indeed, it is possible that entrepreneurial efforts, if not financially or personally satisfying, may reduce individual's interest in later entrepreneurship. *Third*, the possibility must be raised that instrument of measurement, i.e. the items themselves, is invalid in context of action. If this is the case, the items we now commonly use for measuring intentions can in fact only be utilized to measure unfilled intentions. To establish the connection between intention and action we would therefore need to first measure intention and then, separately at a later point, its realization. Also the measurement of intention needs more attention. Gollwitzer (1999) found that implementation intentions explain better the actual behavior than do mere intention. Implementation intentions link

anticipated critical situations to goal-directed responses. It would be useful to investigate the role of implementation intentions in start-up activity.

All in all, despite the formidable challenges of longitudinal data collection (see e.g. Harte and Stewart, 2010; Joensuu et al., 2013) a serious effort should be made to extend longitudinal studies to actual behavior, i.e. realization of intentions (see also Fayolle and Liñán, 2014). This would entail following up on changes of intentions during studies and then their actualization in actions either during studies or after graduations. Additionally, deeper attention should be paid to future studies that link intentions and starting the start-up process. Fayolle and Liñán (2014) have suggested that implementation intention theory and the concept of commitment should be included when analyzing the link between intentions and behavior.

In summary, our results suggest that the antecedents of intentions differ for students merely speculating about possible future entrepreneurial activities and for students actually taking steps to start their own business. While attitudes are significant for intentions of both groups, entrepreneurial characteristics are of much greater significance for explaining the intentions of the latter group. Furthermore, while the intentions of students actually starting a business are higher than others', their intentions are neither at maximum level nor uniform, which suggests that measurement of intention and action must either be separate or that it requires items more accommodating to the possibility of action.

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Appendix 1. Variables and their items (all measured on a 7-point Likert scale).

Entrepreneurial intention

How likely are you to start your own business and work as an entrepreneur after graduation?

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

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 behavioral 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)?

Interesting

Esteemed

Worth pursuing

Boring

Fascinating

Despised

Good income level

Entrepreneurial characteristics

In the following, you will find a list of things often associated with entrepreneurship and business skills. Please assess your own current abilities in regard to these things.

I am able to make important decisions even if there are uncertainty factors present.

It is easy for me to produce new ideas.

I often find more alternative solutions to problems than others do.

I am able to question habitual practices.

I always strive to find better ways to do things.

I am able to engage others in an activity.

I am able to organize a group's activities and tasks.

Start-up behaviour

Are you currently starting your own business? (E.g. you are working on a business idea or other plans) (yes/no)

Appendix 2. Correlations between study variables (N=3572, not included students who have started a firm)

		Intentions	Subjective Norm	Perceived behavioral control	Attitudes	Entrepreneurial characteristics	Gender	Mother as an entrepreneur	Father as an entrepreneur	Basic education
Intentions	Pearson Correlation	1								
	Sig. (2-tailed)									
	N									
Subjective Norm	Pearson Correlation	,146**	1							
	Sig. (2-tailed)	,000								
	N	3498								
Perceived behavioral control	Pearson Correlation	,518**	-,001	1						
	Sig. (2-tailed)	,000	,938							
	N	3570	3498							
Attitudes	Pearson Correlation	,562**	,134**	,389**	1					
	Sig. (2-tailed)	,000	,000	,000						
	N	3565	3495	3563						
Entrepreneurial characteristics	Pearson Correlation	,291**	,024	,343**	,275**	1				
	Sig. (2-tailed)	,000	,158	,000	,000					
	N	3567	3497	3565	3564					
Gender	Pearson Correlation	,165**	-,106**	,146**	,032	,053**	1			
	Sig. (2-tailed)	,000	,000	,000	,060	,002				
	N	3560	3488	3558	3555	3557				
Mother as an entrepreneur	Pearson Correlation	,204**	,047**	,106**	,126**	,046**	-,013	1		
	Sig. (2-tailed)	,000	,006	,000	,000	,007	,447			
	N	3488	3417	3486	3483	3485	3479			
Father as an entrepreneur	Pearson Correlation	,269**	,044*	,147**	,186**	,068**	-,016	,324**	1	
	Sig. (2-tailed)	,000	,011	,000	,000	,000	,354	,000		
	N	3472	3400	3470	3467	3469	3463	3463		
Basic education	Pearson Correlation	,059**	-,013	,101**	,043*	,069**	,048**	,043*	,052**	1
	Sig. (2-tailed)	,001	,460	,000	,013	,000	,006	,013	,003	
	N	3409	3340	3407	3405	3407	3401	3357	3339	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

