

ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS

BACHELOR THESIS

The relationship between entrepreneurship education and entrepreneurial intentions of students.

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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Introduction

The emergence of entrepreneurship over the last decades makes it become the fuel for worldwide economies that solves numerous global challenges, increases employment rates, and generates sustainable economic growth (Wong, Ho, & Autio, 2005). In this time of immense global challenges rise, there is an ever-increasing need for people who can think differently, identify opportunities and come up with innovative solutions.

According to Baptista et al. (2013) human capital investment facilitates the process of economic growth at macroeconomic level and leads to an increasing trend of opportunity-based entrepreneurs. Consequently, throughout the last decade there has been a clear exponential expansion of entrepreneurship education as part of both universities' curriculum and informal trainings. However, Gibb (2002) argues that there is a need of a radical Schumpeterian change in the entrepreneurial educational systems and pedagogy for it to lead to expected outcomes. As only adequate teaching methods that promote development of opportunity identification skills, cognitive tools and environmental flexibility can make people become more entrepreneurial (Detienne & Chandler, 2004; Honig, 2004). Entrepreneurial behavior development benefits not only the business environment, but also local communities and institutions. Therefore, it becomes of high interest and importance for policy makers to find what is the most effective combination of teaching methods and content, and whether entrepreneurship education indeed accelerates entrepreneurial behavior.

Nicolaou et al. (2008) claim that a significant part of entrepreneurial activity can be explained by genetic factors. While Baum and Locke (2004) claim that successful entrepreneurs have specific traits and attitudes that can be developed. This explains the ongoing debate in the entrepreneurship research filed on whether entrepreneurs are born or made (Henry, Hill, & Leitch, 2005).

Even if the similar trends over decades of entrepreneurship and entrepreneurial education has been clearly depicted, not enough research to reach a consensus has been conducted. A significant part of previous empirical research claims that entrepreneurship programs have a positive effect on entrepreneurial intentions through influencing perceived feasibility and desirability of participants towards entrepreneurship (Liñán et al., 2010; Sánchez, 2013; Autio et al., 2001; Sánchez, 2010). Conversely, Oosterbeek et al. (2010) found an insignificant influence of entrepreneurship program on entrepreneurial skills and even a negative effect on their intentions. Moreover, since the decision of becoming an entrepreneur is considered to be both voluntary as well as conscious, it becomes of high importance to assess the decision-making process and factors that influence it. According to Liñán and Chen (2009) entrepreneurial intention models following the cognitive approach is the single best predictor of the future entrepreneurial behavior of individuals.

However, even if these models received wide empirical support there are considerable differences between studies related to investigation of entrepreneurial intentions. This makes the comparison between them not plausible and the process of reaching a consensus even more complicated. Therefore, since the relationship as well as the analysis method are still ambiguous, this relationship is worth being further investigated.

In the current study, we expect that students whose studies had an entrepreneurial focus or at least one entrepreneurship-related course, are expected to resemble higher entrepreneurial intentions in comparison to those who did not. Another part of analysis on impact of entrepreneurship education on entrepreneurial education is based on Ajzen's (1991) Theory of Planned Behavior (TPB). This intentions model assumes that the effect of external factors indirectly affects someone's intentions through subjective norms, perceived behavioral control and attitude towards behavior. Therefore, we expect a positive relationship between entrepreneurship education and entrepreneurial intentions of students that runs through mediators included in our models. Therefore, this research has the aim to fill the gap by answering the question:

Does entrepreneurship education relate to entrepreneurial intentions of students through subjective norms, perceived behavioural control and attitude towards entrepreneurship?

In order to capture the true relationship direction and magnitude, this research will be based on a Dutch student survey consisting of 150 students. Although studies showed that economic development of a country does not affect the amount and type of entrepreneurial education (Coduras Martínez, Levie, Kelley, Sæmundsson, & Schøtt, 2010). Coduras Martínez et al. (2010), have argued that it has an impact on the effect of entrepreneurship education on entrepreneurial behavior through quality of training and institutions. Additionally, cultural aspect represents an important factor that considerably influences individual's behavior that are not evident to other societies and are hard to account for (Liñán & Chen, 2009). The sample that we have chosen ensures the same institutional context and environmental factors for all participating individuals. The relationships are estimated using Ordinary Least Squares regressions.

The remainder of this research paper consists of theoretical framework, data and methodology as well as the results, conclusion and discussion sections. In the next division of this research the hypotheses that are going to be tested are presented. After this, the data our research will be based on is discussed in detail. Subsequently, in the methodology part of this research the methods that are going to be applied in finding the effect and testing the robustness of our results are introduced. And finally, in the last two sections of this paper the results will be presented, and the conclusions drawn.

Theoretical framework

In order to answer the central question of this research paper the already existing literature on entrepreneurial intentions and education as well as the impact of entrepreneurship education on entrepreneurial intentions is investigated. This literature review will serve as starting point in our in-depth analysis and further investigation of the relationship by formulating hypotheses that will be subsequently tested.

2.1 Entrepreneurship Education

This part of the literature review investigates the emergence, trends, content delivered, and pedagogy methods used and their relevance in entrepreneurship education programs to reach the settled societal goals.

The emergence of entrepreneurship as the fuel for economic growth made entrepreneurship education gain importance within countries' development strategies in addressing numerous emerging challenges (Wong, Ho, & Autio, 2005). The assumption made by policy-makers is that entrepreneurial behavior can be enhanced through adequate learning environment development (Jones & English, 2004). However, it is worth specifying that entrepreneurship education does not have the aim to only convert students into entrepreneurs, but rather make them understand entrepreneurship and become more entrepreneurial (Gibb, 2002). Therefore, the primary role of entrepreneurship education is to form a general understanding, not to impose entrepreneurship as a future career choice, and encourage entrepreneurial behavior and thinking within all sectors. This explains the clear exponential growth of entrepreneurship education inclusion in curriculum of universities depicted in recent decades as well as significant university, government and international support provided (Luthje & Franke, 2003; Kuratko, 2005). However, this response is not only due to public authorities' valuation of the impact entrepreneurship has on economic growth, but there is also an increasing interest for entrepreneurial career opportunities from individuals' side (Gibb, 2002; Luthje & Franke, 2003; Fayolle, Gailly, & Lassas-Clerc, 2006). According to Luthje and Franke (2003) this is due to the growing importance of self-employed values such as independence and the diminishing attraction of individuals to a salary work environment.

Interesting to notice is that 80% of those who have ever had access to entrepreneurship education got it during their formal education (Coduras Martínez, Levie, Kelley, Sæmundsson, & Schøtt, 2010). This indicates the importance of formal education in the entrepreneurship ecosystem development (Franke & Lüthje, 2004). The most prevalent feature of almost all entrepreneurial courses included was found to be business plan development (Honig, 2004). However, there is neither empirical nor theoretical evidence that

this indeed leads to increased entrepreneurial activity as their pedagogical educational aims are not clear enough (Honig, 2004). Therefore, it becomes questionable whether university environment can indeed meet the challenge of educating entrepreneurs who will lead to the expected societal development outcomes (Kirby, 2004). The growing amount of investigation on the appropriateness of the content and methodology used in teaching entrepreneurship has led to the conclusion that there is a need of a Schumpeterian shift in the ways of organizing knowledge and education (Gribb, 2002; Kirby, 2004; Honig, 2004; Jones & English, 2004). According to Kuratko (2005), this destructive change is considered to be one of the most important and high priority innovations that should be made for a productive, innovative and competitive business environment. This means that the business school model of developing and teaching entrepreneurship is outdated. And, there is an urgent need of universities to shift from educating 'about entrepreneurship' towards 'for entrepreneurship' methods that are intended to develop out of the box thinking and most appropriate solution identification approaches (Kirby, 2004; Gibb, 2002; Jones & English, 2004).

Since there is still not a clear definition of entrepreneurship, it makes the development of a curriculum that leads to the intended goals even harder (Kirby, 2004; Jones & English, 2004). The emergence of entrepreneurship education literature investigates and proposes a wide range of skills that should be developed as well as most effective teaching methods that could be applied in this sense (Honig, 2004; Jones & English, 2004; Detienne & Chandler, 2004; Cope, 2005; Neck & Greene, 2010; Minniti & Bygrave, 2001; Peterman & Kennedy, 2003). However, since entrepreneurship is a planned behavior this makes the cross-cultural analysis of the way in which content and teaching methods affect individuals limited. Moreover, there are environmental factors, multidimensional and time lagging effects that cannot be taken into account in a simple model of entrepreneurship program characteristics on entrepreneurial intentions (Fayolle, Gailly, Lassas-Clerc, 2006). Therefore, there is no universal composition of entrepreneurship education program content and methods that could be applied to all individuals and have the same expected results. Still, what is clear enough is that these should have the aim of developing soft skills in a dynamic manner, such as opportunity identification, creativity, communication, leadership, problem-solving, time-management, critical thinking, and failure learning (Kirby, 2004; Detienne & Chandler, 2004; Luthje & Franke, 2003). Also, these should give students the liberty to choose and shape their own study program, make them apply their knowledge to real-world problems through decision-making processes and provide them with role models who will be able to teach and motivate them. Also, entrepreneurship educators and trainers have to be adequately instructed in order for them to deliver the content through the most effective method for entrepreneurial attitudes and behaviors development (Henry, Hill, & Leitch, 2005). These should not only be trained how to deliver valuable content to future entrepreneurs, but also how to change 'hearts and minds' (Souitaris, Zerbinati & Al-Laham, 2007). Moreover, what Luthje and Franke (2003) suggest is to identify entrepreneurship-interested students on basis of a set of personality traits and incentivize them to

take part in these programs. This way, the public authorities and universities' policies towards favorable entrepreneurial ecosystem development are believed to be more likely in having the intended results.

2.2 Entrepreneurship Education and Environment in the Netherlands

In general, entrepreneurship policies in the Netherlands have the aim to incentivize the development of a favorable business environment that leads to innovation and economic growth. However, even if their main goal is not social inclusion but rather offering equal opportunities to everyone, there are still some national as well as local policy initiatives which focus on helping youth and migrants moving into work through entrepreneurship. Even though, the policy-makers' aim is for the increasing rates of entrepreneurs to have a quantitative as well as qualitative impact on the entrepreneurship environment, through the increased number of opportunity-driven entrepreneurs.

Important to know is that in the Netherlands the process of enhancing entrepreneurial attitudes and behaviors is mainly facilitated by the Higher Education Institutions (HEIs). The HEIs promote innovation within teaching methods and lifelong learning, provide digital learning environment and possibility for business development as well as give students both the opportunity to choose and design their own programs as well as to network (OECD/EU, 2018). Moreover, entrepreneurship education within HEIs also guarantees the possibility of obtaining necessary support and reputation if interested in becoming an entrepreneur in the future from other alumni or partners (OECD/EU 2018). This way the infiltration of well-educated entrepreneurs within Dutch entrepreneurship ecosystem benefits the society at large and makes the goal of the government achievable.

Besides the favorable conditions created through government interventions, cultural context also plays a significant role in the career choice decision individuals face (Luthje & Franke, 2003). The average number of self-employed persons in the Netherlands is above the EU average, however, interesting to highlight here is that most entrepreneurs are solo and do not have in near future a scope to hire employees. When the Netherlands is compared to other innovation-driven economies, the significant higher indicators for perceived opportunities and perceived capabilities as well as lower rate for fear of failure indicator is notable. Moreover, the same can be concluded when looking at both the high status attributed to successful entrepreneurs and the society's perception of entrepreneurship as a good career choice.

To sum up, from entrepreneurial behavior and attitudes indicators as well as from entrepreneurial framework conditions assessed, the Netherlands could be considered a potentially favorable place for one to develop their business. Moreover, according to the mentioned characteristics of entrepreneurship student programs, the assumption that the content and pedagogy methods used at the university and sample of our analysis are adequate could be made.

2.3 Effect of entrepreneurship Education Program on Entrepreneurial Intentions

Entrepreneurship education during the last decades appears in the curriculum of a lot of universities and receives significant support from governments around the world. This trend is motivated by the belief that entrepreneurship plays a significant role in both economic growth as well as employment (Kuratko, 2005). Moreover, it is believed that entrepreneurship education serves as the most efficient method in promoting this development (Pittaway & Cope, 2007). However, there is limited empirical or theoretical support provided to these claims (Peterman & Kennedy, 2003) and even negative effect was found (Oosterbeek, Praag, & Ijsselstein, 2010). These ambiguous results serve as a sound motive for the emerging debate within entrepreneurship academy whether entrepreneurs are born or made (Henry, Hill & Leitch, 2005; Nicolaou, Shane, Cherkas, Hunkin, & Spector, 2008; Fayolle & Gailly, 2013; Sánchez, 2010).

Detailed investigation of the already available entrepreneurship education programs is expected to meet the economic and academic challenges by explaining the required composition as well as the magnitude of impact it has on entrepreneurial intentions of students. However, there is no universal and adequate empirical method available to make the evaluation and comparison of the programs feasible (Honig, 2004; Fayolle, Gailly, & Lassas-Clerc, 2006). What is empirically and theoretically demonstrated is that there are a lot of skills that could be developed through the application of adequate teaching techniques in appropriate content delivery processes (Fayolle, Gailly, & Lassas-Clerc, 2006; Henry, Hill & Leitch, 2005). However, there is not enough evidence to prove that these competencies will indeed increase students' entrepreneurial intentions. Therefore, given that there is a clear need to empirically investigate the relationship between entrepreneurial education programs and intentions the following hypothesis is formulated:

Hypothesis 1. *Students that had access to entrepreneurship education will likely have higher entrepreneurial intentions than those that did not.*

2.4 Entrepreneurial intentions models and Theory of Planned Behavior

Intentionality analyzes the planning process and does not investigate the aspects of actual new venture formation. Understanding where the ideas for venture creation come from and what are the factors that influence people to move from intent to action becomes of high importance for management research, teachers, practitioners and public policymakers. Entrepreneurial intentions analysis offers a better understanding of opportunity identification process and makes the market interventions more valuable for favorable entrepreneurship ecosystem development.

There is a prominent amount of psychological literature that stresses the high explanatory power intentions have in predicting planned behavior (Liñan & Chen, 2009; Gailly, & Lassas-Clerc, 2006; Kickul & Zaper, 2000; Peterman & Kennedy, 2003; Veciana, Aponte, & Urbano, 2005). Since new venture creation is a limited and hard to observe behavior that requires time and meticulous planning it is considered a planned behavior or intentional. Therefore, intention is considered to be the best predictor of entrepreneurship behavior when compared to attitude, belief or any other psychological variable (Krueger, Reilly, & Carsrud, 2000; Liñan & Chen, 2009; Fayolle, Gailly, & Lassas-Clerc, 2006; Fayolle & Gailly, 2013). This is because intentions models do account for both individual (e.g. employment type) as well as situational (e.g. personality traits) variables and therefore have higher explanatory power and validity than models that include only one type of above-mentioned variables. Moreover, even if according to Bird (1988) there are significant time lags from entrepreneurial intent to actions, Krueger et al. (2000) argue that early career intentions are still a good representation of future vocational choice.

Ajzen's (1991, 2002) TPB is an intentional model available and used for entrepreneurship behavior explanation that have been extensively tested and received empirical support. It has been applied to different human behavior investigations (e.g. voting, smoking) proving to be a sound and valid framework for the exploration of human behavior in general. Based on this Ajzen's (1991, 2002) TPB theory, intentions depend on subjective norms, perceived behavioral control and attitude towards a particular behavior which consequently results in actual behavior. By using this model, it is possible to investigate how exogenous factors affect beliefs and attitudes of individuals that consequently affect their intentions. In the context of this study, this makes possible to study how entrepreneurship education as an independent variable has an effect on the above-mentioned determinants of entrepreneurial intentions. To get a better understanding of the relationships underlying the link between education and entrepreneurial intention, the current study will investigate whether subjective norms, perceived behavioral control and attitude mediate the relationship between entrepreneurship education and entrepreneurial intentions (see Figure 1).

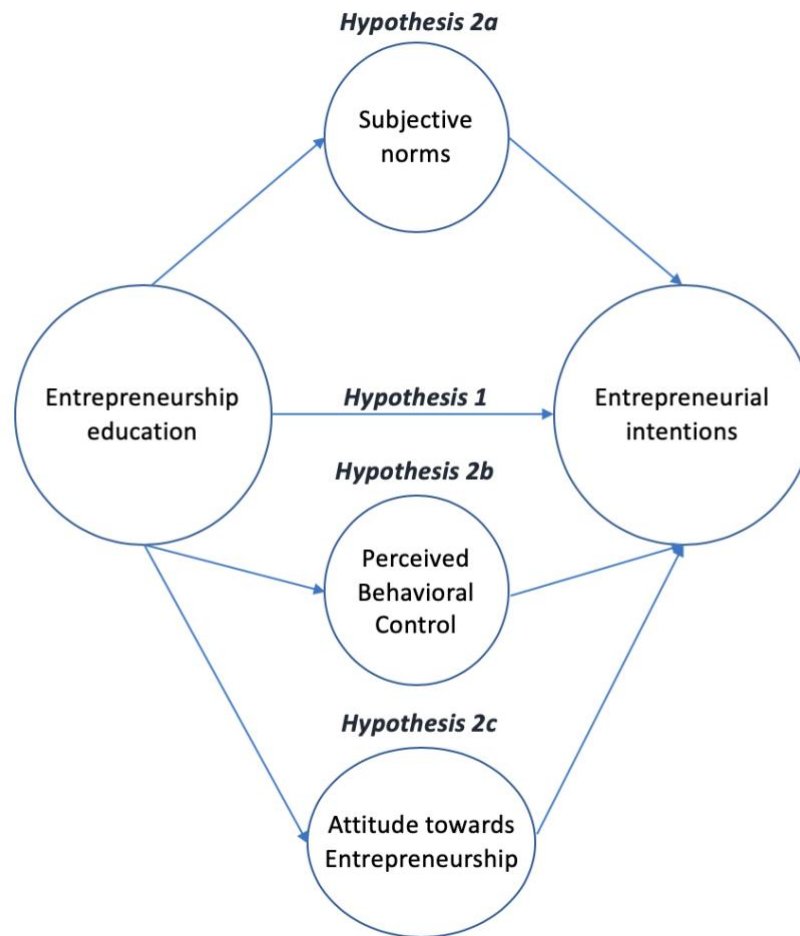


Figure 1. Multiple mediation design and simple regression

2.4.1 Subjective Norms

Subjective norms represent the influence opinions of people in close environment of participating individuals have on their decisions to become an entrepreneur or not. The environment within university, attitude of colleagues and professors towards entrepreneurship creates the students' entrepreneurial ecosystem (Tsukanova, Morris, & Shirokova, 2017). This way, entrepreneurship education is expected to provide to students the subjective norms, which are subsequently used to understand whether their future potential intentions to start a business are supported and accepted by their close environment. Furthermore, previous studies have found that opinions of close environment do have a significant impact on one's entrepreneurial intentions (Ajzen, 1991). Also, interesting to notice here is that close environment influence could also go the other way around. This means that students taking entrepreneurship courses could affect how social environment (e.g. parents, friends) sees entrepreneurship as a future career choice. Therefore, to investigate whether this variable mediates our relationship of interest the following hypothesis is formulated and consequently tested:

Hypothesis 2a *Entrepreneurship education is positively related to entrepreneurial intentions of students through subjective norms.*

2.4.2 Perceived Behavioral Control

Perceived behavioral control in this model serves at measuring individuals' anticipated perception of whether being an entrepreneur is going to be hard or easy for them. Adequate entrepreneurship education teaching methods and techniques is expected to play a significant role in developing the necessary abilities for the students to have a higher entrepreneurial self-efficacy (Honig, 2004; Jones & English, 2004; Detienne & Chandler, 2004; Cope, 2005). For example, Honig's (2004) proposed teaching model is believed to provide necessary skills as well as flexibility of future entrepreneurs to adopt to changing environment and succeed as entrepreneurs. Moreover, feasibility of a behavior is fundamental for predicting behavior or intentions, as individuals usually choose to do what they believe they could control (Ajzen, 1991). Therefore, in order to identify whether this antecedent of intentions indeed has a mediating effect on our relationship between entrepreneurship education and entrepreneurial intentions the following hypothesis is built:

Hypothesis 2b *Entrepreneurship education is positively related to entrepreneurial intentions of students through perceived behavioral control.*

2.4.3 Attitude towards Entrepreneurship

Attitude towards entrepreneurship assesses the general impression individuals have about entrepreneurship. These could be positive or negative and are built on basis of the available information or beliefs one has. Entrepreneurship education is expected to have an impact on students' entrepreneurial intentions through attitudes towards entrepreneurship, which are affected by the so called 'socializers' (e.g. teachers, role models). This could be due to the fact that charismatic leaders can transmit their enthusiasm for entrepreneurship to students through emotional contagion (Cherulnik, Donley, Wiewel, & Miller, 2001). Important to notice is that in general, one is more likely to behave in a certain way if their attitude towards that behavior is positive (Ajzen, 1991). To understand whether attitude towards entrepreneurship has a mediating effect on our relationship of interest, the following hypothesis is formulated for being further evaluated:

Hypothesis 2c *Entrepreneurship education is positively related to entrepreneurial intentions of students through attitude towards entrepreneurship.*

Data

In this section of the research paper a detailed description of the secondary data this research makes use of is presented. Moreover, the sample, operationalization and conceptualization of our variables as well as descriptive statistics are discussed in detail.

3.1 Sample

As it is not feasible to investigate the impact of entrepreneurship education on entrepreneurial intentions of the entire population of students, a sample of students is drawn. Consequently, the analysis of this research is based on secondary dataset used by Bernoster et al. (2018) in their investigation, which is built from responses of students of the Erasmus University of Rotterdam. Respondents that did not provide answers to all the presented questions or statements were excluded from the sample. Therefore, in this survey even if 182 students from different fields of study have participated, due to missing observations the final sample consists of 150 students. The collection period of this data was between May 2015 and April 2016. Therefore, this sample of students who were about to face a career choice is a valid and representative group for this entrepreneurial relationship investigation. Also, the entrepreneurial intention research based on university students offers the advantage of a more homogenous sample in terms of age and qualifications. Therefore, this allows us to capture a more robust relationship between entrepreneurship education and their intentions.

3.2 Variables and Measures

3.2.1 Entrepreneurial intentions

For a better prediction of entrepreneurial intentions data and comparability of established results our data is collected on basis of a standardized measure developed by Liñán and Chen (2009) – Entrepreneurial Intention Questionnaire (EIQ). This questionnaire was developed on basis of in-depth examination of both psychological and entrepreneurship literature as well as previously proposed empirical models. After being extensively tested (Liñán & Chen, 2009; Gailly, & Lassas-Clerc, 2006; Kickul & Zaper, 2000) all the included items measured on a Likert scales proved to be statistically robust and theoretically sound. Moreover, this collection method makes possible to test our established hypotheses through the usage of it in the TPB model provided by Ajzen (1991, 2002).

Entrepreneurial intentions are measured on a 7-point Likert scale which indicates the degree to which participants agree with the presented statements. Allocation of one point means strongly disagreement, while seven points mean total agreement with the statement. Questionnaire statements

taken from Liñán and Chen's (2009) EIQ include: "I am ready to do anything to be an entrepreneur", "My professional goal is to become an entrepreneur", "I will make every effort to start and run my own firm", "I am determined to create a firm in the future", "I have very seriously thought of starting a firm", "I have the firm intention to start a firm someday".

In the analyses of our hypotheses entrepreneurial intentions is our dependent variable. This variable is continuous and indicate the willingness of students to become an entrepreneur rather than an employee. An individual average is calculated. This ranges from one to seven indicating participants' entrepreneurial intentions magnitude.

3.2.2 Participation in entrepreneurship program

To assess whether students have had access to entrepreneurship education during their studies these statements were included in the questionnaire: "My study contains courses focused on entrepreneurship", "I am taking part in a specialization program focused on entrepreneurship", "I have taken at least one course in entrepreneurship", "I have taken at least one course in entrepreneurship that was mandatory". Based on a "Yes" or "No" response, entrepreneurship education participation was assessed.

Entrepreneurship education is a dummy variable. This means that our independent variable of interest is a composite measure that takes value one if students' responses to at least one of these four statements is "Yes" and zero otherwise.

3.2.3 Control variables

In examining the association between entrepreneurship education and entrepreneurial intentions some control variables are added to the Ordinary Least Squares (OLS) model to reduce the possibility of omitted variable bias. These variables are correlated with entrepreneurship education and are also determinants of entrepreneurial intentions. Age, introduced as a continuous variable into the model, is one of them, as according to Lévesque and Minniti (2006) it influences the tendency of people to start a business. Another control variable that is included in our models is gender which takes value one for females and zero for males. This is because there is a clear masculine association to the entrepreneur career choice (Bruni, Gherardi, & Poggio, 2004). Additionally, the field of study plays a significant role in determining students' entrepreneurial intentions (Gerba, 2012). Therefore, a dummy variable is included into the model that takes value one if the field of study of the participating student is business and economics and zero otherwise. Also, the family context is introduced into the model as a dummy variable that takes value one if one or both parents have a company or are a major shareholder of a company and zero otherwise. Family

members' entrepreneurial activity significantly influences the intentions of other members (Carr & Sequeira, 2007).

3.2.4 Mediators

Liñán and Chen's (2009) EIQ ensures also the robust and sound operationalization of the three mediators: subjective norms, perceived behavioral control and personal attitude towards entrepreneurship of survey participants. These mediators are measured on 7-point Likert scale. The evaluation is based on a set of statements included in the questionnaire. Allocation of seven points indicate total agreement while one point indicates total disagreement with the statement. An individual average score is calculated for each of these mediators on basis of their specific statement evaluation.

In order to assess the *subjective norms* of students the following question is included: "If you decided to create a firm, would people in your close environment approve of that decision?". Students were given three types of close environment people that could influence their entrepreneurial decisions: "Your close family", "Your friends" and "Your colleagues" and were asked to indicate the degree of approval.

To quantify participants' entrepreneurial capacity or *perceived behavioral control* the following six statements are introduced in the questionnaire: "To start a firm and keep it working would be easy for me", "I am prepared to start a viable firm", "I can control the creation process of a new firm", "I know the necessary practical details to start a firm", "I know how to develop an entrepreneurial project", "If I tried to start a firm, I would have a high probability of succeeding".

Personal attitudes towards entrepreneurship of students are measured on basis of these six statements included in the questionnaire: "Being an entrepreneur implies more advantages than disadvantages to me", "A career as entrepreneur is attractive for me", "If I had the opportunity and resources, I'd like to start a firm", "Being an entrepreneur would entail great satisfactions for me", "Being an entrepreneur would make me very satisfied", "Among various options, I would rather be an entrepreneur".

3.3 Descriptive statistics

In Table 1 the Pearson correlations between this research paper's main study variables are summarized. These are contingency tables, where variables are both used as a column and row headings. Correlations can be used in interpreting strength and direction of a relationship between two variables. As it can be seen there is a significant positive correlation between entrepreneurship education and entrepreneurial intentions of students. Also, interesting to notice is that there is a significant positive correlation between family members' entrepreneurial activity and entrepreneurial intentions of students.

Moreover, a clear significant correlation between dependent, independent and mediating variables can be depicted. However, correlations cannot be used in the causality argumentation. Therefore, there is a need of an adequate analytical technique which could ensure proper investigation of the observed correlations between our variables of interest. Table 2 presents mean, standard deviation as well as minimum and maximum values each variable of our analysis could take. Also, since we have in our research variables that are composed of multiple statements included into the questionnaire, their reliability is assessed using Cronbach's alpha. As it can be seen all the composite measures of this research prove to have an excellent or good internal consistency, meaning that these variables measure what they are actually meant to measure.

Table 1. Correlation table for all measures of interest

Variable	1	2	3	4	5	6	7	8	9	10
1 Age	1									
2 Gender	-0.01	1								
3 Undergraduate	-0.4*	-0.09	1							
4 Field of study	0.08	-0.24*	-0.34*	1						
5 Family	0.07	0.15	-0.09	0.19*	1					
6 Education	-0.04	-0.16	-0.15	0.61*	0.14	1				
7 Intentions	0.16*	-0.01	0.04	0.02	0.25*	0.14*	1			
8 Personal Attitudes	0.16*	-0.07	0.03	0.03	0.21*	0.11*	0.88*	1		
9 Perceived Behavioral Control	0.64	-0.12	0.001	0.19*	0.17*	0.26*	0.52*	0.46*	1	
10 Subjective Norms	0.16	-0.01	-0.07	0.08	0.15	0.11*	0.41*	0.36*	0.46*	1

*Note. * $p < 0.05$.*

Table 2. Descriptive statistics for students of Erasmus University of Rotterdam

Variable	Mean	Std. Dev.	Min.	Max.	Cronbach's alpha
Age	20.64	2.06	18	30	
Gender	0.55	0.5	0	1=female	
Undergraduate	0.85	0.36	0	1=bachelor	
Field of study	0.43	0.5	0	1=economics and business	
Entrepreneurial Family	0.3	0.46	0	1=self-employed parents	
Education	0.32	0.47	0	1=attended an entrepreneurship education program/course	
Intentions	3.3	1.62	1	7	0.94
Personal attitudes	3.65	1.6	1	7	0.95
Perceived behavioral control	4.57	0.99	1	6	0.85
Subjective norms	5.5	0.92	3	7	0.80

Methodology

This section presents the empirical analysis approaches of our secondary data used in order to answer the central question, test the established hypotheses of this research paper as well as assess their robustness.

4.1 OLS Regression Analyses

Since our analysis is based on a cross-sectional dataset multiple OLS regressions are built to test our hypotheses. First model in our analysis is a linear regression with one regressor, where entrepreneurial intentions of students is our dependent variable and entrepreneurship education is our independent variable. The mathematical model specification is:

$$Y_i = \beta_0 + \beta_1 * X_{1,i} + \varepsilon_i \quad (1)$$

, where Y_i is entrepreneurship intentions of individual i , $X_{1,i}$ is the variable of interest – entrepreneurship education and ε_i is the error term.

It is crystal clear that this naïve with-and-without comparison cannot capture the true effect entrepreneurship education attainment has on entrepreneurial intentions of students. Therefore, in order to overcome selection bias, a set of control variables are added to the initial model. Therefore, the model becomes:

$$Y_i = \beta_0 + \beta_1 * X_{1,i} + \dots + \beta_n * X_{n,i} + \varepsilon_i \quad (2)$$

, where X_1 to X_n are control variables added to the initial model: age, gender, study level, field of study and family business exposure.

Mediation analysis in our research is used to understand the mechanism or the nature of the relationship between entrepreneurship education and entrepreneurial intentions. Therefore, in order to test the hypotheses built on basis of Ajzen's (1991, 2002) TPB our analysis also makes use of mediation methodology. More specifically in our case scenario we will be looking at the mediation effects of personal attitudes, perceived behavioral control and subjective norms on the relationship between entrepreneurship education and entrepreneurial intentions. In order to investigate whether there is a need of this further investigation of our relationship of interest for each of these mediating variables, a model of this form is built to examine whether indeed these mediators have an impact on entrepreneurial intentions:

$$Y_i = \beta_0 + \beta_1 * X_{1,i} + \dots + \beta_n * X_{n,i} + \gamma_1 * Z_{1,i} + \varepsilon_i \quad (3)$$

, where γ_1 is the indirect impact of entrepreneurship education that runs through mediator $Z_{1,i}$.

Subsequently, a model that contains all control variables and Ajzen's (1991, 2002) TPB mediators is built to investigate the link between these mediating variables and entrepreneurial intentions as well as assess whether this theory is adequate for this relationship investigation:

$$Y_i = \beta_0 + \beta_1 * X_{1,i} + \dots + \beta_n * X_{n,i} + \gamma_1 * Z_{1,i} + \dots + \gamma_m * Z_{m,i} + \varepsilon_i \quad (4)$$

4.2 Mediation Models

To test the mediation hypotheses, mediation models will be used to estimate direct as well as indirect effect education has on entrepreneurial intentions. As it can be seen from Figure 2.2, direct effect is presented as the path from entrepreneurship education to entrepreneurial intentions, c' . However, the indirect effect is represented by path from entrepreneurship education to mediators and from mediators to entrepreneurial intentions, i.e. product of a and b . And, the sum of these two effects is considered to be the total effect entrepreneurship education has on entrepreneurial intentions. However, even if this total effect might be numerically identical to the one obtained from a simple regression, i.e. c (see Figure 2.1), there are some conceptual differences that have to be taken into account. Significance of the coefficient obtained in a simple regression investigation does not have any influence on the relevance of testing mediators' influence. Since these models have the main aim to identify whether some of the established relationship between entrepreneurship education and entrepreneurial intentions run through mediating variables. These do not have the aim to prove the causal relationship between dependent and independent variables, but rather explain part of the relationship that runs through mediators.

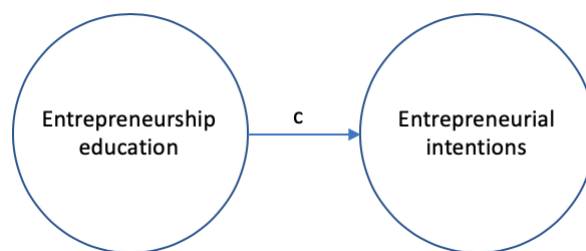


Figure 2.1 Relationship between entrepreneurship education and entrepreneurial intentions

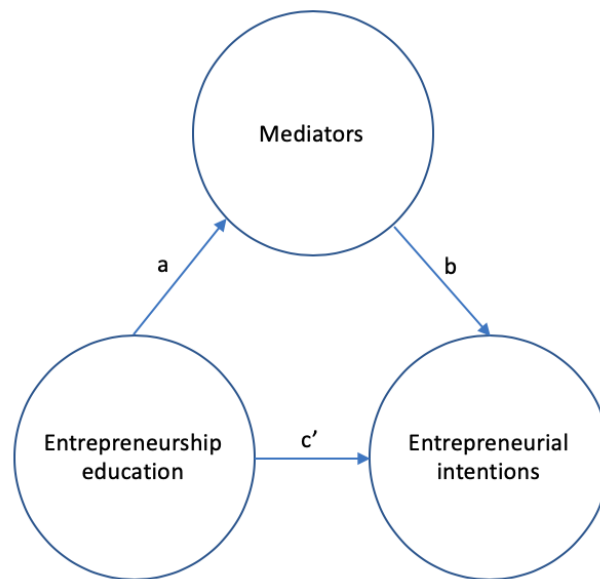


Figure 2.2 Relationship between entrepreneurship education and entrepreneurial intentions including mediators

This mediation analysis is based on the method proposed by Baron and Kenny (1986). This research will use a two-step procedure which investigates the significance of coefficients between our variables of interest. First, it investigates the significance of the relationship between independent variable and mediator (i.e. path a). Second step looks at the link between mediator and dependent variable (i.e. path b). In case our coefficients are not significant then this means that there is no mediation. However, if both coefficients of our analysis as well as the Sobel test statistic are significant, it could be claimed that there is mediation.

4.3 Robustness Analysis

Since there is always place for concerns about omitted variable bias in research conducted not in an experimental setting. This research is subject to the same burden. Even if the introduced control variables have the aim to reduce the omitted variable bias, it is still likely that there will be left some unobserved differences between students who do take entrepreneurial education classes and those who do not. In this case, the solution to this problem is the exploration of the sensitivity of our coefficient of interest to the inclusion of the available set of control variables (Oster, 2019). This way, if the coefficient is not subject to any changes, as well as R-squared, then we could claim that omitted variable bias is limited. Even though, an estimation model of selection on unobservables proposed by Oster (2019) based on Altonji, Elder and Taber's (2005) method represents a useful tool for assessing robustness of regression estimates. This sensitivity analysis assumes that the selection on observed controls is proportional to the selection on unobservableles. This is because control variables are assumed to be a random subset of the entire set of variables that could affect our estimate. Important to notice here is that this is not the case for the linear

model, which instead assumes that it takes into account all the possible confounders that could influence the established relationship. Therefore, on basis of our coefficient of interest variance after adding control variables and making assumptions about (1) the value of selection on observables and unobservables (σ) and (2) desired maximum R^2 to be reached (R_{max}) the bias-adjusted treatment effect is estimated. However, neither this estimate can be claimed to be the perfect causal point estimate of our relationship since this does also rely on strong assumptions as well as the investigation is done using cross-sectional data. But these assumptions are not as strong as the ones linear regression implies. Consequently, the estimates are used to assess the robustness of our results.

Results

5.1 Hypotheses Testing

Our investigation starts with a simple regression of entrepreneurship education on entrepreneurial intentions (Model 1). Secondly, in order to increase the robustness of results a model that includes besides our independent and dependent variables, control variables, is built (Model 2). After this mediator variables are added to the model (Model 3-5). Finally, a model regressing entrepreneurship education on entrepreneurial intentions containing all mediating variables is built (Model 6).

In Table 3 the results of the regression analyses are presented. Hypothesis 1 of this research paper states that entrepreneurship education has a positive influence on students' entrepreneurial intentions. As it can be seen, Model 1 of Table 3 returns a positive, but insignificant coefficient. Since there are some observable factors that could potentially influence our relationship outcome this research paper's control variables are added to our initial model. Interesting to notice is that Model 2 of Table 3 indicates that there is a positive significant relationship between education and entrepreneurial intention, $\beta = 0.67$, $p < 0.05$. Entrepreneurship education access of students within their formal education as part of their program or elective courses increase their entrepreneurial intentions by 0.67 points. Therefore, one **cannot reject** the hypothesis that entrepreneurship education attainment is related to students' entrepreneurial intentions.

As it has been expected, with the inclusion of mediators (Model 3-6) into our initial regression, the coefficient of entrepreneurship education becomes insignificant and smaller than the initial one. It can be concluded that for all models (Model 3-6) presented in Table 3, all mediators significantly relate to entrepreneurial intentions indicating that the usage of TPB is suitable for this relationship investigation and further mediation analysis is required.

Table 3. Linear regression results for the relationship between entrepreneurship education and entrepreneurial intentions

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age		0.16* (0.29)	0.03 (0.04)	0.13* (0.07)	0.12 (0.07)	0.03 (0.03)
Gender		-0.1 (0.29)	0.16 (0.14)	0.05 (0.27)	-0.09 (0.15)	0.18 (0.14)
Undergraduate		0.53 (0.43)	0.13 (0.21)	0.38 (0.37)	0.53 (0.42)	0.12 (0.22)
Field of study		-0.40 (0.31)	-0.14 (0.22)	-0.45 (0.3)	-0.37 (0.31)	-0.17 (0.22)
Entrepreneurial Family		0.85** (0.28)	0.2 (0.16)	0.6* (0.26)	0.69* (0.28)	0.16 (0.15)
Education	0.47 (0.28)	0.67* (0.29)	0.26 (0.19)	0.30 (0.28)	0.53 (0.3)	0.17 (0.19)
Personal attitudes			0.87** (0.04)			0.79** (0.05)
Perceived behavioral control				0.8** (0.1)		0.21** (0.07)
Subjective norms					0.64** (0.13)	0.12 (0.08)
Constant	3.17 (0.16)	-0.74 (1.99)	-0.75 (0.77)	-3.44 (1.59)	-3.27 (1.97)	-1.91 (0.78)
Observations	150	150	150	150	150	150
R ²	0.02	0.12	0.78	0.34	0.24	0.79
Adjusted R ²	0.01	0.08	0.76	0.30	0.21	0.78

Note. Standard errors are in the parentheses; * $p < 0.05$, ** $p < 0.01$.

Table 4. Linear regression results for the relationship between entrepreneurship education and mediators

Variable	Personal attitudes	Perceived behavioral control	Subjective norms
Education	0.37 (0.28)	0.56** (0.15)	0.21 (0.16)
Constant	3.53 (0.16)	4.39 (0.10)	5.43 (0.09)
Observations	150	150	150
R ²	0.01	0.07	0.01
Adjusted R ²	0.005	0.06	0.005

Note. Standard errors are in the parentheses; * $p < 0.05$, ** $p < 0.01$.

Further investigation is conducted based on Baron and Kenny's (1986) mediation analysis approach. This way we could assess whether indeed the relationship between entrepreneurship education is mediated by personal attitudes, perceived behavioral control and subjective norms. In order to this, regression analyses with education as independent variable and the mediator as dependent variable were estimated (see Table 4).

As it can be seen in the Table 3 even if there is a positive and significant link between personal attitudes and entrepreneurial intentions (Model 3), $\beta = 0.87$, $p < 0.01$. There is not enough evidence to claim that there is a significant relationship between subjective norms and entrepreneurship education (see Table 4). Therefore, this means that personal attitude does not mediate the relationship between entrepreneurship education and entrepreneurial intentions and the Hypothesis 2a is **rejected**. This could imply that the teaching methods and content delivered to students is not adequate for increasing their attitude towards entrepreneurship in general.

As it can be seen from Table 3 (Model 5) there is a positive and significant relationship between subjective norms and our dependent variable, $\beta = 0.64$, $p < 0.01$. However, it appears that there is an insignificant positive relationship between subjective norms and entrepreneurship education (see Table 4). Therefore, this means that Hypothesis 2c is **rejected** as well, and entrepreneurship education does not have a significant influence on their entrepreneurship perception through subjective norms.

However, perceived behavioral control does mediate the relationship between entrepreneurship education and entrepreneurial intentions. This is due to the fact that besides the significant coefficient that can be seen in Table 3 (Model 4), $\beta = 0.8$, $p < 0.01$. There is also a significant relationship between

entrepreneurship education and perceived behavioral control, $\beta = 0.56$, $p < 0.01$ (see Table 4). Also, Sobel test statistic is significant ($a*b = 0.47$, $p < 0.01$). Consequently, this means that the inclusion of mediator makes the direct influence of entrepreneurship education on entrepreneurial intentions insignificant. Therefore, hypothesis 2b, which states that there is a positive link between entrepreneurship education and entrepreneurial intentions mediated by perceived behavioral control, **is not rejected**.

5.2 Robustness Analysis

Table 5. Bias-adjusted treatment effects under hypothetical proportional selection of observables and unobservables and R-squared

Result description	Baseline effect [R ²]	Controlled effect [R ²]	Bias-adjusted treatment effect β (Squared difference from controlled beta)	Bias changes direction
Education	0.47 [0.2]	0.67 [0.12]	$\sigma = 1$ $R_{max} = 1$ 0.06 (0.37)	Yes
			$\sigma = 0.5$ $R_{max} = 1$ 3.68 (9.09)	No
			$\sigma = 0.5$ $R_{max} = 0.25$ 0.95 (0)	No

As it can be seen from Table 4 the sensitivity analysis of our results has been conducted in order to check the robustness of our results and hypothetically estimate true coefficients of our relationship of interest. The bias-adjusted treatment effect β indicates the influence of entrepreneurship education, matching a degree of proportional selection delta, on entrepreneurial intentions. In the first case we assume that our upper bound delta is equal to one, which means that the selection on observables is equal to the selection on unobservables. In the next two cases the assumption is that the selection on unobservables is half the selection on observables. Another assumption made is about R², where $R_{max} = 1$ means that the effect on intentions can be fully explained by the entrepreneurship education as well as the entire set of control variables, which is highly unlikely. Since there is no bias direction change for some of our hypothetical bias-adjusted effects, this means that our estimate is robust to these certain levels of unobserved omitted variables. From the multiple solutions proposed for our beta, the default upper bound of our confidence interval is the coefficient with the lowest squared difference from controlled beta and with the same direction of bias as our controlled effect (Oster, 2019). This coefficient is obtained under the assumption that the selection on unobservables is half the selection on observables and the inclusion of treatment and control variables into the model explains 25% of the variance in the dependent variable. And,

it means that under above-mentioned assumptions, the true effect of entrepreneurship education on entrepreneurial intentions students is somewhere between 0.67 and 0.95. Since there is a considerable change in the R^2 when control variables are added to the simple regression, it means that the assumptions made about the magnitude of influence unobservables could have on our relationship considering the impact of observables, is plausible. This is because the control variables are assumed to be a random sample of the entire set of variables that could affect our relationship under investigation.

Conclusion and Discussion

In this section the results of this research will be discussed. Also, the limitations of this paper as well as further research suggestions are presented. In the end, the final conclusion of this research is drawn.

6.1 Discussion

The purpose of this paper was to investigate whether entrepreneurship education has an impact on entrepreneurial intentions of students. Additionally, we looked at the means through which this relationship is established. This research started with the analysis of the already existing empirical research on entrepreneurship education. This led to the establishment of 4 hypotheses that consequently have been tested using the conceptual models applied in previous studies and mainly multiple regressions and mediation analyses. These models were built on basis of the cross-sectional data collected from students of Erasmus University of Rotterdam using the empirically tested Entrepreneurial Intentions Questionnaire.

After the empirical analysis of our secondary data it could be concluded that students who took part in an entrepreneurship program are more likely to have higher intentions than non-participants. This is in line with earlier findings and claims made by Liñán et al. (2010), Sánchez (2013), Autio et al. (2001), and Sánchez (2010).

The Theory of Planned Behavior was used to investigate the means or mediating effects through which this intent is enhanced. The current study looked at how intermediary variables such as personal attitudes, perceived behavioral control, subjective norms can clarify the true provenience of the relationship between education and entrepreneurial intention. Support was found for one of the established hypotheses related to the role of mediating variables: perceived behavioral control. This according to Ajzen (2002) means that the influence of entrepreneurship education on entrepreneurial self-efficacy is strong, which subsequently tend to influence significantly entrepreneurial intentions of students. Entrepreneurship programs/courses seem to have a positive impact on entrepreneurial skills one has, which makes them believe that they could perform well as entrepreneurs. However, it is surprising to notice that we did not find evidence that the other two variables mediate the relationship between entrepreneurship education and entrepreneurial intentions. Even if these mediators do influence entrepreneurial intentions, there is not enough evidence to claim that entrepreneurship education is that exogenous variable that could have a significant impact on subjective norms or attitudes towards entrepreneurship of students. This means that even if entrepreneurship education content might be adequate. The enthusiasm of teachers towards entrepreneurship might lack and therefore do not significantly influence their behavioral or normative beliefs as it was expected.

6.2 Limitations and Further Research

This study has some limitations that have to be taken into consideration. Since our data is collected in a cross-sectional survey setting this immediately implies that causal claims about the investigated relationship cannot be made. This is because data on participating students is collected for a single period of time, which does not allow neither for running a pre-test nor a post-test investigation. Furthermore, it is possible that the study suffered from omitted variable bias. Also, the investigation of students' dynamic transformation of intentions into actions, which according to Bird (1988) is subject to time lagging effects, is not feasible to be assessed. Therefore, this leads to the conclusion that the established models do only prove that there is an association between our dependent and independent variables, but further investigation is needed to claim something about causal effects.

Moreover, the self-report bias might also play a role in this relationship investigation. Even if these mediating variables are not built based on a sensitive information collected from students, but rather on their environmental settings' influence. There is still space for overestimation or underestimation of the reported answers of students. Especially when students are asked to indicate their self-efficacy in dealing with entrepreneurial tasks, which is captured by perceived behavioral control variable in our questionnaire. Additionally, there is not a clear composition of the content and teaching methods used in the entrepreneurship education programs/courses of all participating individuals. In other words, this means that entrepreneurship education programs/courses' similarity is questionable, and this could have an impact on the outcomes of this research.

Besides data collection method and omitted variable bias, another limitation of this study is its sample. Only students of Erasmus University of Rotterdam were asked to complete the questionnaire. Even if this does ensure similar environmental factors, age and education level, which play a significant role in the formation process of intentions of students, this sample might not be representative for the entire population of students. Therefore, the results of this research might not be generalizable to other samples. Also, even if the large enough sample condition is satisfied, missing data could lead to the introduction of selection bias in our estimates. This is due to the fact that random loss assumption of data that is not directly related to our independent or dependent variable could not be made.

To sum up, this means that there is an urgent need of further in-depth investigation of the relationship, which could prove whether these results in absence of the above-mentioned limitations are true. Based on the outcome of this study it becomes of high interest to investigate the impact of specific types of content and pedagogy methods used in entrepreneurship education on students' entrepreneurial intentions. Moreover, further research should also investigate what type of entrepreneurship education

program has the biggest impact on entrepreneurial intentions of students. Since experimental study of this relationship is not ethical to be conducted, longitudinal study of this relationship is the setting that will allow anticipation before the entrepreneurship program as well as dynamic effects analysis after it, to be feasible. This way, it could become clear whether the intentions of students with entrepreneurial education translates into action. Individuals may have really high indicators of their intentionality, but their intentions never transcend into something more. Furthermore, the analysis of the factors that influence students to go from intentions to actions could serve as an important input in the entrepreneurial process investigation.

6.3 Conclusion

This study confirmed that students who had access to entrepreneurship education tend to have higher entrepreneurial intentions when compared to those that did not. This is in line with previous established findings supporting the framework that entrepreneurs are made. However, not all TPB expected variables mediate the relationship between entrepreneurial intentions and entrepreneurship education. This could be due to the above-mentioned limitations of this research design and execution. Moreover, this outcome could be also due to the fact that entrepreneurship education programs/courses that our students had access to, affect only perceived behavioral control. Therefore, these findings could serve as an important information mean for both theory and practice. Leading us to the conclusion that further investigation overcoming these limitations is required. However, it is important to stress that the content and pedagogy methods used in entrepreneurship education play a significant role in the magnitude and direction of the relationship. Also, important to notice is that our finding on perceived behavioral control highlights the importance for future entrepreneurship education programs to focus on development of behavioral control aspect. This way, through higher perceived behavioral control, entrepreneurship education will translate into higher entrepreneurial intentions.

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