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# The moderating role of higher education on entrepreneurship

The moderating  
role of HE

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## Abstract

**Purpose** – Entrepreneurial activities have a great impact on the economy and entrepreneurs are even more important for developing countries. Accordingly, the need for entrepreneurial graduates is increasing. Thus, this study aims to investigate the role of higher education with regard to the entrepreneurial intentions and traits of university students in Turkey.

**Design/methodology/approach** – A survey was administered to freshmen and senior university students studying business and engineering at five established universities in Turkey, yielding a total sample of 767.

**Findings** – This logistic regression analysis indicates that some personality traits play an important role in influencing the students' intention to become entrepreneurs. The study findings also suggest that students with higher education have a higher intention of becoming entrepreneurs.

**Research limitations/implications** – The cross-sectional method of data collection was used. However, longitudinal data from a bigger sample would have provided more valid support for the study.

**Practical implications** – The findings of this study have important implications for those who formulate, deliver and evaluate educational policy in Turkey. Based on the findings, policy makers may wish to review the current higher educational system and make changes to foster students' entrepreneurial mindset.

**Originality/value** – The study fills the gap in the literature by particularly testing the moderating effect of education between entrepreneurial traits and intentions.

**Keywords** Entrepreneurialism, Intention, Traits, Turkey, Education

**Paper type** Research paper

## Introduction

Because of today's global economic crises and rapid technological advances, as pointed out by Collins *et al.* (2004), for twenty-first century graduates, university education is no longer a passport to employment. Since large corporations have started to employ fewer people, there is increasing demand for entrepreneurial graduates. Accordingly, a large body of entrepreneurship literature examines the factors that influence

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entrepreneurial intentions. Previous research suggests that among other factors, individuals' personality traits influence their intentions to start a business (Koh, 1996; Mueller and Thomas, 2001; Robinson *et al.*, 1991). However, while investigating the interface between the traits of individuals and their intentions, these studies do not consider the moderating effect of higher education.

As pointed out by Nga and Shamuganathan (2010, p. 259) "Personality traits are partly developed by innate nurturing, socialization and education." The specific school and the educational system in general play a crucial role in predicting and developing entrepreneurial traits. While a school's curricula should focus on encouraging independence, innovation, creativity and risk-taking, the pedagogical approach should encourage children to make decisions, accept mistakes and learn from them (Ibrahim and Soufani, 2002). However, in today's business schools around the world, rather than being educated for entrepreneurship, students are educated about entrepreneurship and enterprise (Kirby, 2005; Laukkanen, 2000).

Although there is a substantial amount of research on entrepreneurship education, (Holmgren and From, 2005), there is limited and contradictory empirical research (for example, Collins *et al.*, 2004; Guerrero *et al.*, 2008; Gurel *et al.*, 2010; Thompson *et al.*, 2010; Wu and Wu, 2008) on its effects. Besides that, available literature considers only the direct effect of it on entrepreneurship. The moderating effect of education has not been previously investigated with the exception of the studies conducted by Gurel *et al.* (2010) on tourism students and Thompson *et al.* (2010) on male students. This study fills this gap by considering the moderating effect of today's higher education between entrepreneurial traits and intentions of students or potential entrepreneurs. What happens to the personal traits, skills, attitudes and desires after having formal education? In this study, we intend to find an answer for this question.

### **Higher education system and entrepreneurship in Turkey**

Although modernization of universities in Turkey started in 1931, the changes that established the foundation of today's universities happened in 1981 as the higher education system in Turkey was comprehensively reorganized. With the help of this restructuring, all institutions of higher education were designed as universities under the Council of Higher Education. Access to higher education was centralized and a central university entrance exam was introduced. Non-profit foundations were allowed to establish private higher education institutions. Since then, the number of both public and private universities increased (Mizikaci, 2006). Currently, there are 154 higher education institutions, of which 102 are public and 52 are private universities, as well as nine private vocational schools of higher education (YOK Ulusal Tez Merkezi, 2010). Turkish higher educational institutions have taken their basic characteristics from both Continental European, and the Anglo-American models, (Mizikaci, 2006). Although there has been a tremendous increase in the number of universities, equal access to higher education is still a challenge in Turkey (Mizikaci, 2006). Accordingly, as a signatory country of the Bologna Declaration, there have been a number of changes taking place in the Turkish higher education system. One of the most important changes is the promotion of vocational education. Because of the shortcomings of the secondary school education in Turkey, programs were launched in 2001 to improve and enlarge vocational education options. Training in entrepreneurship in universities, has begun to be offered as elective courses under

business administration programs after 1995. In a very limited number of universities, an entrepreneurship course is compulsory either in a four-year degree or an MBA program (Gürol and Atsan, 2006). Besides these courses, entrepreneurship training in Turkey is given by means of certificate programs, conferences, seminars, congresses and symposiums. In addition, a number of universities have Techno cities, Entrepreneurship Research and Application Centers and Entrepreneurship Clubs to help equip both students and small business owners in the area of entrepreneurship (Özmen and Özalın, 2008). As of 2010, only one private university has a separate major in entrepreneurship labeled as “international entrepreneurship” under its Faculty of Economics and Business Administration (OSYM, 2010). A review of Master’s and doctoral dissertations reveal that only 40 studies have been conducted in the area of entrepreneurship since 1990 (YOK Ulusal Tez Merkezi, 2010). In summary, entrepreneurship education within the higher education system of Turkey is in its infancy.

Although entrepreneurship education has a long way to go in Turkey, small and medium-sized enterprises (SMEs) play great role in Turkey’s economy. SMEs account for 99.6 percent of the total business population (Mittelstädt and Cerri, 2008). According to a recent report of OECD by Mittelstädt and Cerri (2008), since opportunities for entrepreneurship education are limited in Turkey; it creates a large supply of under educated labor, which in turn hampers innovative activities by small and micro firms. The country is marked by a large oversupply of subsistence entrepreneurship with low efficiency ratios and low levels of aggregate firm productivity. In order to overcome these problems, encouraging enterprising graduates is important in Turkey.

### **Theoretical background**

#### *Entrepreneurial intentions*

In line with the well-known entrepreneurial intentions models (Ajzen, 1991; Shapero and Sokol, 1982), Learned (1992) proposes a three-dimensional model for organization formation, labeled as:

- (1) propensity to found;
- (2) intention to found; and
- (3) sense making.

These three dimensions lead to a decision to found or not found.

Learned (1992, p. 42) defines “intention to found” as “a conscious state of mind which directs attention towards the goal of establishing the new organization” and adds that “individuals with intention have a higher likelihood of founding than do individuals with only propensity.” “Propensity to found”, on the other hand, is related to some predisposing psychological traits and background factors. According to him, “some individuals have a combination of psychological traits in interaction with background factors which make them more likely candidates to attempt to found businesses.” In other words, not all individuals have the potential to start a new venture. Some personal characteristics or traits define an individual’s potential to become an entrepreneur (Learned, 1992, p. 40).

Past research on entrepreneurship can be investigated under three major genres; functional, personality and behavioral approaches (Cope, 2005 quoted in Nga and Shamuganathan, 2010). While the functional approach studies rational outcomes of entrepreneurship within economic theory, the personality approach deals with the characteristics of entrepreneurs' psychological traits. On the other hand, the behavioral approach investigates the process of how an entrepreneur perceives and acts on the present opportunities (Nga and Shamuganathan, 2010). This study is positioned on the personality approach.

As Cunnigham and Lischeron (1991) state, selecting the appropriate basis for defining the entrepreneurial person is challenging. Timmons *et al.* (1977) indicate that more than twenty characteristics to distinguish entrepreneurs from others are cited in the literature. In this study, we select four traits closely associated with entrepreneurial potential: need for achievement, *locus* of control, propensity to take risks and innovativeness (Koh, 1996).

Since McClelland (1961), need for achievement (n Ach) has been associated with entrepreneurial behavior. Based on the results of his series of studies on need for achievement, McClelland (1961, 1965) claimed that such behaviors correlate strongly with "entrepreneurial" success. Need for achievement is one of the most frequently cited entrepreneurial traits in the literature (Frank *et al.*, 2007; Gürol and Atsan, 2006) and it is the strongest predictor of entrepreneurship (Pillis and Reardon, 2007). Empirical research findings show that in a small sample of MBA students in Hong Kong, entrepreneurially inclined students do not significantly have higher need for achievement. In contrast, in a sample of fourth-year university students, Gürol and Atsan (2006) report the opposite in Turkey.

Another frequently cited entrepreneurial psychological variable is internal *locus* of control. *locus* of control relates to an individual's perceptions concerning his ability to influence events in his life. While "internals" believe that they are in control of their lives, "externals" believe that external forces such as destiny, luck and powerful others are in charge (Begley and Boyd, 1987). Several research results suggest that internal *locus* of control is an entrepreneurial characteristic (Koh, 1996; Mueller and Thomas, 2001; Robinson *et al.*, 1991).

Schumpeter (1990) defines the entrepreneur simply as an innovator, and as suggested by Drucker (1986, p. 19), "innovation is the specific tool of entrepreneurs." Robinson *et al.* (1991, p. 19) state that innovation in business is related to "perceiving and acting upon business activities in new and unique ways". Many authors argue that innovation distinguishes entrepreneurs from managers (Carland *et al.*, 1984; Steward *et al.*, 1998). Empirical research findings also support the notion that individuals with entrepreneurial intentions are more innovative than those without such intentions (Gurel *et al.*, 2010; Gürol and Atsan, 2006; Koh, 1996; Robinson *et al.*, 1991). As Mueller and Thomas (2001) point out, study findings show that innovation is a primary motive in starting a business venture.

As Gürol and Atsan (2006, p. 30) point out that "Entrepreneurship is historically associated with risk taking." According to Mill (1984), who introduced the term "entrepreneurship" in economics, risk-bearing is the key in distinguishing entrepreneurs from managers (quoted in Cunnigham and Lischeron, 1991). A number of empirical research results also support this notion that entrepreneurs are

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risk takers. Steward and Roth's (2001) meta-analysis indicates that the risk propensity of entrepreneurs is greater than that of managers. Study findings of Gurel *et al.* (2010), Gürol and Atsan (2006) and Koh (1996), show that entrepreneurially-inclined students have significantly higher scores in risk-taking than non-entrepreneurially-inclined students.

### *Education*

There has been significant amount of research regarding the impact of education on entrepreneurial behavior, though the influence of education on entrepreneurial perceptions still requires research attention (Peterman and Kennedy, 2003). First, research findings in this area are contradictory. While some researchers claim that formal education lessens the entrepreneurial desire of the individual (for example Shapero, 1980), there are others who say that people's entrepreneurial intentions actually increase with education (for example Davidsson, 1995). Second, the available research concentrated on investigating the direct influence of education on entrepreneurial intention, therefore ignoring the possible moderating effect of it.

Goedhuys and Sleuwaegen (2000) report that although primary education does not have a significant impact on the probability of being an entrepreneur, this effect increases steadily for higher levels of education and becomes significant. Davidsson (1995) and Davidsson and Honig (2003) also state that the effect of education level is not linear. While individuals with primary education deviate in the negative direction, the effect of university education is positive. Particularly, advanced business education seems to increase an individual's propensity toward entrepreneurship. By increasing the learning capabilities of individuals, formal education also increases entrepreneurial efficiency and successful firm growth. Similarly, based on US census data, Robinson and Sexton (1994), found that the number of years of formal education increase the probability of becoming self-employed.

In contrast, Wu and Wu (2008) report that respondents with a diploma and undergraduate degree show higher interest in starting a business than those with a postgraduate degree. According to the researchers, individuals with higher levels of education might have better outside options and thus have less intention to entrepreneurship. Other researchers argue that formal education reduces curiosity and vision and increases risk aversion (Fallows, 1985; Shapero, 1980). For instance, Ronstadt (1984) claims that traditional education leads to conformity and decreases tolerance for ambiguity, thus lowering students' abilities in creative thinking, an indispensable characteristic of entrepreneurship. Laukkanen (2000) states that as business schools traditionally teach their graduates to be too analytic, problem-conscious and risk-averse, they scare students from establishing new business ventures. Similarly, Shapero and Sokol (1982) question the effect of a "good" business school education on entrepreneurship by stating that it conveys the idea that small businesses are not desirable or are doomed to fail. Peterman and Kennedy (2003) also emphasize that formal education in general does not encourage entrepreneurship because it generally prepares students for jobs in corporations and suppresses creativity and entrepreneurship. Kirby (2005) claims universities and business schools can develop entrepreneurs only after a radical change in their intellectual and educational priorities.

**Research framework and hypotheses**

In his organization formation model, Learned (1992, p. 40) also stresses the importance of the situation. According to him, in venture creation, person-level variables in interaction with other variables should not be ignored. Although individuals may have the necessary combination of traits and background, in other words the potential to found a business, the final decision is formed from the interaction of the potential with the situation. The situation may facilitate or inhibit the individual to found his/her own business. Recognizing the presence of the situational determinants in the start-up process, Frank *et al.* (2007) state that personality traits are subject to change due to the interaction between natural (psychogenetic) and environmental (learning behavior) factors.

Accordingly, we propose the model in Figure 1, which illustrates the framework underpinning this study. The framework posits that entrepreneurial intention is influenced by personality traits, background and environmental factors.

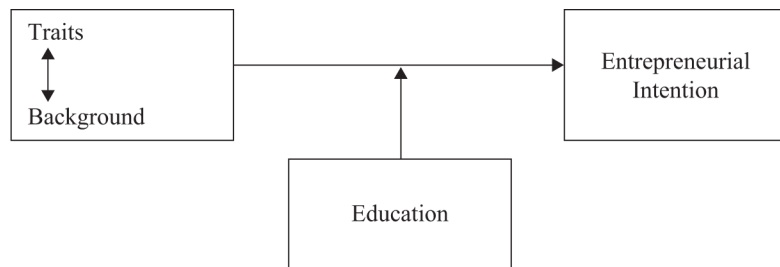
Given the above factors, we hypothesize that:

- H1. Need for achievement will be associated with intention in establishing a business.
- H2. Internal *locus* of control will be associated with intention in establishing a business.
- H3. Innovativeness will be associated with intention in establishing a business.
- H4. Risk-taking will be associated with intention in establishing a business.
- H5. Education will moderate the relationship between entrepreneurial traits and intentions.

**Research design**

*Sampling and data collection*

In this study, data were collected from freshmen (first-year) and senior (fourth year) university students studying business and engineering at five established universities in Turkey. The sample included students of two private and three public universities. We aimed to reach both private and public universities; students in private universities mostly come from high-income families, whereas students in state universities come from relatively lower-income families in Turkey. Data collection of the main study was completed in November 2007. A total of 917 questionnaires were completed and collected during classes from students studying business administration and



**Figure 1.**  
Factors affecting  
entrepreneurial intention



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engineering, either under the monitoring of the authors or with the guidance of the university professors. Participation was voluntary and anonymous. After eliminating freshmen students repeating their freshmen courses, senior students who spent more than the normal time required for graduation in the program they are studying and those students who did not indicate their departments, 767 questionnaires were usable.

#### *Questionnaire development and measurement*

A questionnaire was developed to measure students' entrepreneurial traits including need for achievement, risk-taking propensity, innovativeness, and *locus* of control. All these items were adapted from well-known scales and measured using a five-point Likert scale between one (strongly disagree) and five (strongly agree). To minimize response-set bias and the halo effect, some statements were reverse-scored and intermingled with other statements. The survey instrument also included items to measure entrepreneurial intentions, personal circumstances and demographics that predispose individuals to act entrepreneurially.

*Dependent variable.* Entrepreneurial intentions were measured by the respondent's judgments about the likelihood of establishing his/her own business. Respondents were specifically asked whether they had the intention to establish their own businesses or not.

*Independent variables.* To measure need for achievement, Cromie and Johns (1983, p. 318) suggest that measures of achievement values based on conscious beliefs are preferable to projective tests, which are mainly used to measure achievement motivation as introduced by McClland (1961). Although there are a number of pencil-and-paper tests to measure achievement motivation, most have a unitary dimension (Cromie, 2000) and therefore, we adapted eight items from Kahl's (1965) achievement values. According to him, achievement orientation is multidimensional and consists of four key components: desire for occupational accomplishment, independence of family (individualism), activism or mastery over the environment and trust in people. Of these four components, we used the items measuring occupational accomplishment (five items) and independence (three items).

A modified version of Rotter's (1966) I-E Scale, as utilized by Mueller and Thomas (2001), consisting of ten items was used to measure internal *locus* of control. The instrument is originally designed to measure the respondent's belief in his ability to control external forces. Prior research has shown that this instrument is reliable and valid (Begley and Boyd, 1987).

Eight items from the *Jackson Personality Inventory Manual (JPI)* as utilized by Mueller and Thomas (2001) were used to measure innovativeness. The manual defines innovativeness as a tendency to be creative; a high score on this scale indicates that the individual tends to be novel and original in his ideas (Mueller and Thomas, 2001). As Mueller (2004) reports, the Cronbach alpha reliability score for this scale is acceptable.

The risk-taking propensity scale was also assessed by the *JPI* – revised edition (Jackson, 2007). The scale consists of four components: monetary, physical, social and ethical risk-taking. A high score on this scale indicates that the respondent enjoys gambling, taking chances, enjoys adventure and is unconcerned with danger (Sexton and Bowman-Upton, 1990). In this study, we used ten items related to monetary and social risk-taking. The instrument has accepted internal consistency (Begley and Boyd, 1987).



*Moderating variable.* Education is introduced as a moderating variable in our regression model. It is coded dichotomously where 0 indicated freshmen students and 1 represented senior students.

*Control variables.* Gender and family background were chosen as the control variables in this study. Previous research has shown that males (Delmar and Davidsson, 2000; Greene and Saridakis, 2008; Koh, 1996; Matthews and Moser, 1996; Mueller, 2004) and individuals with an entrepreneurial family (Basu and Virick, 2008; Gasse, 1985; Greene and Saridakis, 2008; Henley, 2007; Hisrich, 1986; Liñán *et al.*, 2005) are more likely to establish their own businesses. On the basis of these, we included gender and family background as control variables in our analysis. In addition, the students' major is also included as another control variable. Although there is some research investigating the effect of the study subject on entrepreneurship (e.g. Guerrero *et al.*, 2008; Wu and Wu, 2008), the findings are mixed.

#### *Properties of the scales*

Reliability coefficients (Cronbach's alpha) are 0.61 for independence, 0.63 for *locus* of control, 0.74 for innovativeness, and 0.66 for propensity to take risks. These values are considered acceptable as an indication of reliability (Hair *et al.*, 1998). Since the Cronbach alpha for occupational achievement was 0.59, we did not include it in our analysis.

### **Findings**

#### *Sample profile*

The students in the sample were between the ages of 17 and 27, with the average age of 18.7 for freshmen and 21.7 for senior students. The majority of respondents were male (51.1 percent). Only 40.1 percent of the students indicated that they come from an entrepreneurial family. The proportions of senior and freshman students were 43.8 percent and 56.2 percent respectively. While 64.1 percent of the responses came from private universities, 35.9 percent came from public universities. Of the students in private universities, 56.9 percent had intentions to start a business. Only 44.7 percent of the students in public universities showed a tendency to establish a business. 55.0 percent of respondents were management students and 45.0 percent were engineering students. While 50.4 percent of the engineering students had intentions to establish a business, of the management students 54.2 percent had the same intention. Only 40 out of 336 senior students indicated that they took an entrepreneurship course during the course of their study.

#### *Role of higher education*

$\chi^2$  tests of independence conducted to examine whether there are significant differences between freshman and senior students with respect to demographic and family characteristics, showed that the two groups can be considered homogenous with respect to gender and family entrepreneurial inclination.

To investigate the effect of entrepreneurial traits, background factors and education on intention, we performed a direct logistic regression, since the dependent variable is dichotomous. In the second model of this logistic regression analysis, education is included as a moderating variable. As suggested by Aiken and West (1991) for moderated regression analysis, we centre the continuous variables. After deleting

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cases with missing demographic values, data from 762 respondents were available for analysis: 400 students with intentions and 362 students without intentions of starting their own businesses. Results of the regression analysis are summarized as Table I. In this analysis, entrepreneurial intention is the outcome, four entrepreneurial traits (independence, *locus* of control, innovativeness, and propensity to take risks) are the predictors and education is the moderating variable. Gender, inclination of family and major are included as control variables.

Table I shows the regression coefficients, Wald statistics, significance levels and odds ratios for each of the predictors. According to the Wald criterion, males, senior students and students with an entrepreneurial family have significantly higher odds of having an intention in establishing a business. The odds ratio of 1.573 indicates that senior students have a probability of stating an entrepreneurial intention 1.5 times higher than the freshmen students. This finding is consistent with the study findings of Robinson and Sexton (1994) who found that the number of years of formal education increases the probability of becoming self-employed. According to the authors, high educational attainment allows individuals to recognize a variety of business opportunities and provide them with the required skills to exploit them. Thus, Arenius and De Clercq (2005) found that there is positive correlation between years of education and opportunity recognition. In addition, those with higher risk-taking propensity and independence of family also show greater intentions of starting their own businesses. This finding is in line with the research findings of Gürol and Atsan (2006), who found that Turkish students with a higher risk-taking propensity and need for achievement are more entrepreneurially inclined. Among the selected entrepreneurial traits, propensity to take risks has the highest influence on entrepreneurial intentions. The odds ratio of 2.912 for risk-taking propensity indicate that when risk-taking propensity increases by one unit, the odds of stating an intention in establishing a business increase by a factor of 2.912 - more than two times. This finding is also consistent with the findings of Gurel *et al.* (2010), who report that in a sample of tourism students, both in Turkey and the UK, propensity to take risks has an important influence on the entrepreneurial intentions of students. No differences are found in students' innovation and *locus* of control. According to the Hofstede's (1980) typology, Turkey has a collectivistic culture with high uncertainty avoidance. Such cultures have been found to be negatively related to entrepreneurial traits including internal *locus* of control and innovativeness (Mueller and Thomas, 2001). Given the above factors, we have accepted *H1* and *H4*.

Among the predictors, having an entrepreneurial family also seems to be a strong predictor for entrepreneurial intention. This result is consistent with several authors' findings (Basu and Virick, 2008; Gasse, 1985; Gurel *et al.*, 2010; Henley, 2007; Hisrich, 1986; Liñán *et al.*, 2005) that suggest a positive relationship between having an entrepreneurial family and intention to start a business.

Analyzing interaction effects for education by entrepreneurial traits reveals that students' risk-taking propensity interacts with education. The results indicate that when risk-taking propensity increases by one unit, the odds of stating an intention in establishing a business increase by a factor of 2.107 for senior students. This finding reveals that the moderating effect of education is higher for senior students. With the higher independence of family scores, this finding may suggest that high educational attainment provides the individual with the confidence to become entrepreneurially

**Table I.**  
Results of logistic  
regression analysis

	Model		Interaction model		
	$\beta$	Wald's $\chi^2$	$e^{\beta}$ (odds ratio)	Wald's $\chi^2$	$e^{\beta}$ (odds ratio)
Constant	-0.051	0.071	0.951	0.193	0.920
Gender	-0.732	19.899***	0.481	18.690***	0.490
Entrepreneurial family	0.762	21.526***	2.144	21.733***	2.159
Education	0.453	7.555***	1.573	7.929***	1.602
University	0.228	1.849	1.256	2.164	1.281
Major	-0.293	3.134*	0.746	2.905*	0.752
Risk-taking propensity	1.069	36.540***	2.912	14.138***	2.245
Innovativeness	0.276	2.908*	1.318	0.309	1.123
<i>Locus</i> of control	0.069	0.137	1.072	0.350	1.161
Independence of family	-0.279	5.645**	0.757	1.522	0.826
Education × risk-taking propensity				0.745	3.985**
Education × innovativeness				0.373	1.268
Education × <i>locus</i> of control				-0.217	0.805
Education × independence of family				-0.211	0.810

**Notes:** \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; coding for the dummy variables: Entrepreneurial intention: 0 = having no intention and 1 = having intention to establish a business; Education: 0 = freshmen and 1 = senior; Gender: 0 = male and 1 = female; Entrepreneurial family: 0 = not having an entrepreneurial family, 1 = having an entrepreneurial family; University: 0 = public, 1 = private; Major: 0 = management, 1 = engineering; the interaction was calculated as the product term of Education and each covariate

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active, though high educational attainment does not necessarily increase their risk-taking propensity. Since the moderating effect of education is not significant with the other personality traits, we accepted *H5* only with respect to risk-taking propensity.

### Conclusions and discussion

While much research has focused on entrepreneurial intentions, little research has been conducted to explore the effect of education on them. This study fills this gap in the literature not only by investigating the direct effect of higher education on intentions but also by exploring the possible moderating effect of it. Thus, this study investigates if entrepreneurial traits such as need for achievement, risk-taking propensity, innovativeness, and *locus* of control affect the entrepreneurial intentions of students and if higher education has a moderating effect on this relationship.

Our logistic regression analysis indicates that there is a statistically significant relationship with entrepreneurial intentions and some entrepreneurial features; particularly the propensity to take risks and independence of family. Our logistic regression analysis also shows that having an entrepreneurial family is an important predictor of having an intention to start a business. These findings are consistent with previous research findings (such as Basu and Virick, 2008; Gurel *et al.*, 2010; Gürol and Atsan, 2006; Henley, 2007).

The study findings also indicate that senior students are 1.5 times more likely to have entrepreneurial intentions than freshmen students, indicating that students with a higher level of education have a higher intention of becoming entrepreneurs. This finding may support the study findings of Robinson and Sexton (1994), who found that the number of years of formal education increase the probability of becoming self-employed. As our analyses of interaction effects for education by entrepreneurial traits show (see Table I), students' risk-taking propensity interacts with education, suggesting that increases in risk-taking have a greater effect on entrepreneurial intentions for senior students than for freshmen students. Although in collectivist cultures, important entrepreneurial traits including internal *locus* of control and innovativeness have negative relationship with entrepreneurial intentions (Mueller and Thomas, 2001), according to Kozan *et al.* (2006), this does not necessarily suggest a negative environment for entrepreneurship in Turkey. As Özsoy *et al.* (2001) report, the most significant motive for self-employment in Turkey is financial. Because of low wages and a high unemployment rate in Turkey, individuals are pushed towards establishing a business in order to have a decent living. Accordingly, this study's findings suggest that after completing formal education, with confidence and risk-taking propensity inherent in students with entrepreneurial intentions, senior students show a higher intention in establishing a business. Study findings also show that education does not have a positive moderating effect regarding the other entrepreneurial traits. However, as suggested by Frank *et al.* (2007), it is necessary to take measures to promote personality characteristics in schools and universities to develop business start-up intentions of students. Based on their empirical research findings, these researchers state that in addition to conveying knowledge of the start-up process, educational offerings have to be designed in a way to especially encourage the personality traits including need for achievement, *locus* of control and

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risk-taking propensity, since these traits can be regarded as essential factors influencing the development and realization of start-up ideas.

### **Implications, limitations and future research**

According to Kirby (2005), in order to prepare students for the challenges of the entrepreneurial climate of the twenty-first century, students need to develop personal skills, attributes and behavioral patterns that enhance their entrepreneurial capabilities. This can only be possible by changing not only the current content of courses, but also the process of learning itself. The question of whether entrepreneurship can be taught at all (Henry *et al.*, 2004) has been the centre of an ongoing debate in the literature for years. However, as Gorman (1997) points out many researchers agree that through a certain reformation and reorganization of traditional education, entrepreneurship can be taught and that something positive must replace or be a part of traditional education to achieve that (Holmgren and From, 2005). It is our belief that in Turkey, educational offerings should be designed in a way to foster the students' entrepreneurial mindset especially in terms of innovativeness and independence.

As a result of these, this study offers valuable insight for those who formulate, deliver and evaluate educational policy. Based on the findings of our research, policy makers may wish to review the current higher educational system and implement educational programs that will develop innovativeness and independence of students. This is particularly important in the context of a developing country. In light of these factors, this research offers value both for academics and policy makers. This research is also important for academics as the findings indicate that education does not only have a direct effect on entrepreneurial intention, but also has a moderating effect on it through its influence on personality traits. This influence has been neglected in previous research. Thus, academics should consider the moderating effect of higher education in future research studies.

In terms of the limitations of the study, we used a cross-sectional method of data collection which came from a number of selected universities. Longitudinal data from a larger sample would have provided more valid support for the study. Another important limitation is the number of factors that are investigated. Among hundreds of variables that can influence entrepreneurial intentions; four important variables, namely religion, family income, self-efficacy and energy level were not included in the study. Also, a larger sample including other cultures would make the investigation more global. On the basis of cost and length of the survey instrument, selected items from well-known measures were utilized in the study. This may be considered as another limitation of the study.

Further research can investigate potential educational approaches and provisions that could foster entrepreneurial traits in individuals. In addition, students who have taken an entrepreneurship course may be studied. Finally, an examination of the institutional approach to the analysis of entrepreneurial intention and identification of factors within the institutional framework (educational, legal, and economic) that stimulate and/or hinder entrepreneurial intention in different countries could lead to valuable results. This study is only a starting point. In order to fully understand the role of education on entrepreneurial intentions, more in-depth qualitative research would needed to be undertaken.

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