

# ***The Impact of Entrepreneurship Education: A Study of Iranian Students' Entrepreneurial Intentions and Opportunity Identification***

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*Building on the theory of planned behavior, an ex ante and ex post survey was used to assess the impacts of elective and compulsory entrepreneurship education programs (EEPs) on students' entrepreneurial intention and identification of opportunities. Data were collected by questionnaire from a sample of 205 participants in EEPs at six Iranian universities. Both types of EEPs had significant positive impacts on students' subjective norms and perceived behavioral control. Results also indicated that the elective EEPs significantly increased students' entrepreneurial intention, although this increase was not significant for the compulsory EEPs. The findings contribute to the theory of planned behavior and have implications for the design and delivery of EEPs.*

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## ***Introduction***

During the past few decades, entrepreneurship has become an important economic and social topic as well as an often-researched subject around the world (Fayolle and Gailly 2008). According to research, entrepreneurship is an intentional and planned behavior that can increase economic efficiency, bring innovation to markets, create new jobs, and raise employment levels (Shane and Venkataraman 2000). Most empirical studies indicate that entrepreneurship, or at least some aspects of it,

can be taught and that education can be considered one of the key instruments for fostering entrepreneurial attitudes, intentions, and competences (Falkang and Alberti 2000; Harris and Gibson 2008; Henry, Hill, and Leitch 2005; KuratKo 2005; Martin, McNally, and Kay 2013; Mitra and Matlay 2004). This view has led to a dramatic rise in the number and status of entrepreneurship education programs (EEPs) in colleges and universities worldwide (Finkle and Deeds 2001; Katz 2003; KuratKo 2005; Matlay 2005); investment in these programs is still on the increase (Gwynne 2008). Nevertheless, the

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impact of these programs has remained largely unexplored (Bechard and Gregoire 2005; Peterman and Kennedy 2003; Pittaway and Cope 2007; von Graevenitz, Harhoff, and Weber 2010). Moreover, the results of previous studies are inconsistent. Some of these studies reported a positive impact from EEPs (e.g., Athayde 2009; Fayolle, Gailly, and Lassas-Clerc 2006; Peterman and Kennedy 2003; Souitaris, Zerbini, and Al-Laham 2007), whereas others found evidence that the effects are statistically insignificant or even negative (Mentoor and Friedrich 2007; Oosterbeek, van Praag, and Ijsselstein 2010; von Graevenitz, Harhoff, and Weber 2010).

Methodological limitations may be the cause of these inconsistent results (von Graevenitz, Harhoff, and Weber 2010). Some studies, for instance, are ex post examinations that therefore do not assess the direct impact of an EEP (e.g., Kolvereid and Moen 1997; Menzies and Paradi 2003), or have small sample sizes (e.g., Fayolle, Gailly, and Lassas-Clerc 2006; Jones et al. 2008); this has led Martin, McNally, and Kay (2013) to conclude that entrepreneurship education researchers must include pre- and postentrepreneurship interventions. Previous studies also have not differentiated between elective and compulsory programs, and research on the important role of compulsory versus voluntary participation in EEPs has been neglected; therefore, Oosterbeek, van Praag, and Ijsselstein (2010) call for the testing of different program variants. In addition, there is no agreement on what would constitute a well-defined method and a suitable conceptual model for assessing the effects of EEPs (Falkang and Alberti 2000; von Graevenitz, Harhoff, and Weber 2010). Moreover, non-business university students have received limited attention in previous studies (Lans et al. 2013), despite the fact that this population represents the bulk of young adults pursuing an education program. Finally, there is no study regarding the impact of entrepreneurship education for Iranian universities.

The present study has attempted to reduce these theoretical and methodological gaps and make four contributions to the existing literature. First, we applied an intention model to assess the impact of EEPs. As a second contribution, we studied the effects of large-scale compulsory and elective entrepreneurship courses at different universities. The third contribution is our use of a pretest plus post-test

design to study these effects. And the fourth contribution is to assess the effect of entrepreneurship education on non-business university students in a developing country, namely Iran. This paper is organized as follows. In the next section, we explain entrepreneurial intentions (EIs) and the theory of planned behavior (TPB). We then discuss the relationships between intentions, their antecedents, and opportunity identification, and point out how EEPs may affect these factors. Next, we describe the method and findings. Finally, we discuss our results and their implications both for the practice of entrepreneurship education and for future research.

### **Theoretical Framework**

*EIs.* In the social psychology literature, intentions have proved to be the best predictor of planned individual behaviors, especially when the target behavior is rare, difficult to observe, or involves unpredictable time lags (Krueger, Reilly, and Carsrud 2000). Entrepreneurship is a typical example of such planned and intentional behavior (Bird 1988; Krueger and Brazeal 1994). EI refers to a state of mind that directs and guides the actions of the individual toward the development and implementation of a new business concept (Bird 1988). There is a vast body of literature arguing that EI plays a very pertinent role in the decision to start a new business (Linan and Chen 2009). As a consequence, in recent years, employment status choice models that focus on EI have been the subject of considerable interest in entrepreneurship research (e.g., Engle et al. 2010; Iakovleva, Kolvereid, and Stephan 2011; Karimi et al. 2013a, 2014). Krueger, Reilly, and Carsrud (2000) found that intention models offer a great opportunity to increase our understanding and predictive ability for entrepreneurship.

*The TPB.* Among intention models, one of the most widely researched is the TPB, originally presented by Ajzen (1991). This model has been widely applied in entrepreneurship research, and its efficacy and ability to predict EI and behaviors have been demonstrated in a number of studies on entrepreneurship (for example, Karimi et al. 2014; Kolvereid and Isaksen 2006). The central factor of the TPB is the individual intention to perform a given behavior (e.g., the intention to become an entrepreneur). Consequently, the model stresses that intention is affected by three components or antecedents

(Ajzen 1991): (1) subjective norms (SN), referring to perceived social pressures to perform or refrain from a particular behavior (e.g., becoming an entrepreneur); (2) attitudes toward the behavior, that is, the degree to which a person has a favorable or unfavorable evaluation about performing the target behavior (e.g., being an entrepreneur); and (3) perceived behavioral control (PBC), that is, the perceived difficulty or ease of performing the behavior (e.g., becoming an entrepreneur). PBC is conceptually similar to perceived self-efficacy as proposed by Bandura (1997). In both concepts, the sense of capacity to perform the activity is important (Ajzen 2002).

## Hypotheses

Researchers have empirically applied the TPB to students' EI and confirmed the theory's predictions regarding the effects of SN, PBC, and attitude toward entrepreneurship (ATE) on their intentions (e.g., Engle et al. 2010; Linan and Chen 2009; Iakovleva, Kolvereid, and Stephan 2011). However, these findings as a whole do not represent a conclusive and consistent picture. Linan and Chen (2009) tested the TPB among university students in Spain and Taiwan. Their results showed that both ATE and PBC had significant effects on EI; however, PBC was the strongest predictor of EI in Taiwan, whereas in Spain, ATE was the strongest predictor of EI. Even though SN had no significant direct effect on intention, SN indirectly affected intention through ATE and PBC. Engle et al. (2010) tested the ability of the TPB to predict EI in 12 countries. The results suggested that the TPB model successfully predicted EI in each of the study countries, although, as foreseen by Ajzen and just illustrated in empirical work, the significant contributing model elements differ among countries. Engle et al. (2010) reported that SN was a significant predictor of EI in every country, whereas ATE was a significant predictor in only six countries (China, Finland, Ghana, Russia, Sweden, and the United States), and PBC was a significant predictor in only seven countries (Bangladesh, Egypt, Finland, France, Germany, Russia, and Spain). Finally, Iakovleva, Kolvereid, and Stephan (2011) used the TPB to predict EI among students in five developing and eight developed countries. The findings provided support for the applicability of the TPB in both developing and developed countries. They found the three antecedents to be significantly related to EI in all 13 countries. In

sum, these findings together support Ajzen's (1991) assertion that all three antecedents are important, although their explanatory power is not the same in every situation and country. Therefore, it is hypothesized that

*H1: (1) SN, (2) ATE, and (3) PBC are positively related to university students' EI.*

*Opportunity Identification.* Opportunity identification or recognition has been defined as the ability to identify a good idea and transform it into a business concept (or the considerable improvement of an existing venture) that adds value to the customer or society and generates revenues for the entrepreneur (Lumpkin and Lichtenstein 2005). Opportunity identification has long been accepted as a key step in the entrepreneurial process (Ozgen and Baron 2007). In fact, without business opportunity identification, there is no entrepreneurship (Short et al. 2010). For this reason, opportunity identification has become a required element of scholarly research and studies of entrepreneurship, and there has been considerable interest in studying the factors, processes, and dynamics that foster it (Gregoire, Shepherd, and Lambert 2010). The literature provides two main theories regarding opportunity identification: the discovery theory and the creation theory (Alvarez and Barney 2007). Recent research has provided evidence that both the discovery and creation approaches can occur in entrepreneurial practice and that research is moving toward a middle ground position (Bhave 1994; Short et al. 2010).

*The TPB and Opportunity Identification.* Although three attitudinal antecedents are known to influence a wide range of behaviors, prior studies conducted in different areas (e.g., Bagozzi, Moore, and Leone 2004; Conner and Armitage 1998; Hausteine and Hunecke 2007; Hsu et al. 2006; Perugini and Bagozzi 2001) argued that additional variables could enhance the power of the TPB to predict and explain an individual's intention and behavior. Within the domain of entrepreneurship, opportunity identification can be added to the TPB as an additional fundamental element. As mentioned, opportunity identification is a crucial component of the entrepreneurial process (Ardichvilia, Cardozob, and Ray 2003; Gaglio and Katz 2001; Shane and Venkataraman 2000), and it is an

intentional process (Krueger, Reilly, and Carsrud 2000). In fact, the act of entrepreneurship and the creation of a new business firm are based on the joint occurrence of two events (Krueger and Brazeal 1994; Reitan 1997a). The first event is the presence of a suitable entrepreneurial opportunity, whereas the second event represents a person who is able and willing to take advantage of an entrepreneurial opportunity. When these two events coincide, entrepreneurial behaviour may take place; thus, a new firm can be founded. According to Reitan (1997a), "a potential entrepreneur is a person who perceives a venture opportunity and/or intends to start a new venture, but has not (yet) taken any steps regarding venture start-up." The argument is that opportunity identification and EI are key characteristics of potential entrepreneurs, and both must be present for new business creation to take place.

Edelman and Yli-Renko (2010) also stated that perceptions and other cognitive factors play a fundamental role in both the discovery and creation views of entrepreneurship. They argued that the perception that opportunities exist in the market rather than the actual environment or the objective changes in technology or consumer needs is important in predicting efforts to create a new business. In other words, perceptions of opportunity will stimulate an individual's efforts to start a new business. Stronger perceptions will increase the intention to create a new firm and the energy of potential entrepreneurs to start a firm (Edelman and Yli-Renko 2010). A perception of an opportunity can spark an intention-based cognitive process that leads to entrepreneurial action (Krueger, Reilly, and Carsrud 2000). It has been shown that the opportunity identification perception (OIP) and EI are closely connected (Bird 1988). That is, a person who finds an opportunity desirable and feasible is likely to create a business (Bhave 1994).

On the basis of the previous discussion and in line with Reitan (1997b) and Edelman and Yli-Renko (2010), we propose the following hypothesis:

*H2: Those students who have higher OIP will have greater intentions to start up a new business.*

In the last decade, researchers have presented numerous models of entrepreneurship and opportunity identification that are

grounded in the TPB (e.g., Dutton and Jackson 1987; Krueger 2003). In addition, researchers have made considerable efforts to understand the antecedents of opportunity identification (e.g., Ardichvilia, Cardozob, and Ray 2003; Baron and Ensley 2006; Casson and Wadeson 2007; Gaglio and Katz 2001; Ozgen and Baron 2007; Shane 2000). These attempts have contributed greatly to our understanding of opportunity identification; however, they fall short of offering a comprehensive understanding of the process. Dutton and Jackson (1987) first mapped out an elegant model of opportunity perception in a study with similarities to the TPB. They argued that a situation is perceived as an opportunity when an individual's perception of the outcomes is positive and the situation is perceived as controllable. Jackson and Dutton (1988) tested this model successfully. Based on Shapero's and Sokol (1982) model and Dutton and Jackson (1987), Krueger (2000, 2003) and Krueger and Brazeal (1994) developed a complementary EI model that includes the perception of opportunity. According to this model, the perception of opportunity is dependent on the same two crucial antecedents of EI, perceptions of desirability (attitude in the TPB) and perceptions of feasibility (PBC or self-efficacy in the TPB). In other words, if individuals perceive entrepreneurship as desirable and feasible, they are more likely to see an opportunity and, thus, form an EI. Reitan (1997b) conducted an empirical study and found that opportunity identification has some of the same antecedents as EI. Specifically, perceptions of desirability and feasibility were strong predictors of both, whereas SN was important for understanding EI only.

Although the relationship between OIP and ATE is less clear and research on this relationship is scant, previous empirical studies indicate that PBC may be positively related to OIP. According to Ajzen (2002), PBC includes self-efficacy and controllability. Research has demonstrated that self-efficacy (Krueger and Dickson 1994) and controllability (Dutton 1993) are positively linked to opportunity identification. Studies have also found that self-efficacy is a remarkable predictor of OIP (Ardichvilia, Cardozob, and Ray 2003; Gibbs 2009; Gonzalez-Alvarez and Solis-Rodriguez 2011; Krueger 2000; Mitchell and Shepherd 2010; Ozgen and Baron 2007; Ucbasaran, Westhead, and Wright 2009). For example, the study by Krueger and Dickson (1994) found a

direct correlation between an increase in self-efficacy and an increase in perceptions of opportunity. Increasing entrepreneurial self-efficacy should increase perceived feasibility of starting a business, thus increase perceptions of opportunity (Krueger, Reilly, and Carsrud 2000). Ozgen and Baron (2007) believe that individuals with high self-efficacy tend to have broader social networks and to be more popular due to high self-confidence and self-assurance; as a result, these people will receive more information. Therefore, these authors believe that high self-efficacy may indeed be linked to opportunity recognition in this manner. Moreover, individuals with high self-efficacy believe that they can successfully develop the opportunities they discover. As a result, they may be more proactive in searching for such opportunities (e.g., Gaglio and Katz 2001) and, in particular, in seeking opportunity-relevant information from other persons (Ozgen and Baron 2007). Accordingly, their study demonstrates that self-efficacy is positively related to opportunity recognition. Drawing on the results and arguments in the studies just mentioned, we propose that students' PBC and ATE influence their perception of new business opportunity identification.

*H3: (1) ATE and (2) PBC will be positively related university students' OIP.*

**Entrepreneurship Education.** Entrepreneurial education is a rapidly growing area and a hot topic in colleges and universities all around the world, and its supposed benefits have received much praise from researchers and educators. Nevertheless, the outcomes and effectiveness of EEPs have remained largely untested (Pittaway and Cope 2007; von Graevenitz, Harhoff, and Weber 2010). According to Alberti, Sciascia, and Poli (2004), the first and most important area for further investigation should include assessing the effectiveness of these programs. However, this raises an important question: How should entrepreneurship education be assessed? One of the most common ways to evaluate an EEP is to assess individuals' intentions to start a new business. Intentionality is central to the process of entrepreneurship (Bird 1988; Krueger 1993), and studies show that EI is a strong predictor of entrepreneurial behavior. Nonetheless, the impact of EEPs on EI to set up a business is at present poorly understood and has remained relatively untested

(Athayde 2009; Peterman and Kennedy 2003; Souitaris, Zerbinati, and Al-Laham 2007; von Graevenitz, Harhoff, and Weber 2010). Several scholars (e.g., Fayolle, Gailly, and Lassas-Clerc 2006; Weber 2012) suggest that the TPB is appropriate for the evaluation of EEPs such as entrepreneurship courses. The main purpose of such an intervention is to bring about a change in students' entrepreneurial attitudes and intentions, and the TPB promises to deliver a sound framework for assessing this change systematically. The TPB has been empirically used by some researchers to assess the impact of EEPs on the students' EI, and its value has been successfully demonstrated (Fayolle, Gailly, and Lassas-Clerc 2006; Souitaris, Zerbinati, and Al-Laham 2007). As such, the TPB is considered to provide a useful framework for both analyzing how EEPs might influence students with regard to their EI and, in particular, for defining and measuring relevant criteria.

### **Entrepreneurship Education Effects on EIs**

Krueger and Carsrud (1993) were the first to apply the TPB in the specific context of entrepreneurship education. They pointed out that an education program can have an impact on the antecedents of intention identified by the TPB. Fayolle, Gailly, and Lassas-Clerc (2006) found that although entrepreneurship education has a strong and measurable effect on students' EI, it has a positive, but not very significant, impact on their PBC. Souitaris, Zerbinati, and Al-Laham (2007) used the TPB in order to test the impact of EEPs on the attitudes and intentions of science and engineering students. They found that EEPs significantly increased students' EI and subjective norms. However, they did not find a significant relationship between EEPs and attitudes and PBC, whereas Peterman and Kennedy (2003) and Athayde (2009) found a positive effect of EEPs on intentions and perceived feasibility, or ATE, among high-school students. Walter and Dohse (2012) reported that EEPs were positively related only to ATE, not to SN or PBC. Results regarding entrepreneurship education initiatives are therefore somewhat inconclusive, and more detailed research is needed to get a full understanding of the relationship between entrepreneurship education and attitudes/intentions. Notably, in their recent meta-analysis, Martin, McNally, and Kay (2013) found overall positive effects of EEPs on

knowledge and skill, perceptions of entrepreneurship, and entrepreneurship outcomes. Thus, we propose that

*H4: Students who have followed an EEP will have higher (a) SN, (b) ATE, (c) PBC, and (d) EI after the program than before the program.*

*H4e: Students whose SN, ATE, and PBC have increased will also have increased their EI.*

### **Entrepreneurship Education Effects on Opportunity Identification**

If entrepreneurs are to be successful in creating and operating new ventures, they must not only develop an EI but also be successful at discerning opportunities that others ignore or fail to notice and then exploit these opportunities in a timely and effective manner (Dutta, Li, and Merenda 2011). Therefore, developing opportunity identification abilities is a key element of the entrepreneurship process, and entrepreneurship education should enhance this competency (Linan, Rodríguez-Cohard, and Rueda-Cantucho 2011; Lumpkin, Hills, and Shrader 2004). According to the entrepreneurship education literature, opportunity identification could and should be taught, and it should be a central topic in programs that aim to train future entrepreneurs (Saks and Gaglio 2002). Along the same lines, DeTienne and Chandler (2004) state that the entrepreneurship classroom is an appropriate place for fostering the skills required to enhance opportunity identification competency. Despite a growing amount of literature on opportunity identification and its importance in the entrepreneurship process, there is a dearth of research regarding the effects of education on students' ability to identify business opportunities. The results of a study by DeTienne and Chandler (2004) indicate that entrepreneurship education led to the identification of more opportunities and more innovative opportunities. Munoz, Mosey, and Binks (2011) also reported that entrepreneurship education develops students' opportunity identification capabilities. Moreover, entrepreneurship education can increase the entrepreneurial knowledge of students (Martin, McNally, and Kay 2013), and it has been indicated that there is a positive relationship between entrepreneurial knowledge and iden-

tification of entrepreneurial opportunities (Shepherd and DeTienne 2005). Thus, we propose that

*H5: Students who have followed an EEP will have higher OIP after the program than before the program.*

*Elective versus Compulsory Entrepreneurship Education.* As already mentioned, empirical studies have yielded mixed results about the effects of EEPs on entrepreneurship. Oosterbeek, van Praag, and Ijsselstein (2010) and von Graevenitz, Harhoff, and Weber (2010) found that the EEPs had a negative impact on EI. Both studies examined compulsory EEPs. Oosterbeek, van Praag, and Ijsselstein (2010) argued that the effects of EEPs may have been negative because participation in EEPs was compulsory. In this study, we assess the effects of two types of EEPs (voluntary, or elective, and compulsory EEPs) on students' EI. Compulsory programs are given to every student enrolled in a certain degree program; therefore, they include both those interested and those uninterested in entrepreneurial activity and education. However, participants in elective EEPs have an interest in entrepreneurship education and seek out further knowledge and skills in entrepreneurship. Moreover, motivated students will more actively participate in learning activities than students forced to take the course. Therefore, we can expect that an elective EEP has a greater influence on participants than does a compulsory one.

*H6: An elective EEP will have a greater effect on students' ATE, SN, PBC, OIP, and EI compared with a compulsory EEP.*

### **Research Method**

*EEPs.* Over the past decades, many developing countries including Iran have faced various economic problems, in particular the excessive number of university graduates unable to find government or private sector work opportunities. Over the last decade, Iran has expressed increasing interest in various entrepreneurship fields (in higher education settings, policymaking, and business) as a fundamental solution for the unemployment problem and improving the economy. The government is spending more than ever to promote and encourage entrepreneurship and innovation. Accordingly, measures and mechanisms have

been proposed to develop entrepreneurship in the public and private sectors as well as in universities. The first official step was taken in 2000 with the establishment of a comprehensive program for entrepreneurship development in universities, called KARAD, as part of the Third Economic and Social Development Program. The main goals of KARAD were to promote an entrepreneurial spirit and culture in academic communities; familiarize students with entrepreneurship as a career choice and as specific facets aimed to encourage and train them on how to prepare a business plan; and start and manage a new business. To achieve this goal, several programs and strategies were considered including establishing entrepreneurship centers and introducing entrepreneurship courses such as “fundamentals of entrepreneurship” into undergraduate education (Karimi et al. 2010).

“Fundamentals of entrepreneurship” as a compulsory or elective course is taught to undergraduate students in their last two years of college in various faculties/departments. It aims to increase university graduates’ knowledge about entrepreneurship, influencing their entrepreneurial attitudes and intentions, and encourage them to be job creators rather than job seekers. According to Linan’s (2004) EEP categorization, these criteria allow the course in which this study’s survey was conducted to be classified in the category of “entrepreneurial awareness education.” Although the course description is almost the same at every university, educators might use various teaching materials and methods for this course. The methods most often employed are lectures, readings, class discussion, business plans, case studies, and guest speakers.

*Participants and Procedures.* During the 2010–2011 academic year, an ex ante and ex post survey was used to measure the change in student EI and opportunity identification perceptions over approximately a four-month period in “fundamentals of entrepreneurship” courses at six Iranian universities. Our research used a quantitative method, including a questionnaire that was handed out at the beginning of the first session (t1) and at the end of the final session (t2) of the courses. Undergraduate students who enrolled in the entrepreneurship courses at six Iranian public universities served as the sample for the study ( $n = 320$ ). The reason for including several different universi-

ties was the objective of covering a wide range of different class characteristics and of different rankings of Iranian universities. As not all the students in the university were allowed to take entrepreneurship courses, respondents for our questionnaire were selected on a purposive basis. The students surveyed were told that the questionnaires were for research purposes only and that their answers would not affect their curriculum in any way; participation was always presented as a voluntary choice. In the first survey (t1), 275 students participated (response rate of 86 percent), and in the second survey (t2), 240 students (response rate of 75 percent). We were able to match the two questionnaires (at t1 and at t2) for 205 students. These represent 64 percent of total enrollment in the entrepreneurship courses at the selected universities. The sample consisted of 86 male students (42 percent) and 119 female students (58 percent), with ages ranging from 19 to 31, with a mean of 22.08 years. There is a greater proportion of females in the sample because more females than males enroll in the degrees where the data were collected. There was no control group; only students participating in the course filled out the two questionnaires. In general terms, the breakdown of the sample according to college major is as follows: agricultural sciences (49.8 percent), engineering sciences (21.5 percent), Humanistic Science (21.5 percent), and Basic Sciences (7.2 percent).

*Measurement of Variables.* All construct measures were adopted from existing scales. All items (aside from demographic characteristics) were measured using a seven-point Likert scale ranging from 1 representing “strongly disagree” to 7 representing “strongly agree.” These items and the sources from which the items were adopted are summarized in Table 1. Several control variables were used in the study: age, gender (coded as 1 = male and 0 = female), university ranking (coded as 3 = high ranking, 2 = intermediate ranking, and 1 = low ranking), university (categorical variable for the six selected universities), and academic major (categorical variable for the four academic majors).

*Statistical Analysis.* The obtained data were analyzed using SPSS 18 (SPSS Inc., Chicago, Illinois, USA) and AMOS 18 (IBM, New York, USA). As a first step, an exploratory factor analysis (EFA) was performed on the items.

**Table 1**  
**Details, Reliability, and Validity of the Measures**

Construct	Research Reference	No. of Item	$\alpha$		CR		AVE	
			Pre	Post	Pre	Post	Pre	Post
Entrepreneurial Intentions	Linan and Chen (2009) (e.g., "I have very seriously thought of starting a firm")	6	0.84	0.85	0.89	0.90	0.50	0.52
Attitude toward Entrepreneurship	Linan and Chen (2009) (e.g., "Being an entrepreneur implies more advantages than disadvantages to me").	5	0.78	0.85	0.86	0.91	0.55	0.66
Subjective Norm	Adopted from Kolvereid (1996), which has been used in Kolvereid and Isaksen (2006), Krueger, Reilly, and Carsrud (2000), and Souitaris, Zerbiniati, and Al-Laham (2007). This scale included two separate questions: belief (e.g., "I believe that my closest family thinks that I should start my own business") and motivation to comply (e.g., "I care about my closest family's opinion with regard to me starting my own business"). The belief items were recoded into a bipolar scale (from -3 to +3) and multiplied with the respective motivation-to-comply items. The subjective norm variable was calculated by adding the three results and dividing the total score by three.	6	0.82	0.91	0.90	0.95	0.58	0.74
Perceived Behavioral Control	Linan and Chen (2009) (e.g., "Starting a firm and keeping it viable would be easy for me.")	6	0.88	0.88	0.93	0.93	0.60	0.61
Opportunity Identification	Selected from the literature on opportunity identification (Hills 1995; Nicolaou et al. 2009; Ozgen and Baron 2007; Singh et al. 1999; Ucbasaran et al. 2003), gauging both the self-perceived ability to recognize opportunities (e.g., "I am able to recognize new business opportunities in the market") and alertness to opportunities when they exist ("I have a special alertness or sensitivity toward business opportunities in my environment")	9	0.83	0.81	0.89	0.88	0.46	0.42

AVE, average variance extracted; CR, construct reliability.



EFA helps explain the variability among observable variables and thus served to eliminate problematic items with significant cross loadings or loading to the wrong factor; items remaining after this filtering exercise were selected to build each of the constructs used in the structural equation modeling (SEM) in the second step. SEM was employed to define the relationship between EI and its antecedents (H1) and to test the relationships between PBC, ATE, OIP, and EI (H2 and H3). Furthermore, the paired samples *t*-test was used to test the impact of the programs on the students' entrepreneurial attitudes, OIP, and intentions (H4 and H5). Finally, the independent samples *t*-test was utilized to compare the effects of elective and compulsory courses (H6).

## Results

### SEM

The SEM approach was used to validate the research model and test the effects in the hypotheses. According to Hair et al. (2006), it is appropriate to adopt a two-step approach in SEM: (1) the assessment of the measurement model and (2) the assessment of the structural model.

### The Assessment of the Measurement Model

The first step, involving confirmatory factor analysis, was to test the goodness-of-fit indices, and the reliability and validity of the proposed measurement model. The measurement model includes 23 items describing five latent constructs: ATE, SN, PBC, OIP, and EI. Goodness-of-fit indicators suggest a very good fit of the proposed model for the pretest ( $\chi^2 = 284.432$ ,  $p = .001$ ;  $\chi^2/df = 1.323$ ; GFI = 0.893; TLI = 0.962; CFI = 0.968; IFI = 0.968; RMSEA = 0.04) and post-test data ( $\chi^2 = 278.022$ ,  $p = .003$ ;  $\chi^2/df = 1.287$ ; GFI = 0.898; TLI = 0.972; CFI = 0.976; IFI = 0.977; RMSEA = 0.038). Therefore, on the basis of the results obtained, the hypothesized model of five constructs is a suitable measurement model for this study.

The convergent and discriminant validities of the constructs can be assessed by referring to the measurement model. According to Fornell and Larcker (1981), convergent validity is evaluated for the measurement model based on three criteria: (1) factor loadings; (2) the scale composite or construct reliability (CR); and (3) the average variance extracted (AVE). The findings showed that all items' critical ratio values

exceed 6.117 ( $p < .01$ ), and all loadings are more than 0.5. Moreover, all constructs had a construct reliability (CR) value, ranging from 0.86 to 0.95, higher than the recommended level of 0.70. With respect to the AVE estimate, the results revealed that the AVE estimate for all constructs is above or close to the recommended threshold of 0.50 (Table 1). Discriminant validity was assessed by comparing the square root of the AVE for a given construct with the correlations between that construct and all other constructs. The square roots of the AVE of each construct, listed on the diagonal of Table 2, all exceed the correlation shared between the construct and other constructs in the model, indicating adequate discriminant validity between each construct.

### The Assessment of the Structural Model

With the construct validity and reliability measures established, all the constructs were used as input to form a structural model representing the hypothesized model depicted in Figure 1. As shown in Figure 2, the overall goodness-of-fit statistics show that the structural model fits the pretest and post-test data well. Having assessed the fit indices for the measurement models and structural models, the estimated coefficients of the causal relationships between constructs were examined. Table 3 shows the coefficient of each hypothesized path and its corresponding CR (known as the *t*-value). It can be seen from this table that the predictive positive effect of SN on EI is supported (pretest:  $\beta = 0.22$ ,  $CR = 3.299$ ,  $p < .001$ ; post-test:  $\beta = 0.20$ ,  $CR = 3.056$ ,  $p < .01$ ), an effect which corresponds to H1a. H1b is also supported: ATE has a positive effect on EI (pretest:  $\beta = 0.28$ ,  $CR = 3.969$ ,  $p < .001$ ; post-test:  $\beta = 0.30$ ,  $CR = 4.078$ ,  $p < .001$ ). As the PBC also has a significant effect on EI (pretest:  $\beta = 0.45$ ,  $CR = 5.684$ ,  $p < .001$ ; post-test:  $\beta = 0.47$ ,  $CR = 5.212$ ,  $p < .001$ ), H1c is supported. The results also show that OIP positively influence EI (pretest:  $\beta = 0.22$ ,  $CR = 3.169$ ,  $p < .01$ ; post-test:  $\beta = 0.14$ ,  $CR = 1.970$ ,  $p < .05$ ), supporting H2. H3a and H3b presume that ATE and PBC would influence OIP. As hypothesized, the estimate of the paths coefficients of ATE (pretest:  $\beta = 0.20$ ,  $CR = 2.261$ ,  $p < .05$ ; post-test:  $\beta = 0.21$ ,  $CR = 2.414$ ,  $p < .05$ ) and PBC (pretest:  $\beta = 0.31$ ,  $CR = 3.636$ ,  $p < .001$ ; post-test:  $\beta = 0.34$ ,  $CR = 3.481$ ,  $p < .001$ ) on OIP was positive and statistically significant, which provided support for H3a and H3b. Overall, the TPB

**Table 2**  
**The Correlation Matrix and Discriminant Validity**

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
EI (t1)	4.85	1.43	<b>(0.71)</b>																	
ATE (t1)	5.13	0.953	0.33**	<b>(0.74)</b>																
SN (t1)	2.25	5.67	0.36**	0.11	<b>(0.76)</b>															
PBC (t1)	4.35	1.32	0.60**	0.21**	0.24**	<b>(0.77)</b>														
OIP (t1)	4.31	1.15	0.43**	0.25**	0.15*	0.32**	<b>(0.69)</b>													
EI (t2)	5.06	1.31	0.47**	0.13	0.25**	0.31**	0.28**	<b>(0.72)</b>												
ATE (t2)	5.22	1.04	0.25**	0.32**	0.16*	0.17*	0.21*	0.57**	<b>(0.81)</b>											
SN (t2)	4.07	7.07	0.24**	0.13	0.34**	0.17*	0.18*	0.43**	0.30**	<b>(0.86)</b>										
PBC (t2)	4.68	1.27	0.38**	0.12	0.09	0.40**	0.21*	0.67**	0.47**	0.42**	<b>(0.78)</b>									
OIP (t2)	4.38	0.954	0.29**	0.08	0.12	0.23**	0.35**	0.42**	0.34**	0.23**	0.41**	<b>(0.65)</b>								
EI (t2-t1)	0.213	1.66	-0.57**	-0.21*	-0.13	-0.32**	-0.18*	0.46**	0.28**	0.16*	0.24**	0.10								
ATE (t2-t1)	0.083	1.31	-0.05	-0.54**	0.06	-0.02	-0.02	0.40**	0.64**	0.16*	0.32**	0.24**	0.42**							
SN (t2-t1)	1.82	7.86	-0.04	0.05	-0.44**	-0.02	0.06	0.22**	0.16*	0.69**	0.33**	0.13	0.25**	0.10						
PBC (t2-t1)	0.337	1.65	-0.22**	-0.09	-0.14*	-0.57**	-0.12	0.32**	0.26**	0.22**	0.53**	0.16*	0.52**	0.35**	0.32**					
OIP (t2-t1)	0.074	1.41	-0.18*	-0.18	-0.05	-0.12	-0.66**	0.07	0.07	0.01	13	0.47**	0.25**	0.21**	0.04	0.23**				
Age	22.08	1.72	0.15*	0.11	0.02	0.07	0.01	0.08	-0.03	0.05	0.06	-0.02	-0.07	-0.10	0.03	-0.02	-0.03			
Gender	0.42	0.49	0.06	-0.22**	-0.07	0.08	0.04	-0.09	-0.08	-0.04	-0.01	0.13	-0.12	0.10	0.02	-0.07	0.06	0.05		
Selection	0.37	0.46	0.04	0.09	0.02	0.11	0.02	0.22**	0.07	0.08	0.13	0.09	0.14*	-0.02	0.07	0.02	0.05	-0.30**	-0.20*	
Ranking	2.14	0.92	-0.09	-0.03	-0.01	-0.06	-0.04	0.15*	0.03	0.11	0.24*	0.17*	0.10	0.04	0.11	0.10	0.12	-0.22**	-0.06	0.22**

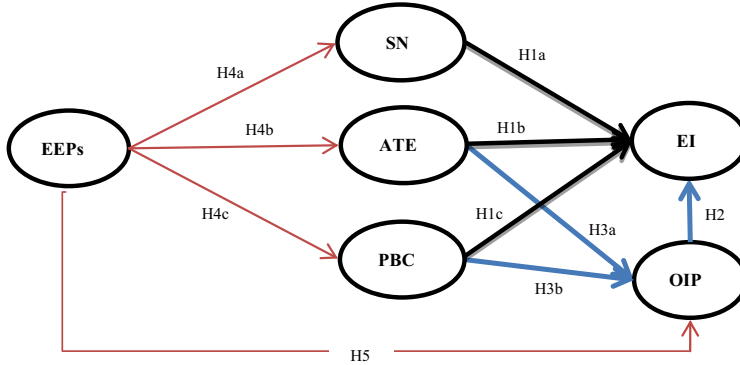
\* $p < .05$ .

\*\* $p < .01$ .

$n = 205$ ; Two-tailed tests of significance were used. The square roots of AVE estimates are in bold on the diagonal.

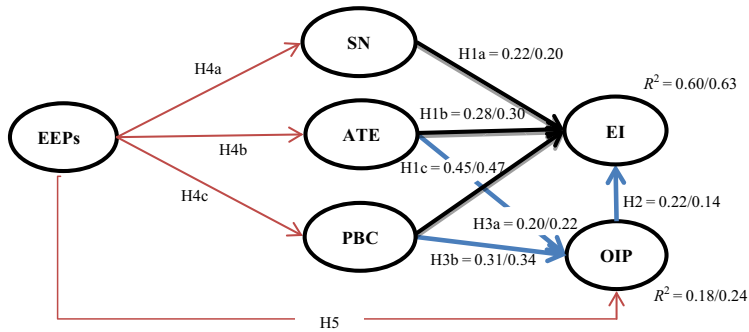
ATE, attitude toward entrepreneurship; AVE, average variance extracted; EI, entrepreneurial intention; OIP, opportunity identification perception; PBC, perceived behavioral control; S.D., standard deviation; SN, subjective norms.

**Figure 1**  
**The Proposed Research Model**



ATE, Attitude toward Entrepreneurship; EEP, Entrepreneurship Education Programs; EI, Entrepreneurial Intention; OIP, Opportunity Identification Perception; PBC, Perceived Behavioral Control; SN, Subjective Norms.

**Figure 2**  
**The Proposed Research Model**



Pretest/Post-Test; ATE, Attitude toward Entrepreneurship; EEP, Entrepreneurship Education Programs; EI, Entrepreneurial Intention; OIP, Opportunity Identification Perception; PBC, Perceived Behavioral Control; SN, Subjective Norms. Goodness-of-Fit Indices (Pretest):  $\chi^2 = 284.862$ ;  $\chi^2/df = 1.319$ ; GFI = 0.893; TLI = 0.963; CFI = 0.968; IFI = 0.969; RMSEA = 0.040. Goodness-of-Fit Indices (Post-Test):  $\chi^2 = 278.125$ ;  $\chi^2/df = 1.282$ ; GFI = 0.897; TLI = 0.973; CFI = 0.977; IFI = 0.977; RMSEA = 0.037.

model explained respectively 60 and 63 percent of the variance in the EI in the pretest and post-test samples ( $R^2_{pretest} = 0.60$ ;  $R^2_{post-test} = 0.63$ ). To test the relationships between the control variables and the change in ATE, SN, PBC, EI and OIP, a correlation and a general linear model (GLM) procedure were employed. The results of correlation indicated that age, gender,

and university ranking did not have significant correlations with the difference values of ATE, SN, PBC, EI, and OIP (Table 2). The GLM results also showed no significant differences in ATE, SN, PBC, EI, and OIP, controlling for the categorical variables (university and academic major), suggesting that the findings of this study were not affected by these control variables. In

**Table 3**  
**Results of the Structural Equation Modeling**

<b>Hypotheses Tested</b>	<b>Estimate (<math>\beta</math> Value)</b>	<b>S.E.<sup>a</sup></b>	<b>CR<sup>b</sup> (<math>t</math>-Value)</b>	<b><i>p</i></b>
<b>Model at t1</b>				
H1a: Subjective Norm	0.22	0.014	3.299	0.000**
H1b: Attitude toward Entrepreneurship	0.28	0.191	3.969	0.000**
H1c: Perceived Behavioral Control	0.45	0.071	5.684	0.000**
H2: Opportunity Identification	0.22	0.079	3.196	0.001**
H3a: Attitude toward Entrepreneurship	0.20	0.186	2.261	0.024*
H3b: Perceived Behavioral Control	0.31	0.066	3.636	0.000**
<b>Model at t2</b>				
H1a: Subjective Norm	0.20	0.012	3.056	0.002**
H1b: Attitude toward Entrepreneurship	0.30	0.084	4.078	0.000**
H1c: Perceived Behavioral Control	0.47	0.096	5.212	0.000**
H2: Opportunity Identification	0.14	0.097	1.970	0.049*
H3a: Attitude toward Entrepreneurship	0.22	0.075	2.414	0.016*
H3b: Perceived Behavioral Control	0.34	0.074	3.481	0.000**

\* $p < .05$ .

\*\* $p < .01$ .

<sup>a</sup>S.E. is an estimate of the standard error of the covariance.

<sup>b</sup>C.R. is the critical ratio obtained by dividing the covariance estimate by its standard error.

**Table 4**  
**Results of Paired *t*-Test for the Program Impacts (*n* = 205)**

Scale	Pretest		Post-Test		Difference	
	<i>M</i>	<i>S.D.</i>	<i>M</i>	<i>S.D.</i>	<i>t</i> (204)	<i>p</i>
EI	4.85	1.43	5.06	1.32	1.83	0.068
SN	2.25	5.67	4.08	7.07	3.28	0.001*
ATE	5.13	0.95	5.22	1.04	0.90	0.367
PBC	4.35	1.32	4.68	1.28	2.92	0.004*
OIP	4.31	1.15	4.38	0.97	0.75	0.453

\**p* < .01.

ATE, attitude toward entrepreneurship; EI, entrepreneurial intention; OIP, opportunity identification perception; PBC, perceived behavioral control; S.D., standard deviation; SN, subjective norms.

order to test H4e, we employed a correlation analysis, as summarized in Table 2. As expected, a change in SN, ATE, PBC, and OIP was significantly related to an increased intention to start one's own business. Therefore, H5e was accepted.

*Impact of EEPs on Students.* In order to assess the impacts of the entrepreneurship courses on the students' entrepreneurial attitudes, intentions, and OIP, we conducted the paired samples *t*-test. Table 4 summarizes the results of this test. The results showed a positive and significant difference in the pretest (*M* = 2.25) and post-test value (*M* = 4.08) of SN (*t* = 3.28, *p* = .001 < .01). The significant difference between the pretest (*M* = 4.35) and post-test data (*M* = 4.68) was also evident for PBC (*t* = 2.92, *p* = .004 < .01). However, the mean score of ATE in the pretest sample (*M* = 5.13) was not significantly different from the mean score in the post-test sample (*M* = 5.22) (*t* = 0.904, *p* = .367 > .05). In addition, for OIP, the mean score in the pretest sample (*M* = 4.31) was not significantly different from that in the post-test sample (*M* = 4.38). The results also revealed that the post-test value of EI (*M* = 5.06) was increased compared with the pretest value (*M* = 4.851), though this increase was not very significant (*t* = 1.83, *p* = .068 > .05). The GLM procedure of ANOVA also indicated significant differences between the pre and post-test values for SN (*F* = 10.77, *p* = .001) and PBC (*F* = 8.51, *p* = .004) but not

for EI, ATE, and OIP. The results therefore demonstrate that there are positive and significant differences in pre and post-test values of SN and PBC, confirming H4a and H4c; however, there are not significant differences in pre and post-test values of ATE, OIP, and EI, rejecting H4b, H4d, and H5.

*Differences in EEP Impacts in Relation to the Selection Mode.* In order to examine whether attitudes, intention, and opportunity identification change are equally likely for the two types of EEPs (elective versus compulsory), we compared the effects of these different programs by using the independent samples *t*-test. For each student, a gain score was calculated for each of the five scales, which consisted of the student's score on the scale in the post-test survey minus his/her score on the same scale in the pretest survey. As can be seen in Table 5, in the pretest sample, the students in elective courses exhibited higher scores on all five scales compared with the students in compulsory courses, but none of these differences is statistically significant. In the post-test sample, the two groups differed significantly in their EI, such that the students in the elective courses have greater EI than the students in the compulsory courses. The elective courses had a significantly greater positive impact on the students' EI as the gain in EI was significantly higher for the students in the elective courses than for the students in the compulsory courses. The results of the paired samples *t*-test (Table 6) also showed significant

**Table 5**  
**Differences in the EEP Impacts According to Selection Mode (Compulsory versus Elective)**

Scale	Pretest			Post-Test			Gain											
	Compulsory ( <i>n</i> = 127)	Elective ( <i>n</i> = 78)	Difference	Compulsory ( <i>n</i> = 127)	Elective ( <i>n</i> = 78)	Difference	Compulsory ( <i>n</i> = 127)	Elective ( <i>n</i> = 78)	Difference									
	<i>M</i>	<i>S.D.</i>	<i>t</i> (203)	<i>p</i>	<i>M</i>	<i>S.D.</i>	<i>t</i> (203)	<i>p</i>	<i>M</i>	<i>S.D.</i>	<i>t</i> (203)	<i>p</i>						
EI	4.80	1.39	4.93	1.50	-0.59	0.550	4.84	1.33	5.44	1.22	-3.23	0.001*	0.03	1.67	0.51	1.59	-2.01	0.046*
SN	2.19	5.77	2.35	5.53	-0.19	0.844	3.65	4.06	4.77	7.08	-1.10	0.272	1.46	8.21	2.42	7.54	-0.84	0.403
ATE	5.07	0.96	5.24	0.93	-1.25	0.212	5.16	1.04	5.31	1.04	-1.05	0.297	0.09	1.32	0.07	1.32	0.08	0.938
PBC	4.24	1.27	4.52	1.39	-1.52	0.131	4.55	1.28	4.89	1.25	-1.84	0.068	0.32	1.70	0.37	1.57	-0.20	0.839
OIP	4.30	1.16	4.33	1.15	-0.18	0.861	4.32	0.99	4.49	0.93	-1.28	0.203	0.02	1.41	0.17	1.40	-0.74	0.462

\**p* < .05.

\*\**p* < .01.

ATE, attitude toward entrepreneurship; EI, entrepreneurial intention; OIP, opportunity identification perception; PBC, perceived behavioral control; S.D., standard deviation; SN, subjective norms.

**Table 6**  
**Results of Paired *t*-Test for the Impacts of Elective and Compulsory Programs**

Scale	Compulsory ( <i>n</i> = 127)						Elective ( <i>n</i> = 78)					
	Pretest		Post-test		Difference		Pretest		Post-test		Difference	
	<i>M</i>	<i>S.D.</i>	<i>M</i>	<i>S.D.</i>	<i>t</i>	<i>p</i>	<i>M</i>	<i>S.D.</i>	<i>M</i>	<i>S.D.</i>	<i>t</i>	<i>p</i>
EI	4.80	1.39	4.84	1.33	0.21	0.833	4.93	1.50	5.44	1.22	2.80	0.006**
SN	2.19	5.78	3.65	7.06	2.00	0.047*	2.35	5.53	4.77	7.08	2.83	0.006**
ATE	5.07	0.96	5.16	1.04	0.76	0.450	5.24	0.93	5.31	1.01	0.49	0.622
PBC	4.24	1.27	4.55	1.28	2.10	0.037*	4.52	1.39	4.89	1.25	2.06	0.043*
OIP	4.30	1.16	4.32	0.99	0.14	0.892	4.33	1.15	4.49	0.93	1.05	0.298

\**p* < .05.

\*\**p* < .01.

ATE, attitude toward entrepreneurship; EI, entrepreneurial intention; OIP, opportunity identification perception; PBC, perceived behavioral control; S.D., standard deviation; SN, subjective norms.

differences in pre and post-values of EI, SN, and PBC for the elective courses, but for the compulsory courses, they showed significant differences only in pre- and post-values of SN and PBC.

## Discussion

The purpose of this study was to assess the impact of EEPs on students' EI, drawing on the TPB. Moreover, the proposed model incorporates the perception of opportunity identification into the TPB. To address this purpose, we employed an ex ante and ex post survey, with 205 participants in elective and compulsory EEPs at six Iranian universities.

The findings were in line with earlier studies on the effects of EEPs but nevertheless also present some differences. We found confirmation for the impact of (both types of) EEPs on SN (Souitaris, Zerbinati, and Al-Laham 2007; Weber 2012). For both voluntary and compulsory EEPs, the postprogram mean value of PBC was increased in relation to the preprogram value (Peterman and Kennedy 2003; Weber 2012), something that Souitaris, Zerbinati, and Al-Laham (2007) were not able to confirm. However, this study did not provide evidence that EEPs have a significant effect on students' EI in the sample as a whole. This conflicts with the idea that participating in EEPs fosters indi-

viduals' intentions to start a new business (Souitaris, Zerbinati, and Al-Laham 2007). Notably, the comparison of elective and compulsory EEPs indicated that intention change is not equally distributed across these programs. The elective EEPs had a significantly greater positive impact on students' EI. Moreover, this study could not find a significant effect of either elective or compulsory EEPs on ATE: The programs failed in developing students' ATE. This finding is in line with the results of Souitaris, Zerbinati, and Al-Laham (2007), and Weber (2012), but it is not consistent with the findings of Peterman and Kennedy (2003). Contrary to our expectation, neither type of EEP led to a significant increase in OIP, which contradicts the results of DeTienne and Chandler (2004).

The significant increase in the mean value of SN may reflect the emphasis within both programs on teamwork (e.g., working together in teams of four to six to create business plans) and on giving students the opportunity to build a network with entrepreneurially-minded friends and peers, and with entrepreneurs. A possible explanation for the increase in PBC could be related to mastery experience and vicarious experience (role modeling), which might be gained by the students during the programs. Most EEPs try to emphasize the

“learning-by-doing” component (such as writing a business plan and field work) and to expose the students to the real world. In addition, the teachers tell success stories about entrepreneurs or invite guest entrepreneurs as speakers who can serve as successful role models for students.

The reason for the lack of a significant effect of EEPs on ATE is not fully clear, and this warrants future research. A few possibilities are explored here. The first plausible explanation is that the students had relatively high scores for this variable at the beginning of the program, so there was not much room left for improving their attitudes. It should be noted that small differences in the mean do not imply that there is no change at all in these variables. Another explanation could be related to the program design. EEPs may have not been designed sufficiently well with regard to persuasion and attitude change.

The effects of compulsory EEPs on EI may have been insignificant because participation was compulsory, as the comparison analysis showed. A second possibility is that students may have gained a realistic picture of both themselves and being an entrepreneur and decided, in this light, that they do not want to become an entrepreneur. In this sense, we cannot say that the programs did not affect students' EI; the programs may have enhanced the awareness of entrepreneurship among these students and led them to assess their future as entrepreneurs. A similar explanation was provided by Oosterbeek, van Praag, and Ijsselstein (2010), who argue that the reason may have been that some participants had lost their excessive optimism about entrepreneurship and rejected the idea of becoming an entrepreneur after the program had finished. von Graevenitz, Harhoff, and Weber (2010) also argue that EEPs provide individuals with signals about their entrepreneurial ability and aptitude. As a result, some students may become aware that they are not well suited for entrepreneurship.

With respect to opportunity identification, one explanation for this result could be related to the fact that despite the emphasis of EEPs on opportunity identification, most teachers did not pay the necessary attention to fostering this competency in their classes. The results of interviews with some students and teachers after the post-test measurement indicated that this competency was often ignored or received

less emphasis during the courses. Neck and Greene (2011) point out that the majority of entrepreneurship courses are focused on the exploitation of opportunities and assume that the opportunity has already been identified. Where this is the case, very little time and attention are given to creativity, the idea generation process, and how to identify new business opportunities.

## **Implications**

*Theoretical Implications.* This study has several theoretical implications. It provides further supporting evidence for the application of the TPB in predicting and understanding EI in non-Western countries such as Iran. Furthermore, this study contributes to the TPB by examining the effect of entrepreneurship education as an exogenous influence on EI and its antecedents, and it shows that the TPB can provide a useful framework to assess the effectiveness of EEPs. In addition, this study develops and extends the TPB model by incorporating the OIP as a proximal cause of EI, and it examines the relationship between this variable and EI and its antecedents.

*Practical Implications.* In terms of practice, the study provides valuable information and insight for those who formulate, deliver, and evaluate educational programs aimed at increasing the EI of students. The findings indicate that PBC is the strongest predictor of EI, and as this study confirmed, PBC can be fostered through EEPs. Therefore, educators should focus more on the use of appropriate teaching methods in order to enhance students' PBC more effectively. According to Bandura (1997), an individual's sense of self-efficacy can be built and strengthened in four ways: mastery experience or repeated performance accomplishments, vicarious experience or modeling, social persuasion, and judgments of one's own physiological states, such as arousal and anxiety. Entrepreneurship education can play a significant role in developing students' entrepreneurial self-efficacy in these ways by applying the educational activities and teaching methods presented next (Segal, Schoenfeld, and Borgia 2007). Our findings strongly suggest that participation in both elective and compulsory EEPs can positively influence students' PBC or self-efficacy, confirming that universities can shape and foster entrepreneurial self-efficacy through EEPs.



Educational activities providing “real-world” experience or “virtual reality” experiences in the classroom, including the use of role playing, case methods, and business simulations, facilitate the development of decision-making skills and strengthen entrepreneurial self-confidence through mastery experiences or repeated performance accomplishments. Vicarious learning can be increased through educational activities such as successful entrepreneurs as guest speakers, video profiles of well-known entrepreneurs, case studies, student internships, and participation in business plan competitions. Encouraging comments, positive feedback, and praise from—and persuasive discussions with—teachers and professionals in educational programs can increase self-efficacy through social persuasion. These activities can also reduce stress levels and anxiety.

In particular, the findings suggest that universities can develop students’ EI through elective rather than compulsory EEPs. Therefore, educators should differentiate between compulsory courses offered to all students and courses offered as electives for students who are interested in entrepreneurship. According to von Graevenitz, Harhoff, and Weber (2010) and Oosterbeek, van Praag, and Ijsselstein (2010), the primary aim for compulsory programs, with a mix of participants interested in entrepreneurship and participants who are uninterested, is a sorting effect: Students attending these programs become informed about entrepreneurship as an alternative career choice and gain more realistic perspectives, regarding both themselves and what it takes to be an entrepreneur. Therefore, after completing EEPs, some students will learn that they are well suited for entrepreneurship and be strengthened in their decision to become entrepreneurs, whereas others will learn that they are not. In elective courses, on the other hand, self-selection will lead to a higher level of EI and increase the likelihood of participants becoming entrepreneurs.

The findings also showed that SN influences EI, and we can improve SN through EEPs. Some previous studies (e.g., Linan and Chen 2009) found that SN also has a relevant effect on EI through ATE and PBC. In particular, in a collectivistic culture such as Iran where family life and relationships with close friends and relatives are important (Javidan and Dastmalchian 2003; Karimi et al. 2013b), SN

appears to play a significant role. Therefore, it is suggested that teaching methods and contents specifically designed to improve SN should be included in EEPs. SN can be improved by means of teamwork and by providing opportunities for students to build a network with entrepreneurial-minded friends and peers, and with role models and entrepreneurs (Mueller 2011; Souitaris, Zerbinati, and Al-Laham 2007; Weber 2012). It was concluded that EEPs did not influence ATE because the mean score of this variable was high at the beginning of EEPs. Therefore, we can suggest that if an EEP has attendees who are already highly motivated about entrepreneurship and have high attitudes and EI, the aim of such a program should be “education for start-up” rather than “entrepreneurial awareness education” (according to the classification by Linan 2004). As discussed earlier, the objective of the latter program is to provide information for students about entrepreneurship so that they consider entrepreneurship as a possible and alternative choice of career. The former program aims at the preparation of individuals for running conventional small businesses and focuses on the practical aspects related to the creation of a new business, such as how to obtain financing, legal regulations, and taxation (Curran and Stanworth 1989). Entrepreneurial awareness education can be offered as a compulsory or elective program, whereas education for start-up can be offered only as an elective.

Although opportunity identification is the core of entrepreneurship (Shane and Venkataraman 2000), very little is done to train a student in how discover or create new business opportunities (Neck and Greene 2011). The findings of the present study also showed that the EEPs did not significantly influence students’ perception of opportunity identification. Therefore, in both compulsory and elective courses, enhancing this competency should be a particularly important component of entrepreneurship education and a fundamental design principle in EEPs. In addition, students should be equipped with tools enabling them to find opportunities and make opportunities (Neck and Greene 2011; Sarasvathy 2008). Lumpkin, Hills, and Shrader (2004) argue that teaching creativity skills can enhance opportunity identification competency. According to Sardeshmukh and Smith-Nelson (2011), students’ ability to

identify new business opportunities can be enhanced by means of a combination of classroom activities (e.g., activities associated with creativity such as divergent thinking and idea generation exercises) and experiential activities (e.g., internships and engaging students with community entrepreneurs by way of guest lectures by entrepreneurs, mentoring by local entrepreneurs, and live case studies). Another factor which needs to be considered by educators is the role of networking in identifying opportunities. Social networks have been found to be important in the opportunity identification process (Ozgen and Baron 2007). Social networks are significant sources of knowledge (Johannison 1990) and of new ideas (Christensen and Peterson 1990) and have been associated with the number of perceived new opportunities (Hills 1995; Ozgen and Baron 2007; Singh et al. 1999). Therefore, educators should devote attention to developing students' network skills in EEPs and should give them more opportunities to network with peers and other entrepreneurs (Lumpkin, Hills, and Shrader 2004).

As mentioned already, policymakers and university faculties should recognize the differential effects of various types of EEPs and that the effects will not be the same across all programs. Although we cannot recommend one type over the other in general terms, policymakers and instructors who want to produce more and better entrepreneurs while subject to cost constraints should keep in mind that elective programs may yield better results than compulsory programs. Policymakers and educators should also be aware that cultural context and values play an important part in EEPs. Studies show that the Iranian culture has changed over the last four decades (Tajaddini and Mujtaba 2011). For instance, the recent study by Karimi et al. (2013b) reported that although Iranian students are relational and show great affection toward family members, close friends and relatives (high family collectivism), they also tend to embrace individualistic values (such as personal success and autonomy) to a greater degree than the older generations. Javidan and Dastmalchian (2003) also reported that the Iranian culture is a mix of family ties and connections and a high degree of individualism, and it has strong orientations toward achievement and performance. Therefore, policymakers and educators should develop

EEPs that accommodate these different cultural values.

### **Limitations and Future Research**

The current study has several limitations that provide future research opportunities. This study assessed only the effects of participating in the EEPs on intention and opportunity identification; future research should examine the specific characteristics, design elements, contents, and teaching approaches of the EEPs, and their relationships to these outcomes. Future researchers may also address the question of why the EEPs foster PBC and subjective norms but not attitude toward entrepreneurship or opportunity identification.

As we did not have control groups to compare with our treatment groups, we are unable to determine the exact impact of EEPs on students' EI. We can assume that these significant pretest/post-test differences are the results of participating in EEPs because the content of the EEPs is very specific and not duplicated in other courses; however, the availability of a control group would have strengthened our findings. It should be noted that we did not want to conduct an artificial randomized trial; we preferred a study in a naturalistic academic setting that would not deprive any of the undergraduate students in that department of the potential benefits of participating in EEPs.

Finally, future research should focus on the intention-behavior relationship as this crucial link has been studied even less than the one between antecedent attitudes and EIs. Consequently, a longitudinal study is recommended for future research to be able to capture the changes in entrepreneurial attitudes and intention over time and the subsequent formation of entrepreneurial behavior from intention.

### **Conclusions**

This paper aimed to investigate the impact of EEPs on students' EI and opportunity identification using the TPB. The data support both the measurement and the structural model. Our study indicated that the EEPs significantly influenced subjective norms and PBC but that these programs did not have significant impacts on students' attitude toward entrepreneurship and their perceptions of opportunity identification. The study also showed that the elective EEPs significantly increased students'

EI but that this increase was not significant for the compulsory EEPs. We recommend that others investigate if our findings can be replicated in different educational institutions and EEPs, perhaps using designs comparing the outcomes of EEP participants with those of nonparticipant groups. As noted earlier, future research might also assess whether different teaching methods and learning environments would have different effects on the outcomes and whether course educator differences such as skills or academic background would influence the outcomes. In conclusion, this research provides evidence that EEPs are effective, but the current form needs improvement. It is imperative that we begin to understand how to improve EEP learning outcomes, especially regarding opportunity identification. If we do not tackle these issues, we may end up with graduates who lack the abilities and knowledge needed in order to identify new business opportunities and, as a result, fail in the first step of the entrepreneurship process. We hope that our study will encourage further exploration of the results of EEPs and that it may guide and inspire policymakers and entrepreneurship educators alike to design and deliver successful EEPs.

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