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Individual entrepreneurial orientation: development of a measurement instrument

Individual
entrepreneurial
orientation

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Abstract

Purpose – The purpose of this paper is to develop a measurement instrument for individual entrepreneurial orientation to be used to measure the entrepreneurial orientation of students and other individuals.

Design/methodology/approach – A measure of Individual Entrepreneurial Orientation (IEO) was generated, validated, and then tested on 1,100 university students. The items for the scale were based on the definitions of the five entrepreneurial orientation dimensions presented by Lumpkin and Dess. Final analysis of the IEO items using exploratory factor analysis resulted in reliable and valid measures for three of the dimensions.

Findings – The scale development process for IEO resulted in three distinct factors that demonstrated reliability and validity: innovativeness, risk-taking, and proactiveness, which statistically correlated with measures of entrepreneurial intention.

Research limitations/implications – The study comprised students at one university in the central southern USA and should be extended to other regions of the country and world, as well as to non-students, for greater generalisability.

Practical implications – An individual-level entrepreneurial orientation measurement instrument can be used to assist in entrepreneurship education and in student team and project assignments. It has value as a factor of influence in determining educational training for various decisions such as career choices and business endeavours. IEO also could be used by venture capitalists who are considering supporting business proposals and by individuals who want to assess the strength of their orientation towards entrepreneurship.

Originality/value – The paper contributes to the measurement of entrepreneurial orientation of individuals and can be used to help with student education and business training.

Keywords Entrepreneurialism, Individual behaviour, Individual entrepreneurial orientation, Measure development, Students, Entrepreneurial intention

Paper type Research paper

1. Introduction

As the pursuit of entrepreneurial ventures continues to grow, so do the research-based educational and training programmes that are directed towards this growth. One stream of research looks at entrepreneurial orientation (EO), an important construct that has been used extensively in entrepreneurship literature. It has been shown to influence firm performance, profitability, growth and product innovation in entrepreneurial firms (Johan and Dean, 2003; Avlontis and Salavou, 2007; Moreno and Casillas, 2008; Tang *et al.*, 2008). A validated scale to assess an individual's EO would be quite valuable to faculty in teaching entrepreneurship as well as in structuring teaching methods, in making team selection decisions and in project assessments. For example, the cohesiveness of student teams can seriously impact



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their effectiveness (DeRue *et al.*, 2010). Thus, understanding students' individual entrepreneurial orientation (IEO) could lead to more cohesive student project teams. Understanding EO at the individual level could also be valuable to future business owners, to business incubators and to potential investors who are considering supporting business proposals. Therefore, this research attempts to measure EO of individuals and will be referred to as IEO. Students at a regional US university were used to develop this IEO instrument based on the EO construct and dimensions presented by Lumpkin and Dess (1996).

In this research the five basic EO dimensions defined by Lumpkin and Dess (1996) are applied to an assessment of university students. Although EO and attributes have been assessed for university students in some academic research (Gürol and Atsan, 2006; Levenburg and Schwarz, 2008; Raposo *et al.*, 2008), there has never been a thorough assessment and validation of the EO construct at the individual level. The lack of clarity in this area is partially a result of examining entrepreneurial tendencies from multiple perspectives including personality trait research, entrepreneurial attitude studies and loosely defined entrepreneurial attribute studies, not specifically looking at the EO of an individual that is a direct result of the trait and attitude measures inherent in the original EO scale. Since EO has been found to be an important causal factor in the success of organisations through numerous empirical studies (see Rauch *et al.*, 2009, for a summary), it is of benefit to develop a validated measure for individuals rather than organisations. IEO is developed and validated by the authors to address this need. First, the research on individual personality traits and characteristics, and the study of entrepreneurial attitudes should be examined in order to provide support for the development of the IEO construct that is a direct result of the measures inherent in the original EO scale. Therefore, in the following sections there will be a brief review of three major areas of literature relevant to this study: overview of EO theory; examination of individual entrepreneurial traits, characteristics and attitudes; and measurement of individual entrepreneurial propensity.

2. EO theory overview: EO

EO at the organisation level is defined as "the strategy-making processes that provide organisations with a basis for entrepreneurial decisions and actions" (Rauch *et al.*, 2009, p. 762). It has been studied predominantly in its relation to firm performance and has been shown consistently to be highly significant, explaining on the average 24 per cent of performance variation (Rauch *et al.*, 2009). This construct is further described by a set of three to five behaviours that were developed out of business strategy and entrepreneurship literature (Covin and Slevin, 1989; Miller, 1983). These behaviours include innovativeness, willingness to take risks, proactiveness, competitive aggressiveness and autonomy (Lumpkin and Dess, 1996). Three of these have been used in the majority of the EO research: innovativeness, risk-taking and proactiveness, while autonomy and competitive aggressiveness have been studied less often (Rauch *et al.*, 2009; Lyon *et al.*, 2000). Researchers have found that in general the EO construct including these five dimensions can be considered collectively (Lumpkin *et al.*, 2009; Runyan *et al.*, 2008) or separately (Lumpkin and Dess, 1996, 2001; Wang, 2008), depending on context. In the recent meta-analysis of EO presented by Rauch *et al.* (2009), out of 51 studies on EO, the construct was studied as unidimensional in 37 studies and multidimensional in the remaining 14. Early research examined it as a multidimensional construct more often, until it was determined that the variables tend to move together in most contexts.

The definitions of the five dimensions, as described in Rauch *et al.* (2009) are shown in Table I. These five dimensions, defined as behaviours of the organisation, provide an indication of the organisation's entrepreneurial nature: a higher EO score leads to higher performance of the firm. Since one can also define an organisation, particularly a small or entrepreneurially founded organisation, as the result of an individual's behaviours, the EO dimensions could be measured for an individual. Entrepreneurs' willingness to take on risks and be proactive in leading their organisation can certainly be important behaviours that a person may take on in other pursuits of life. Individuals, such as students, can easily be observed as risk takers or non-risk takers, as innovative or not. Some students prefer working alone (autonomously) while others prefer the comfort of the group. Some students are very competitive and aggressively pursue being best in the class, while others are content to just pass the class. Therefore, applying these definitions to an individual not only seems plausible, but valuable in designing effective instruction methods depending on behaviours that the students exhibit.

3. Studies of individual entrepreneurial traits, attitudes and behaviours

When considering the EO of individuals the question to be addressed is "What are the personal characteristics or attitudes a person possesses that might increase propensity to engage in and be successful at entrepreneurial activities?". The answer to this question is impacted by three streams of research involving, first, an individual's environment; second, personality traits; and third, attitudes towards being entrepreneurial impacted by social influences (Levenburg and Schwarz, 2008). The first stream, environmental factors, includes economic opportunities, tax advantages, available funding or other external stimuli for starting a business. While this has been studied extensively at the firm level, it is not the focus of this research. However, the second and third streams: personality traits and attitudes, deal with the individual. Entrepreneurial attitudes and personality traits contribute to a person's likelihood of being in a business, or in reverse, exposure to entrepreneurial business impacts attitudes (Domke-Damonte *et al.*, 2008; Raposo *et al.*, 2008; Harris and Gibson, 2008). Traits and attitudes will be considered separately in the following sections.

Dimension	Definition
Autonomy	"Independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it to fruition"
Competitive aggressiveness	"Intensity of a firm's effort to outperform rivals"
Innovativeness	"Predisposition to creativity and experimentation through introduction of new products and services as well as technological leadership via R and D in new processes"
Proactiveness	"An opportunity-seeking, forward-looking perspective characterised by new products and services ahead of the competition and acting in anticipation of future demand"
Risk-taking	"Taking bold action by venturing into the unknown, borrowing heavily and/or committing significant resources to ventures in uncertain environments"

Note: ^aTaken from Rauch *et al.* (2009)

Table I.
Entrepreneurial
orientation dimensions
and definitions^a

While traits are lasting and do not vary much over time, they are often examined as part of the entrepreneurial tendencies of an individual (Rauch and Frese, 2007; Zhao *et al.*, 2010). Trait research on individuals and their propensity for entrepreneurial activities was a popular stream of study in the 1980s into the 1990s and stems from personality trait research. Trait research, unfortunately yielded mixed results as it was discovered that there were not a specific set of personality “traits” that defined a successful entrepreneur. The recent meta-analysis by Zhao *et al.* (2010) concluded that in 60 studies that were examined only two personality traits, openness to experience and conscientiousness, were most associated with entrepreneurial intentions. Emotional stability, extraversion, agreeableness and risk propensity had weak or mixed results. Risk propensity has been considered a personality trait in some instances but it is also argued that is a combination of the other “big five” personality traits and thus should not be considered separately (Zhao and Siebert, 2006). Need for achievement, internal locus of control and tolerance for ambiguity are traits that were examined in their correlation with the EO of used car salesmen (Okhomina, 2010). The findings are unique in that EO was the dependent variable. The results found support for the relationship between these traits and EO, although the sample size was relatively small (90 respondents). All of these personality factors may have an influence on EO. For example, autonomy could be influenced by extraversion, internal locus of control and conscientiousness. One could argue that proactiveness stems from extraversion, need for achievement and openness to experience (Lumpkin and Dess, 2001; Claes *et al.*, 2005). Competitive aggressiveness could also have a relationship with need for achievement and extraversion (Lumpkin and Dess, 2001).

When trait research failed to yield consistency, examination of entrepreneurial attitudes was initiated with Robinson’s *et al.* (1991) work. Since personality traits are more static and tend to change little over time, the research evolved to an assessment of entrepreneurial attitudes of individuals. Attitudes are either positive or negative, and can change depending on the exposure to outside influences (Ajzen and Fishbein, 1977; Robinson *et al.*, 1991). For instance, an individual may have a positive attitude towards taking risks, but after a significant loss due to risk-taking, her attitude may change to a negative one. Therefore researchers, with a particular focus on education, began examining entrepreneurial attitudes and how they might be influenced by teaching and classroom experiences (Harris *et al.*, 2007; Packham *et al.*, 2010). Social influences to entrepreneurial ventures can have an impact on one’s tendency to want to start a business; whether it is through a family business, personal business or just working in an entrepreneurial firm (Robinson *et al.*, 1991; Peterman and Kennedy, 2003; Levenburg and Schwarz, 2008). Entrepreneurial attitude research, at the individual level, proscribed four basic attitudes that were correlated with intentions to become an entrepreneur (Harris and Gibson, 2008). These included personal control, innovation, self-esteem and achievement with respect to business involvement. Attitudes were examined for students and then for entrepreneurs. The measurement instrument was developed specifically with regard to respondents who were entrepreneurs or those involved in business as many of the items refer to “business dealings” (Robinson *et al.*, 1991). Findings indicated that past experience with family business was linked with stronger entrepreneurial attitudes (Harris and Gibson, 2008; Zampetakis *et al.*, 2009; Roberts and Robinson, 2010). Returning to the question posed “What are the personal characteristics or attitudes a person possesses that might increase propensity to engage in and be successful at entrepreneurial activities?”. It appears that attitudes

may influence one's EO specifically innovation and risk-taking (as direct elements of EO) and proactiveness and autonomy (indirectly through self-esteem and personal control).

Other researchers studying students used a variety of measures for entrepreneurial attitudes that included a mixture of attitude and trait measures, and often included items referencing risk-taking and innovativeness (Domke-Damonte *et al.*, 2008; Levenburg and Schwarz, 2008; Macko and Tyszka, 2009). Authors assess attitudes towards wanting to become an entrepreneur, creativity, proactivity and emotional intelligence (Zampetakis *et al.*, 2009), self-efficacy and entrepreneurial intentions (Zhao *et al.*, 2010), alertness, perseverance, creativity and self-efficacy leading to behavioural self-control (Gelderen *et al.*, 2008) to name a few. Similarly to the EO measures used by Covin and Slevin (1989), there is a mix of traits and attitude variables included in the study of individual entrepreneurs. Table II includes a summary of some of the research on assessment of student or individual attributes tied to entrepreneurial propensity.

Although the research listed reflects some examination of entrepreneurial characteristics at the individual level, there is a mixture of variables including both attitudes and traits that has been studied. Thus, there is no standard scale for individual level EO that has been adopted. The scale development completed by Robinson *et al.* (1991) of attitudes towards entrepreneurship is the most robust and was used in the research by (Harris *et al.*, 2007; Harris and Gibson, 2008; Gibson *et al.*, 2009). That research was originally developed for assessment of the attitudes of entrepreneurs and was then applied to students who were involved in educational activities related to entrepreneurship. The research did not address risk-taking. The assessment questions were directed towards students' experience within a business not towards students with no business exposure. The study of students in India by Levenburg and Schwarz (2008) found entrepreneurial characteristics, as measured with five items on creative thinking were correlated with those students who want to be entrepreneurs. They had one measure of risk-taking that was not correlated with entrepreneurial intension. Innovativeness is by far the most common thread in all but two of the studies shown in Table II. Questions from that research generally ask if individuals have ever worked for a small business, owned a small business or have their family members owned a small business as another indicator of their EO. There has been research to support that this exposure increases the likelihood that individuals will be interested in becoming entrepreneurs themselves (Peterman and Kennedy, 2003; Harris and Gibson, 2008).

Since EO at the organisation level is a behavioural construct that has been successfully measured at that level and has been positively correlated with improved performance (Covin and Slevin, 1989; Lumpkin and Dess, 1996; Runyan *et al.*, 2008), it is logical to examine individuals' EO (Kuratko *et al.*, 2005) and behaviours or some proxy of those behaviours. Measurement of students' perceptions of their behaviours especially willingness to take risks, innovativeness, autonomy and proactiveness may give an indication of how successful these individuals might be as entrepreneurs. This leads to a review of the third major area of literature relevant to this study as the dependent variable proxy for performance: entrepreneurial intention.

4. Research addressing individual entrepreneurial intention

Measuring individuals' desire to become entrepreneurs provides variables for the current research comparing IEO strength to intentions. Strong IEO scores may indicate that individuals want to be entrepreneurs or perhaps, if individuals want to become entrepreneurs, their IEO scores may be higher. The intention to become an

Table II.
Variables to measure
entrepreneurial attributes
in individuals

Variables	Authors	Results
Achievement	Robinson <i>et al.</i> (1991)	Development of validated scale for entrepreneurial attitudes with respect to business outcomes
Personal control		
Innovation		
Self-esteem		
Managerial motivation	Parnell <i>et al.</i> (2003)	Comparison of US students with Chinese students studying in the USA and in China. Found differences between the three groups
Self-management		
Organisation effectiveness		
Power	Baughn <i>et al.</i> (2006)	Cognitive factors and how they relate to entrepreneurial interest in business students in China (lowest), Vietnam and Philippines (highest)
Self-efficacy		
Social support		
Normative support		
Parent-sibling ownership	Gürol and Atsan (2006)	Found that all of the traits except tolerance for ambiguity and self-confidence are increased in Turkish students that intend to become entrepreneurs
Family demands		
Need for achievement		
Locus of control		
Risk-taking propensity	Okhomina (2007)	Found that these traits are correlated with EO for a sample of 90 used car salesman
Tolerance for ambiguity		
Innovativeness		
Self-confidence		
Need for achievement	Gelderen <i>et al.</i> (2008)	Examination of undergraduate business students in Amsterdam. Found entrepreneurial alertness was correlated with entrepreneurial intention
Locus of control		
Tolerance for ambiguity		
Perseverance		
Entrepreneurial alertness	Harris and Gibson (2008)	Found a correlation between Entrepreneurial attitudes and past entrepreneurial experience
Self-efficacy		
Creativity		
Achievement		
Personal control	Levenburg and Schwarz (2008)	Students in India, over the USA, have a greater entrepreneurial interest. Those with entrepreneurial intentions scored higher on creativeness not risk-taking
Innovation		
Self-esteem		
Risk-taking		
Creative thinkers	Harris <i>et al.</i> (2007)	Students participating in the SBI were pre- and post-tested for EAO. Findings supported a positive correlation between SBI education and their EAO scores
Internal locus of control		
Achievement		
Personal control		
Innovation	Gibson and Harris (2009)	Comparison between community college and university students on their EAO. University students had higher EAO scores than community college students
Self-esteem		
Personal control		

entrepreneur has been shown to correlate with actually becoming one (Zhao *et al.*, 2010). This has been the focus of most literature dealing with individual's traits and attitudes, with entrepreneurial intention as the dependent variable in the analysis. Authors have addressed propensity to become an entrepreneur with a variety of measures. Table III provides a summary of the items used to measure individual propensity for entrepreneurship. These measures are really addressing what one might consider the dependent variable, "Do they plan to become an entrepreneur?".

		Individual entrepreneurial orientation
Measure	Sources	
Start my own business	Dabic <i>et al.</i> (2010)	
Partner with someone to start a business		
Work for immediate family business		
Work for small or new company		
Work for a large company or corporation	Packham <i>et al.</i> (2010)	
Being engaged in some positive action towards creating a new venture in the next 12 months		
Starting a new business from an idea		
Entrepreneurship within an existing company	Sowmya <i>et al.</i> (2010)	
Entrepreneurship using research		
I plan to start my own business in the future	Couto and Tiago (2009)	
I plan to start my own business after graduation		
No, I do to plan to start my own business	Gibson <i>et al.</i> (2009)	
Would like to own a small business		
Likelihood of owning a small business		
Feel prepared to own a small business	Levenburg and Schwarz (2008)	
I would like to work for myself		
I would like to start my own venture	Gürol and Atsan (2006)	
What are you planning to do after graduation?		
Form my own business venture		
Work in private sector (salaried)	Parnell <i>et al.</i> (2003)	
Work in public sector (salaried)		
I consider myself to be entrepreneurial		
I desire to be self-employed	Krueger <i>et al.</i> (2000) and Baughn <i>et al.</i> (2006)	
I own (or plan to own) my own business		
I have a strong desire to own my own business		
I aspire to be my own boss		
Is starting your own business an attractive idea to you?		
How desirable is it for you to start your own business?		
What is the likelihood you will start your own business in the next five years?		
How practical is it for you to start your own business?		
If you started a business in the near future, what is the probability you would succeed?		

Table III.
Measures of entrepreneurial intention

The research is mixed on whether a higher level of entrepreneurial attitudes and traits are correlated with a higher preference to be an entrepreneur. Students are primarily the focus of entrepreneurial propensity research as they are a convenient sample group that generally has yet to enter the business world. There may also be international differences as it has been found that students in India have a higher propensity to become entrepreneurs than students in the USA (Levenburg and Schwarz, 2008). In another example, Gürol and Atsan (2006) found few students in Turkey who had the desire to be entrepreneurs. Harris and Gibson (2008) found that students' entrepreneurial attitudes are increased by their exposure to entrepreneurial firms through family or in their own employment history. There were some consistencies in the measures for entrepreneurial propensity or intention to become an entrepreneur and these will be used to help validate the IEO scale in this research as a proxy for performance.

The literature presented provides a foundation for the development of the measures proposed here. There has been significant value to the development and validation of

the EO construct for research on entrepreneurial firms. EO has been shown to be a direct contributor to firm success and can be moderated by outside influences and events (Lumpkin and Dess, 1996, 2001; Runyan *et al.*, 2008). However, previous measures for IEO lack consistency thus justifying the need for a validated measure for IEO. Development of an EO measure for individuals who may or may not become entrepreneurs would fill a void in the literature where there is not a complete construct developed that addresses the five subscales of EO at the individual level. Once developed, measuring the relationship between the IEO and entrepreneurial intention would help validate the scale.

Therefore, the major purpose of this research is to develop a scale for IEO that can be administered to students and other individuals. This instrument derives from the commonly used EO measure that has been correlated with improved performance by entrepreneurial firms. The correlation between IEO and entrepreneurial intentions will also be assessed.

5. Methodology

The first step in the scale development process involved developing the subscale items for each of the five IEO variables and pretesting the items for convergent and discriminant validity, and reliability. The second step involved administering the revised IEO scale to a large sample. Finally, the revised IEO scale was assessed for its reliability and validity.

5.1 Step one: IEO subscale development

Development of the IEO scale involved using EO variables and their definitions provided by Lumpkin and Dess (1996). The measures for EO at the organisation level were modified to assess EO for an individual. They had to be reworded to ask about these variables of interest in the environment that the individual would encounter them, rather than in an organisation. Preliminarily the validated measures provided by Lumpkin *et al.* (2009) were changed from “my firm” and “managers of my firm” to “I” and the “business opportunities” to “opportunities” and so on. Any references to business goals were changed to project goals or team goals and references to business objectives were generalised to project achievement objectives. Several statements were recast to be negatively stated. Items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). In preliminary testing with 20 adults and 40 students several of the items had to be modified or dropped as they lacked discriminant validity in the Q-sort. Items were added that related directly to the definitions and that were more relevant to individuals not actively involved in business operations. A second Q-sort resulted in satisfactory items that demonstrated convergent and discriminant validity.

5.2 Step two: data collection

Online surveys were e-mailed to students at a regional mid-south university. Students were asked to respond to the Likert scale statements on IEO, developed and refined by the authors, as well as to questions designed to measure students' individual propensity for entrepreneurship (taken from Table III), and to demographic questions. The responses were edited for duplicates and incomplete entries, resulting in 1,102 usable surveys. In order to test for non-response bias, Venkatraman's (1989) method of comparing early and late respondents was used. Late respondents were determined to be those who responded 21 days or more after the initial e-mail was sent to the student

population. χ^2 -tests of independence indicated no significant differences between respondent groups for age, year in school and gender.

5.3 Step three: IEO scale assessment

Cronbach's α was used to assess the internal consistency of the initial items. The multiple items for measurement of IEO were factor analysed with principal component analysis using promax rotation to determine the convergent and discriminant validity of the measures.

6. Results

A total of 1,102 usable online surveys completed by students at a regional mid-south university comprised the sample with the characteristics presented in Table IV.

6.1 Internal IEO scale reliability

An assessment of the internal consistency of the initial scale items resulted in the consideration of the removal of two of the variables due to low Cronbach α s: autonomy (0.208) and competitiveness (0.585). Factor analysis confirmed the removal of these two as noted in Table V. Reliability analysis of the remaining variables of risk-taking, innovativeness and proactiveness indicated for each that much higher Cronbach α s

Variable	Item	Frequency	Percentage
Gender	Male	415	37.7
	Female	687	62.3
Year in school	Freshman	251	22.8
	Sophomore	131	11.9
	Junior	201	18.2
	Senior	325	29.5
	Graduate	185	16.8

Table IV.
Characteristics of the
sample ($n = 1,102$)

Item	Component 1	Component 2	Component 3
RISK2 [...] bold action by venturing into the unknown	0.18	-0.06	0.73
RISK3 [...] invest [...] yield a high return	-0.12	0.17	0.74
RISK5 [...] act "boldly" [...] where risk is involved	-0.03	-0.10	0.87
INNOV1 [...] try new and unusual activities [...]	0.51	0.13	0.12
INNOV3 [...] unique, one-of-a-kind approaches [...]	0.78	-0.05	-0.03
INNOV4 [...] prefer to try my own unique way [...]	0.81	0.06	-0.10
INNOV5 [...] favour experimentation/original approaches [...]	0.73	-0.02	0.10
PROACT1 [...] act in anticipation of future problems [...]	0.10	0.70	-0.04
PROACT4 [...] plan ahead on projects	-0.12	0.86	-0.02
PROACT5 [...] prefer [...] to get things going [...]	0.07	0.78	0.06
Eigenvalues	3.43	1.51	1.05

Notes: Extraction method: principal component analysis; rotation method: promax with Kaiser normalisation. Rotation converged in five iterations

Table V.
Factor analysis for
final three factors with
final items

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would be attained if items were removed. Following standard practice from Churchill (1979) and dropping the items with the lowest items-to-total correlation resulted in three items for risk, four items for innovativeness and three items for proactiveness. Cronbach α s on all three meet Nunnally and Bernstein's (1994) standard for scale development studies of 0.7.

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6.2 Internal validity: factor analysis of the IEO scale

Three distinct factors emerged from the factor analysis, accounting for 60 per cent of the total variance: risk-taking, innovativeness and proactiveness. Items proposed to measure autonomy and proactiveness did not load on the same factors and only weakly loaded on any of the other factors (thus confirming what the reliability analysis indicated). The remaining items loaded well on their hypothesised factors with only a few exceptions which resulted in the removal of one or two items for each of the dimensions of EO. (Items removed were the same items that the reliability analysis indicated were weak.) See Table V for a summary of the factor analysis with the remaining items for each variable and the eigenvalues for each component.

6.3 External validity of the IEO scale

While analysing the IEO scale using Cronbach's α and factor analysis leads to an internally consistent set of items with content and face validity, it is the extent to which the IEO correlates with other measures designed to measure the same thing that establishes its construct validity (Churchill, 1979). An analysis of the correlations among items of the subscale and between the IEO and other purported measures of entrepreneurial propensity (taken from Table III) indicates the establishment of construct validity for the IEO (see Table VI). Past EO research shows that the EO subscales all correlate with each other and with firm performance (Covin and Slevin, 1989; Wiklund and Shepherd, 2005; Stam and Elfring, 2008). The correlations in Table VI show that the IEO subscales also correlate with each other and with entrepreneurial propensity.

Scale purification and item reduction, along with the results of the factor analysis, resulted in a ten-item scale with three subscales that suggest a measure of IEO which is content valid and reliable with construct validity. Table VII summarises these ten items.

The three variables that did result from this scale development process are variables that correlate well with the interest of researchers when studying individuals and entrepreneurial tendencies, as is in evidence in the studies reported in Table II. Innovativeness, proactiveness, and risk-taking are dimensions that stand out as

Table VI.
Correlation matrix of
validated constructs

	1	2	3	4	5
1. Risk-taking subscale	1				
2. Innovative subscale	0.47**	1			
3. Proactiveness subscale	0.25**	0.34**	1		
4. I would like to work for myself	0.27**	0.33**	0.21**	1	
5. I would like to start my own venture	0.36**	0.36**	0.19**	0.78**	1

Note: **Correlation is significant at the 0.01 level (two-tailed)

		Individual entrepreneurial orientation
RISK2	I like to take bold action by venturing into the unknown	229
RISK3	I am willing to invest a lot of time and/or money on something that might yield a high return	
RISK5	I tend to act "boldly" in situations where risk is involved	
INNOV1	I often like to try new and unusual activities that are not typical but not necessarily risky	
INNOV3	In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before	
INNOV4	I prefer to try my own unique way when learning new things rather than doing it like everyone else does	
INNOV5	I favour experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems	
PROACT1	I usually act in anticipation of future problems, needs or changes	
PROACT4	I tend to plan ahead on projects	
PROACT5	I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it	
		Table VII. Ten items measuring individual entrepreneurial orientation

measurable and distinctive for this sample. The variables were also significantly correlated, as they are in the EO scale, lending support for the unidimensionality of this construct.

7. Discussion and conclusions

The scale development process for IEO resulted in three distinct factors that demonstrated reliability and validity. These three factors: innovativeness, risk-taking, and proactiveness are the same variables that have been predominantly used in existing EO literature. Items proposed to measure autonomy did not load on a separate factor and only weakly loaded on any of the other factors. Since autonomy has not been widely validated by other empirical work to date, it is not surprising that it had weak factor loadings. It is also possible that autonomy for the majority of these young adults is a behaviour that develops as they mature which would also contribute to its lack of reliability. The competitive aggressiveness variable also has had little empirical validation. Similar to autonomy, this may be something that is a learned behaviour or only applicable when an actual business and finances are at risk. These two variables are the least studied in the existing EO literature as evidenced by the Rauch *et al.* (2009) meta-analysis in which autonomy was only reported in three of the 51 studies and competitive aggressiveness was reported in seven. Risk-taking, proactiveness and innovativeness were prolific in the studies reported.

The literature has shown a disparity in the assessment of how entrepreneurial an individual may be. Traits of individuals have been examined and there is substantial research in that arena. Generally, the conclusions have shown entrepreneurs are more extraverted, open, conscientious and less agreeable and neurotic than regular managers (Zhao and Siebert, 2006). Yet the recent meta-analysis (Zhao *et al.*, 2010) has shown that only openness and conscientiousness are highly correlated with both entrepreneurial intentions and performance. Attitudes seem to vary somewhat by gender and culture (Harris and Gibson, 2008). Until now, none of these efforts have been directed specifically at the EO of an individual that is a direct result of the trait and attitude measures inherent in the original EO scale. The proliferation of literature that uses EO as a variable of interest at the individual level, while lacking in a

consistent measurement instrument certainly indicates the need for a validated measure for IEO. The IEO scale is an important step in building upon the research in these areas so that one's orientation can be assessed.

While the newly developed IEO has exciting possibilities, there may be some limitations. Attempts should be made to further validate the IEO using students from universities in other parts of the country and world and across other age groups. The nature of the students at one regional university may differ significantly from other schools. If the measures are robust, they should still hold up but this needs to be examined. The instrument should also be tested on individuals who are not students, as it could be a valuable tool in determining career possibilities and for assessing potential as entrepreneurs for those who seek assistance from small-business development centres. As studies continue, a confirmatory factor analysis is also a necessary next step to confirm each of these newly developed subscales and their relationship with the IEO construct. The IEO scale could be further examined to see if it correlates with intentions to become an entrepreneur through a longitudinal study measuring students' IEO and whether they become entrepreneurs or not. This would also further validate the scale.

There are important practical implications in the use of this IEO instrument for researchers, educators, trainers and career planners. This research provides an important beginning to understanding students' EO at a relatively young stage of development. This understanding of the dimensions of IEO will allow researchers opportunities to explore the link between these three variables and other factors of interest. It will also help to better understand the strengths individuals might use to develop their own entrepreneurial ventures. The relationship between IEO and other areas of student and individual performance should also be examined. A person's IEO could be used as a factor of influence in various decisions such as career choices and business endeavours.

A validated scale would be quite valuable to faculty in structuring teaching methods, making team selection decisions and in curriculum development. Administering the IEO instrument to college students at the beginning of the semester would allow entrepreneurship faculty an opportunity to better position the content of the course material for their student audience. Being able to nurture and develop entrepreneurship in individual students would benefit the faculty, the students and entrepreneurship programmes in higher education. Teachers of high school students would find the IEO scale helpful in directing students into business classes and summer entrepreneurship camps.

The IEO instrument should also be used for determining student team membership. Since the cohesiveness of student teams can seriously impact their effectiveness (DeRue *et al.*, 2010), understanding students' IEO could lead to more cohesive student project teams.

Regular assessment of students' IEO would contribute to an analysis of entrepreneurship programmes in higher education. As pointed out by Harris and Gibson (2008) such analysis is necessary, and entrepreneurship education programmes must "be willing to use this information to modify the curriculum" (p. 577).

Understanding EO at the individual level could also be valuable to future business owners, business incubators and to potential investors who are considering supporting business proposals. Educators and trainers will have a scale with which to measure IEO that could be used in teaching entrepreneurship as well as used for training in small-business seminars.

References

- Ajzen, I. and Fishbein, M. (1977), "Attitude-behaviour relations: a theoretical analysis and review of empirical research", *Psychological Bulletin*, Vol. 84 No. 5, pp. 888-918.
- Avlontis, G.J. and Salavou, H.E. (2007), "Entrepreneurial orientation of SMEs, product innovativeness, and performance", *Journal of Business Research*, Vol. 60 No. 5, pp. 566-75.
- Baughn, C.C., Cao, J., Le, L., Lim, V. and Neupert, K. (2006), "Normative, social and cognitive predictors of entrepreneurial interest in China, Vietnam and the Philippines", *Journal of Developmental Entrepreneurship*, Vol. 11 No. 1, pp. 57-77.
- Churchill, G.A. Jr (1979), "A paradigm for developing better measures of marketing constructs", *Journal of Marketing Research*, Vol. 16 No. 1, pp. 64-74.
- Claes, R., Beheydt, C. and Lemmens, B. (2005), "Unidimensionality of abbreviated proactive personality scales across cultures", *Applied Psychology: An International Review*, Vol. 54 No. 4, pp. 476-89.
- Couto, J. and Tiago, M. (2009), "Propensity for entrepreneurship among university students", *The Business Review, Cambridge*, Vol. 12 No. 1, pp. 308-16.
- Covin, G. and Slevin, D. (1989), "Strategic management of small firms in hostile and benign environments", *Strategic Management Journal*, Vol. 10 No. 1, pp. 75-87.
- Dabic, M., Basic, M. and Novak, I. (2010), "The role of gender differences on students' entrepreneurial attitudes: a cross-country comparative study of Croatia and Poland", *The Business Review, Cambridge*, Vol. 15 No. 1, pp. 97-103.
- DeRue, D., Hollenbeck, J., Ilgen, D. and Feltz, D. (2010), "Efficacy dispersion in teams: moving beyond agreement and aggregation", *Personnel Psychology*, Vol. 3 No. 1, pp. 1-40.
- Domke-Damonte, D., Faulstich, J.A. and Woodson, W. (2008), "Entrepreneurial orientation in a situational context: comparisons between Germany and the United States", *Journal of Business Strategies*, Vol. 25 No. 1, pp. 15-31.
- Gelderen, M., Brand, M., Praag, M., Bodewes, W., Poutsma, E. and Gils, A. (2008), "Explaining entrepreneurial intentions by means of the theory of planned behaviour", *Career Development International*, Vol. 13 No. 6, pp. 538-59.
- Gibson, S.G., Harris, M.L., Mick, T.D. and Burkhalter, T.M. (2009), "Comparing the entrepreneurial attitudes of university and community college students", in Swinney, J. (Ed.), *USASBE 2009 Proceedings*, USASBE, Anaheim, CA, pp. 1059-68.
- Gürol, Y. and Atsan, N. (2006), "Entrepreneurial characteristics amongst university students: some insights for entrepreneurship education and training in Turkey", *Education & Training*, Vol. 48 No. 1, pp. 25-38.
- Harris, M., Gibson, S. and Taylor, S. (2007), "Examining the impact of small business institute participation on entrepreneurial attitudes", *Journal of Small Business Strategy*, Vol. 18 No. 2, pp. 57-75.
- Harris, M.L. and Gibson, S.G. (2008), "Examining the entrepreneurial attitudes of US business students", *Education & Training*, Vol. 50 No. 7, pp. 568-81.
- Johan, W. and Dean, S. (2003), "Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses", *Strategic Management Journal*, Vol. 24 No. 13, pp. 1307-14.
- Krueger, N.F., Reilly, M.D. and Carsrud, A. (2000), "Competing models of entrepreneurial intentions", *Journal of Business Venturing*, Vol. 15 Nos 5,6, pp. 411-32.
- Kuratko, D., Ireland, D., Covin, J. and Hornsby, J. (2005), "A model of middle-level managers' entrepreneurial behaviour", *Entrepreneurship, Theory and Practice*, Vol. 13 No. 4, pp. 62-72.

- Levenburg, N. and Schwarz, T. (2008), "Entrepreneurial orientation among the youth of India: the impact of culture, education and environment", *The Journal of Entrepreneurship*, Vol. 17 No. 1, pp. 15-35.
- Lumpkin, G., Coglisier, C. and Schneider, D. (2009), "Understanding and measuring autonomy: an entrepreneurial orientation perspective", *Entrepreneurship Theory and Practice*, Vol. 33 No. 1, pp. 47-69.
- Lumpkin, G.T. and Dess, G.G. (1996), "Clarifying the entrepreneurial orientation construct and linking it to performance", *The Academy of Management Review*, Vol. 21 No. 1, pp. 135-72.
- Lumpkin, G.T. and Dess, G.G. (2001), "Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle", *Journal of Business Venturing*, Vol. 16 No. 5, pp. 429-51.
- Lyon, D., Lumpkin, G.T. and Dess, G.G. (2000), "Enhancing entrepreneurial orientation research: operationalizing and measuring a key strategic decision making process", *Journal of Management*, Vol. 26 No. 5, pp. 1055-85.
- Macko, A. and Tyszka, T. (2009), "Entrepreneurship and risk taking", *Applied Psychology: An International Review*, Vol. 58 No. 3, pp. 469-87.
- Miller, D. (1983), "The correlates of entrepreneurship in three types of firms", *Management Science*, Vol. 29 No. 7, pp. 770-91.
- Moreno, A. and Casillas, J. (2008), "Entrepreneurial orientation and growth of SMEs: a causal model", *Entrepreneurship Theory and Practice*, Vol. 32 No. 3, pp. 507-28.
- Nunnally, J.C. and Bernstein, I.H. (1994), *Psychometric Theory*, 3rd ed., McGraw-Hill, New York, NY.
- Okhomina, D. (2007), "Does level of education influence psychological traits? Evidence from used car entrepreneurs", *Journal of Management and Marketing Research*, Vol. 3, pp. 1-14.
- Packham, G., Jones, P., Miller, C., Pickernell, D. and Thomas, B. (2010), "Attitudes towards entrepreneurship education: a comparative analysis", *Education and Training*, Vol. 52 Nos 8/9, pp. 568-86.
- Parnell, J., Shwiff, S., Yalin, L. and Langford, H. (2003), "American and Chinese entrepreneurial and managerial orientations: a management education perspective", *International Journal of Management*, Vol. 20 No. 2, pp. 125-37.
- Peterman, N.E. and Kennedy, J. (2003), "Enterprise education: influencing students' perception of entrepreneurship", *Entrepreneurship, Theory and Practice*, Vol. 28 No. 2, pp. 129-44.
- Raposo, M., do Paco, A. and Ferreira, J. (2008), "Entrepreneurs profile: a taxonomy of attributes and motivations of university students", *Journal of Small Business and Enterprise Development*, Vol. 15 No. 2, pp. 405-18.
- Rauch, A. and Frese, M. (2007), "Let's put the person back into entrepreneurship research: a meta-analysis on the relationship between business owners' personality traits, business creation, and success", *European Journal of Work and Organisational Psychology*, Vol. 16 No. 4, pp. 353-85.
- Rauch, A., Wiklund, J., Lumpkin, G.T. and Frese, M. (2009), "Entrepreneurial orientation and business performance: an assessment of past research and suggestions for the future", *Entrepreneurship Theory and Practice*, Vol. 33 No. 3, pp. 761-87.
- Roberts, L. and Robinson, P. (2010), "Home-based entrepreneurs, commercial entrepreneurs and white-collar workers: a comparative study of attitudes toward self-esteem, personal control and business growth", *Journal of Small Business and Entrepreneurship*, Vol. 23 No. 3, pp. 333-53.
- Robinson, P.B., Stimpson, D.V., Huefner, J.C. and Hunt, H.K. (1991), "An attitude approach to the prediction of entrepreneurship", *Entrepreneurship Theory and Practice*, Vol. 15 No. 4, pp. 13-31.

- Runyan, R., Droge, C. and Swinney, J. (2008), "Entrepreneurial orientation versus small business orientation: what are their relationships to firm performance?", *Journal of Small Business Management*, Vol. 46 No. 4, pp. 567-88.
- Sowmya, D.V., Majumdar, S. and Gallant, M. (2010), "Relevance of education for potential entrepreneurs: an international investigation", *Journal of Small Business and Enterprise Development*, Vol. 17 No. 4, pp. 626-40.
- Stam, W. and Elfring, T. (2008), "Entrepreneurial orientation and new venture performance: the moderating role of intra- and extraordinary social capital", *Academy of Management Journal*, Vol. 51 No. 1, pp. 97-111.
- Tang, J., Tang, Z., Marino, L., Zhang, Y. and Li, Q. (2008), "Exploring an inverted U-shape relationship between entrepreneurial orientation and performance in Chinese ventures", *Entrepreneurship Theory and Practice*, Vol. 32 No. 1, pp. 219-39.
- Venkatraman, N. (1989), "Strategic orientation of business enterprises: the construct, dimensionality, and measurement", *Management Science*, Vol. 35 No. 8, pp. 942-62.
- Wang, C. (2008), "Entrepreneurial orientation, learning orientation, and firm performance", *Entrepreneurship Theory and Practice*, Vol. 32 No. 4, pp. 635-57.
- Wiklund, J. and Shepherd, D. (2005), "Entrepreneurial orientation and small business performance: a configurational approach", *Journal of Business Venturing*, Vol. 20 No. 1, pp. 71-91.
- Zampetakis, L.A., Kafetsios, K., Bouranta, N., Dewett, T. and Moustakis, V.S. (2009), "On the relationship between emotional intelligence and entrepreneurial attitudes and intentions", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 15 No. 6, pp. 595-618.
- Zhao, H. and Siebert, S. (2006), "The big five personality dimensions and entrepreneurial status: a meta-analytic review", *Journal of Applied Psychology*, Vol. 91 No. 2, pp. 259-71.
- Zhao, H., Seibert, S. and Lumpkin, G.T. (2010), "The relationship of personality to entrepreneurial intentions and performance: a meta-analytic review", *Journal of Management*, Vol. 36 No. 2, pp. 381-404.

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