



Developing a Methodology to Evaluate Enterprise Education Programmes

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Abstract. The contribution of this research to existing entrepreneurship theory is to present a conceptual model for understanding enterprise potential in young people in an educational context, and to demonstrate how enterprise potential can be measured. The overall aim of this research was to develop an evaluation tool which can be used in future evaluation studies of enterprise education. The tool can be used to overcome some of the limitations of evaluation studies, which have been identified by researchers. Longitudinal studies using the tool will enable consistent comparison of entrepreneurial attitudes, and it is recommended that it is used in conjunction with objective measures of entrepreneurial behaviour such as actual start-up activity. Enterprise potential was conceptualised as high entrepreneurial self-efficacy which was operationalised as positive attitudes towards five dimensions: leadership, achievement, personal control, creativity and intuition. Based on this conceptual framework the attitudes to enterprise (ATE) test was developed. This new measure provides a tool to evaluate enterprise programmes, enabling researchers to take into account other moderating factors, which may influence attitudes towards enterprise such as gender, type of school, ethnic background, and a family background of business ownership. For policy makers the tool can provide evidence of the efficacy of different types of enterprise education programmes for different target groups, thus helping to identify how best to target resources and investment. A series of validity and reliability tests was used to develop and refine the ATE test including: factor analysis; Cronbach alpha tests; discriminant and nomological validity tests; and a test for criterion validity using a second independent sample. Limitations to this testing indicate a need for further tests particularly criterion validity tests, using new, larger and more diverse samples.

1. Introduction

Governments around the world place increasing importance on the need for 'enterprise' attitudes and skills (Leitch, 2006, OECD 2009a, 2009b, 2001). Enterprise skills are perceived as necessary tools for survival in the modern era of globalisation and new technology (OECD 2001b, Ofsted 2005, Keck and

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Buonfino 2008). Rapid globalisation, it is argued, has created greater job flexibility and the rise of ‘portfolio’ careers consisting of a combination of study, part-time and voluntary work, self-employment/agency work, and periods as an employee (Handy 1990). The Organisation for Economic Cooperation and Development (OECD) recently launched a workstream with the objective of advancing Entrepreneurship Education as one of the key drivers of sustained social development and economic recovery (OECD 2009a, 2009b). Encouraging enterprise is perceived as key to creating jobs and improving competitiveness and economic growth throughout Europe (European Commission (EC) 2002, 2003, 2006, 2007).

In the UK the last government allocated £55 million annually to fund enterprise education in secondary schools; and a further £30 million to extend provision from secondary to primary and tertiary institutions to create an “enterprise journey” for all (McLarty et al. 2010). Enterprise education is perceived to be a key component of the economic well-being of young people, one of the goals of the *Every Child Matters* programme (Treasury 2003), and the Education Act of 2004 (Ofsted 2005).

In the search for policy solutions to the problems of youth unemployment, national governments and international organisations such as the OECD have turned their attention towards the twin concepts of ‘enterprise’ and ‘enterprise education’ (EC 2002, OECD 2009a 2001a). These concern both ‘entrepreneurship’ meaning self-employment and business ownership; and ‘enterprise’ meaning attitudes and skills often associated with entrepreneurs, but which are now perceived as crucial ‘employability’ skills in the increasingly competitive global business environment.

The need for new skills, the continuous updating of skills, and temporary employment prospects, all increase the difficulties young people face in job markets around the world. Enterprise education may help prepare young people for the demands of self-employment or for careers in a rapidly changing environment, but education is still only one factor among many which can influence attitudes to work and career trajectories. Evidence from the British Household Survey, and the Youth Cohort studies in the UK, indicate a link between academic achievement, occupational choice and socio-economic background (Brynnner and Parsons 2001, Payne 2001, Cabinet Office 2009). What this evidence shows is that there is a positive correlation between wealth and achievement. Young people from wealthier families are more likely to attain greater academic achievement, attend top universities and earn more than young people from poorer families. Elitism in the professions, and a lack of focus on careers in schools, mean that young people from middle class as well as lower income backgrounds are often not encouraged to aspire towards social mobility.

The aim of this research was to develop an evaluation tool which has the potential to be used in longitudinal evaluation studies of enterprise education, thus enabling the tracking of entrepreneurial attitudes over time. The need for the tool,

it is argued, stems firstly from the widespread increase in enterprise programmes for young people internationally. Secondly, evaluation methodologies have often been criticised for being superficial (Storey 2002; Hytti and Kuopusjarvi 2004, Greene 2009, Levie et al. 2009). Storey (2002), in his six steps model of monitoring and evaluation of enterprise and small business initiatives, noted a lack of control groups, longitudinal designs and a lack of objective measures. Greene (2009) found that different evaluation methodologies can result in radically different evidence of the impact enterprise programmes have had. Greene's (2009) key finding was that simpler forms of evaluation tend to provide positive support, whereas more sophisticated evaluations are less positive. This new evaluation tool has the potential to enable more sophisticated research designs, particularly pre and post testing longitudinal designs.

Reliable evidence is needed, based on sound evaluations, to inform policy makers and programme providers about the efficacy of different types of enterprise education programmes. This last point becomes even more important given the increasing investment by governments in developing an enterprise culture and more enterprising individuals.

The demand for employees with 'enterprise' skills emanates from both employer organisations and from government departments (Turner 2002, CBI 2009). For many young people entering the labour market for the first time long-term careers with one employer are can no longer be taken for granted, replaced instead by fixed-term contracts and uncertain futures (OECD 2001a, Hayward 2004). Moreover, employers are looking for people who are flexible, innovative, decisive and easily adaptable to change: people with enterprise skills and attitudes (CBI 2009).

This research builds on a previous pilot study to develop a research tool, designed to measure enterprise potential in young people, an attitudes to enterprise (ATE) test (Athayde 2009). The pilot study exposed some conceptual weaknesses in the original design of the instrument. Therefore, the underlying conceptual design was revisited to enable the development of an improved, and more effective, instrument. The tool was then piloted on a sample of 470 students aged 14-17 in secondary schools in London UK. Further validity testing was carried out using a sample of 328 undergraduates. The remainder of this paper describes the underlying theoretical framework, the methodology, the empirical findings; and the implications and limitations of this research.

2. Theoretical Framework

The design of the research instrument draws on a review of entrepreneurship research, the Entrepreneurial Attitude Orientation Scale (EAO) (Robinson et al. 1991) and enterprise theory (Gibb 1987, 2000, 2007, 2008). Gibb's enterprise theory distinguishes between enterprising 'behaviours' 'skills' and 'attributes'.

Definitions of the successful entrepreneur often centre on a collection of behaviours underpinned by certain skills and attributes, which include creativity; autonomy (or personal control), achievement orientation; leadership and, less commonly, coping with uncertainty and ambiguity. Therefore, entrepreneurial ‘potential’ was conceptualised in this study as a multidimensional construct.

The EAO scale used four dimensions in a business context: achievement; self-esteem; personal control and innovation (Robinson *et al.* 1991). The EAO scale has been used in several studies in the U.S. (McCline *et al.* 2000; Rasheed, 2002), in Malaysia (Shariff & Saud 2009), in South Africa Van (Wyk *et al.* 2003), and India (Kundu and Rani, 2008). A further study of young people in the UK measured three dimensions: ‘hard work’, ‘internal locus of control’ and ‘need for achievement’ (Bonnert and Furnham 1991). Since these early studies debate has continued about the nature of the entrepreneurial personality, though a number of key dimensions have remained constant. Enterprise education is perceived as a means of developing core enterprising behaviours, attributes and skills in young people such as problem solving, creativity, and persuasiveness. Personal attributes are also important, including self-confidence, dynamism and resourcefulness; whereas behaviours include persuading others, opportunity seeking, and taking action in uncertain environments.

The five dimensions reported in an early review by Caird (1991a:1991b) remain among the most commonly cited and studied (Vecchio 2003). This included: calculated risk-taking; creative tendency; high need for achievement; high need for autonomy; and an internal locus of control (Caird 1991a:1991b). The use of such personality traits as a basis for developing a model of entrepreneurship, however, has suffered from conceptual and methodological problems. Personality traits are static and theories based solely on traits are simplistic representations which underestimate cognition and the influence of specific situational factors on actions (Ajzen 1991). Moreover, such studies have demonstrated neither discriminant nor convergent validity² (Robinson *et al.* 1991, McCline *et al.* 2000). For these reasons an attitude approach similar to that used by Robinson *et al.* (1991) was adopted.

Chell (1998, 2008) has comprehensively mapped the progress of research on the entrepreneurial personality and highlighted the importance of both intentionality and a social cognitive approach to the field. Entrepreneurship is an intentional process (i.e. mental processes are key, not personality traits), and intentionality and mental processes have been shown to be central to entrepreneurship (Bird 1988, Katz and Shepherd 2003, Thompson 2009, Haynie 2009). Ajzen (1991, 2005) has shown that intentions can be used to predict and explain future behaviour and that in turn attitudes will affect intentions. Krueger and Carsud (1993) have argued that attitudes influence behaviour via intentions and, as such, both are antecedents to entrepreneurial behaviour. Indeed, a

2. Validity is a key requirement in the development of scales.

growing number of studies has found links between attitudes, intentions and entrepreneurship (Krueger and Carsud 1993, Krueger and Kickul 2006, Mitchell et al 2007, Thompson 2009).

Though risk-taking is considered to be an important component of entrepreneurship, attempts to measure the risk-taking propensity of entrepreneurs have had mixed results. Whereas studies such as Brockhaus (1980) and Peacock (1986) found no differences in risk-taking between successful and unsuccessful entrepreneurs and the general population, Carland, et al. (1995) and Stewart and Roth (2001) found that entrepreneurs did show a greater propensity for risk-taking than managers. Adolescent risk-taking, however, is conceptualised somewhat differently in the youth-related sociology literature (e.g. Gullone and Moore 2000). Perceptions of risk-taking in young people are often conceptualised in terms of 'thrill-seeking' or 'anti-social' behaviours and centre around issues such as drug taking, criminality and sexual behaviours. Therefore, it was decided not to include risk as a construct in the development of the evaluation tool.

Instead, based on previous literature, and the aims of governments and international organisations such as the OECD and the EU, five main dimensions were identified as key outcomes of enterprise education, which could sensibly be measured: creativity; personal control; dynamic/achievement orientation; intuitive thinking; and inspiring and motivating others (e.g. team/leadership skills).

Creativity

The concept of innovation is central to many definitions of 'entrepreneurship' and has been measured in a number of studies (Caird 1991a; Robinson et al. 1991, Mueller and Thomas 2000, Gelderen 2000, Louw et al. 2003). Greater scope for creativity in schools is advocated by commentators on enterprise education (Jones and Wright 2007). Aspects of creativity include flexibility, coping with the unexpected, finding solutions to seemingly intractable problems by looking at them in a new/quirky way, being able to imagine something out of the ordinary (Jeffrey and Craft 2004). Finally, students participating in a programme designed to encourage entrepreneurial creativity, demonstrating higher entrepreneurial intentions, reported high levels of perceived learning, in particular in creativity (Litz et al. 2011).

Personal Control

A strong belief in personal control has been viewed as a prerequisite for action, and Shapero (1985) and Krueger and Carsud (1993) propose that 'propensity to act' is an essential disposition for new venture creation. Bonnett and Furnham (1991) found that young people on an enterprise programme had a greater degree of personal control than non-participants. Previous research has found a significant relationship between the Protestant Work Ethic and an internal locus

of control (Furnham and Steele 1993), where 'locus of control' is the extent to which a person believes they have control over their life. 'Locus of control' refers to a stable personality trait which is difficult to measure (Krueger and Carsud 1993), however a concept of personal control refers more to attitudes towards taking control (Robinson et al. 1991). Personal control has also been linked to self-esteem, particularly in young people (Stipeck and Nord 1981).

Dynamic/Achievement Orientation

A high need for achievement was identified by McClelland (1965) as an intrinsic characteristic of an entrepreneur, and his research has established its links with economic development at the level of countries. The link between entrepreneurs and achievement motivation has been confirmed by subsequent studies (Morris and Fargher 1974; Durand and Shea 1974; Caird 1991a; Robinson et al. 1991). In developing a domain of enterprising behaviours of ordinary people Gelderen (2000) included 'being active', 'busy,' and 'initiative'. Participants in an enterprise programme for young people had higher levels of achievement orientation than non-participants (Hansemark 1998), and young people on a Young Enterprise (YE) programme were also found to hold stronger beliefs in 'hard work' than non-participants (Bonnett and Furnham 1991).

Intuition

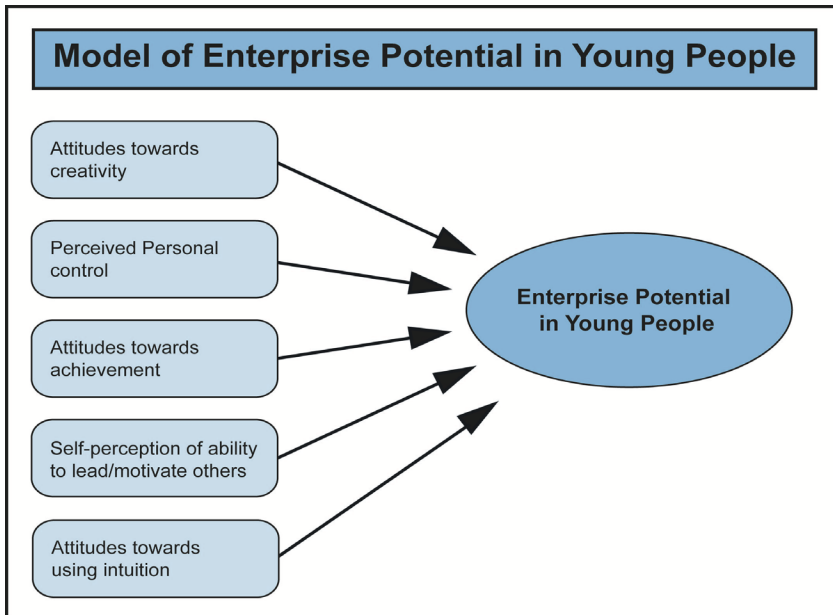
Intuition has only recently begun to be investigated as a possible characteristic of the entrepreneur (Allison et al. 2000). 'Intuition' is a dimension that can be associated with the ability to cope with uncertainty and unstable circumstances, which are often associated with enterprise creation (Gibb 1987). Gibb (1993) and Horne (2001) recommend that an element of uncertainty should be introduced in the classroom during the teaching of enterprise skills, to enable students to experience the need to make choices even when they lack all the necessary information. Intuition has been recognised as an advantage to entrepreneurs and is related to opportunity recognition. Cognitive style is defined as a person's preferred way of gathering, processing and evaluating information. Allison et al. (2000) used the Cognitive Style Index (CSI) in a study of 250 entrepreneurs and managers and found that successful entrepreneurs were more intuitive in their cognitive style than managers.

Leadership

Vecchio (2003) identifies 'leadership' as an important factor in entrepreneurship, but notes that it has received more attention so far within the general field of management than in entrepreneurship research. In a review of studies on entrepreneurial traits Vecchio (2003) argues that 'entrepreneurship' can be viewed as a type of leadership, which occurs in a specific setting (i.e. a small business). This argument makes 'leadership' a central dimension in the process of 'entrepreneurship'. According to Timmons and Spinelli (2004) domains for

leadership include: likes responsibility (e.g. put in charge of others), or may take responsibility in a group automatically because others expect it. A leader gets on well with people and is popular with those around them. They are good at motivating others to get things done and can create enthusiasm in other people. Based on this review of entrepreneurship dimensions, a model of ‘enterprise potential in young people was developed. This underpinned the original version of the test. In developing the model consideration was also given to the challenge of operationalising these attitudes in an appropriate way for young people still at school. Figure 1 gives an overview of the conceptual model which was developed to use as a basis for designing the original evaluation tool (Athayde 2009).

Figure 1: Model of enterprise potential in young people



The first pilot study had mixed results. Following a review of the conceptual model it was decided that this was an overly simplified model of what is in fact a complex phenomenon. This limitation led to some ineffective statements for each construct, albeit that some constructs namely leadership and creativity were originally well defined. Some of the statements in the remaining constructs however were neither well conceptualised, nor well operationalized. These limitations then resulted in low reliability in some constructs, and a lack of structural validity. To achieve the required thresholds of reliability (i.e. Cronbach alpha = 0.7), and validity it was necessary to reduce the number of statements to 18, and to omit the “intuition” sub-scale altogether. This was because it was not possible to produce a version of the “intuition” scale that met the minimum

reliability threshold of 0.7. Based on these findings therefore, it was decided to re-examine the initial conceptual framework to improve the overall effectiveness of the test.

There is increasing evidence to suggest that self-efficacy is a central construct in entrepreneurship research (Krueger and Bazeal 1994, Forbes 2005, Markham et al. 2005, 2002, Hmieleski and Corbett 2007, Zellweger et al. 2010) and there is a growing body of research into the development of entrepreneurial self-efficacy scales for adults (Chen et al. 1998, De Noble et al. 1999, Baum and Locke 2004, McGee et al. 2009). The concept of self-efficacy originates in social cognitive theory, and states that people who expect to perform well at a task, will do better than people who expect to perform badly (Bandura and Schunck 1981, Gist 1992, Bandura 1997, 1986). Chen et al.'s (1998) measure of entrepreneurial self-efficacy successfully differentiated entrepreneurs from non-entrepreneurs. Finally, Baum and Locke (2004) found that entrepreneurs who are confident in their ability to achieve high growth are likely to have high growth expectations of their businesses. Often, entrepreneurial self-efficacy is characterised by domain specific constructs, as in this case of growth expectations.

Furthermore, self-efficacy has been shown to be reliable indicator of academic achievement in children, and such scales are used widely with children and young people (Pajares 1996, Pajares and Schunk 2001, Martinelli et al. 2009). Self-efficacy is central of Bandura's social cognitive theory (Bandura 1977).

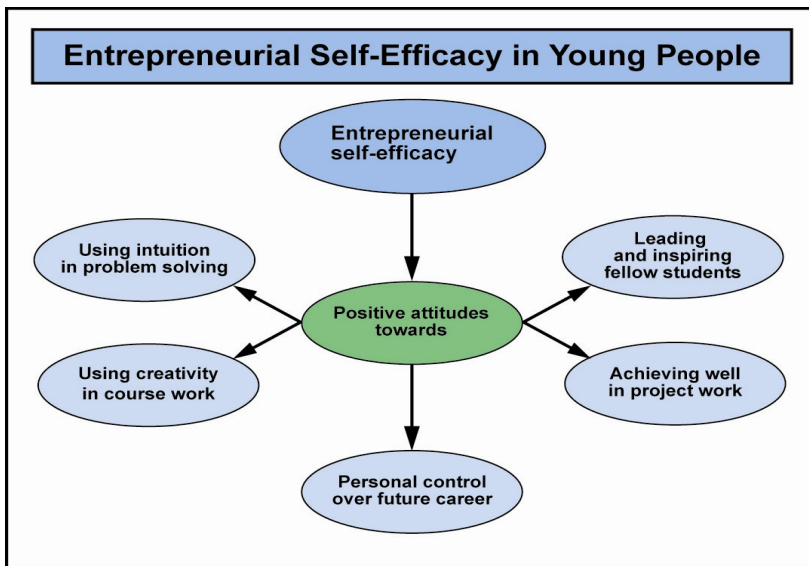
Given this evidence of the central role of self-efficacy it was decided to incorporate it into the conceptual framework of enterprise potential in young people. The aim was to give it a prominent role to develop a more accurate conceptual model, which would have the potential to improve the operationalisation of the constructs, and the development of more effective statements.

According to Bandura (2006) the construction of sound measurement scales relies on a good conceptual analysis of the relevant domain. Self-efficacy is not a global trait but is domain specific. That is, one may have high self-efficacy in one area but low self-efficacy in another, and therefore self-efficacy scales need to reflect this by being multi-dimensional. Furthermore, entrepreneurial research also often emphasises the need to identify domain specific dimensions (e.g. Hmieleski and Corbett 2007). Each dimension should be located in a specific domain that closely reflects a context which will be familiar and relevant to potential respondents. A weakness of the original research instrument for young people was a lack of specificity in the domains relating to each sub-scale. To rectify this, the domains were redefined by placing them in a specific context, which would be relevant to young people.

The new model therefore, posits that enterprise potential can be understood through the lens of self-efficacy. In this way the research adds to our conceptual understanding of entrepreneurial potential in young people, by interpreting it as a constellation of positive attitudes and self-efficacy. Figure 2 is a graphic

representation of the modified model. The model demonstrates how entrepreneurial self-efficacy in young people is a reflection of positive self-efficacy in five dimensions. These dimensions, though similar to those in the original model, have been refined to take into account the need for measures of self-efficacy to be domain specific (Bandura 2006). Apart from the leadership and creativity dimensions, the original conceptual model, as shown in Figure 1, did not provide specific domains for each construct, but instead sometimes vague descriptions of, for instance, attitudes towards using intuition. Following a review this lack of specificity was deemed to be partly responsible for the low reliability and lack of structural validity of some constructs. The modified model in Figure 2 therefore was the foundation for improving the statements in each construct, and the development of version two of the test.

Figure 2: Modified Model of Entrepreneurial Self-Efficacy in Young People



3. Methodology

3.1. Sample and procedures

The second version of the instrument was administered to 470 students at six secondary schools in London UK aged 14-17. The questionnaire consisted of two parts; the first was the new scale and the second part included a series of questions designed to obtain demographic data on the sample, as well as information about respondents' career aspirations. The attitude scale comprised

of 30 statements (6 for each of the five constructs) and respondents were asked how much they agreed or disagreed with each statement on a 1-7 Likert scale.

The characteristics of these respondents are shown in Table 1. There were 228 females and 242 males. Some of the pupils attended highly selective schools, which use an academic exam to select at entry. There were 164 pupils attending a selective school and 306 pupils who attended a non-selective school.

Table 1: Sample Profile of Study One

Characteristics	Number (%) (N=470)
<i>Gender</i>	
Male	242 51.5%
Female	228 48.5%
<i>Selective school</i>	
Yes	164 34.9%
No	306 65.1%
<i>Age</i>	
14-15	229 48.7%
16-17	241 51.3%
<i>Ethnicity</i>	
Mixed	61 13.0%
Asian	87 18.5%
Black	114 24.3%
White	208 44.3%
<i>Business Owning Parent</i>	
Yes	175 37.2%
no	295 62.8%

As with the first study the modified instrument was subjected to a series of statistical tests to establish whether it was a valid and reliable scale (Hair et al. 1998). Structural validity of new scales can be determined through several methods, which focus on validity both within the factors of the scale (convergent validity), and between measures, or nomological validity (Gerbing and Anderson 1988, Hair et al., 1998). A similar approach was used by Haynie and Shepherd (2009) to test the structural validity of their measure of adaptive cognition (MAC); by McGee et al. (2009) in developing their measure of entrepreneurial self-efficacy for adults; and by Thompson (2009) to develop the Entrepreneurial Intent Metric. Convergent validity shows that given items in a scale measure the same factor and that therefore that factor is unidimensional (Gerbing and Anderson 1988, Hair et al., 1998). This shows that the theoretical assumptions underpinning the factor, that all the statements are interrelated and stem from the same conceptual grouping, are valid (Nunnally and Bernstein, 1994). Discriminant validity between sub-scales is established when sub-scales are shown to be distinct from each other. This is demonstrated by comparing the average variance extracted (AVE) values of each dimension, to the correlations

between the components. An exploratory factor analysis was used to delineate the underlying structure of the scale.

Cronbach's coefficient alpha is generally used to test the reliability of scales (Cronbach 1991, Hair et al. 1998). A summary of over 800 articles of empirical studies using Cronbach alphas found that reported coefficients ranged from 0.6 to 0.99 (Peterson 1994). De Vellis (1991), Nunnally (1978) and Churchill (1997) recommend using a threshold of 0.7 as a minimum acceptable alpha. Haynie and Shepherd (2009) also used 0.7 as a minimum threshold in the development of their measure of adaptive cognition for entrepreneurship. In multi-dimensional scales each sub-scale is a scale in its own right, and should be tested for reliability separately.

Finally, a test of criterion validity was also carried out. Criterion or external validity is achieved when a new measure is capable of distinguishing between a pre-defined group who possess a certain characteristic and, score significantly higher than a control group, who do not have the pre-defined characteristic. In this case running a business was used as the defining characteristic and dependent variable. The sample was divided into two groups; the experimental group who run their own business, and a control group who did not.

4. Empirical Findings

According to Hair et al. (1998), "factor analysis is an interdependence technique in which all variables are simultaneously considered, each related to all the others." Conventional or exploratory factor analysis which allows the researcher to compare the groupings which emerge, with those specified was used in this study. In this study it was anticipated that the factors (representing the dimensions) would be uncorrelated and therefore an orthogonal rotation, the varimax rotation, was selected. For instance, Stormer *et al.* (1999) found that though some of the subscales of the GET test were correlated the subscales were relatively independent of one another to warrant use of a varimax (orthogonal) rotation. In this study a principal component analysis was carried out using a varimax rotation and all 30 items were submitted. Only factors with eigenvalues greater than 1 were extracted, and only statements loading over .50 were used.

The results of the EFA are presented in Table 2. Five components were identified that could be related to the dimensions underlying the sub-scales. These components accounted for 61.3% of the variance, which is reasonable. The key components of a scale in the field of social sciences is expected to account for at least 60 *per cent* of the variance (DeVellis 1991). It can be seen that some of the statements loaded onto more than one factor, however most of the secondary loadings were under the threshold of .5, and where they were over .5 the loading on the primary construct was greater. For instance, the statement "I am worried I will not make a success of my future working life" had a factor

Intuition	I'll keep trying out different solutions to a problem rather than give up.				.537	.867	2.381
	If you don't know all the facts about a problem then there is no way you can find the answer.				.451	.767	
	If I don't know the answer to a problem, then I'll have a guess.			.401		.626	
	Instinct helps me work out solutions to problems.					.489	
	Making mistakes is a good way to learn.					.463	
I trust my own instinct when solving problems.					.459		

A further measure of within structural validity is discriminant validity (Fornell and Larcker, 1981, Haynie and Shepherd, 2009). Discriminant validity between sub-scales is established when sub-scales are shown to be distinct from each other. This is demonstrated by comparing the average variance extracted (AVE) values of each dimension, to the correlations between the components. A correlation matrix was constructed for the five components to determine the discriminant validity of the test (Table 3). In Table 3 the diagonal elements (in bold) show the square root of the AVE, and the remaining cells show the correlations among the dimensions. For discriminant validity to be established a dimension's AVE should be greater than 0.05, and the square root of the AVE higher than the corresponding bivariate correlation. Both of these criteria were met.

Table 3: Correlation matrix showing discriminant validity of sub-scales (N=470)

Sub-scale	Create	Achieve	Personal Control	Lead	Intuition
Perceptions of creativity	0.801				
Achievement orientation in project work	0.538	0.753			
Perceived personal control over career	0.315	0.547	0.776		
Self-perceptions of ability to lead others.	0.406	0.461	0.481	0.831	
Intuition in problem solving	0.458	0.455	0.401	0.346	0.704

Next, a test for nomological validity was carried out, which compares the ATE test with another already established measure; in this case the Protestant Work Ethic scale (PWE) (Warr et al. 1979). This has been shown to have some correlation with locus of control (Bonnett and Furnham 1998), and is theoretically related to some of the dimensions of the ATE test, such as achievement orientation and personal control, but not either intuition or creativity. Table 4 shows that in fact the both the achievement and personal control dimensions were correlated with the PWE scale, indicating that they are measuring somewhat similar attitudes. However the PWE scale was found not to

be correlated with attitudes towards creativity, leadership or intuition, which suggests that these sub-scales are measuring different kinds of attitudes to those associated with the Protestant Work Ethic.

Table 4: Nomological validity of sub-scales using the PWE scale (N=470)

Sub-scale	Protestant Work Ethic Scale Pearson Correlation
Perceptions of creativity	0.041
Achievement orientation in project work	0.385**
Perceived personal control over career	0.443**
Self-perceptions of ability to lead others.	0.112
Intuition in problem solving	0.075

** significant at $p = 0.050$

Testing Reliability

To test the reliability of each sub-scale, Cronbach alphas were calculated for each scale, using all six statements, and Table 5 shows the coefficient alphas, along with the means and standard deviations for each scale. Four of the five subscales were internally reliable with alphas over 0.70, and the leadership scale was over .8. The intuition subscale however achieved an alpha of 0.659. As the intuition scale was very close to the minimum reliability threshold of 0.7 it was decided to retain this sub-scale, for further testing.

Table 5: Cronbach's Alpha Scores for Main Constructs (N=470)

Sub-scale	Number of items	Cronbach coefficient alpha	Means	SD
Self-perceptions of ability to lead others.	6	0.814	28.6	6.2
Perceptions of creativity	6	0.760	23.5	5.5
Perceived personal control over career	6	0.756	25.40	5.3
Achievement orientation in project work	6	0.755	22.94	5.8
Intuition in problem solving	6	0.659	24.30	5.1

Having established that the second version of the ATE test was valid and largely internally reliable, with a caveat about the intuition subscale, the second version of the ATE test was then tested for criterion validity.

Establishing Criterion Validity

Criterion validity is achieved when a measure is capable of distinguishing between a pre-defined group who display a certain characteristic, in this case a propensity to run a business, with a control group, who do not have the pre-defined characteristic. Specifically criterion validity is established when the target group score significantly higher on the measure than the control group.

A second independent sample was used for this test, and the questionnaire was administered on-line to 2,300 students enrolled on entrepreneurship and business courses at Kingston University between 2010 and 2011. A total of 328 useable responses were received representing a response rate of 14.26 *per cent*. The sample consisted of slightly more females (56.7%) than males (43.3%) (Table 6). Just over half the sample was between 22 - 30 years old, and 41.5 *per cent* was under 21 years of age. Slightly more than one third were currently running a business (34.1%), compared to two thirds (65.9%) who said they were not running a business.

To explore differences between the current business owners and the control group an analysis of variance was calculated using average scores achieved on the ATE test for each group. Average scores were calculated by first summing scores of all statements in each sub-scale (leadership, creativity, achievement, personal control, and intuition). A total test score was then calculated by summing sub-scale scores for each respondent to produce an overall measure of entrepreneurial self-efficacy. Given the unequal cell sizes, the homogeneity of the variance of the dependent variable between groups was tested, and found to be acceptable (Levene's test = .2523). Results indicate that there is an overall effect of running a business on ATE test scores ($F=36.953$) (Table 7). The mean ATE test score for the business owners group was significantly greater than the mean score for the control group (176.6 and 154.4 respectively).

Table 6: Profile of Second Sample (N=328)

Characteristics	Number (%)
<i>Gender</i>	
Male	142 43.3
Female	186 56.7
<i>Age</i>	
<21	136 41.5
22-25	86 26.2
26-30	87 26.9
>30	14 4.3
Not answered	5 1.5
<i>Ethnicity</i>	
Mixed	47 14.3
Asian	63 19.2
Black	68 20.7
White	130 39.6
Not answered	20 6.1
<i>Business owner</i>	
Yes	112 34.1
No	216 65.9

Table 7: Analysis of Variance Results for ATE Test Scores (N=328)

Univariate Tests of significance	F	df	Significance	ATE Test scores (max score =210)	
				Business owner	Not Business Owner
Own Business	36.953	1	0.000***	176.6	154.4

*significant at $p = 0.001$

These findings demonstrate that the second version of the instrument is capable of distinguishing between students currently running a business and students not running a business. Therefore this second study has enabled further development of the test and resulted in a more reliable and valid instrument.

What Can The Evaluation Tool be Used For?

Following the development of the scale to measure enterprise potential in young people, the reader may now be wondering – so what? A short experiment will, hopefully, demonstrate the potential usefulness of the tool. The tool can be used to make comparisons with other dependent variables, to provide a more complete picture of young people's attitudes towards their future working life and career aspirations, and to provide more context for evaluations.

For instance, previous studies have identified ethnicity as a possible influence on entrepreneurial behaviour (Walstad and Kourilsky 1998, Botham 2005). Young Black people in the United States showed more desire for self-employment than other ethnic groups (Kourilsky & Walstad 1998), and Black undergraduates have been found to display stronger entrepreneurial traits than White or Asian undergraduates (Louw et al., 2003). It was also found that in London, young people from ethnic minority groups were more likely to be in business for themselves than were White young people (Botham 2005). Using the ATE test, it is possible to measure differences in the enterprise potential (scores on the test) between different ethnic groups. Using the first sample of secondary school students an analysis of variance was carried out to test for any such differences. It must be emphasised that this testing is just an experiment to show the usefulness of the ATE test and not an actual evaluation study. For this a separate independent sample would need to be used with a longitudinal research design, along with objective measures of entrepreneurial behaviour including actual business start-up.

Findings show that there were in fact significant differences between the scores of different ethnic groups. Black pupils were more likely to aspire to future business ownership than other groups however their ATE test scores were the lowest (Table 8). This indicates a potential gap between aspirations and enterprise potential (or potential ability to run an enterprise). Black pupils were also more likely to envisage unemployment in future than any of the other groups. It may be the case that the attraction of running a business for some Black pupils is a reaction to a perceived danger of unemployment, and therefore 'push' factors rather than 'pull' factors may at work (Clark and Drinkwater 2000).

Table 8: Analysis of Variance Results for ATE Test Scores by Ethnicity (N=470)

Univariate Tests of Significance			F	df	Sig
Ethnicity			10.345	2	0.001*
Scores**	Mixed	125.75			
	Asian	135.30			
	Black	117.75			
	White	132.53			

* significant at 0.001 ** Max score = 210.

5. Discussion and Conclusion

Theoretical implications

The model of entrepreneurial self-efficacy in young people presented in this paper offers potential insights into the understanding of enterprise potential in young people. It combines two central theoretical themes in entrepreneurship research: entrepreneurship as an intentional process, and entrepreneurial self-efficacy. The underlying conceptual development has made a theoretical contribution through the evolution of the final conceptual framework as it developed from the original simple model of enterprise potential, with which the research began. By using concepts from entrepreneurial self-efficacy theories, combined with elements of attitude theory, a more sophisticated model of enterprise potential in young people was developed. This model has evolved throughout the course of this research project, from a simple description of five key dimensions associated with entrepreneurship, to a more complex model which demonstrates the causal relationships between positive attitudes and levels of entrepreneurial self-efficacy. The focus on attitudes reflects intentional theories of entrepreneurship (Bird 1988, Katz and Shepherd 2003, Thompson 2009).

In this way enterprise potential was conceptualised as high entrepreneurial self-efficacy, which, in turn, was interpreted and operationalised as positive attitudes towards five dimensions: leadership, achievement, personal control, creativity and intuition. The concept of self-efficacy was important in the redesign of the test in both a theoretical sense, and also methodologically.

Practical implications

This new research instrument can provide a tool for evaluation studies of enterprise programmes, thereby enabling more rigorous research designs using a pre- and post-programme testing, with control groups. Participants and non-participants would complete the test prior to the commencement of an enterprise education programme and following completion. Providing the experimental and control groups were suitably matched, then it would be possible to compare changes in scores and attribute any significant increase in the participant group to

the impact of the programme. It could also enable researchers to take into account other moderating factors, which may influence attitudes towards enterprise. Using analysis of variance tests, or regression, the research instrument can highlight the potential impact of social and human capital factors such as type of school attended, academic achievement, socio-economic status, ethnic background, and parental occupations (including a family background of business ownership).

Future research

The instrument should undergo further reliability and validity testing. Additional studies would enable confirmatory factor analysis using statistical techniques such as structural equation modelling and/or partial least squares. It would also be useful to test the instrument in a variety of different contexts and even countries to explore its suitability as a universal scale. By using the same scale the impact of different enterprise programmes could be compared. Furthermore, it would also be interesting to compare the levels of entrepreneurial self-efficacy in young people in different countries. Such data could be used to make comparisons with findings from, for instance, the Global Entrepreneurship Monitor (GEM) studies.

Limitations of the research

When looking at the links between enterprise potential as measured by the evaluation tool, and other demographic variables such as type of school attended and ethnic background, a number of limitations emerge. The main limitation to this first cross-sectional study is a lack of objective measures of entrepreneurial behaviour over time such as actual business start-up. However, this study was designed to develop the tool rather than as an actual evaluation study of an enterprise programme. The tool is designed to be used to track entrepreneurial attitudes over time in longitudinal studies, and evaluation studies of enterprise education programmes, using pre and post testing.

Another limitation of this research can be found in the short-comings of the second sample used to test for criterion validity. In particular this second sample was rather too homogeneous to provide a thorough test of criterion validity. Many of the students were participating in entrepreneurship courses and so it could be argued that they were predisposed to answer questions in the ATE test more positively. To overcome these limitations the ATE test needs further testing using new and more diverse samples.

Conclusion

The aim of this research was to develop an evaluation tool which has the potential to be used in pre and post testing evaluation studies of enterprise education programmes. Further validity testing of the evaluation tool needs to be carried out to test its efficacy in different educational contexts, across different age groups,

in different countries and even to develop a more parsimonious tool. Future samples should be large and sufficiently diverse to enable a more thorough test of criterion validity. The research offers some theoretical insights into entrepreneurship and young people by providing a new model for understanding entrepreneurial potential. The model combines entrepreneurship as an intentional process, and entrepreneurial self-efficacy. Integrating the concept of self-efficacy into the theoretical framework enabled the development of better definitions of the five constructs, which led to improved statements. This focus on self-efficacy reflects the growing importance of this concept in entrepreneurial research (Krueger and Bazeal 1994, Forbes 2005, Markham et al. 2002, 2005, Hmieleski and Corbett 2007).

The ATE test has the potential to be used in many different settings and enable comparisons both between enterprise education programmes, and young people in different geographical locations; be it locally, regionally, nationally or internationally. The test has been used in South Africa to begin to map entrepreneurial attitudes in pupils (Steenekamp et al. 2011a, Steenekamp et al. 2011b). For policy makers the test can provide evidence of the efficacy of different types of enterprise education programmes for different target groups, thus helping to identify how best to target resources and investment.

Such evidence is of potential value to policy makers and practitioners of enterprise education by identifying gaps in entrepreneurial aspirations and entrepreneurial capability. Addressing such gaps may involve a need for enterprise education, either to increase capability or to enable pupils to make more realistic career plans. A combination of both may be potentially relevant. In a similar way the tool could be used to test for differences between socio-economic groups. For instance, given the relationship between socio-economic background and academic achievement, what might be the relationship between socio-economic group and enterprise potential? These are just some of the questions which future research could address.

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