JOURNAL OF SMALL BUSINESS STRATEGY

THE HUNT FOR THE HEFFALUMP CONTINUES: CAN TRAIT AND COGNITIVE CHARACTERISTICS PREDICT ENTREPRENEURIAL ORIENTATION?

Eva Cools[1] and Herman Van den Broeck,
Vlerick Leuven Gent Management School
and Ghent University, Belgium
Eva.Cools@vlerick.be

ABSTRACT

In this paper, we aimed to get more insight into what typifies Flemish entrepreneurs. Therefore, we compared entrepreneurs with non-entrepreneurs for five characteristics (tolerance for ambiguity, self-efficacy, proactive personality, locus of control, need for achievement) and for cognitive styles. Additionally, we used these trait and cognitive characteristics to predict variances in entrepreneurial orientation (EO). We found that entrepreneurs (n = 177) score significantly higher on all traits than non-entrepreneurs (n = 60). For the cognitive styles (measured with the Cognitive Style Indicator), we found that non-entrepreneurs score higher on the knowing and planning style. No differences were found for the creating style. With regard to the link between the entrepreneur's profile and EO, we found a significant contribution of tolerance for ambiguity and proactive personality to EO.

INTRODUCTION

To answer the question 'who is an entrepreneur?', researchers tried to identify the unique characteristics of entrepreneurs by borrowing concepts from the trait psychology domain (Landström, 1999; Shook, Priem, and McGee, 2003), but these studies did not yield unequivocal findings (Cromie, 2000; Florin, Karri, and Rossiter, 2007). However, as some scholars contend, it remains worthwhile to study the entrepreneurial profile, as there cannot be entrepreneurship without the entrepreneur (Poon, Ainuddin, and Junit, 2006; Steyaert, 2004). Consequently, the aim of this research project is to gather more insight into what typifies Flemish entrepreneurs and what distinguishes them from non-entrepreneurs.

With this study, we continue the hunt for the Heffalump; this is answering the 'who is the entrepreneur' question (Bouckenooghe, Cools, Vanderheyden, and Van den Broeck, 2005). The Heffalump is a character from Winnie the Pooh that has been hunted by many individuals using various ingenious trapping devices, though no one has yet succeeded in capturing it. All who claim to have caught sight of the Heffalump report it to be enormous, but they disagree on its particularities (Steyaert, 2004; Wickham, 2004). Given the criticism on the trait approach, this study differs from previous studies on the entrepreneurial profile in two respects.

To begin, we add a cognitive perspective, in addition to the trait approach, as it provides an alternative lens with which to explore

1Dr. Cools won the "Best paper for a junior researcher" award with an earlier version of this paper at the 20th Research in Entrepreneurship and Small Business (RENT) conference in November 2006.

entrepreneurship-related phenomena. The recent adoption of the cognitive perspective in entrepreneurship research reflects a promising evolution of the ongoing discussion of the 'who is the entrepreneur?' question (Baron, 2004). The cognitive view of entrepreneurship focuses on detecting knowledge structures and mental models that entrepreneurs use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth (Mitchell, Busenitz, Lant, McDougall, Morse, and Smith, 2002). An interesting construct in this context is cognitive styles, defined as the way in which people perceive stimuli and how they use this information for guiding their behavior (Hayes and Allinson, 1998). Cognitive styles influence people's preferences for different types of knowledge gathering, information processing, and decision making, all key actions entrepreneurs are confronted with daily (Leonard, Scholl, and Kowalski, 1999). Although cognitive styles provide an alternative means to conceptualize the characteristics of entrepreneurs, they have not received much attention in entrepreneurship literature to date (Sadler-Smith, 2004).

Second, we use the different trait and cognitive characteristics to examine entrepreneurial orientation (EO). EO has been widely studied to conceptualize the methods, practices, and decision-making styles that business leaders use to act entrepreneurially (Lumpkin and Dess, 1996). The failure to identify a set of dispositional characteristics of entrepreneurs has led some scholars to shift their attention to entrepreneurial behavior, conceptualized as the firm's EO (Krauss, Frese, Friedrich, and Unger, 2005; Poon et al., 2006). Most studies on EO focus on the possible relationship between EO and organizational performance (Wiklund, 1999; Zahra and Covin, 1995). Recently, some scholars have defended the usefulness of studying the link between the entrepreneur's characteristics and EO (Lumpkin and Erdogan, 2004; Poon et al., 2006). Few studies have examined EO as a dependent variable by investigating the link between several trait characteristics and EO. The link between entrepreneurs' cognitive styles and EO has (as far as we know) not been studied yet.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

To introduce the conceptual framework of the study, we will focus on the different concepts that are included in the research design: traits, cognitive styles and entrepreneurial orientation.

The Trait Approach

As stated in the introduction, there is substantial research on those traits that purport to predispose individuals to behave in an entrepreneurial way (Bridge, O'Neill, and Cromie, 2003; Florin, et al., 2007). However, some recent reviews in the entrepreneurship field refer to the inconsistent research results with regard to several of these characteristics. This led to increased criticism on the trait approach, even to the extent that it is questioned whether entrepreneurs do indeed score higher on particular qualities than non-entrepreneurs (Bridge, et al., 2003). Cromie (2000) and Vecchio (2003), for instance, refer to studies that did not find differences between entrepreneurs and non-entrepreneurs for locus of control and need for achievement. Delmar (2000) argues that the inconsistencies in trait research are due to the large number of traits that are linked to entrepreneurship, the different ways in which similar traits are operationalized, and the supposed static nature of entrepreneurial traits in many of these studies. Given the criticism of trait research, several authors suggest that identifying a cluster of traits might be more useful to assessing the entrepreneurial profile than focusing on a single characteristic (Cromie, 2000; Johnson, 1990). Moreover, the attitudinal approach states that an alternative way to describe entrepreneurs is through the use of particular attitudes that might predict entrepreneurial

behavior (such as achievement, proactive behaviour, personal control, self-esteem) rather than focusing only on personality characteristics or demographics of entrepreneurs (Florin, et al., 2007; Robinson, Stimpson, Huefner, and Hunt, 1991; Wyk and Boshoff, 2004). Consequently, we simultaneously included five entrepreneurial characteristics and attitudes in our research, hereby focusing on a mixture of extensively studied concepts (e.g., locus of control, need for achievement) and newer perspectives (e.g., proactive personality) (Hansemark, 2003; Shane, Locke, and Collins, 2003).

Tolerance for Ambiguity

When there is insufficient information to structure a situation, an ambiguous situation is said to exist. The way in which people deal with this ambiguous situation reflects their tolerance for ambiguity (Furnham and Ribchester, 1995). People with a high tolerance for ambiguity find ambiguous situations challenging and strive to overcome unstable and unpredictable situations to perform well. Dealing with uncertainty, risks, and continuous changes are part of the entrepreneurial job (Markman and Baron, 2003). Whetten, Cameron, and Woods (2000) found that managers with high tolerance for ambiguity were more entrepreneurial in their actions. Entrepreneurs with higher tolerance for ambiguity were found to own the most innovative and entrepreneurial firms (Entrialgo, Fernández, and Vázquez, 2000; Rigotti, Ryan, and Vaithianathan, 2003).

Self-efficacy

Self-efficacy is a person's belief about his or her chances of successfully accomplishing a specific task (Bandura, 1997). Self-efficacy is a motivational construct that influences people's choices of activities, goal levels, persistence, and performance in a variety of contexts (Zhao, Seibert, and Hills, 2005). There is increased attention for the role of self-efficacy in the study of entrepreneurship, implying research on entrepreneurial career preferences, intentionality, new venture formation, and performance (Chen, Greene, and Crick, 1998; Markman, Balkin, and Baron, 2002). Research on self-efficacy concludes that it is an important factor to clarify entrepreneurial intentions and behavior (Boyd and Vozikis, 1994; Neck, Neck, Manz, and Godwin, 1999). People must believe in their capacity to succeed in starting and running a new business before they will do so.

Proactive Personality

Bateman and Crant (1993) define a proactive personality as a dispositional construct that refers to individual differences in the extent to which people take action to influence and change their environment. Research on the entrepreneurial profile concluded that proactive behavior is a characteristic of entrepreneurs (Becherer and Maurer, 1999; Kickul and Gundry, 2002). According to Drucker (1985), entrepreneurs see change as the norm. They always search for change, respond to it, and exploit it as an opportunity. Crant (1996) found that, to a large extent, having a proactive personality clarified the entrepreneurial intentions of MBA students.

Locus of Control

Locus of control refers to the extent to which people attribute the source of control over events to themselves (internal locus of control) or to external circumstances (external locus of control) (Rotter, 1966). Boone, De Brabander, and Van Witteloostuijn (1996) conclude that many entrepreneurs eventually succeed due to an internal locus of control, as this helps them to overcome setbacks and disappointments, leading to higher firm performance. Blau (1993) found that an internal locus of control was positively related to the initiative dimension of performance, implying that people with an internal locus of control engaged more frequently in innovative and spontaneous performance that goes beyond basic job requirements. However, some studies failed to distinguish entrepreneurs and non-entrepreneurs concerning their locus

of control (Chen, et.al., 1998; Cromie, 2000).

Need for Achievement

Need for achievement refers to a desire to accomplish something difficult, excel, and do better than others in order to achieve a sense of personal accomplishment (McClelland, 1961). Several studies found a positive effect of high need for achievement on entrepreneurial behavior and on firm performance (Collins, Hanges, and Locke, 2004; Johnson, 1990). Entrepreneurs need to continuously enhance their performance and have to cope with challenging tasks (Utsch and Rauch, 2000), which are characteristic of high achievers. However, Cromie (2000) refers to different studies that could not identify differences in need for achievement of entrepreneurs and other groups, such as managers or university professors. On the basis of previous research with these different traits and attitudes and following the majority of studies that found a higher score for these characteristics for entrepreneurs than for non-entrepreneurs, we propose:

> **Hypothesis 1**: Entrepreneurs will score higher on each of these traits than non-entrepreneurs.

The Cognitive Approach

Recently, a more cognitive oriented approach has been introduced in the entrepreneurship domain (Baron, 2004; Mitchell Busenitz, Lant, McDougall, Morse, and Smith, 2004). Rather than looking at dispositional traits, the cognitive perspective focuses on aspects of entrepreneurial cognition that are relevant in the entrepreneurial process. It tries to answer the question why some people are and others are not able to discover and exploit particular entrepreneurial opportunities. In line with this cognitive approach, we examine entrepreneurs' cognitive styles. A cognitive style is a fairly stable characteristic of people that is related to their habitual way of information processing (Hayes and Allinson, 1998; Sadler-Smith and Badger, 1998). It influences how people look at their environment for information, how they organize and interpret this information, and how they use these interpretations for guiding their actions (Hayes and Allinson, 1998).

A large variety of cognitive style dimensions have been identified by researchers over the years (Hodgkinson and Sadler-Smith, 2003; Kozhevnikov, 2007). Recently, Cools and Van den Broeck (2007) reported on the development of a reliable, valid, and convenient cognitive style instrument–the Cognitive Style Indicator (CoSI)–for use with managerial and professional groups. They found substantial support this instrument's construct validity in three diverse samples (N = 5,924; N = 1,580; and N = 635). Reliability, item, and factor analyses confirmed the internal consistency and homogeneity of three cognitive styles: a knowing, planning, and creating style (see Table 1). People with a knowing style search for facts and data. They want to know exactly the way things are and like to search for rational solutions. People with a planning style are characterized by a need for structure. Planners prefer a well-structured work environment and attach importance to preparation and planning to reach their objectives. People with a creating style like experimentation and out-of-the-box thinking. They like uncertainty and freedom. As previous research with this cognitive style model has already demonstrated its value to distinguish entrepreneurs from non-entrepreneurs (Bouckenooghe et al., 2005), we use this model in our research project.

Kickul and Krueger (2004) concluded from their study with entrepreneurs that cognitive styles play an important role in entrepreneurial thinking. Cognitive styles are considered to be fundamental determinants of individual and organizational behavior that manifest themselves in individual workplace actions and in organizational systems, processes, and routines (Brigham, DeCastro, and Shepherd, 2007; Sadler-Smith

Table 1 - Description of the three-dimension cognitive style model

Knowing style	Planning style	Creating style
Facts	Sequential	Possibilities
Details	Structured	Ideas
Logical	Conventional	Impulsive
Reflective	Conformity	Flexible
Objective	Planned	Open-ended
Impersonal	Organized	Novelty
Rational	Systematic	Subjective
Precision	Routine	Inventive

Note: Based on Table 1 in Cools and Van den Broeck (2007).

and Badger, 1998). Allinson, Chell, and Hayes (2000) proposed that cognitive styles are an alternative way of differentiating entrepreneurs from non-entrepreneurs. Buttner and Gryskiewicz (1993), for instance, found a more innovative cognitive style for entrepreneurs than for managers in large established organizations. Stewart, Watson, Carland, and Carland (1998) concluded from their research that entrepreneurs had a more innovative cognitive style than managers of large organizations, who tended to prefer a more adaptive, analytical cognitive style. Florin, et al. (2007) reported that individuals with a high entrepreneurial drive had a preference for innovative solutions, questioned the status quo, and were characterized by a nonconformist attitude. Allinson, et al. (2000) found that entrepreneurs were more intuitive in their cognitive style than the general population of managers. However, no style differences were found between the entrepreneurs and the senior managers and executives in their samples. Based on the few previous cognitive style studies with entrepreneurs and using the terminology of the CoSI model, we propose that:

Hypothesis 2: Entrepreneurs will score higher on the creating style than the non-entrepreneurs.

Hypothesis 3: Entrepreneurs will score lower on the knowing and the planning style than the non-entrepreneurs.

Entrepreneurial Orientation

Entrepreneurial orientation (EO) refers to the top management's strategy in relation to innovativeness, proactiveness, and risk taking (Kreiser, Marino, and Weaver, 2002; Poon et al., 2006). *Innovativeness* refers to a firm's willingness to engage in and support new ideas, novelty, creative processes and experimentation that may result in new products, services, or technological processes. *Proactiveness* refers to the propensity of a firm to take an opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and by acting in anticipation of future demand. *Risk taking* refers to the extent a firm is willing to make large and risky resource commitments, and to make decisions and take action without certain knowledge of probable outcomes. Although EO has been conceptualized as a firm-level behavioral process of entrepreneurship, the behavior of the firm and that of the entrepreneur are likely to be the same in entrepreneur-led firms (Poon et al., 2006).

Many scholars have examined the relationship between the degree of entrepreneurial orientation and firm performance. These studies yielded ambiguous results, with some scholars reporting a positive relationship between EO and firm performance (Wiklund, 1999; Zahra and Covin, 1995) and others finding no significant relationship between them (Auger, Barnir, and Gallaugher, 2003).

Although different scholars emphasized that the founders and executives of organizations can exert important influences on the firm's actions, only a few studies investigated EO as a dependent variable (Lumpkin and Erdogan, 2004; Poon et al., 2006).

Traits as Antecedents of EO

A review of entrepreneurship literature revealed some theoretical models (Aloulou and Fayolle, 2005; Lumpkin and Dess, 1996) and empirical works (Krauss et al., 2005; Lumpkin and Erdogan, 2004; Poon et al., 2006) suggest that traits might influence entrepreneurial orientation. However, there is little evidence for and consensus about selecting certain traits (and not others) as antecedents of EO. Therefore, we used the whole cluster of traits that were introduced earlier as antecedents of EO in our model. Previous research found that being innovative, risk taking, and proactive requires a certain level of tolerance for ambiguity (Entrialgo et al., 2000; Lumpkin and Erdogan, 2004). Self-efficacy is assumed to influence people's willingness to introduce new products, to be proactive towards the environment, and to take risks (Poon et al., 2006). Having a proactive personality is found to result in proactive behavior, meaning a willingness to change the status quo and a tendency to identify opportunities and improve things (Crant, 2000). With regard to locus of control, more internally oriented entrepreneurs were found to pursue more product-market innovation, undertake greater risks, and lead rather than follow competitors (Entrialgo et al., 2000; Miller, Kets De Vries, and Toulouse, 1982). Previous studies found that achievement motivation was positively correlated with a preoccupation with future goals (proactiveness) and with personal innovativeness (Entrialgo et al., 2000; Lumpkin and Erdogan, 2004).

Cognitive Style Differences as Antecedents of EO

Researchers used cognitive styles as a basis for studying decision-making behavior, conflict handling, strategy development, and group processes (Leonard, et al., 1999). As cognitive styles are individual preferences with regard to information processing, it can be assumed that these differences lead to variation in the way entrepreneurs see strategy (Hough and Ogilvie, 2005; Sadler-Smith, 2004). Research on managerial characteristics and strategy suggested that creative managers can be found in innovative firms, while more bureaucratically oriented managers can be found in stable firms (Gallén, 1997). Gallén (2006) concluded from her research that analytical types more often described the defender strategy as the most viable option (i.e., offering a stable set of products and competing mainly on price, quality, service, and delivery), while more intuitive types preferred a prospector firm strategy (i.e., having a broad product definition, striving to be first in the market, and focusing on change and innovation). We do not know of prior studies that linked cognitive styles to EO. Given the limited prior research on the antecedents of EO, we formulate a rather general hypothesis:

> **Hypothesis 4**: Both trait variables and cognitive styles will explain a significant amount of variance in entrepreneurial orientation after controlling for the effects of age, firm size, and firm age.

METHOD

Samples and Procedure

We collected the data in March 2006 with a survey instrument sent out through email to 1,797 Flemish entrepreneurs and 422 Flemish healthcare managers. The samples were drawn from a database maintained by a leading Western European business school. There is little consensus among scholars regarding the definition of entrepreneurship(Curran and Blackburn, 2001). For the sample of entrepreneurs, we selected people who indicated in the function categories that they were owner or general manager of the firm from the database. We

Table 2 – Sample Description

	Entrepreneurs ***(n = 177)***	***Healthcare managers*** ***(n = 60)***
Mean age	*47.46 (SD = 9.19)*	*45.82 (SD = 7.84)*
Men	*88 %*	*71 %*
Women	*12 %*	*29 %*
Sector	*Industry and production (30 %)* *Services (36 %)* *Distribution and trade (11 %)* *ICT and new technology (14 %)* *Other (9 %)*	*Hospitals (37 %)* *Nursing homes (63 %)*
Mean firm age	*37.49 years (SD = 39.01)*	
Department		*General management (68 %)* *Nursing and care (22 %)* *Finance and administration (10 %)*

used two additional sampling criteria: a firm size limit of 500 employees and the exclusion of schools (or institutes) and firms within social profit. The maximum limit of 500 employees is consistent with the definition of 'small business' according to the U.S. Small Business Administration. We used the exclusion of schools and social profit firms to avoid having public sector organizations in this sample. We selected the sample of healthcare managers (from hospitals as well as nursing homes) from the same database. We used a relatively broad approach and include managers of all ranks and departments.

In total, 177 entrepreneurs (10% response rate) and 60 healthcare managers (14% response rate) participated in our research. Using the Internet or e-mail is a new and promising data collection tool because it is cheap and efficient. However, past experiences have shown that the response rates are quite low compared to alternatives because people easily ignore requests for cooperation in such research studies (Spector, 2001). Table 2 shows an overview of the characteristics of the samples. Both samples are comparable in terms of age, with a mean age of 47 years for the entrepreneurs and 46 years for the healthcare managers. Both samples consist of a majority of men. Whereas the healthcare managers work in hospitals and nursing homes, the entrepreneurs operate in a variety of sectors (i.e., industry and production, services, distribution and trade, ICT and new technology, other).

Measures

To select the measures, we considered the relevance of the instruments for entrepreneurs as well as non-entrepreneurs. For instance, we found a general locus of control scale and a general self-efficacy scale most appropriate for our research design rather than a firm-level scale or one focused on specific entrepreneurial activities. To limit the length of the survey, we searched for short scales, such as the five-item Need for Achievement scale of Steers and Braunstein (1976). If a short measure was not available, we selected a number of items from a larger scale, choosing those items that displayed the highest factor loadings as indicated in the original scale development and validation articles. All scales in the survey (unless otherwise indicated) used a five-point Likert scale format from 1 (*typifies me not at all*) to 5 (*typifies me completely*). We created a composite score for each scale by averaging the responses across the items used for the measure. Higher scores on a measure reflect higher levels of the construct.

Tolerance for Ambiguity

We assessed tolerance for ambiguity using ten items, taken from the willingness-to-change subscale of the Innovativeness scale (Hurt, Joseph, and Cook, 1977) and the Need for Cognitive Closure scale (Webster and Kruglanski, 1994). Given the criticism on several existing and widely used Tolerance for Ambiguity scales (Furnham and Ribchester, 1995; Grenier, Barrette, and Ladouceur, 2005), we chose to measure the construct with these subscales. A sample item is 'I don't like situations that are uncertain' (reverse coded; $\alpha = .73$).

Self-efficacy

We measured self-efficacy with six items from the 17-item General Self-Efficacy Scale (GSE) developed by Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, and Rogers (1982). This scale has been the most widely used instrument to measure general self-efficacy (Chen, Gully, and Eden, 2001). A sample item is 'Failure just makes me try harder' ($\alpha = .61$).

Proactive Personality

We assessed proactive personality with six items from Bateman and Crant's (1993) 17-item Proactive Personality scale, such as 'If I see something I don't like, I fix it.' The alpha reliability of this scale was .73.

Locus of Control

We excerpted a seven-item scale from Rotter's (1966) Internal-External (I-E) scale to measure locus of control (Kreitner, Kinicki, and Buelens, 2002). We used a Likert scale version of this measure (Poon et al., 2006), with higher scores reflecting higher internality (e.g., 'There really is no such thing as luck'). The alpha reliability of this scale is 0.72.

Need for Achievement

We assessed achievement motivation with the achievement need subscale of the Manifest Needs Questionnaire (Steers and Braunstein, 1976). A sample item is 'I do my best work when my job assignments are fairly difficult.' The scale consists of five items, with an alpha reliability in our sample of .56.

Cognitive Styles

Cognitive styles were measured with the Cognitive Style Indicator (CoSI) (Cools and Van den Broeck, 2007). CoSI is an 18-item questionnaire, which distinguishes a knowing style (four items, $\alpha = .76$, e.g., 'I like to analyze problems'), a planning style (seven items, $\alpha = .82$, e.g., 'I prefer clear structures to do my job'), and a creating style (seven items, $\alpha = .78$, *e.g.*, 'I like to extend the boundaries').

Entrepreneurial Orientation

We use the scales of Covin and Slevin (1989) and Miller and Toulouse (1986) to measure the EO of a firm. Only the entrepreneurs completed this measure. The response format of this ten-item questionnaire uses a five-point Likert scale on which the entrepreneurs have to indicate the extent to which the items represent their firm's strategy. The EO questionnaire distinguishes three subdimensions: innovativeness (3 items, $\alpha = .78$, e.g., 'Changes in product or service lines have been mostly of a minor nature' versus '...have usually been quite dramatic'), proactiveness (4 items, $\alpha = .88$, e.g., 'In dealing with its competitors, my firm typically responds to actions which competitors initiate' versus '...typically initiates actions which competitors then respond to'), and risk-taking (3 items, $\alpha = .77$, e.g., 'In general, the top managers of my firm have a strong proclivity for low risk pro-jects (with normal and certain rates of return'versus '...a strong proclivity for high risk projects (with chances of high returns')). The overall reliability of the questionnaire is .90.

Analyses

To compare entrepreneurs and non-entrepreneurs on the different cognitive and traits characteristics (Hypotheses 1, 2, and 3), we performed independent sample *t* tests, comparing the means of the two groups for each of the variables.

We used hierarchical regression to analyze the extent to which we can use the trait and cognitive variables in our study to predict entrepreneurial orientation (Hypothesis 4), entering the variables in three steps. Model 1 contained only the control variables: age, firm size, and firm age[2\]. Model 2 consisted of the control variables and the trait characteristics. Model 3 in its turn added the cognitive styles to the previous model.

RESULTS

Descriptive Statistics

We summarized the correlations of the variables in Table 3, together with the corresponding means, standard deviations, and alpha reliabilities. All trait variables (except locus of control) were significantly correlated among one another. This is consistent with previous research with these characteristics (Judge, Thoresen, Pucik, and Welbourne, 1999; Poon et al., 2006). Looking at the correlations among the cognitive styles, we found a strong positive correlation between the knowing and planning style ($r = .58$, $p < .001$). However, item and factor analyses justify the distinction between the two styles.

Looking further at the correlations in Table 3, it is remarkable that the creating style shows a strong correlation with different trait variables and with entrepreneurial orientation ($r = .39$, $p < .001$). Previous research on cognitive styles found that people with an intuitive cognitive style prefer to leave options open, can tolerate ambiguity, like to restructure situations, have a proactive personality, and are self-confident (Kickul and Krueger, 2004; Kirton, 1994; Myers, McCaulley, Quenk, and Hammer, 2003). Furthermore, we found a significant negative correlation between the planning style and tolerance for ambiguity ($r = -.30$, $p < .001$). Finally, looking at entrepreneurial orientation, the highly significant correlation of EO with tolerance for ambiguity is notable ($r = .47$, $p < .001$). We also found a significant correlation between EO and need for achievement ($r = .37$, $p < .001$) and EO and proactive personality ($r = .35$, $p < .001$).

Comparing Entrepreneurs and Non-Entrepreneurs

Table 4 represents the results of the comparison between the entrepreneurs and non-entrepreneurs on the different trait and cognitive characteristics. As can be seen in Table 4, the entrepreneurs score higher on all characteristics than the non-entrepreneurs. Hence, Hypothesis 1 was confirmed. When comparing the entrepreneurs and non-entrepreneurs on their cognitive styles, we see that Hypothesis 3 was confirmed, but Hypothesis 2 was not. Comparison of the cognitive style profiles of the two samples in our study revealed that healthcare managers score significantly higher on the knowing and the planning style than entrepreneurs.

Interestingly, when comparing healthcare managers with entrepreneurs from the service sector ($n = 64$), all differences between

2\We selected these three control variables on the basis of previous studies within the entrepreneurship field. Firstly, the age of the entrepreneur, used here as a proxy for amount of working experience, might be an important variable in the context of firm's strategic orientations (Hisrich, 1990; Markman and Baron, 2003). Second, our sample of entrepreneurs represent a wide variance in terms of firm age, ranging from firms younger than 5 years and ones older than 100 years (M = 37.49 years; SD = 39.01). Different scholars refer to the influence of company age or organizational life cycle stage on the extent to which a firm is entrepreneurial versus more institutionalized respectively (Begley, 1995; Dodge and Robbins, 1992). Finally, researchers suggest that there is a relationship between firm size and innovation, although previous studies did not come to an unambiguous interpretation of the size-innovation relationship (Chen and Hambrick, 1995; Damanpour, 1992).

Table 3 - Descriptive statistics, scale reliabilities, and correlations of study variables

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Knowing style	(.76)								
2. Planning style	.58***	(.82)							
3. Creating style	.19**	.05	(.78)						
4. Tolerance for ambiguity	–.08	–.30***	.58***	(.73)					
5. Self-efficacy	.28***	.15*	.36***	.38***	(.61)				
6. Proactive personality	.22**	.05	.53***	.50***	.61***	(.73)			
7. Locus of control	.17*	.14*	.17*	.07	.27***	.38***	(.72)		
8. Need for achievement	.27***	.11	.50***	.53***	.57***	.62***	.32***	(.56)	
9. Entrepreneurial orientation†	–.06	–.12	.39***	.47***	.18*	.35***	.01	.37***	(.90)
Mean	3.69	3.70	4.02	3.29	3.70	3.71	3.18	4.10	3.44
Standard deviation	.65	.60	.50	.51	.63	.52	.58	.50	.74

Notes. Alpha reliabilities are shown in parentheses on the diagonal; †This measure was only completed by the entrepreneurs; *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4 - Comparison of entrepreneurs ($n = 177$) and non-entrepreneurs ($n = 60$)

	Entrepreneurs		**Managers**		**Comparison**	
Variable	*M*	*SD*	*M*	*SD*	*t*	*df*
Traits						
Tolerance for ambiguity	3.34	.51	3.16	.50	2.39*	(227)
Self-efficacy	3.79	.61	3.42	.61	3.99***	(229)
Proactive personality	3.80	.51	3.44	.47	4.79***	(228)
Locus of control	3.27	.53	2.95	.65	3.79***	(228)
Need for achievement	4.18	.45	3.87	.57	3.76***	(227)
Cognitive styles						
Knowing style	3.64	.66	3.86	.60	–2.21*	(232)
Planning style	3.64	.58	3.86	.63	–2.48*	(231)
Creating style	4.05	.49	3.94	.51	1.52	(233)

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

the two samples remained significant, except for the knowing style ($t(121) = -1.69$, $p = .09$) and tolerance for ambiguity ($t(120) = 1.72$, $p = .09$). These additional analyses suggest that the findings in Table 4 are probably more due to being an entrepreneur or not than to the sector of employment. In contrary to other studies (Begley, 1995), additional analyses within the sample of entrepreneurs revealed that no significant differences can be found for any of the traits when looking at a number of demographics (such as age, gender, education level, tenure, sector, firm size, firm age).

Trait and Cognitive Variables as Predictors of Entrepreneurial Orientation

To study the effect of the cognitive and trait variables on entrepreneurial orientation, we performed hierarchical regression analysis (see Table 5).

Exploration of Table 5 reveals that Model 2 (control and trait variables) was a better predictor of EO than Model 1 (control variables) ($\Delta R^2 = .27$; $F(5,140) = 10.57$, $p < .001$). Model 3 (adding cognitive styles), in its turn, was a better predictor than the

default zero model (R^2 = .29; $F(11,137)$ = 5.09, p < .001), but it was no significant

Table 5 – Hierarchical Regression Analysis of Trait and Cognitive Characteristics of Entrepreneurial Organization

	Model 1		Model 2		Model 3	
Variables	β	*t*	β	*t*	β	*t*
Constant		10.23***		.63		.54
Age	.04	.50	.08	.998	.07	.91
Firm size	.02	.20	–.05	–.60	–.06	–.78
Firm age	–.09	–1.04	.01	.06	.002	.03
Tolerance for ambiguity			.33	3.72***	.31	2.68**
Self-efficacy			–.19	–1.96†	–.18	–1.73†
Proactive personality			.22	2.16*	.22	2.09*
Locus of control			–.09	–1.20	–.09	–1.17
Need for achievement			.20	1.96†	.21	1.95†
Knowing style					–.12	–1.34
Planning style					.07	.70
Creating style					.03	.31
Summary statistics						
R^2		.01		.28***		.29***
ΔR^2				.27***		.01

Note. †p < .10, *p < .05, **p < .01, ***p < .001.

improvement compared to Model 2 (ΔR^2 = .01; $F(3,137)$ = .65, p = .58). These findings suggest that Model 2 is the best fitting model. Consequently, Hypothesis 4 was only partly confirmed. Two of the traits are found to be significant contributors of entrepreneurial orientation. Specifically, people with higher tolerance for ambiguity showed higher entrepreneurial orientation (β = .33, p < .001), as well as more proactive people (β = .22, p < .05). Need for achievement showed a positive relationship with EO, but only at the p < .10 level of significance (β = .20, p = .052). Although previous research identified self-efficacy as an important antecedent of EO (Poon et al., 2006), we found a negative relationship with EO, although it was only significant at the p < .10 level of significance (β = –.19, p = .052). Contrary to expectations, locus of control did not contribute significantly to EO (β = –.09, p = .23).

DISCUSSION AND CONCLUSION

The aim of our study was to contribute to further insights about who the entrepreneur is. Two aspects gave our research a unique character in comparison to other studies on the entrepreneurial profile. Firstly, we integrated the trait and the cognitive approach. Studying a cluster of characteristics and attitudes rather than one single trait is suggested to be a useful approach to assess people's entrepreneurial drive (Cromie, 2000; Florin, et al., 2007). Given the promise of the recent cognitive perspective within entrepreneurship research (Baron, 2004), several authors recognized the relevance of studying cognitive style differences of entrepreneurs (Allinson, et al. 2000; Brigham, et al., 2004). Moreover, we compared entrepreneurs and non-entrepreneurs on these traits and cognitive styles, which contributed to further clarification of differences between entrepreneurs and non-entrepreneurs. Second, we used these individual characteristics and cognitive styles as antecedents to clarify entrepreneurial orientation. Most studies on EO look at the link to organizational performance. Research on EO as a dependent

variable is currently scarce (Lumpkin and Erdogan, 2004; Poon et al., 2006).

Discussion of Findings

Our findings demonstrated that Flemish entrepreneurs score higher on tolerance for ambiguity, self-efficacy, proactive personality, an internal locus of control, and need for achievement than the non-entrepreneurs in the study. These results are consistent with previous trait studies that found that entrepreneurs had a higher tolerance for ambiguity than non-entrepreneurs (Koh, 1996), higher levels of self-efficacy (Chen et al., 1998), a more proactive personality (Becherer and Maurer, 1999), an internal locus of control (Vecchio, 2003), and a stronger need for achievement (Collins et al., 2004). These findings suggest that entrepreneurs are currently better equipped to deal with the numerous uncertainties and changes that characterize the current work surroundings than healthcare managers. Fortunately, many of these traits and attitudes can be learned and developed, implying that effective training programs can play an important role to strengthen people's profile.

With regard to cognitive style differences, we found a higher score for the knowing and the planning style for non-entrepreneurs than for entrepreneurs. This indicates a larger focus on rationality and procedures from managers of the healthcare sector than from entrepreneurs. We found no differences for the creating style. Although previous research found a higher score on an innovative cognitive style for entrepreneurs than for non-entrepreneurs (Buttner and Grysliewicz, 1993; Stewart, et al., 1998) this was not confirmed in our study. However, this finding is consistent with previous research of Allinson, et al. (2000). They found no differences for an intuitive cognitive style between entrepreneurs and senior managers. Managers on higher levels, like entrepreneurs, also face uncertainty, time pressure, ambiguity, and incomplete information, needing an intuitive problem solving approach (Sadler-Smith, 2004). These findings suggest that it is not necessarily a creating style that typifies entrepreneurs. In contrary, it seems that higher levels of knowing and planning styles hamper an entrepreneurial attitude. The knowing style is characterized by a focus on facts and figures, a high level of rationality, and avoidance of risks. The planning style is characterized by an urge for control, a focus on structures, procedures and planning, and a need for certainty. These characteristics might implicate that people with these styles see more risk in entrepreneurship and experience higher levels of uncertainty.

With regard to the link between the entrepreneur's profile and EO, we found a significant contribution of tolerance for ambiguity and proactive personality to EO. Previous research identified tolerance for ambiguity as one of the most important variables in explaining managerial coping with organizational change (Judge et al., 1999). Similarly, proactive behavior is considered to be an important variable in the context of organizational success (Crant, 2000). According to Kickul and Gundry (2002), entrepreneurs with a proactive personality choose a strategic orientation for their firms that will permit flexibility and change in response to surrounding business conditions. In contrary to other studies, we found no significant contribution of need for achievement and locus of control to EO and a negative contribution of self-efficacy (Entrialgo et al., 2000; Poon et al., 2006). However, the findings with regard to need for achievement and self-efficacy should be treated with caution, given the low internal consistencies observed for the scales in our research (Cronbach alpha < .70).

Research Limitations

Some limitations of this study should be taken into account for further research. First, we cannot absolutely assure that the samples are representative of their populations. This coverage problem is inherent to online

surveying. A replication of this study with another sample of Flemish entrepreneurs might strengthen our findings. Additionally, it is necessary to continue and cross-validate this study with data from multiple sources. We used self-reporting questionnaires, using a single data source, which implies that respondents can unduly influence the result. Certainly with regard to the measurement of entrepreneurial orientation, it might be useful to include responses from more than one data source in further research. According to Curran and Blackburn (2001), a high proportion of small firms have two or more owner-managers, partners or directors, which suggests that it might be better to aggregate responses of several entrepreneurs from one company to measure EO. The existence of entrepreneurial teams might for instance clarify why we did not find a contribution of entrepreneur's cognitive styles to EO.

Furthermore, due to availability and access problems, we only compared entrepreneurs and healthcare managers. To examine the consistency of our findings, further research should also look at the comparison between other types of managers for two major reasons. *(1)* As trait studies within entrepreneurship did not succeed in identifying those factors that are unique to entrepreneurs, a major criticism on studies that compare entrepreneurs with non-entrepreneurs is that these traits are common to successful people, including managers (Boyd and Vozikis, 1994). Our study could not fully address this criticism as we only included healthcare managers. However, we could make a distinction between entrepreneurs and non-entrepreneurs with regard to the level to which they show particular traits. *(2)* Although previous studies on entrepreneurs' cognitive styles did not find differences between entrepreneurs and senior managers in their samples with regard to the intuitive cognitive style (Allinson, et al., 2000), they did find differences for lower-level managers. Due to the sample size of the non-entrepreneurs in our study and the limited number of lower-level managers within this sample (n = 10), we could not examine this further.

As there is little prior research on EO as a dependent variable, there was not much theoretical and empirical basis to identify relevant models for hierarchical regression analyses. Further research is needed to stimulate our understanding of variances in entrepreneurial orientation. In this regard, it is also important to carefully select the right measures to assess the variables, as the low internal consistencies of the self-efficacy and need for achievement scales in our study imply that our results should be treated with caution. As we selected items from larger scales for several trait concepts and also applied these scales in different settings from those for which they were originally developed, questions about their validity can be raised (Begley, 1995).

Finally, it can be of interest to take a longitudinal perspective rather than a cross-sectional one, linking trait variables to entrepreneurial intentions, and later on to entrepreneurial orientation to learn more about the entrepreneurial profile. For instance, locus of control and self-efficacy are considered to be learned characteristics that can change over time (Hansemark, 2003). A longitudinal study, in which dependent and independent variables are kept apart, can contribute to further examination of the predictive power of various traits. Moreover, comparing potential entrepreneurs with actual entrepreneurs and various types of corporate managers, preferably in a longitudinal setting, can stimulate the advancement of the knowledge regarding what distinguishes entrepreneurs from other types of managers.

Practical Implications

Our findings are useful in the light of the coaching and training of entrepreneurs and managers as they contribute to the existing knowledge about what characterizes different types of business leaders. Starting a new business is a complex and expensive endeavor, which currently still has a low

success rate. Many new firms fail in the short term. Identifying and investing in the right individual characteristics might lead to an increased success rate. By identifying the factors (i.e., trait and cognitive characteristics) that are associated with an entrepreneurial attitude, programs can be designed (by governments or other institutions) to develop and enhance these characteristics. In this respect, this research project shows that entrepreneurship and management education may not only focus on technical and managerial skills. It is equally, or even more important, to focus attention on fostering an entrepreneurial drive in business education; this means stimulating particular attitudes and intentions (such as self-efficacy, need for achievement, proactive personality) and teaching people how to deal with their individual profile. (Florin, et al., 2007; Peterman and Kennedy, 2003; Souitaris, Zerbinati, and Al-Laham, 2007). Neck et al. (1999), for instance, made some useful suggestions for a model of 'Thought Self-Leadership' to stimulate people's self-efficacy. These authors distinguish between opportunity thinking (i.e., a pattern of thoughts that focuses on opportunities, worthwhile challenges, and constructive ways of dealing with challenging situations) and obstacle thinking (i.e., a pattern of thoughts that focuses on negative aspects, such as reasons to give up or retreat from the problem). In terms of success, whether you are an obstacle thinker or an opportunity thinker makes a substantial difference. Through the effective application of the right mental strategies (e.g., self-talk, mental imagery), it is possible to stimulate people's self-efficacy and consequently, their resulting chance of success.

With this research project, we hope to stimulate entrepreneurs and healthcare managers to gain more insight into their own profile. Because the business environment in which many entrepreneurs and managers operate is increasingly complex, unpredictable, and unstable, the information-processing demands that are placed on these business leaders are enormous. In this respect, understanding the way in which they process and organize information is highly relevant (Sadler-Smith, 2004). Importantly, no style is inherently better than another. Sadler-Smith and Badger (1998) emphasized the importance of style versatility (i.e., having a mixture of cognitive style profiles) at the organizational level for effective innovation. Individuals with a more intuitive cognitive style are expected to be more effective in the initiation phase of the innovation process (i.e., the stage in which new ideas are generated), whereas individuals with a more analytical profile may be better in the implementation phase (i.e., the stage in which ideas are put in practice). Consequently, effectively managing individual cognitive styles and strategies to facilitate versatility is an important issue for organizations to stimulate organizational learning and innovation (Leonard and Straus, 1997; Sadler-Smith and Badger, 1998).

Conclusion

This research project fits well within the call of Landström (1999) to integrate a variety of perspectives into one study in order to further advance research on entrepreneurship. On the one hand, we have explored a cluster of characteristics and the cognitive style profiles of entrepreneurs, along with the comparison with non-entrepreneurs; on the other hand, we have also studied the link with entrepreneurial orientation. Between the two, we are convinced that we contributed to the advancement of entrepreneurship research.

To further stimulate research on the proclivity to entrepreneurship, the field of entrepreneurship research can benefit from a novel approach. Building further on the work of Ländstrom (1999), it can be an interesting endeavor in future research to integrate a variety of research methods in one study to advance entrepreneurship research. Taking into account the limitations of this research project, we are convinced that multi-source, multi-method, and longitudinal studies on the entrepreneurial profile will contribute to

the advancement of the entrepreneurship field.

REFERENCES

Allinson, C.W., Chell, E., & Hayes, J. (2000). Intuition and Entrepreneurial Behaviour. *European Journal of Work and Organizational Psychology,* 9(1): 31–43.

Aloulou, W., & Fayolle, A. (2005). A Conceptual Approach of Entrepreneurial Orientation within Small Business Context. *Journal of Enterprising Culture,* 13(1): 21–45.

Auger, P., Barnir, A., & Gallaugher, J.M. (2003). Strategic Orientation, Competition, and Internet-based Economic Commerce. *Information Technology and Management,* 4(2): 139–164.

Bandura, A. (1997). *Self-efficacy: The Exercise of Control.* New York: Freeman.

Baron, R.A. (2004). The Cognitive Perspective: A Valuable Tool Answering Entrepreneurship's Basic "Why" Questions. *Journal of Business Venturing,* 19(2): 221–239.

Bateman, T.S., & Crant, J.M. (1993). The Proactive Component of Organizational Behavior: A Measure and Correlates. *Journal of Organizational Behavior,* (14)2: 103–118.

Becherer, R.C., & Maurer, J.G. (1999). The Proactive Personality Disposition and Entrepreneurial Behavior among Small Company Presidents. *Journal of Small Business Management,* 37(1): 28–36.

Begley, T.M. (1995). Using Founder Status, Age of Firm, and Company Growth Rate as the Basis for Distinguishing Entrepreneurs from Managers of Smaller Businesses. *Journal of Business Venturing,* 10(3): 249–263.

Blau, G.J. (1993). Testing the Relationship of Locus of Control to Different Performance Dimensions. *Journal of Occupational and Organizational Psychology,* 66(2): 125–138.

Boone, C., De Brabander, B., & Van Witteloostuijn, A. (1996). CEO Locus of Control and Small Firm Performance: An Integrative Framework and Empirical Test. *Journal of Management Studies,* 33(5): 667–699.

Bouckenooghe, D., Cools, E., Vanderheyden, K, & Van den Broeck, H. (2005). In Search for the Heffalump: An Exploration of Cognitive Style Profiles Among Flemish Entrepreneurs. *Journal of Applied Management and Entrepreneurship,* 10(4): 58–75.

Boyd, N.G., & Vozikis, G.S. (1994). The Influence of Self-Efficacy in the Development of Entrepreneurial Intentions and Actions. *Entrepreneurship Theory and Practice,* 18(4): 63–90.

Bridge, S., O'Neill, K., & Cromie, S. (2003). *Understanding Enterprise: Entrepreneurship and Small Business (second edition).* New York: Palgrave Macmillan.

Brigham, K.H., De Castro, J.O., & Shepherd, D.A. (2007). A Person-Organization Fit Model of Owner-Managers' Cognitive Style and Organizational Demands. *Entrepreneurship Theory and Practice,* 31: 29–51.

Buttner, E.H., & Gryskiewicz, N. (1993). Entrepreneurs' Problem-Solving Styles: An Empirical Study Using the Kirton Adaption/Innovation Theory. *Journal of Small Business Management,* 31(1): 22–31.

Chen, C.C., Greene, P.G., & Crick, A. (1998). Does Entrepreneurial Self-Efficacy Distinguish Entrepreneurs from Managers? *Journal of Business Venturing,* 13(4): 295–316.

Chen, G., Gully, S.M., & Eden, D. (2001). Validation of a New General Self-Efficacy Scale. *Organizational Research Methods,* 4(1): 62–83.

Chen, M.J., & Hambrick, D.C. (1995). Speed, Stealth, and Selective Attack: How Small Firms Differ from Large Firms in Competitive Behavior. *Academy of Management Journal,*

38(2): 453–482.

Collins, C.J., Hanges, P., & Locke, E.A. (2004). The Relationship of Need for Achievement to Entrepreneurship: A Meta-Analysis. *Human Performance,* 17(1): 95–117.

Cools, E., & Van den Broeck, H. (2007). Development and Validation of the Cognitive Style Indicator. *The Journal of Psychology: Interdisciplinary and Applied,* 141(4): 359–387.

Covin, J.G., & Slevin, D.P. (1989). Strategic Management of Small Firms in Hostile and Benign Environments. *Strategic Management Journal,* 10(1): 75–87.

Crant, J.M. (1996). The Proactive Personality Scale as a Predictor of Entrepreneurial Intentions. *Journal of Small Business Management,* 34(3): 42–49.

Crant, J.M. (2000). Proactive Behaviour in Organizations. *Journal of Management,* 26(3): 435–462.

Cromie, S. (2000). Assessing Entrepreneurial Inclinations: Some Approaches and Empirical Evidence. *European Journal of Work and Organizational Psychology,* 9(1): 7–30.

Curran, J., & Blackburn, R.A. (2001). *Researching the Small Enterprise.* London: Sage.

Damanpour, F. (1992). Organization Size and Innovation. *Organization Studies,* 13(3): 375–402.

Delmar, F. (2000). The Psychology of the Entrepreneur. In: S. Carter & D. Jones-Evans (Eds.), *Enterprise and Small Business.* London: Pearson Education, 142–143.

Dodge, H.R., & Robbins, J.E. (1992). An Empirical Investigation of the Organizational Life Cycle Model for Small Business Development and Survival. *Journal of Small Business Management,* 30(1): 27–37.

Drucker, P.F. (1985). *Innovation and Entrepreneurship: Practice and Principles.* New York: Harper & Row.

Entrialgo, M., Fernández, E., & Vázquez, C.J. (2000). Characteristics of Managers as Determinants of Entrepreneurial Orientation: Some Spanish Evidence. *Enterprise & Innovation Management Studies,* 1(2): 187–205.

Florin, J., Karri, R., & Rossiter, N. (2007). Fostering Entrepreneurial Drive in Business Education: An Attitudinal Approach. *Journal of Management Education,* 31(1): 17–42.

Furnham, A., & Ribchester, T. (1995). Tolerance of Ambiguity: A Review of the Concept, Its Measurement and Applications. *Current Psychology,* 14(3): 179–200.

Gallén, T. (1997). The Cognitive Style and Strategic Decisions of Managers. *Management Decision,* 35(78): 541–551.

Gallén, T. (2006). Managers and Strategic Decisions: Does the Cognitive Style Matter? *Journal of Management Development,* 25: 118–133.

Grenier, S., Barrette, A.-M., & Ladouceur, R. (2005). Intolerance of Uncertainty and Intolerance of Ambiguity: Similarities and Differences. *Personality and Individual Differences,* 39(3): 593–600.

Hansemark, O.C. (2003). Need for Achievement, Locus of Control and the Prediction of Business Start-ups: A Longitudinal Study. *Journal of Economic Psychology,* 24(3): 301–319.

Hayes, J., & Allinson, C.W. (1998). Cognitive Style and the Theory and Practice of Individual and Collective Learning in Organizations. Human Relations, 51(7): 847–871.

Hisrich, R.D. (1990). Entrepreneurship/ Intrapreneurship. *American Psychologist,* 45(2): 209–222.

Hodgkinson, G.P., & Sadler-Smith, E. (2003). Complex or Unitary? A Critique and Empirical Re-assessment of the Allinson-Hayes Cognitive Style Index. *Journal of Occupational and Organizational Psychology,* 76(2): 243–268.

Hough, J.R., & Ogilvie, dt (2005). An Empirical Test of Cognitive Style and Strategic Decision Outcomes. *Journal of Management Studies,* 42(2): 417–

448.

Hurt, H.T., Joseph, K., & Cook, C.D. (1977). Scales for the Measurement of Innovativeness. *Human Communication Research,* 4(1): 58–65.

Johnson, B.R. (1990). Towards a Multidimensional Model of Entrepreneurship: The Case of Achievement Motivation and the Entrepreneur. *Entrepreneurship Theory and Practice,* 14(3): 39–54.

Judge, T.A., Thoresen, C.J., Pucik, V., & Welbourne, T.M. (1999). Managerial Coping with Organizational Change: A Dispositional Perspective. *Journal of Applied Psychology,* 84(1): 107–122.

Kickul, J., & Gundry, L.K. (2002). Prospecting for Strategic Advantage: The Proactive Entrepreneurial Personality and Small Firm Innovation. *Journal of Small Business Management,* 40(2): 85–97.

Kickul, J., & Krueger, N. (2004). A Cognitive Processing Model of Entrepreneurial Self-Efficacy and Intentionality. In: S.A. Zahra *et al.* (Eds.), *Frontiers of Entrepreneurship Research.* Wellesley, MA: Babson College, Center for Entrepreneurial Studies, 607–619..

Kirton, M.J. (Ed.) (1994). *Adaptors and Innovators: Styles of Creativity and Problem Solving.* New York: Routledge.

Koh, H.C. (1996). Testing Hypotheses of Entrepreneurial Characteristics: A Study of Hong Kong MBA Students. *Journal of Managerial Psychology,* 11(3): 12–25.

Kozhevnikov, M. (2007). Cognitive Styles in the Context of Modern Psychology: Toward an Integrated Framework of Cognitive Style. *Psychological Bulletin,* 133(3): 464–481.

Kraus, S.I., Frese, M., Friedrich, C., & Unger, J.M. (2005). Entrepreneurial Orientation: A Psychological Model of Success among Southern African Small Business Owners. *European Journal of Work and Organizational Psychology,* 14(3): 315–344.

Kreiser, P.M., Marino, L.D., & Weaver, K.M. (2002). Assessing the Psychometric Properties of the Entrepreneurial Orientation Scale: A Multi-Country Analysis. *Entrepreneurship Theory and Practice,* 26(4): 71–94.

Kreitner, R., Kinicki, A., & Buelens, M. (2002). *Organizational Behaviour (second European edition).* London: McGraw-Hill.

Landström, H. (1999). The Roots of Entrepreneurship Research. *New England Journal of Entrepreneurship,* 2(2): 9–20.

Leonard, D., & Straus, S. (1997). Putting your Company's Whole Brain to Work. *Harvard Business Review,* 75(4): 111–121.

Leonard, N.H., Scholl, R.W., & Kowalski, K.B. (1999). Information Processing Style and Decision Making. Journal of Organizational Behavior, 20(3): 407–420.

Lumpkin, G.T., & Dess, G.G. (1996). Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. *Academy of Management Review,* 21(1): 135–172.

Lumpkin, G.T., & Erdogan, B. (2004). If Not Entrepreneurship, Can Psychological Characteristics Predict Entrepreneurial Orientation? – A Pilot Study. *The ICFAI Journal of Entrepreneurship Development,* 1(1): 21–33.

Markman, G.D., Balkin, D.B., & Baron, R.A. (2002). Inventors and New Venture Formation: The Effects of General Self-Efficacy and Regretful Thinking. *Entrepreneurship Theory and Practice,* 27(2): 149–165.

Markman, G.D., & Baron, R.A. (2003). Person-Entrepreneurship Fit: Why Some People Are More Successful as Entrepreneurs than Others. *Human Resource Management Review,* 13(2): 281–301.

McClelland, D.C. (1961). *The Achieving Society.* New York: Van Nostrand.

Miller, D., Kets De Vries, M.F.R., & Toulouse, J. (1982). Top Executive Locus of Control and Its Relationship to

Strategy-Making, Structure, and the Environment. *Academy of Management Journal,* 25(2): 237–253.

Miller, D., & Toulouse, J.M. (1986). Strategy, Structure, CEO Personality and Performance in Small Firms. *American Journal of Small Business,* 10(3): 47–62.

Mitchell, R.K., Busenitz, L., Lant, T., McDougall, P.P., Morse, E.A., & Smith, H.B. (2002). Toward a Theory of Entrepreneurial Cognition: Rethinking the People Side of Entrepreneurship Research. *Entrepreneurship Theory and Practice,* 27(2): 93–104.

Mitchell, R.K., Busenitz, L., Lant, T., McDougall, P.P., Morse, E.A., & Smith, H.B. (2004). The Distinctive and Inclusive Domain of Entrepreneurial Cognition Research. *Entrepreneurship Theory and Practice,* 28(6): 505–518.

Myers, I.B., McCaulley, M.H., Quenk, N.L., & Hammer, A.L. (2003). *MBTI Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator.* Palo Alto, CA: Consulting Psychologists Press.

Neck, C.P., Neck, H.M., Manz, C.C., & Godwin, J. (1999). "I Think I Can; I Think I Can": A Self-Leadership Perspective toward Enhancing Entrepreneur Thought Patterns, Self-Efficacy, and Performance. *Journal of Managerial Psychology,* 14(6): 477–501.

Peterman, N.E., & Kennedy, J. (2003). Enterprise Education: Influencing Students' Perceptions of Entrepreneurship. *Entrepreneurship Theory and Practice,* 28(2): 129–144.

Poon, J.M.L., Ainuddin, R.A., & Junit, S.H. (2006). Effects of Self-Concept Traits and Entrepreneurial Orientation on Firm Performance. *International Small Business Journal,* 24(1): 61–82.

Rigotti, L., Ryan, M., & Vaithianathan, R. (2003). Tolerance of Ambiguity and Entrepreneurial Innovation. *Working Papers, Duke Fuqua School of Business,* 1 January 2003.

Robinson, P.B., Stimpson, D.V., Huefner, J.C., & Hunt, H.K. (1991). An Attitude Approach to the Prediction of Entrepreneurship. *Entrepreneurship Theory and Practice,* 15(4): 13–31.

Rotter, J.B. (1966). Generalized Expectancies for Internal and External Control of Reinforcement. *Psychological Monographs: General and Applied,* 80(1): 1–28.

Sadler-Smith, E. (2004). Cognitive Style and the Management of Small and Medium-sized Enterprises. *Organization Studies,* 25(2): 155–181.

Sadler-Smith, E., & Badger, B. (1998). Cognitive Style, Learning and Innovation. *Technology Analysis and Strategic Management,* 10(2): 247–265.

Shane, S., Locke, E.A., & Collins, C.J. (2003). Entrepreneurial Motivation. *Human Resource Management Review,* 13(2): 257–279.

Sherer, M., Maddux, J.E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogers, R.W. (1982). The Self-Efficacy Scale: Construction and Validation. *Psychological Reports,* 51(2): 663–671.

Shook, C.L., Priem, R.L., & McGee, J.E. (2003). Venture Creation and the Enterprising Individual: A Review and Synthesis. *Journal of Management,* 29(3): 379–399.

Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do Entrepreneurship Programmes Raise Entrepreneurial Intention of Science and Engineering Students? The Effect of Learning, Inspiration and Resources. *Journal of Business Venturing,* 22(4): 566–591.

Spector, P.E. (2001). Research Methods in Industrial and Organizational Psychology: Data Collection and Data Analysis with Special Consideration to International Issues. In: N. Anderson, D.S. Ones, H.G. Sinangil & C. Viswervaran (Eds.), *Handbook of Industrial, Work, and Organizational Psychology. Volume 1: Personnel Psychology.* London: Sage, 10–26.

Steers, R.M., & Braunstein, D.N. (1976). A Behaviorally-Based Measure of Manifest Needs in Work Settings.

Journal of Vocational Behavior, 9(2): 251–266.

Stewart, W.H., Jr., Watson, W.E., Carland, J.C., & Carland, J.W. (1998). A Proclivity for Entrepreneurship: A Comparison of Entrepreneurs, Small Business Owners, and Corporate Managers. *Journal of Business Venturing,* 14(2): 189–214.

Steyaert, C. (2004). Entrepreneurship without Entrepreneurs? Reclaiming a(n other) Psychology of Entrepreneurship Studies. Paper presented at the RENT XVIII Conference, Copenhagen, November.

Utsch, A., & Rauch, A. (2000). Innovativeness and Initiative as Mediators between Achievement Orientation and Venture Performance. *European Journal of Work and Organizational Psychology,* 9(1): 45–62.

Vecchio, R.P. (2003). Entrepreneurship and Leadership: Common Trends and Common Threads. *Human Resource Management Review,* 13(2): 303–327.

Webster, D.M., & Kruglanski, A.W. (1994). Individual Differences in Need for Cognitive Closure. *Journal of Personality and Social Psychology,* 67(6): 1049–1062.

Whetten, D., Cameron, K., & Woods, M. (2000). *Developing Management Skills for Europe (second edition).* Harlow: Pearson Education.

Wickham, P.A. (2004). *Strategic Entrepreneurship (third edition).* Harlow: Pearson Education.

Wiklund, J. (1999). The Sustainability of the Entrepreneurial Orientation-Performance Relationship. *Entrepreneurship Theory and Practice,* 24(1): 37–48.

Wyk van, R., & Boshoff, A.B. (2004). Entrepreneurial Attitudes: A Distinction between Two Professional Groups. *South African Journal of Business Management,* 35(2): 33–38.

Zahra, S., & Covin, J. (1995). Contextual Influence on the Corporate Entrepreneurship-Performance Relationship: A Longitudinal Analysis. *Journal of Business Venturing,* 10(1): 43–58.

Zhao, H., Seibert, S.E., & Hills, G.E. (2005). The Mediating Role of Self-Efficacy in the Development of Entrepreneurial Intentions. *Journal of Applied Psychology,* 90(6): 1265–1272.

Eva Cools is a researcher in the People and Organization Department at Vlerick Leuven Gent Management School in Gent, Belgium. Her current research activities focus on cognitive styles, team research, change management, and entrepreneurship.

Herman Van den Broeck is a professor at the Faculty of Economics and Business Administration of Ghent University and teaches educational interaction and communication in the Teacher Training department. He is head of the People and Organization Department at Vlerick Leuven Gent Management School, Gent, Belgium.

ACKNOWLEDGEMENT

This study is part of a research project under the authority of Flanders District of Creativity, a Belgian government institution that aims to stimulate entrepreneurship, innovation, and creativity in Flanders. We are grateful to Flanders District of Creativity (www.flandersdc.be) for their financial support to execute this research project.