

Metacognitive patterns – assessing how entrepreneurs think about their thinking

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ABSTRACT

Key words: Entrepreneurial Cognition; Meta programmes; Metacognition; Entrepreneurial Process

Objectives: Identify meta programmes and cognitive patterns that are influential in the entrepreneurial process such as opportunity recognition, evaluation and exploitation; to investigate the application of meta programmes and the Metacognitive Patterns Indicator (MPI) in the entrepreneurial context.

Prior work: There is a fast growing area of research interest in exploring entrepreneurship through the theoretical lens of entrepreneurial cognition. In particular, to investigate how entrepreneurs think, reason and behave such that they create value and wealth through identifying and implementing market opportunities. Previous studies suggest that entrepreneurial and accounting students have distinctive meta programmes, a model for assessing metacognitive patterns. The study of meta programmes contributes to an understanding of entrepreneurial metacognition that enables entrepreneurs to think about and reorganize existing knowledge structures to promote adaptable cognitions during the process of entrepreneurship.

Approach: Semi-structured interviews were completed with 8 practising entrepreneurs. The interview transcriptions were analysed to identify influential meta programme patterns and entrepreneurial cognitions in the entrepreneurship context.

Results: Distinctive meta programmes and entrepreneurial cognitive patterns were identified. For example, the meta programmes “Proactive” (a propensity to take the initiative), “Towards” (a preferred intuition for what can be achieved and gained) and “Internal” (a strong confidence in one’s own opinion). Two entrepreneurial cognitive preferences such as entrepreneurial alertness and average risk propensity are also identified in this study.

Implications: The findings of this research attempts to identify some key meta programmes that are influential in the context of entrepreneurship. It also explores the validity of meta program as a possible and alternative approach in studying entrepreneurs’ preferred cognitive patterns. In addition, the study also provides indication that Metacognitive Pattern Indicator (MPI) has the potential to identify entrepreneurs’ metacognitive patterns.

Value: Meta programmes have valuable implications for deepening the understanding of one’s metacognition in the entrepreneurial context. It opens the opportunity to apply the meta programmes instrument to identify influential entrepreneurial metacognition.

INTRODUCTION

This working paper reports the result of interviewing 8 existing and practising entrepreneurs to identify their influential cognitive patterns and meta programmes. The findings serve as a stepping stone to support the value of using the model of meta programmes to explore entrepreneurial metacognitive patterns.

“How do entrepreneurs think?” In the last two decades, there has been growing interest in entrepreneurial cognition, which is regarded as one of the key independent variables that relate to important outcomes in the entrepreneurial process (Shane & Venkataraman, 2000; Mitchell et al, 2002a; Baron, 2004). Thus far, researchers have provided some fruitful and impressive results in key areas such as: entrepreneurs’ cognitive biases, heuristics and decision errors (Busenitz & Barney, 1997; Alvarez & Busenitz, 2001; Simon et al, 2000; Krueger, 2003), Cognitive processes such as “alertness” (Gaglio & Katz 2001), “counterfactual thinking” (Baron, 2000; Gaglio, 2004) Opportunity recognition (Mitchell & Chesteen, 1995); Entrepreneurial cognitive style (Armstrong & Hird, 2009) and Entrepreneurial Cognitive Scripts (Mitchell et al, 2000, 2002a; 2002b; Seawright et al, 2008).

Extensive research findings indicate that entrepreneurs think differently from non entrepreneurs but efforts to explain the causes of difference in entrepreneurial cognitive processes have yielded disappointing results. This study however applies meta programs from the discipline of Neuro Linguistic Programming (NLP), a model for understanding metacognition, hoping to provide an answer to the question from a different perspective. Such investigations appear to be the first to be reported in entrepreneurial metacognition context. Meta programmes are specific filters individuals use to interact with the world. Meta programmes edit and shape what comes in to the individual from the outside world, they also mould what comes from inside individuals when communicating with the outside world (Charvet, 1997). Ready and Burton on the other hand define meta programmes as *“some of these unconscious filters which direct you pay attention to, the way you process any information you receive and how you then communicate it”* (Ready and Burton, 2004, p117). Previous studies in psychology and cognitive science have revealed that metacognition is the key to understanding individuals’ daily activities such as oral communication, comprehension, writing, attention, memory, problem solving and self-control (Brown, 1978; Flavell, 1979, Kreutzer et al, 1975). Metacognitive control and monitor function as well as its three components, Metacognitive Knowledge (MK), Metacognitive Experience (ME) and Metacognitive Skill (MS) have been used to explain individuals’ varied cognition and their subsequent behaviour (Brown, 2005).

The main objective of this research is to apply an NLP approach to metacognition theory to the entrepreneurship context, in order to identify whether there are distinctive entrepreneurial meta programmes that contribute to a better understanding of metacognition. The second objective and the next phase of this research is to use the Metacognitive Pattern Indicator (MPI) to provide a profile of entrepreneurs’ metacognition distinguish those aspects that are different from non-entrepreneurs’. This working paper reports the findings in the first phase of the research based on interviewing practising entrepreneurs in the South Wales area in order to deepen and enhance the understanding of the influential meta programmes and entrepreneurial cognitive factors at work during their entrepreneurial process. Several meta programmes for example, a propensity to take the initiative (which is labelled as “proactive”), having a preferred intuition of what can be achieved and gained (which is labelled as “Towards”) and a strong confidence in one’s own opinion (which is labelled as “internal”) were identified and entrepreneurial cognitive patterns such as “alertness” and “average risk propensity” were summarised.

LITERATURE REVIEW

Entrepreneur

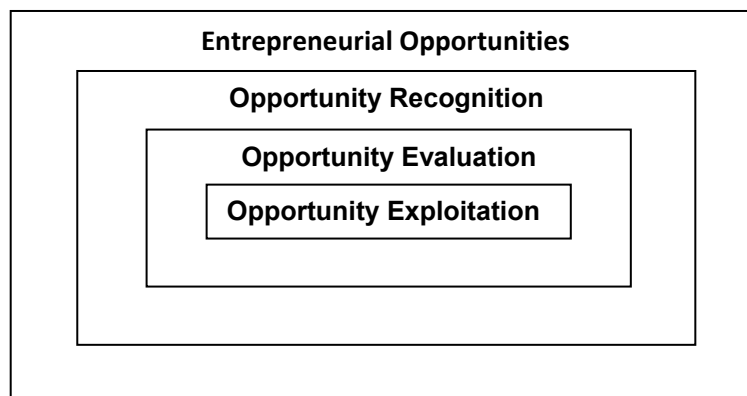
There are different definitions of *“Entrepreneur”* and Howorth et al (2005) argue that many definitions are insufficient on their own to define an entrepreneur and in practice most definitions incorporate multiple criteria. He believes that there is often difficulty in separating the characteristics of the entrepreneur from their actions, i.e. what they are from and what they do; an entrepreneur cannot be defined based on their characteristics because entrepreneurship is a dynamic concept and therefore he argues the definitions should be based on what an entrepreneur does. Shane and Venkataraman (2000) note that an entrepreneur must incorporate opportunity recognitions, they define entrepreneurs as individuals who recognize and exploit new business opportunities by founding new ventures. In the absence of a universally acceptable and applicable definition, this research uses the nearest conceptual representation of what the entrepreneur does and adopts it for its own specific empirical needs (Matlay, 2005). Therefore this research adopts a widely used and agreed

definition. An entrepreneur is ***an individual who recognises or discovers and evaluates an opportunity to create something new, and who then uses various means to exploit or develop the opportunity***¹ (Shane and Venkataraman, 2000). “Opportunity” refers to the chance to meet a market need (or interest or want) through a creative combination of resources to deliver superior value. In general, “opportunities” describe a range of phenomena that begin unformed and become more developed through time (Ardichvili & Ray, 2003). “*something new*” refers to a new product or service, new market, new production or raw materials, or new way of organizing existing technologies, and the entrepreneur then uses various means to exploit or develop this opportunity.

Entrepreneurial Process & Entrepreneurial Opportunities

Keh et al (2002) identified that cognition plays a crucial part in recognising entrepreneurial opportunities and the subsequent entrepreneurial process. Researchers in entrepreneurship have often criticised the sole emphasis on who is and how to make an entrepreneur as well as on what he or she does but ignoring the various characteristics and stages on the journey of entrepreneurship. Shane & Venkataraman (2000) therefore developed the “**entrepreneurial process**” framework which has been cited extensively in contemporary research of entrepreneurship. The model highlights that entrepreneurship involves the study of sources of entrepreneurial opportunities; the processes of recognition, evaluation, and exploitation of opportunities. The framework stresses that entrepreneurial opportunity is the pre-condition of entrepreneurship and entrepreneurs act in discovering, examining and exploiting opportunities. Other researchers suggest that entrepreneurial behaviours are transitory and a tendency of responding to the situational cues of opportunities, therefore they are not stable personal characteristics or traits (Mischel, 1981; Casson, 1982; Wright and Mischel, 1987 cited by Chell, 2008). Opportunities begin as simple concepts that become more elaborate as entrepreneurs develop them and opportunity development is a continuous proactive and cognitive process essential to the formation of a business (Ardichvili & Ray, 2003). The process is demonstrated in *Figure 1*. The whole entrepreneurial process typically communicates judgements and decision makings which determine whether the opportunity is worth acting on; whether or not an opportunity can pass through each of the “recognition”, “evaluation” and “exploitation” stages. It is asserted that entrepreneurial cognition and the cognitive processes associated with entrepreneurial thinking and actions are the key to entrepreneurship. As suggested by Krueger (2003), if the “heart” of entrepreneurship is an orientation toward opportunity recognition, understanding entrepreneurial cognition is imperative to understand the essence of entrepreneurship about how it emerges and evolves.

Figure 1 Entrepreneurial Opportunities



(Adapted and reproduced from Shane & Venkataraman, 2000)

Cognition and Entrepreneurial Cognition

Studies of entrepreneurs’ cognition developed rapidly to challenge the usefulness of entrepreneurial personality and traits in research of entrepreneurship and the entrepreneurial process. Some conclude that the research on personality traits in entrepreneurship shows a lack of consistency in its findings and has reached an empirical dead end and they suggest discontinuing further research (Aldrich, 1999, p76; Wyk &

¹The term ‘evaluate’ is added to the definition as an intermediate stage between opportunity recognition and opportunity exploitation stage to coincide the concept of “entrepreneurial process” proposed by Shane and Venkataraman (2002).

Boshoff, 2004). Thus far, although studies on the entrepreneurial cognition contribution seem promising, it still needs more in-depth understandings of its foundation – the individual's cognition itself. **Cognition** is about individual perceptions, memory, and thinking (Estes, 1975); it is defined as all processes, by which sensory input is transformed, reduced, elaborated, stored, recovered from memory, and used or retrieved for later use (Neisser, 1967; Isen, 2002). Mitchell et al (2002b) believe that the cognitive view of entrepreneurship represents a refreshing change as he sees the cognitive method as a testable approach able to systematically explain the role of the individual in the entrepreneurial process. The cognitive viewpoint will serve well as an effective tool in probing and explaining previous unexplained phenomena within entrepreneurship research. Ward et al (1997)'s research shows that people vary in their abilities to combine existing concepts and information into new ideas because of the differences among individuals' cognitions. As a result, entrepreneurial cognition emerged and has been used as a new lens to help explain the mental processes that occur during the entrepreneurial process and the entrepreneurial environment around them.

By putting the cognitive perspective into entrepreneurship research, the concept of **entrepreneurial cognition** refers to "*the knowledge structure that people use to make assessments, judgements or decision involving opportunity evaluation, venture creation and growth*" (Mitchell, 2002b, p96). The research on entrepreneurial cognition is to understand how entrepreneurs use simplified mental models to piece together previously unconnected information that help them to identify and invent new products or services during the entrepreneurial process; as well as to assemble necessary resources to start and grow business. Entrepreneurship researchers have a long history of interest in understanding why entrepreneurs think and act differently than non-entrepreneurs. It is asserted that cognition plays a role in different aspects of the entrepreneurial process; from identifying opportunities, deciding to exploit the opportunities through making complex decisions and solving difficult and unexpected problems while running a new venture. Thus far, active researchers in this field have devoted considerable energy in examining wide range of intriguing questions and have provided some fruitful and impressive results. Empirical studies show that successful entrepreneurs see opportunity while others tend to see it as risks (Sarasvathy et al, 1998). Baron (2000) found that entrepreneurs are more likely to discover opportunities because they are less likely to engage in counterfactual thinking (i.e., less likely to invest time and effort imagining what "might have been" in a given situation); they are less likely to experience regret over missed opportunities and entrepreneurs are also less susceptible to inaction inertia. Further research includes: the Entrepreneurial cognition framework (Baron & Ward, 2004; Mitchell, 2007); other findings include entrepreneurs' cognitive biases, heuristics and decision errors (Alvarez & Busenitz, 2001; Busenitz & Barney, 1997; Simon, 1999; Simon et al, 2000; Krueger, 2003), Cognitive processes such as "alertness" (Gaglio & Katz 2001; Tang 2008), and cognitive scripts (Mitchell & Chesteen, 1995; Mitchell et al., 2002a) in opportunity recognition; Entrepreneurial cognitive style (Armstrong, 2009), Entrepreneurial Cognitive Scripts (Mitchell et al, 2000, 2002a; Seawright, 2008; Vesper, 1996), and Overconfidence (Forbes, 2005).

Metacognition and Cognition

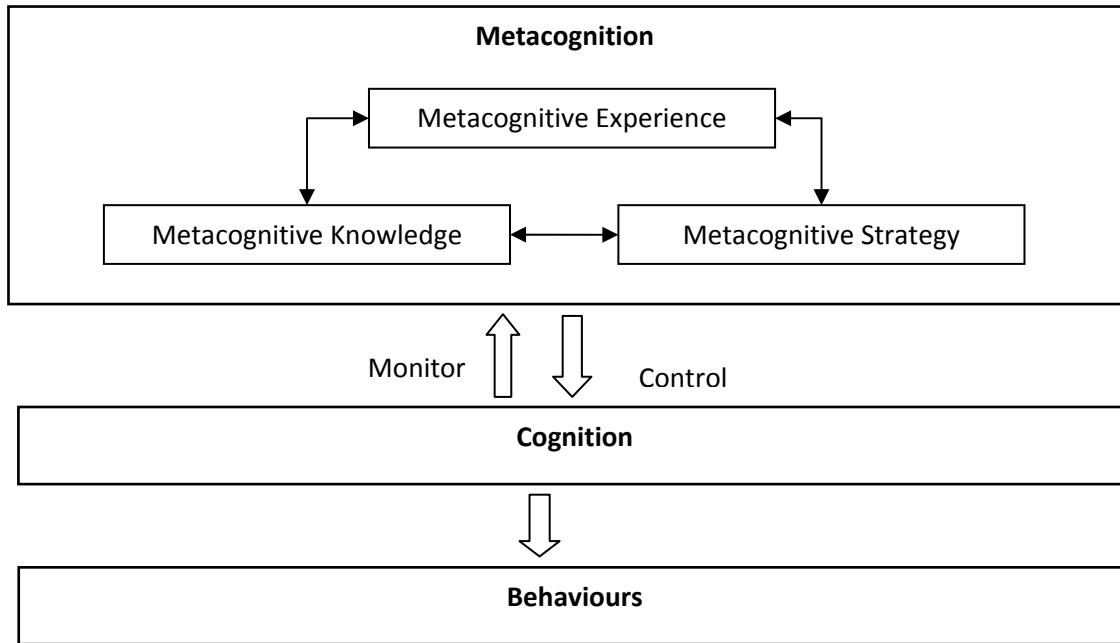
In order to incorporate the various studies of entrepreneurial cognition, Bargon & Ward (2004, p557-558) call for further investigation in characterising modes of entrepreneurial cognition, in order to deepen and enhance understanding of the influential cognitive factors at work during the entrepreneurial process. Prior literature reveals that entrepreneurs' knowledge structures, learning, memories and decision processes play a key role during the entrepreneurial process (Shane 2001; Mitchell et al, 2002a; Ireland et al, 2003). One of the unsolved issues is "*whether or not entrepreneurs possess knowledge structures differ from non-entrepreneurs and do they apply that knowledge more effectively in a wide range of situations?*" Recent studies in entrepreneurs' cognitive knowledge structures focus on examining a contrasting pair of cognitive styles that entrepreneurs apply in various entrepreneurial processes. For example, Bryant's (2007) findings indicate that entrepreneurs use heuristics frequently in relation to the evaluation of opportunities but rely on more systematic decision means during the exploitation phase. Further, Kickul et al (2009) suggests that there are different cognitive preferences in assessing entrepreneurial intention, resources and opportunities. Yet to date, there is no research exploring the unsolved relations between entrepreneurs' knowledge structures, cognitive monitor and control function on one hand and cognitive strategy on the other. As Mitchell et al (2007) conclude, many entrepreneurial cognition researches relate to the way that thinking affects entrepreneurial outcomes, it appears that individuals who understand the thinking patterns related to entrepreneurship, and those who desire to become entrepreneurs, can alter their own thinking patterns accordingly. The demands to understand and to be aware of entrepreneurial thinking patterns as well as alteration of one's cognitive patterns leads this research to investigate the meta –level of entrepreneurial cognition – entrepreneurial metacognition.

Metacognition is the thinking about one's own thoughts and cognitions (Flavell, 1979). It is a model of cognition at the meta level which monitors and controls cognition on the object level. The **monitor function**

refers to processes of identifying and planning task, evaluating and monitoring one's progress, and predicting the outcomes of progress and self regulations. The monitoring function involves the flow of information from the object level (cognition) to the meta level (metacognition). The **control function** of metacognition, on the other hand, involves the initiation and termination of cognitive process and the use of cognitive strategies such as where to allocate one's resources, the specific steps to be used for completing the task, the speed and intensity at which to work on the task, as well as the prioritization of activities (Blume & Covin, 2009). In brief, metacognition evaluates what is being monitored and based on this evaluation; it controls the processes in lower level cognition. Cognition, on the other hand, provides feedbacks to metacognition (Shimamura, 2000). Metacognition consists of three key components, namely: Metacognitive Knowledge (MK), Metacognitive Experience (ME) and Metacognitive Strategy (MS). **MK** is about an individual's ideas or beliefs about themselves and others, it relates to the information or beliefs which are stored in the form of memory and presented in the way of language and writing; **ME** refer to those affective and emotional experiences about an object, task, incident or a piece of information. **MK** and **ME** are not two separate items, but instead they interrelated with each other. After metacognition experiences are formed and cumulated according to various incidents and aspects, they will be stored in memory and become metacognition knowledge (MK) which provides a "database" that individual can retrieve for later use such as solving problems or undertaking tasks. While metacognition experiences are being produced, certain metacognition knowledge (those memories databases) will be recalled and selected during the process of forming metacognition experience. MS (Metacognitive Strategy) refers to the deliberate use of strategies in order to control cognition (Flavell, 1979; Nelson, 1996; Efklides, 2008). For **MS**, "deliberation" is the key, as it represents an individual's "executive control" of his or her cognition (it differs from the Metacognition controlling function mentioned earlier) and "*it involves selective attention and working memory as well as planning, conflict resolution, error detection and inhibitory control*" (Shimamura, 2000). Individuals will use metacognitive skill to apply strategies consciously and purposively, in order to achieve certain outcome or goal. The relationship between MK, ME and MS can be explained in the following way: when an individual experiences some difficulties in solving a problem, this particular ME will trigger the "executive control" (the MS) which then uses one (or more than one) of the strategies to search and adopt from the memory database (which is the MK), in order to resolve the problem.

Humphrey (2003) refers to metacognition as the "inner eye" and people can use their own brain to observe their own brain. Why does metacognition have the function of monitoring and controlling cognition? Humphrey offers some explanations from the self-conscious perspective, he believes the metacognitive (or having the inner eye) could give a "quick and accessible description of how one feels and thinks oneself, what one wants, plans, and fears, therefore, allowing one to make similar attributions to other people and act it quickly". In addition, metacognition also enables people to "imagine" possible future situation in considerable detail. As Humphrey suggests, "*...[inner eye] allows a person to consider disastrous alternatives without physical consequences and thence to find new solutions that might otherwise be impossible ...*" Finally, metacognition enables individuals to look back on the details of one's personal past via episodic memory (Humphrey, 2003 cited by Metcalfe & Kober, 2005, p58-60). The multilevel of metacognition, cognition and behaviours, as well as the multifaceted nature of the metacognition relationship is demonstrated in **Figure 2**

Relationship between Metacognition, Cognition and Behaviours



Adapted and developed from Fernandez-Duque (2000, p290); Eklides (2008; p283)

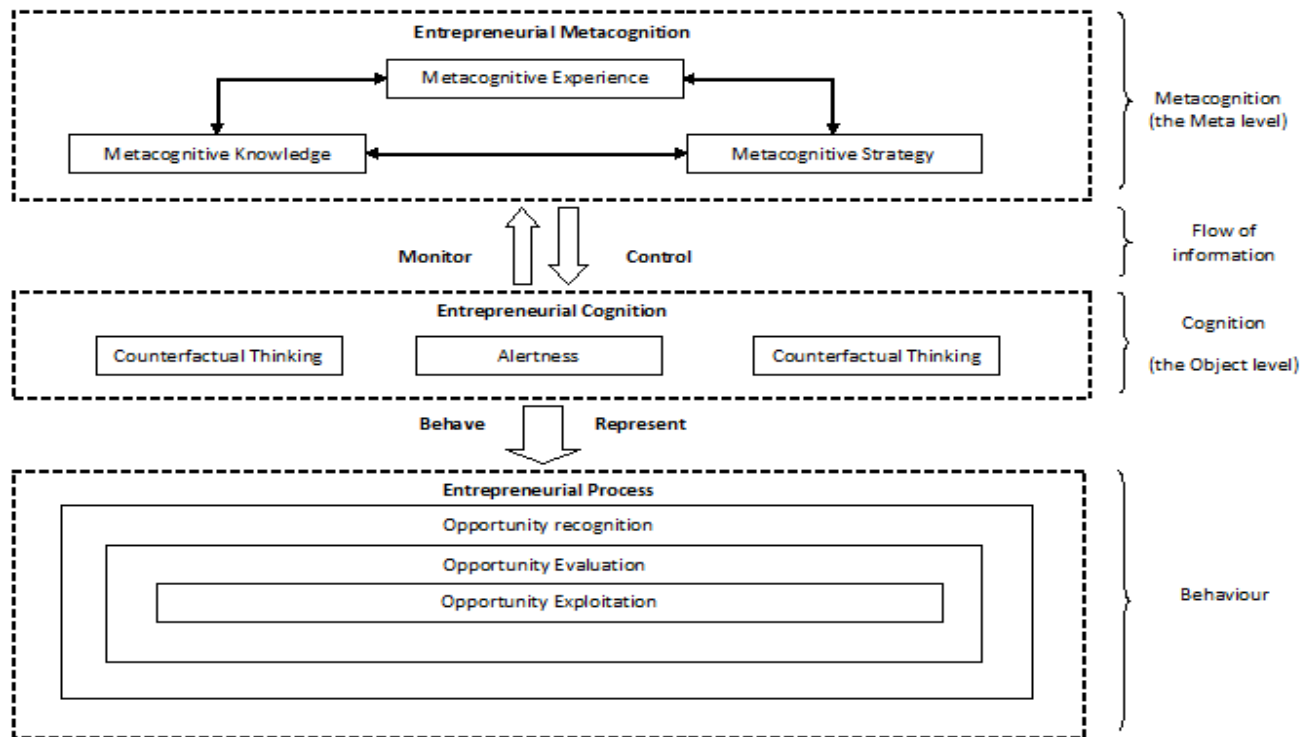
Conceptualising Entrepreneurial metacognition

By applying metacognition into an entrepreneurial context, a working definition of **entrepreneurial metacognition** is proposed as *the higher level of cognition which monitors, controls and regulates the lower level cognitive processes during the entrepreneurial process*. There has been a notable absence in the literature of work on capturing and quantifying cognitive styles underpinning entrepreneurial metacognition. A recent study, however, employed the metacognitive lens to establish an understanding of the function of entrepreneurs' self-regulation during the entrepreneurial process. Haynie & Shepherd (2009) proposed a conceptual process model, the Metacognitive model of Cognitive adaptability and the Measure of Adaptive Cognition (MAC) to explain and measure entrepreneurs' cognitive adaptability. Their findings confirm the suggested five factors of metacognitive awareness: Metacognitive Experience, Metacognitive Knowledge, Metacognitive Monitoring, Metacognitive Choice and Goal Orientation have significant aggregative relations during the entrepreneurial process (Haynie & Shepherd, 2009, p703). This reveals the potential role of metacognition in entrepreneurial contexts as well as numerous opportunities for developing important empirical testing instruments for measuring and summarising entrepreneurial metacognition.

Research indicates that individuals who are more metacognitive in the way that they approach a task or a situation are: (1) more likely to recognize the fact that there are multiple decision frameworks available to formulate a response; (2) more likely to engage in the conscious process of considering those multiple alternatives; and (3) more likely to be sensitized and receptive to feedback from the environment and to incorporate that feedback into subsequent decision frameworks (Melot, 1998 cited by Haynie & Shepherd, 2009, p696). Entrepreneurial metacognition therefore serves as a psychological mechanism that bridges the divide between the biases embedded in entrepreneurs' cognitive mechanisms, and a state of cognitive adaptability that facilitates functioning in a dynamic entrepreneurial environment. Entrepreneurial metacognition can also help entrepreneurs compensate for limitations in their decision making brought on by heuristics and biases in decision making. This compensating effect of entrepreneurial metacognition may be especially important for entrepreneurs who often need to access different cognitive strategies given their dynamic and challenging environment.

As discussed above, in each stage of the entrepreneurial process (opportunity recognition; evaluation and exploitation) the entrepreneur has many decisions to make and each decision is a result of cognitive processes which involve ME, MK and MS at the metacognition level. Therefore the conceptual framework which demonstrates these relationships is illustrated in **Figure 3**

Conceptualising the entrepreneurial metacognition, entrepreneurial cognition in entrepreneurial process



Meta programmes and Neuro Linguistic Programming (NLP) - measurement of metacognition,

The previous section reviewed the potential implications of metacognition in the study of entrepreneurship. This section further discusses the application of meta programmes in capturing metacognition. Meta programmes originate from Neuro Linguistic Programming (NLP) which was co-founded by Richard Bandler and John Grinder in 1975. NLP is defined in the Oxford English Dictionary as “a system of alternative therapy intended to educate people in self-awareness and effective communication, and to model and change their patterns of mental and emotional behaviour.” Dowlen defines NLP as “an extraordinarily complex model of human cognition and behaviour and of how to identify behavioural and communication patterns” (Dowlen, 1996, p31). Meta programmes have been described as: “*Specific filters we use to interact with the world. They edit and shape what we allow to come in from the outside world. They also mould what comes from inside ourselves as we communicate and behave in the world*” (Charvet, 1997, p11). Ready and Burton define meta programmes as “some of these unconscious filters which direct what you pay attention to, the way you process any information you receive and how you then communicate it” (2004, p117). Lawley points out that meta programmes are not personality types, but are ways of processing information and communicating in the moment (Lawley, 1997, p7). Meta programmes therefore operate at an unconscious level, it is about how we interact with the world, including how we behave and how we communicate. They have been used to understand individuals’ preferred metacognitive patterns. After the patterns are identified, it can be used to enhance people’s communication and motivation (Brown, 2002, p79; Brown, 2006). Bodenhamer & Hall refers to meta programmes as: those programs - which are the perspective, way of valuing, style of thinking and emoting, and pattern of choosing and behaving above the everyday thoughts-and-emotions that we experience. A meta program can be used to understand human behaviour and human difference, to reveal how we may vary our own behaviour and communications to become more successful in relating to and changing our own, and other people’s behaviour and models of the world (Bodenhamer & Hall, 1997). The meta programmes are those sorting devices or patterns that individuals use in perceiving, paying attention to information, and inputting and processing the stimuli around them.

Up to now, approaches used in measuring metacognition include questionnaires, observation, lab experiments and thinking aloud. Previous research has used self-report questionnaires for Metacognitive Knowledge (Schraw, 2000), self-report ratings of Metacognitive Experience (Efklides, 2002, 2008), and thinking aloud protocols for Metacognitive Strategy (Veenman & Elshout, 1999). Yet none of the existing measurements are appropriate in the context of entrepreneurial metacognition. Take the thinking aloud measure for example: this method requires participants to speak and state their cognitive process when given a hypothetical task. Arguably, this is not particularly applicable for research on entrepreneurial metacognition which aims to identify the entrepreneurial metacognitive experience, knowledge and strategy. Instead, an

individual's meta programme preferences can be reliably identified from his or her language (Brown, 2005; Charvet, 1997; Bodenhamer & Hall, 1997). Therefore, a qualitative research approach, based on semi-structured interviews, was adopted to identify entrepreneurs' meta programmes while talking about their own enterprising experiences.

Table 2 is a brief example of meta programmes that are identified by encoding the verbal protocols and analysing interview transcripts.

Meta Programme	Brief Description	Examples of associated language patterns
<i>Proactive</i>	a tendency to take action and initiative quickly and appear highly motivated	"get on with it", "initiate", "jumped in", "don't see risk", "action", "set in motion",...
<i>Towards</i>	have a preferred intuition of what can be achieved and gained and tend to gloss over potential problems or obstacles	"always want", "I decided", "looking for", "trying to", "no hesitation", "I want it now", "I make it work", "I was determine"...
<i>Internal</i>	it refers to have confidence on his/her own judgement and opinion	"I like", "own initiatives", "I knew I want", "I realised", "I am..." "I live with myself", "I recon I could", "I love"; "my responsibility".
<i>Difference</i>	more likely to be good at recognising the differences rather than similarities	"innovative", "difference", "contrast", "a hole needs filling", "unique", "new", "why not", "Gaps", "Don't box yourself"...
<i>General</i>	to get the broad scope of a subject such as the general idea or picture of an issue	"ideal person", "no pleasure in details", "in general", "next key steps", "generally" ...
<i>Reactive</i>	tend to put things off until the timing seems right, wanting to reflect on and analyse a situation before taking action	"Wait", "hesitate", "consider consequences", "in response to", "reflect on", "weight things up", "Can I do it?" ...

RESEARCH METHOD

Data Collection

The criteria used for choosing the participants in this research are those individuals who have recognized or discovered an opportunity to create something new (e.g. a new product or service, new market, new production or raw material, or a new way of organizing existing technologies) and who then use various means to exploit or develop the opportunity. The interviewees were identified through two sources. The first source is through a research colleague who has access to young entrepreneurs. Two young entrepreneurs (Entrepreneur 1 and 2) who fit the criteria were contacted and their interviews were used as a pilot test for initial findings as well as the opportunity to improve interview questions and technique for later interviews. The rest of the 6 participants were identified via a key contact, the coordinator of GTI (the entrepreneur incubation centre with links to the University of Glamorgan). The list of interview questions has also been discussed and adjusted accordingly.

Interview Process

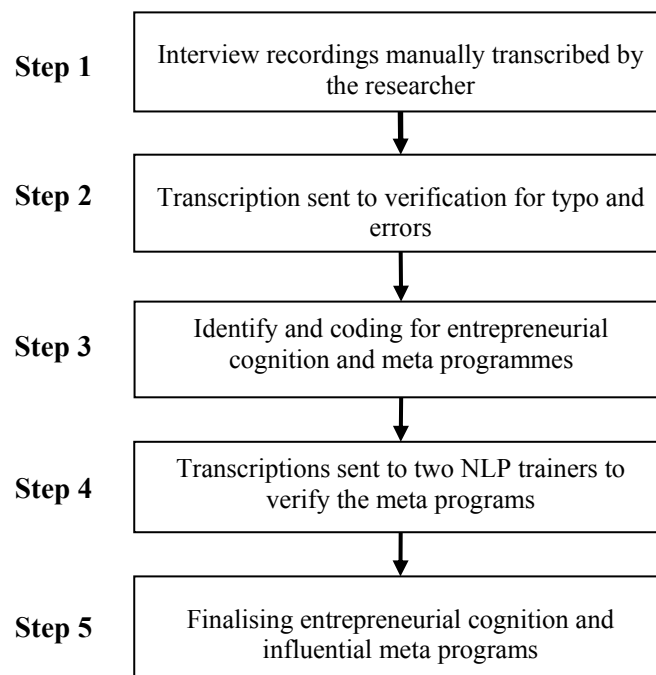
To avoid potential report bias, all interview participants were told that the study was broadly about their enterprising journey. Entrepreneurial cognition and meta programmes were not mentioned in the interviews. In order to anchor their cognition to the entrepreneurial process, the interviews starting off by asking them to describe the nature of the business they are engaged in. Based on these accounts, subsequent questions were asked aiming to elicit interviewees' interpretations of their entrepreneurial experience, the situation they dealt with and the eventual outcomes. Interview questions covered the following aspects of their enterprising experience:

- Origin of business idea;
- Experience of identifying business opportunities
- Definition of risk;
- Risk attitude
- Experience of overcoming obstacles;
- Understanding of the term "entrepreneur"

During the interview, interviewees were invited to talk openly about any topics that came to mind when sharing their enterprising experiences. Further questions were asked to clarify the idea and to encourage interviewees to share more entrepreneurial experiences they thought were important and influential.

Data Analysis

The procedure of data analysis is demonstrated in **Figure 4**:



In **Step 1 and 2**: All the recorded interviews were manually transcribed verbatim and any typo or errors were professionally corrected. **Step 3**, entrepreneurs' cognitive patterns were identified, profiled and coded by the researcher. Entrepreneurs' meta programmes were first identified by the researcher and in **Step 4** the initial findings were sent to two individuals trained in NLP review and verification. The reviewed findings then were compared and discussed between the NLP practitioners and the researcher to ensure that a consensus was reached with respect to identified meta programmes. The rationale of Step 4 is that the researcher was aware the danger of his interpretation being influenced by his own patterned, producing biased results. As Turnbull and Beese (2000) acknowledge, qualitative research can be influenced by the individual attributes and perspectives of the researcher. The final step (**Step 5**) of data analysis is to summarise and finalise the evidence of entrepreneurial cognitions and the influential meta programmes. For a meta programme to be viewed as influential, there had to be a link between the identified meta programme and the entrepreneurial experiences as well as entrepreneurial cognition.

LIMITATIONS

The researcher acknowledges that there are limitations to this study. Firstly, the study interviewed only eight entrepreneurs, all of whom are based in Wales. A larger sample number in the portfolio of businesses could have enriched the study. Secondly the researcher has not received any NLP training, therefore there are arguably biases and limitations during the meta programme identification process of the interview scripts. Yet the quality of meta programmes analysis is deemed to be acceptable as the results were verified by two NLP practitioners. Furthermore, this limitation also relates to the methodological difficulty of tapping into entrepreneurs' thinking. The use of verbal accounts to generate insights about entrepreneurs' thinking preferences rests on the assumption that individuals' accounts are unbiased by their concerns about self-presentation and self-awareness and that these accounts are not influenced by the time and context of the interview. Thirdly, there are specific limits of objectivity in identifying meta program, for example each NLP practitioner has his or her own personal bias on certain meta programmes which will result the analysis become subjective. Fourthly, there are also criticisms of metacognition. Efklides points out that some of the metacognition function is not always implemented at the cognitive level, therefore it is possible that detection or identification metacognition may fail (Efklides, 2008).

FINDINGS AND DISCUSSIONS

During the analysis of interview transcriptions, two main themes of entrepreneurial cognition emerged and six sets of meta programmes were identified.

Entrepreneurial Alertness

In many cases, the entrepreneurs showed an unswerving sensitivity to entrepreneurial opportunities. For example, Entrepreneur 2 stated how his furniture business idea was recognised:

"...So I then had a bit of insight, I was looking at different furniture shops, going out with him as well, helping him out and I sort of realised quickly that everybody has the same furniture, the same brands and quite a lot of imaginative furniture. So I then decided that. Well if I go for something a little bit more unique; keep the practical aspect of it. You know then I can build on that and hopefully develop a different sort of business model that would work. You know, a bit of a niche product that would appeal to quite a broad market and audience sets..."

Entrepreneur 1 also exhibits a similar level of alertness of the opportunity for her gluten-free cheese cake business:

"... I came into the business as a waitress and thought, hang on, this cheesecake and our produce is fantastic why has it only sold in this tiny restaurant, why can't it be sold to every restaurant within the radius. So the business started just from me seeing: "hang on, this is a fantastic food, you know it's a good business, why can't we just take this to the next level..."

In Entrepreneur 4's case, he identified the opportunity for his gift donation business from what he noticed from his niece's birthday party:

"... Got to the end, because she had so many she got bored of opening them, and we thought, there's a lot of waste, a lot of duplicated items, and some her mother didn't want her to have because of her age - she was only 6 at the time, and things that would just never be used, and a lot of plastic, and we thought, this is mental, why can't we buy an alternative gift like a goat, like books for a school in Africa, like a donation... why do we have to do this? and it stemmed from there..."

It has been suggested that any recognition of opportunity by a prospective entrepreneur is preceded by a state of heightened alertness to information. Entrepreneurial alertness (EA) is defined as a propensity to notice and be sensitive to information about objects, incidents, and patterns of behaviour in the environment, with special sensitivity to maker and user problems, unmet needs and interests, and novel combinations of resources or in brief, "the unique preparedness to recognise opportunities when they appear (Kirzner, 1979; Gilad et al, 1989; Ardichvili et al, 2003). Kirzner argues that entrepreneurs possess a special alertness that predisposes them to be extremely sagacious about change: they are quicker to detect its signals; more accurate in sizing up its true significance; quicker to infer the full scope of its implications; and most importantly, more accurate in uncovering its commercial potential (Gaglio, 2004). Those (non entrepreneurs) who do not perceive the signals of change or misinterpret their meaning and implications do not identify innovative opportunities early enough to capitalise on them. Gaglio and Katz (2001) extend this theory further by proposing that the opportunity identification process is heuristically driven and with mental simulations and counterfactual thinking to elaborate on how entrepreneurs work in the opportunity recognition process.

Average Risk Propensity

Risk propensity is the tendency to take actions that one has judged to be risky (Sitkin and Pablo, 1992). Although it is clear that entrepreneurs consistently face a large amount of risk, empirical evidence showing entrepreneurs to have a higher risk propensity has yielded disappointing results. In this research, evidence also suggests entrepreneurs do take risk, in terms of taking advantage of an opportunity and taking initiative in situations of great uncertainty, but their risk propensity is not particularly high or significant. For example:

"They can see a gap, you know, emerging quicker than other people, or maybe they prepare to take the risk. more fluently than somebody else, I think other people tend to sort of hold back a little bit. I wish I could do this but I am little bit hesitant, I am not sure quite sure whether it would work..." (Andrew)

"For me the biggest risk is taking on something and not achieving it, so that's an absolute failure so that's the biggest criteria for me, so when I look at something, whether I want to take it on and do it or not, one of the things I look at is, is there a good chance that I can do it, do I have a better than 50% chance that I can do it,

and I do a little bit of research to see, is it do-able, can I do it , can I find the expertise out there to help me do it, (Entrepreneur 3)

“Anything's a risk to me, risk is something that might result in me failing , me failing and my reputation being damaged. Because if I do something wrong ... erm, whether that be the way I market myself or the way that I perform my job, then that could damage my reputation, could damage my business, could damage my personal and professional reputation , so practically everything I do risks that ...I'm a perfectionist, so everything's checked and checked and checked again... I always thoroughly research stuff , erm you know , seek the support I need and check everything thoroughly that I do... (Entrepreneur 6)

“I don't have a massive amount to lose because I rent this place, I rent my home so you know, I can sort of cover my basic bill each month, I think I am in quite a fortunate position. Yeah that means I can give things a go without too much risk involved. (Entrepreneur 8)

“So if I see a risk in the business, I either got to do what I can do and minimise that risk and just sail through it up to the speed and hope it won't affect you too much. Or I can take advantage of that risk and if I calculate that the risk is worth going for then put a dime on it I suppose you know, (How do you calculate the risk?) I think most of it is gut instinct, you tend to base it on your experiences. I mean when I first started the business I didn't have any gut instinct, I didn't you know, I was worrying about risk on a daily basis... (Entrepreneur 5)

There is little understanding about entrepreneurs' vision and why they think the way they do (Low & MacMillan, 1988). In the most widely cited study on entrepreneurship cognition, Brockhaus (1980) reported that the risk propensity of entrepreneurs does not seem to differ significantly from the rest of the general population. This paradox in entrepreneurial cognition, that entrepreneurs take more risk but do not have a higher risk propensity has not yet been resolved (Busenitz, 1999). In response, some scholars suggest individuals take risky actions because they perceive less risk than most. Even when individuals evaluate identical situations, some people conclude the situation is very risky, whereas others believe it is not (Nutt, 1993). As a result, even if they do not have a high-risk propensity, individuals who perceive less risk than others might unknowingly take risky action (Simon et al, 1999). There are a lot of evidence for this proposition shown in the interviews cited above.

Meta Programmes

Table 3 Meta programmes identified in interviews as important and influential² in entrepreneurial process

Entrepreneur	Number of times Meta programmes identified and (Ranking)					
	"Internal"	"Proactive"	"Difference"	"Towards"	"Reactive"	"General"
Entrepreneur 1	19(1)*	8(4)	10(2)	10(2)	N/I**	2(5)
Entrepreneur 2	10(1)	5(2)	2(4)	4(3)	2(4)	N/I
Entrepreneur 3	10(1)	3(2)	3(2)	3(2)	2(5)	N/I
Entrepreneur 4	4(3)	7(2)	8(1)	1(5)	4(3)	N/I
Entrepreneur 5	9(1)	9(1)	3(4)	4(3)	3(4)	N/I
Entrepreneur 6	9(1)	2(3)	N/I	N/I	6(2)	N/I
Entrepreneur 7	7(1)	2(4)	2(4)	3(3)	2(4)	5(2)
Entrepreneur 8	11(1)	3(3)	3(3)	1(6)	2(5)	4(2)
Total	79	39	31	26	21	11
Ranking in overall	1st	2nd	3rd	4th	5th	6th

* Number in bracket is the ranking of meta programme of the entrepreneur
 **"N/I" = Not identified

Incidence of verbal language patterns that indicate the influential entrepreneur's meta programme preferences is included in Table 3. These identified meta programmes represent important confirmation that meta programmes have an impact on the entrepreneurial process. Patterns are only included in Table 3 if there was a clear indicator of the patterns, as reflected in the language of the entrepreneurs. For example, Entrepreneur

² There are 10 different meta programmes identified in total but the top 6 meta programmes were regarded as influential during the entrepreneurial process. The full table is provided in Appendix 2

1 exhibits a high preference for the meta programme called **“Internal”** which indicate she wants to do things in her own way, rather than following someone else’s suggestion and that she has a strong opinion about herself and her own actions. Other entrepreneurs such as Entrepreneur 2 and Entrepreneur 3 and Entrepreneur 8 also show preference in this specific meta programme. In fact, the “Internal” pattern is the most influential meta programmes among all entrepreneurs except for Entrepreneur 4 for whom the “internal” pattern ranked the third. Other influential meta programmes such as **“Proactive”** (ranks 2nd); **“Difference”** (ranks 3rd), **“Towards”** (ranks 4th), **“Reactive”** (ranks 5th) and **“General”** (ranks 6th) are also discovered. The frequency with which each meta programme was identified provides a basic indicator of the relative importance of each pattern. A high frequency of occurrence was taken as an indicator that the meta programme had relevance to a larger number of entrepreneurs; in addition, the preferences represent differences between entrepreneurs. Take Entrepreneur 4 and Entrepreneur 5 for example, Entrepreneur 4 appears to have the highest preference in “Difference” and Entrepreneur 5, in contrast, exhibits a high preference for “Internal” while his tendency of “Difference” only ranks in 4th place. Despite the interpersonal differences, the finding illustrates strong preferences of “Internal”, “Proactive” and “Difference” meta programmes among the interviewees, which indicates that entrepreneurs tend to have their own idea about their ideas with strong opinions (being “internal”) and being able to recognise a potential business while others don’t (being “difference” and thinking differently) while they will also take action and initiative quickly once the business opportunity is identified (being “proactive”). This evidence is also consistent with the summaries above of entrepreneurial cognition such as entrepreneurial alertness and average risk attitude. In addition, similar findings also correspond to Brown’s research which concludes that entrepreneurial students have meta programmes of “Proactive”, “Difference” and “Internal” (Brown, 2007). Therefore it is hypothesized that a meta programme is more widely influential in entrepreneurial process in this research also applies to the broader entrepreneur population.

IMPLICATIONS AND CONCLUSION

The main purpose of this qualitative research is to test the applicability of using meta programmes to deepen the understanding of entrepreneurial cognition and metacognition. The research findings suggest that meta programmes are a valid and appropriate approach to identify entrepreneurial cognition and metacognition. A further implication of this study is that an awareness of meta programmes can be used by entrepreneurs or potential entrepreneur to aid self awareness of metacognitive thinking process. As mentioned earlier, this study also serves as a stepping stone for further study in entrepreneurial metacognition. The objective of the next step is to identify entrepreneurial metacognition through identification of meta programmes in a more efficient and cost-effective way. This can best be achieved using a self-administered questionnaire. As a person’s meta programmes are usually determined via one-to-one interviews undertaken by a trained NLP practitioner, this is a specialist and time consuming task and because of the costs, it can not be used in research with large samples. A quantitative instrument called the Metacognitive Pattern Indicator (MPI) is regarded as an appropriate tool to fulfil the next research objective. The MPI instrument has been used and tested in the accounting education setting by its founder, Nigel Brown. The MPI is specifically designed and focuses on identifying one’s thinking preferences via completing a self-administered questionnaire. In one of his recent studies, his 96-item instrument questionnaire is able to summarise students’ metacognitive patterns; furthermore, his research findings also provide strong evidence that entrepreneurship students think very differently than accounting students in some of the meta programmes (Brown, 2007). In this researcher’s opinion, the MPI questionnaire can be applied in an attempt to identify entrepreneurs’ metacognition in the entrepreneurship context.

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Appendix

Appendix 1 Profile of interview participants

Entrepreneur	Gender	Age	Education	Business	Business Establishment	Length of Recorded Interview
Entrepreneur 1	Female	20	BA	Govindas Foods Ltd	2008	29 mins
Entrepreneur 2	Male	24	BA	81 Interior	2007	50 mins
Entrepreneur 3	Male	28	MSc	Timto Ltd	2008	53 mins
Entrepreneur 4	Male	54	HND	Redium Ltd	2008	24 mins
Entrepreneur 5	Female	49	LLB	Myriad	2008	25 mins
Entrepreneur 6	Male	28	BSc	Teammetallogic Ltd	2006	42 mins
Entrepreneur 7	Male	31	BA	School of Life	2007	27 mins
Entrepreneur 8	Female	29	MSc	Women Textiles, Art, Design & Consultancy	2005	30 mins

Appendix 2

Meta programmes identified in interviews as important and influential in entrepreneurial process

Number of times Meta programmes identified

Entrepreneur	"Internal"	"Proactive"	"Difference"	"Towards"	"Reactive"	"General"	"Awayfrom"	"Option"	"ThroughTime"	"External"
<i>Entrepreneur 1</i>	19	8	10	10	N/I	2	N/I	N/I	N/I	N/I
<i>Entrepreneur 2</i>	10	5	2	4	2	N/I	N/I	1	1	N/I
<i>Entrepreneur 3</i>	4	7	8	1	4	N/I	N/I	N/I	N/I	1
<i>Entrepreneur 4</i>	10	3	3	3	2	N/I	5	N/I	N/I	N/I
<i>Entrepreneur 5</i>	9	2	N/I	N/I	6	N/I	N/I	N/I	N/I	N/I
<i>Entrepreneur 6</i>	9	9	3	4	3	N/I	N/I	N/I	N/I	N/I
<i>Entrepreneur 7</i>	7	2	2	3	2	5	N/I	N/I	N/I	N/I
<i>Entrepreneur 8</i>	11	3	3	1	2	4	N/I	1	N/I	N/I
Total	79	39	31	26	21	11	5	2	1	1
Rank	1	2	3	4	5	6	7*	8*	9*	9*

* Number in bracket is the ranking of meta programme of the entrepreneur

**"N/I" = Not identified