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Analytic and Non-Analytic Decision Making in Novice & Expert Entrepreneurs

A comparison across entrepreneurial scenarios

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Abstract

This study explores entrepreneurial decision-making with respect to *non-analytic* and *analytic* behaviour among novice and expert entrepreneurs. In order to understand and categorise subcomponents, or strategies, of these two styles of decision-making think-aloud protocols were used. By exploring and comparing behaviour within various entrepreneurial scenarios, and segmenting it using precise categories of cognition, this study adds to existing literature by offering more descriptive value to our understanding of entrepreneurial decision-making. In doing so, it offers insight for novices curious about the thought-processes preceding expert entrepreneurs' decision-making.

Our findings regarding the use of *non-analytic* and *analytic* behaviour among these two groups of entrepreneurs coincide to an extent with previous research on novices and experts. The results regarding what strategies are predominantly used by these two groups offer detailed comparison of behaviour. Further large-scale research is proposed using a similar methodology to this study, as well as research on the merits of these various strategies. This would allow the formulation of prescriptive guidelines for novices that indicate best practice regarding specific *analytic* and *non-analytic* strategies to decision-making.

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1. Introduction

Researchers across domains have been curious for years about expert performance. Questions like ‘what makes someone an expert?’ or ‘do experts do things differently?’ are common to both researchers and practitioners alike in every field. After several decades of research in the subject, a somewhat widely held belief is that expertise is something that is gained with time. Deliberate practice literature tells us that more than seven years of intentful practice results in the accumulation of expertise and lends itself to superior performance in a given domain (Feltovich et al., 2006). This idea of expertise is a crucial assumption held by this paper and will be developed further along in this paper. So, expertise is gained with time, but what exactly makes experts different? That is a question left for individual domains to decide.

Much like other fields, entrepreneurship researchers have strived to pinpoint characteristics of high performing entrepreneurs or expert entrepreneurs. The initial trait approach to discern personal characteristics of these entrepreneurs failed to yield positive results over the last several decades thus prompting researchers to look towards other avenues; individual behaviour being one of them (Baum & Locke, 2004). Unlike the trait approach, this stream has shown promise in recent times with much evidence to show varied decision approaches between expert entrepreneurs and non-experts (Dew et al., 2015). For example, Dew et al. (2009) demonstrated considerable divergence in the logical framing of expert entrepreneurs when compared to MBA students.

A parallel line of study emerged around the same time with similar goals, however pitting novice entrepreneurs (individuals without prior business experience) against habitual entrepreneurs (multiple business experience). Some of these researchers pointed out that habitual entrepreneurs are more likely to employ different decision-making styles in the opportunity-recognition stage due to years of deliberate practice (Ucbasaran et al., 2015) while others demonstrated empirical evidence to suggest prior business experience contributes to valuable learning (Politis, 2008).

Thus, a sentiment linking multiple business experience with expertise also exists in the field among researchers (Gustafsson, 2004).

The findings from the above contexts and others have demonstrated the relative success of the behavioural approach and as a result makes the case for a deeper look into entrepreneur's cognitive[1] structures to explain the differences among them. One argument being that a cognitive approach allows us to not only look at decision strategies, but also seek the thinking-patterns that contribute to their behaviour. The case for taking the cognitive approach in entrepreneurship has also been supported by many scholars in the field (Mitchell et al., 2007; Ucbasaran et al., 2015). Authors like Baron (2004) pointed out how other fields like education and psychology have reaped the benefits of such an approach and asserted to expect similar results in the field of entrepreneurship.

So, it is known that expertise in entrepreneurship is not linked to a particular personality trait and that entrepreneurs are not homogeneous in this respect. However, evidence does point to differences in behaviour among different groups of entrepreneurs . This is especially visible in some situations when comparing expert entrepreneurs with those that are not as experienced. Scholars have also noted the benefits of taking a cognitive approach in entrepreneurship and urged researchers to do so. Keeping these in mind, this research papers adopts a central research question pertaining to *how entrepreneurs make decisions* and the differences, if any in the *thought processes* leading to these decisions among expert entrepreneurs and novice entrepreneurs (*herein used interchangeably with 'experts' & 'novices'*).

Entrepreneurial decision-making has been referred to as a paradigm with many different perspectives to it (Schade, 2010). To cite some examples, Sarasvathy (2001) attempted to distinguish the entrepreneurial decision mindset into 'effectual' and 'causal' approaches, while Gustafsson's (2004) work viewed entrepreneurial decisions along an intuitive-analytic scale. This paper, with aims of exploring decision-making at a deeper cognitive level will take the latter

[1] * Cognition is the study of individual perceptions, memory and thinking (Mitchell et al., 2002)

approach drawing inspiration from the dual-processing model of decision-making (Epstein, 1994; Slovic et al., 2002). This type of processing model suggests two modes of thinking. The first, involves decisions - logical, objective and structured in nature with many scholars calling it the *analytic* mode. The second mode is instinctive, emotionally affected and makes associative connections. This particular mode has less acceptance among scholars in what it encompasses and thus names like experiential, narrative, imagistic system have all been used to describe it. However, Epstein (1994) explains that a concrete resolution for which among them is most valid is unnecessary since each can be valid in its own way and appropriate for their own certain purposes. Thus, this paper calls the second mode the *non-analytic* mode and will take inspiration from multiple dual processing theories to operationalise it in a way that fits the purpose of this paper.

1.1 Research Gap

What purpose is served by following the dual-processing model of thinking and splitting entrepreneurial decision-making into the categories of analytic and non-analytic ? (*herein used interchangeably with 'AN' and 'NA'*). The answer to this lies in the context of the entrepreneurial setting. Entrepreneurship as a field is inherently uncertain by the nature of the tasks involved and information is a key resource in combatting this uncertainty (McMullen & Shepherd, 2006). It is argued that an entrepreneur's battle against uncertainty can be viewed as working under conditions of bounded rationality (Cooper et al., 1995) where the human mind's capabilities are seen as limited because of the constraints in information gathering. Under these conditions, there are no assumptions about gathered information's relevancy or whether all of it is processed. The decision-making process by entrepreneurs under these conditions can be described as satisfying as opposed to optimising (Cooper et al., 1995). This begs the question, how much reliance do entrepreneurs place in available information? Do they go by the information gathered and if so, to what extent ? This is where the cognitive approach outlined in this paper becomes useful. By distinguishing entrepreneurial decisions into various *AN* and *NA* categories, we expect to not only determine the extent to which *experts* and *novices* rely on given information, but also how they process this information. Furthermore, the compartmentalisation of decisions into *AN*

categories allows us to see the extent to which both groups engage in structured behaviour, manipulating the data provided (Denes-Raj and Epstein, 1994; Gustafsson, 2004). On the other hand, *NA* classification depicts entrepreneurs' instinctive motives drawn from external influences outside the given data set.

The research gap to perform this study gains its purpose from two distinct areas. First, existing research have performed well to initiate the operationalisation of cognitive strategies at a surface level. For example, a close study in this line of research by Gustafsson (2004) distinguished entrepreneurial decision-making as analytic, quasi-rational or intuitive. The results showed the novice sample consisting of college students (entrepreneurs, mba, engineers) to be highly analytical decision-makers, whereas the expert entrepreneur sample showed varied approaches that depended on the nature of the task in the opportunity-recognition phase. While this paper did well to highlight the differences in the two groups, it did not take a penetrative approach describing the underlying constructs that make up *AN* and *NA* decision-making. This paper will address that issue and by doing so, will contribute to the research area in a way many scholars including Gustafsson herself have urged. For example, in "Thinking about entrepreneurial decision-making: a review", the authors mention how future research on entrepreneurial decision-making need to explore the use of heuristics in more detail (Shepherd et al., 2015). This paper addresses this need because the different types of heuristics forms the bulk of the non-analytic framework.

Second, much of the existing research on entrepreneurial cognition have adopted the early stage of opportunity-recognition as its focus due to the critical nature of the task in the entrepreneurial journey. (Shane & Venkataraman, 2000; Dew et al., 2015; Gustafsson, 2004). For eg. Baron & Ensley (2006) demonstrated superior pattern recognition skills by expert entrepreneurs when compared with novices at the opportunity-recognition stage. Nevertheless, we must acknowledge that opportunity-recognition is not the end-all of an entrepreneur's journey. What about after the advent of the firm? Schade (2010) mentions some of the other important decisions entrepreneurs must take such as "how to enter a market" and "how to terminate the business". Can we expect

similar results in other entrepreneurial tasks? Thus, there exists research potential outside the scope of the opportunity-recognition task. This paper addresses this gap by including five other important entrepreneurial tasks into its research design based on existing literature in entrepreneurial decision-making

1.2 Purpose & Aim

To summarise this paper's purpose, there exists growing evidence to show varied approaches in decision-making strategies of expert entrepreneurs with novice entrepreneurs. Taking a cognitive approach to decision-making in the entrepreneurial setting helps us visualise thinking-patterns more distinctly, essentially isolating specific strategies of seasoned entrepreneurs. While existing work have laid the foundations of this route, researchers have called for a more fine-grained construct of the various cognitive processes that encompass entrepreneurial decision-making. In addition, recent papers have adopted an opportunity-recognition focus when it comes to studying decision-making but we know the entrepreneurial journey involves several other stages. Thus, we propose the following research question to further our knowledge in this domain

"How does the use of analytic and non-analytic decision-making differ between novice and expert entrepreneurs across different entrepreneurial scenarios"

The aim of this paper is to extend our knowledge on how *experts* and *novices* make decisions in different entrepreneurial scenarios. Recent work have followed an approach that mapped decision-making strategies to expected outcomes. We refrain from taking this path, instead focussing on providing refined descriptive value by identifying underlying cognitive strategies and how they vary from scenario to scenario. The outcomes from this study can be used to isolate expert patterns to further expertise research in the entrepreneurial domain. Results from this study could also be be combined with a normative approach to make best-practice claims for different scenarios. Finally, we hope that this study will provide *novices* with a better understanding of how their decision-making differs in comparison with *experts*, thereby allowing *novices* to undertake a new approach with added perspective.

1.3 Terminology

The definitions of novice and expert entrepreneurs are crucial components of this paper and therefore needs to be addressed early. This paper defines an expert entrepreneur or *expert* as a habitual entrepreneur with no less than seven-ten years of entrepreneurial experience. This is the shortest time required to gain expertise in the field (Gustafsson, 2004; Feltovich et al., 2006). On the other hand, a novice entrepreneur or *novice*, is an individual *"*with no prior (minority or majority) business ownership experience either as a business founder, an inheritor, or a purchaser" (Westhead et al., 2005, p. 394). Additionally, to comply against deliberate practice literature, a *novice* should not have attained expertise and so by definition must have less than seven years of entrepreneurial experience.

2. Theoretical Framework

The introduction highlighted how entrepreneurial decision-making can be considered a multifaceted paradigm (Schade, 2010) but also noted the benefits of taking a cognitive approach. We mentioned the recent emergence of dual-processing theories of decision-making and argued why splitting entrepreneurial decision-making into categories of analytic and non-analytic will help in achieving this paper's purpose. The aim of this section is to break down the many underlying strategies of both categories and form a decision-making framework that can be aptly utilised in the methodology to explain how entrepreneurs think when making decisions.

2.1 Analytic Decision-Making

Throughout literature analytic thinking is discussed as a type of reasoning that requires forethought and control(Gustafsson, 2004), often described as planned and intentional (Chaiken, 1980; Denes-Raj and Epstein, 1994). In combination with the description by Gustafsson (2004), stating that analytic thinking diverges from an otherwise rather unaided style of thinking, we have gathered central themes of what is taken to be analytic. In order to further specify, and ultimately allow us to measure analytic decision-making in an interview with entrepreneurs, concepts that indicate this planned and intentional behaviour are at the core of this study.

Detecting analytic decision-making requires a framework of specific concepts that allows for compartmentalising and quantifying these occurrences. As this research design is to use think-aloud protocols, these concepts are the cornerstone to classifying the various verbal cues from the interview. For clarity, the research design is described in detail in section three. Literature does not specify finalised categories of analytic cognitive mechanisms, but rather provides an understanding of what constitutes analytic behaviour. The following section contains various concepts that we place under the umbrella term *analytic*, based on these characteristics from literature. The result of this is a set of sub-categories to analytic thinking, into which we will categorise the various verbal cues from the interviews.

2.1.1 Adherence to Data

Acting with forethought and planning is a central characteristic of analytic behaviour. In the context of cognition, it is often addressed in terms of data processing (Gustafsson, 2004). Non-analytic behaviour, or more specifically intuition, is seen as rather unaided and the use of data is a tool that allows to counteract this. This highlights an important part in defining analytic behaviour, as general adherence to, and processing information falls under this type of reasoning (Hammond et al., 1987). An important component of analytic behaviour is pertaining to facts, information and data. To be able to measure more specific actions, which show this behaviour in the setting of an interview, the following sub-categories will be used.

Hammond et al. (1987) propose an important characteristic that signals analytic behaviour in a problem solving context. One distinguishing feature that arises is the matter of objectivity. Adherence to data or facts constitutes behaviour that can objectively be realised. This is discussed as a counterweight to intuitive behaviour. This allows for a first sub-category of analytic behaviour to be formed, which we label **Focus on Data**. Verbal cues that reflect general adherence to data are therefore counted as indicating analytic decision-making in the interviews we conduct with the entrepreneurs. Examples regarding these subcategories can be found in the Appendix: 7.3 Table of Codes. For more accurate measurement, further instances of adhering to data need to be addressed. What further will be categorised under Data Focus are decisions that are purely dependent on data provided. Any decision that originates from simply choosing from available information or options, will fall under this sub-category. Continuing with the notion of objective reliability, it is important to note that adherence to data comes in various forms. Gustafsson (2004) highlights distinct aspects which allow for more specific classification of decisions that make use of data. One of these distinct behaviours is individuals making references to not having enough information or data to go by. This type of statement signals the aforementioned adherence to data and adds to our research by providing one more specific sub-category which can be detected in a TAP setting. The verbal cues that signal this lack of data will be categorised in **Insufficient Data.**

To further avoid categorising responses under a very broad umbrella term, Gustafsson's provides further distinct aspects that are said to signal adherence to data. A third sub-category which will be used to categorise the verbal cues from the interviews is made up of occurrences when participants change their mind based on new data. Epstein et al. (1996) discuss this type of behaviour, showing it signals individual's' tendency to act according to data/information, and is said to indicate analytic reasoning. **Changing Mind** (because of new data) is the fourth sub-category of analytic decision-making which will be used to categorise the verbal cues from the interviews. Further concepts need to be included into this framework so that the analytic decision-making during the interviews can be detected and categorised. These further concepts are related in the sense of making use of data, but focuses on aided and systematic decision-making.

2.1.2 A Formal, Structured or Systematic Approach

Ulvila and Brown (1982) elaborate on various ways in which analytic behaviour addresses information using formal systematic and established procedures. As such, this provides a suitable sub-category of analytic decision-making pertaining to instances where a formal procedure is used to manipulate data. Some elaboration is provided by Gustafsson (2004) who discusses this behaviour as known techniques that are used in the process of decision-making. Some examples that arise throughout the work of Ulvila and Brown (1982) are probability calculations and decision-tree analytics. In addition to computations such as return on investment and profit maximisation, the arsenal of entrepreneurs and managers includes strategic tools such as SWOT or Critical Questions Analyses, which all come as an aid to the quantities of variables an entrepreneur deals with (Helms and Nixon, 2010). Instances that display systems or techniques, used to manipulate the data, will be categorised as analytic behaviour. These occurrences will be coded as **Formal Systematic Methods.**

Logical deductions are a concept that are linked to the aforementioned formal systematic approach. Following a set of axioms to make use of information is a further subset of analytic

decision-making. Gustafsson (2004) describes such behaviour as controlled, with authors such as Hammond et al. (1987) highlighting that this analytic behaviour results in a particular confidence that decision-makers have in this systematic approach. Once again the usage of available information is central to this behaviour and could perhaps be categorised as adherence to data. The motivation for adding this further category, labelled **Logical Deductions,** is to enable more honed detection of various analytic decision-making instances during the interviews. Two further sub-categories of analytic behaviour will be introduced in this framework, in order to ensure correct detection of analytic behaviour throughout the TAP.

Shanteau (1988) addresses behaviour which cannot truly be categorised as formal methods. This type of analytic behaviour rather corresponds to analytic approaches to a problem. One such proposed approach occurs when individuals segment problems into smaller, more manageable parts, in order to overcome the hardship of the original decision. This type of behaviour cannot be factored into a formal systematic approach, as it does not follow a set of formalised rules, but rather ought to be seen as a separate technique falling under analytic behaviour. Gustafsson (2004) discusses this phenomenon in different words, referring to actions that decompose problems into smaller elements. These very similar interpretations of what the authors deem to be analytic decision-making provide yet another sub-category of analytic behaviour, which will be used throughout this study. Instances that reflect this behaviour will be coded in the category **Divide & Conquer.** While not a formal system, this type of behaviour does coincide with the aforementioned notions of aiding and planning during the decision process. A final sub-category of analytic decision-making will be introduced, which falls in line with this approach as well. Shanteau (1988) discusses behaviour which entails the system of estimations that aid the decision-process in avoiding large errors. In the process of separating a problem into more manageable and useful parts, these estimations aid in conducting an analytic thought process. During the interviews with entrepreneurs, any instance which indicates this type of systematic behaviour will be coded in the category called **Ballpark Estimation**.

2.2 Non-Analytic Decision-Making

Little doubt exists that humans do not always follow the analytic mode outlined above. Researchers have suggested a second processing style that relies on instincts and emotions to make decisions inspired by years of evolution (Epstein, 1994; Slovic et al., 2002). This particular mode has several theories of what it encompasses and as a result have different names attached to it. However, Epstein (1994) argues that they can all be valid with some more appropriate than others for different purposes. This paper gathers support from a few of those theories to operationalise decision-making that deviates from analytical thinking under the term non-analytic.

A theory by Tversky & Kahneman (1974) introduces the *NA* concept of heuristics or cognitive-shortcuts to aid in decision-making. Researchers have opposing views on whether these shortcuts work in favour of the decision-maker or against them. Some scholars argue that there is an optimal decision and these heuristics only distract the decision-maker (Hutton & Klein, 1999; Tversky & Kahneman, 1974) while others argue that these mental short-cuts, allow the decision-maker to recognise a course of action based on familiar situations. (Hutton & Klein 1999). In the entrepreneurial setting, researchers argue that heuristics allow entrepreneurs to make quick decisions in highly uncertain environments (Busenitz & Barney, 1997; Mitchell et al., 2007) with evidence to suggest experts' greater reliance on heuristics (Gustafsson, 2004). Other dual-processing theories highlight the importance of emotions as a *NA* concept. For example, Epstein (1994) mentions that several authors have introduced an intuitive mode that operates on a range from simple to complex that is determined by the degree of emotions and moods. In the entrepreneurial setting, researchers have conceded the role of emotions and concluded that it is an undeniable part of an entrepreneur's life and decision-making (Mitchell et al., 2007). Thus, it is clear that heuristics and emotions are crucial decision-making components in the entrepreneurial setting and the following section aims to break them down further.

2.2.1 Heuristics

Heuristics is a simplifying strategy employed by individuals to make a decision and draws from ideas, beliefs, experiences, mood and informal processes. (Mitchell et al 2007; Kahneman, 2011; Tversky & Kahneman, 1974). It has been used as a giant umbrella term when discussing decisions that have a basis in the *NA* realm and this section intends to categorise this term into smaller, well defined components.

Rules of Thumb

One way heuristics has been described is in the form of cognitive frameworks that allows individuals to make decisions by piecing together different information to form specific rules that can be applied (Busenitz & Barney, 1997), commonly referred to as rules of thumb. Fong et al. (1986) make the case for abstract inferential rule systems that guide thought processes. They showed how people that underwent training in the law of large numbers displayed improved statistical performance across many everyday problems. They also demonstrated how teachings in domain specific rules led to improvements across other domains. In the entrepreneurial context, a field rife with uncertainties, these rules of thumb or heuristics are argued to allow entrepreneurs to make sense of the complex situation quickly and sometimes even produce superior results (Mitchell et al. 2007). Instances detecting pre-defined set of rules used to understand their environment (Simon & Houghton, 2002) will be coded as rules of thumb. For example: “Always buy a screen protector for your phone”

Representativeness Heuristics

Another subset of heuristics, representativeness is a phenomenon in which individuals tend to make generalisations on individuals or topics based on only a few details about them (Busenitz, 1999). This was demonstrated in a study asking participants to guess the profession of an individual based on a brief personality description of that person. Results showed that the majority of participants ranked their choices in a similar order without real evidence to suggest the person’s profession (Tversky & Kahneman, 1974). While it may seem counter-productive to make decisions based on representativeness due to the lack of substantive evidence; in an

uncertain entrepreneurial setting, these techniques can be especially valuable due to the lack of time and institutional support in gaining random samples (Busenitz, 1999; Katz, 1992). A study also found entrepreneurs to use representativeness to a much higher degree compared to managers in large organisations (Busenitz & Barney, 1997). For the purpose of this study, instances with clear generalisations will be coded as such. For eg: "This phone should have better performance because it looks like an iPhone".

Affect Heuristic

Like other heuristic mechanisms where individuals rely on simplifications of mental processes to make decisions, affect heuristic is another strategy used wherein the individual's reasoning moves away from the systematic deduction of facts and instead relies on the positive and negative feelings generated (Slovic et al., 2002). This extends to individuals making judgements based on the idea of liking or disliking something instead of deliberate reasoning (Kahneman, 2011). There is little doubt today that affect plays a role in decision-making with multiple studies showing its prevalence (Slovic et al., 2006; Hsee and Menon, 1999). The relevance of affect in the entrepreneurial setting has been acknowledge by Baron (2008). He claims that affect heuristic is useful in unpredictable contexts as it helps "tip the balance" to make a decision. He also highlights that affect has been shown to be influential in the creative process and other tasks relevant to entrepreneurs and therefore concludes it to be an essential decision-making strategy for entrepreneurs. Instances suggesting individuals leaning on the good/bad or simple feelings will be coded as such. For example: "I don't know why but I feel this is a better phone"

StoryTelling/Creative Solutions

Many authors are of the idea that narratives provide a method to explain our mental representations (Epstein, 1994). Baumeister & Newman (1994) suggest that narratives are instrumental exercises in self-interpretation by which people make sense of their experiences. Thus, as means of simplifying and giving meaning to their experiences, it can be considered to be a form of heuristics. Hutton & Klein (1999) explains the role of narration in decision-making suggesting it allows individuals to mentally simulate how situations will develop by perceiving resemblance and typicalities from past experiences. This allows them to see how situations arise

and judge outcomes. Thus, instances of mental simulation providing narration to explain past experience will be coded under storytelling. For example: “I once bought this phone that beeped randomly. I thought I bought a broken phone so never paid attention to it, but later realised I could turn it off in the settings. It's not always the machine’s fault you know! ”. Similarly, Shanteau (1988) mentions the likelihood of generating new ideas and reinterpreting outcomes in novel ways in expert decision-making. These instances detecting creative thought or narratives leading to novel outcomes will be coined as creative solutions. For example: “Phones are nice and it has helped me find my way so many times, but why not just use a watch?”

Other Heuristics

Heuristics is a complex cognitive system of breaking information down to make meaningful interpretations (Kahneman, 2011). The above categories make up some of the commonly researched heuristic strategies. But due to the complexity of this phenomenon, we expect instances that do not fit into the above categories. Thus, simple references to ‘personal experience’ (Busenitz and Barney, 1997) and heuristical simplifications that do not fall in the preceding sections will be categorised under this category. For example: “I have learnt that big phones are not very good for typing”.

Ignore The Fluff

Heuristics have been referred to as drawing from informal processes and heuristic logics are said to allow entrepreneurs to make sense of uncertain situations more quickly (Mitchell et al., 2007). Until now, we have only identified heuristic concepts that can be actively measured by response. Shanteau (1988) mentions that expert decision-makers are able to identify information that is valuable and disregard those they deem unnecessary. Similarly, Mitchell & Chesteen (1995) suggest expert entrepreneurs to able to extract relevant information quickly. Thus, we aim to include a task in our methodology to see if our sample entrepreneurs see past unnecessary information. Instances of this category will be coded when respondents do not make references to information that is deemed redundant by the authors of this study.

2.2.2 Emotions

Entrepreneurship by virtue of context is a highly emotional field. The combination of uncertainty, time-pressures and extent of personal consequences contribute to this cause (Cardon et al., 2012). Empirical evidence exists that show entrepreneurs try to avoid negative emotions (Wong et al., 2006) and others have shown the importance of positive emotions for entrepreneurs in starting ventures (Hayward et al., 2010). Nonetheless, the fact that emotions matter in the entrepreneurial process is well-established (Brundin & Gustafsson, 2013). This section introduces two *NA* concepts associated with emotions/moods that were identified as being especially susceptible to entrepreneurs (Baron, 1998).

Counterfactual Thinking

This phenomenon stems from emotional feelings of regret and manifests as thoughts of 'if only' or 'what might have been' (Baron, 1998). Research for this phenomenon has been based on deep rooted emotional responses to events where the individual came close to achieving his/her goal but eventually failed. A study on athletes measured responses of silver medal winners in comparison to bronze medal winners. The results showed that despite being better off, silver medal winners focussed on what they failed to achieve whereas bronze medal winners were more content. These thoughts have also been seen in students that closely miss out on an 'A'. The authors of the study insists that that feelings of regret from close misses can haunt individuals for a very long period of time (Medvec et al.; 1995). Baron (1998) makes the connection of regret and counterfactual thinking relevant to the field of entrepreneurship. He concluded that entrepreneurs overall display less regretful thinking than non-entrepreneurs, but suggested that successful entrepreneurs use these thoughts to make more optimal decision in future (Baron 2004). Instances where entrepreneurs point towards feelings of regret or past learnings to make a future decision will be coded as counterfactual thinking. For example: "Buying a blackberry phone was a waste of $300, and I will never make that mistake again".

Affect Infusion

As humans, everyone experiences days that feel worse than others and your perception of others on those days are not necessarily the same (Forgas, 1993). This altered perception as a direct result of an affective state is the idea behind affect infusion (Baron, 1998). Our 'feelings' or 'affective state' is vulnerable to outside influences and research has shown that it can be altered to produce different outcomes (Forgas, 1995; Robbins and DeNisi, 1998). For eg. Baron (1993) found that participants that were primed to to experience different moods, rated job applicants differently. Baron (1998) suspects entrepreneurs more likely to be affected by this phenomenon due to the emotional investment they place in their ideas, commitment and vision. This study is less concerned about the affective states itself but moreso about instances that reference its influence. For example, "If I'm in a good mood, I will splurge to buy the latest model of the phone"

Emotional Choice

In addition to the above two concepts that draws its basis in the past role of affect or references to the role of affect, we propose another *NA* concept, emotional choice which deals with emotions in the present state. It will take from Cardon et al., (2012) which suggests entrepreneurial emotion as the role of affect, emotions or feelings concurrent with the entrepreneurial process. An example that can highlight this behaviour is "I have to be confident that workers that made this phone were treated fairly before buying it".

2.2.3 Expertise

An assumption held in the introduction is that *experts* are likely to display expert characteristics through years of deliberate practice in the domain. This section aims to explore expertise literature to understand the development of these skills.

The study of expertise initially began in the 1940s with assessing professional chess players. Researchers found experts to have significantly better piece recall compared to novice players. They later explained this phenomenon suggesting experts perceive information as meaningful patterns and thus store these patterns as easily reproducible 'chunks' (Feltovich et al., 2006;

Gustafsson, 2004; Chase & Simon, 1973). So experts perceive information in different ways, but how does an expert get to that point?

Ericsson et al. (1993) argues that expertise is gained with the act of prolonged deliberate practice that enhances the cognitive adaptation to learn and improve skill acquisition. They added that it is a highly structured activity where the individual monitors his/her performance and does not necessarily enjoy the process. Experience alone is not a defining factor unless paired with deliberate intent to improve. (Ericsson et al., 1993). This process repeated for a minimum of seven-ten years in a particular domain lends itself to acquired expertise in the field (Gustafsson, 2004; Feltovich et al., 2006). In entrepreneurship, Baron & Henry (2010) stress the applicability of deliberate practice literature and also found empirical evidence to suggest that experienced entrepreneurs store information differently compared to *novices*. Other empirical studies also exist with growing support for developed entrepreneurial cognitions or scripts in expert entrepreneurs (Mitchell et al., 2002; Gustafsson, 2004; Dew et al., 2009).

2.2.3 Decision-Making Framework

The previous sections dissected decision-making into several *AN* and *NA* concepts based on existing dual-processing theories. With these defined concepts, we can move to create a framework that allows us to assess the differences in decision-making strategies used between *experts* and *novices* across many entrepreneurial scenarios.

Figure 1: Decision Making Framework

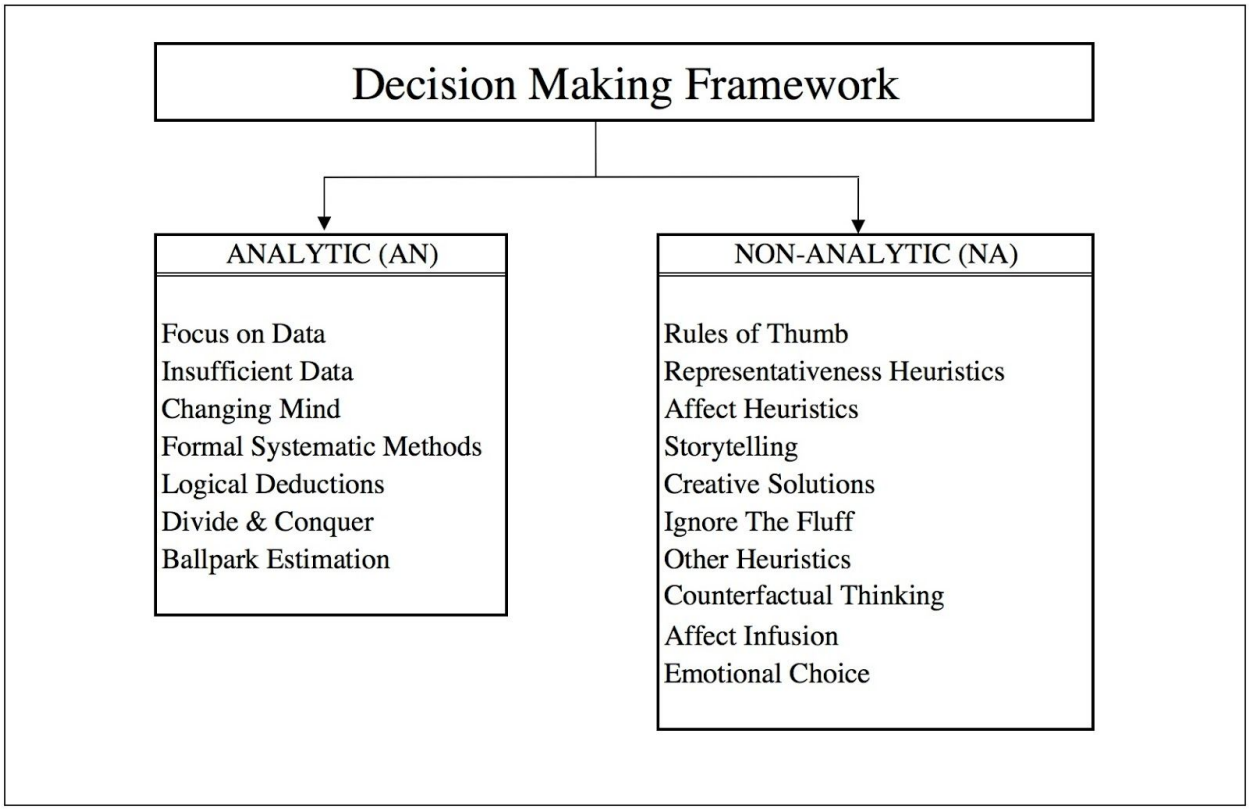

Figure 1 highlights the specific concepts we have identified in the theoretical framework. We aim to use think-aloud-protocols - discussed in-depth in the following section, to identify and code these concepts. We take a mixed approach combining both quantitative and qualitative elements. The numbers yielded from coding will aid in providing a better understanding of the balance in concepts used. However, the findings itself will be descriptive in nature allowing a better look into how these decisions are made.

3. Methodology

3.1 Research Design

To tackle the question - *How does the use of analytic and non-analytic decision-making differ between novice and expert entrepreneurs across different entrepreneurial scenarios* - participants were asked to solve a new venture case utilising five scenarios ranging from entry to company exit. This study takes a qualitative research approach, while maintaining some quantitative elements. A similar approach was taken by Dew et. al (2009) when comparing effectual and predictive logics among MBA students and expert entrepreneurs, with more emphasis on the quantitative elements. The sample size of this study is smaller, and the focus lies with *how* the behaviour differs, aiming to provide insight into the differences. Simple quantitative measures are used to highlight differences between *novices* and *experts* across entrepreneurial scenarios, and the qualitative analysis aims to describe and categorise participants' decision-making. A process tracing technique from verbal protocols, called think-aloud protocols (*herein used interchangeably with 'TAP'*), was chosen for its strength in providing access to participants' internal processes (Fonteyn et al., 1993).

To ensure plentiful data collection, the use of retrospective verbal reports is employed on top of the concurrent verbalisation of the participants, resulting in a mixed methods approach. While gaining insight into the thought processes it is helpful to combine this with some explanation by the participants. In order to avoid inferential bias, which occurs when the participants describe their behaviour without displaying it, literature by Ericsson (2006) was consulted. The author explains that this bias is avoided when the retrospective explanation happens within less than ten seconds of the actual decision. When testing the initial case the answers emerged to be less descriptive than desired, and therefore called for the addition of *why* questions, in order to generate enough data. These were added in accordance with the work by Ericsson (2006).

3.2 Sampling and Subjects

Purposive sampling was used to select participants, since the aim was to compare traits of the two subgroups of entrepreneurs. A sample of four *novices* was assessed in comparison to a sample of four *experts*. As discussed by Bryman and Bell (2011, p.492) this non-probability sample posed the greatest chance for rich results, as it allowed us to compare two groups based on their characteristics. As this purpose is to compare decision-making behaviour among *novices* and *experts*, the criteria for our selection was focused on the years that the entrepreneurs has been in business. We follow literature on deliberate practice, which suggests that seven to ten years allows for individuals to develop expertise and therefore constitutes being an expert in a field (Feltovich et al., 2006; Gustafsson, 2004). For the purpose of obtaining noticeable differences in behaviour between the two groups, we interviewed individuals that did not fall close to this seven year mark for *experts* and instead set the bar at ten years. Similarly, although the definition for *novices* corresponds to first-time business owners with less than seven years of experience, our selection focused on *novices* that had less than one year of business experience.

The process of finding participants came through personal connections and an environment rich with entrepreneurial undertakings. Through the entrepreneurship course at Lund University, and the adjacent business hub Ideon, access to existing firms and entrepreneurs was gained through emails and visits to their offices. This was a strong source for expert participants. Similarly, personal engagements such as competitions and an internship worked strongly in favour of finding suitable participants for the novice group.

As part of adding to the transparency of our research, the participants were asked to provide information as seen in the table below. A secondary purpose to collecting this information was to provide a basis for analysis and interpretation of the results, as this could be improved through consideration for the various qualities the interviewees portrayed. The rather personal nature of the TAP, and due to the requested information, participants' names were altered for anonymity.

Table 1: Participant Information								
Type of Entrepreneur	Participants	Age	Operating Country	Years as Entrepreneur	Companies Started	Number of Industries	Type of Industries	Level of Education
Experts	Fiona	51	Sweden	15	3	2	IT, Consulting	Masters
	Harald	52	Sweden	17	8	3	Engineering, IT, Consulting	Masters
	Miro	41	Sweden	17	9	1	IT	Masters
	Finn	44	Sweden	10	3	2	Consumer Goods, Technology	Masters
Novices	Karl	24	Sweden	1	1	1	Digital Marketing	Bachelors
	Moritz	19	Sweden	1	1	1	IT(Digital Marketing)	Masters
	Anabel	26	Sweden	1	1	1	Sport Equipment	Masters
	Enrico	23	Sweden	1	1	1	Education Support	Masters

Table 2: Participant Statistics				
Type of Entrepreneur	Avg. Age	Avg. Years as Entrepreneur	Avg. Number of Companies Started	Avg. Amount of Industries
Experts	47	14.75	5.75	2
Novices	23	1	1	1

3.3 Interview Process

Participants were handed the case, along with a one page description and verbal preparation for the interview process. On suggestion from Ericsson & Simon (1998) two sample questions were administered in order to warm up and formulate an understanding of the expectations of think aloud protocols. In order to receive the most accurate and direct verbalisation, emphasis was placed on the instruction to verbalise even the most minute thoughts that occur during the process. In line with concerns raised by Fonteyn et al. (1993) the only instruction given during the problem solving was to urge participants to continue verbalising their thoughts. The problem sets followed a chronological order resembling the life of a startup, with clear segmentation at every different scenario. The following structure was used:

A) Entry Scenario

B) Pricing Scenario

C) Marketing Scenario

D) Termination Scenario

E) Exit Scenario

The specific questions for all of these topics can be found in the Appendix: 7.1 Case. The analysis aims to categorise responses into the subcategories of *AN* and *NA* decisions which are discussed in the theoretical framework.

The interviews were conducted in separate rooms, with only the participant and researchers. The majority of the interviews were conducted at the participants' workplaces, in order to promote a real-world setting and the hope to induce responses most representative of real-world behaviour. The duration of the interviews ranged from 40 to 90 minutes.

3.4 Data Analysis

The interviews were recorded and transcribed in order to permit coding of the information provided by the participants. A coding scheme was created and can be seen in full in the Appendix: 7.2 Coding Scheme. Following the structure outlined by Bryman and Bell (2011) the data was addressed, independently by both researchers, firstly using open coding where verbal cues and semantic bundles were highlighted. Consensus had to be reached regarding the selected observations to eliminate biases and data disparity. These were then categories into the sets of *AN* and *NA* (coding). Since no external re-coder was used, the re-coding was done separately by both authors of this study. Gustafsson (2004) indicates this option as being suitable, and highlights that re-coding increases reliability. The responses were then quantified to reveal behavioural differences between our two groups of entrepreneurs, across the different scenarios. A table of codes, and corresponding sample quotes from the participants can be found in the Appendix: 7.3 Table of Codes.

3.5 Case Selection

In creating a study to measure *AN* and *NA* decision-making, the immense subjectivity of decision-making has to be noted. Creating a case suitable for this was not in the scope of this study considering the limited time. Any case for this study had to simulate, to the best of its abilities, real-life entrepreneurial tasks. Sarasvathy's (2008) case from the book *Effectuation: Elements of Entrepreneurial Expertise* was chosen, with questions having been altered to more specifically address concerns important to this study. By using an existing case from a renowned researcher, the results are intended to have more value, as a result from its frequent usage in literature surrounding decision behaviour. In order to condense the research instrument for time purposes, and for clarity regarding our priorities, some alterations were made to the various components of the case.

Three major alterations were made to this case that served to address the specific needs of this paper are as follows:

a. A graph was added in order to test for adherence to data. The intention was to check if participants would bring up the graph or disregard it based on its limited relevance. The formulation of this graph was rooted in the suggestion that experts show better ability in identifying relevant information (Shanteau, 1988).

b. A termination scenario was incorporated into the study in hopes of revealing decision strategies in situations where high emotional factors might come into play. This scenario was incorporated especially with the intention of posing a difficult dilemma. Baron et al. (2001) discuss employee termination in a start-up context, highlighting it as being a common decision for founders as well as discussing it as a tool to gain profitability. As such, this scenario is added to our study as a fitting real world decision that entrepreneurs face.

c. Questions were altered with the purpose of prompting participants to verbalise their thoughts with minimal intervention from the researchers. *Why* was added to the end of the questions, in order to ensure richer data collection.

The specific scenarios were selected to be representative of real world decisions that entrepreneurs face, and also highlight the differences between novices and expert entrepreneurs. The scenarios aim to shed light on how much the entrepreneurs focus on the data at hand, how much they rely on inputs not provided in the case, and their tendency to rely on emotions and personal belief. Based on certain qualities of the questions, we will be able to see decision behaviour under particular conditions. Based on Hammond et al. (1987) one is able to describe some scenarios showing more intuition-inducing or analysis-inducing qualities. Scenario two shows the most analytic-inducing characteristics, as it has a high degree of objective measurability and quantitative information that is presented sequentially to participants. Scenario four is taken to be the most intuition-inducing task due to the openness to interpretation and the limited information, providing a more uncertain environment.

3.6 Limitations and Weaknesses

A clear overview of the limitations of this study can be given following a chronological order of the process.

The approach of addressing decision-making in an *AN* and *NA* manner, brings with it the problem of bias affecting the scope of this study. As discussed in the introduction there are multiple ways in which one may inspect decision-making. One of these options is using *AN* and *NA*, yet a clear weakness is that this does not encompass the other approaches. As a result of choosing this one approach we are therefore only able to describe decision-making from this perspective, leaving perhaps much of the topic unexplored. This problem is reoccurring at various stages of this study such as at the planning stages and literature review, data collection and ultimately analysis. The combined effect ought to be seen as a significant weakness of this study.

Recording and analyzing the data is a further step of this study which highlights some weaknesses. The measurement of verbal cues is undoubtedly influenced by subjectivity of the researchers. Independently coding the transcribed interviews is the most crucial step in ensuring credible data for this research. Consensus regarding the codes is essential to not riddle the data with personal feelings about responses, as otherwise the bias would threaten our results.

Some specific limitations of our study come from our selection of interviewees as well as our case selection for this purpose. The sample of entrepreneurs was purposefully aimed to be very broad. The culturally diverse set of participants brings with it the downfall of a language barrier. Especially in a process such as TAP, it can create problems for data collection. The language of the questions can create difficulties for the participants in understanding the message of the question. As a result, there is a chance that the questions are seen as quite different, and therefore the responses will not be suitable for comparison. Additionally, in a setting such as for TAP, where verbal cues of any sort are helpful for the researchers, it is important to note that these cues might not be verbalised in an English-speaking experiment, if the participant thinks in a different language. As such, data is lost and also it adds a limitation to our study, as comparisons between individuals may then not be the most accurate.

This research tool will be used by two master students with no prior experience with this instrument. Despite literature having been consulted, the TAP will not be as credible and well-executed as from professionals. Coupled with the fact that we hope to describe complex behaviour using the concepts described in our theoretical framework, our research tool does not guarantee findings. Having taken this *AN* and *NA* approach limits our measurable variables and may lead to recording incomplete data, especially given the very complex nature of decision-making. As part of counteracting this, much of the work, and coding, with the interviews will be done separately and subsequently compared to reach consensus. This, in part, acts as a countermeasure to some of the general criticisms of the TAP instrument.

The question regarding validity of this type data is subject to discussion throughout literature, as highlighted by Ericsson and Simon (1980). Learnings regarding the value of *soft data* and the analysis of TAP description are heeded throughout this study. The analysis will be given specific attention in order to depict the findings as data as opposed to personal interpretation, a common criticism of this type of research. As emphasised by Schkade and Payne (1994, p.104) the procedure of questioning participants is heavily subject to subtleties of language. To obtain data which is free of 1) researcher's bias 2) leading the participants and 3) causing subjects to try infer about intentions of the study, special care will be given the formulation of both the problems and the questions.

Attempting to limit the behaviour of participants trying to infer about the research purpose, the participants will be asked to remain focused on the problems and information at hand. Ericsson and Simon (1980) reflect that not heeding the information is a major reason for interviewees to make inferences about the questions, and stray away from providing desired quality of answers.

One limitation that arises from the theoretical framework involves breaking *AN & NA* into its constituent parts. For example, heuristics and emotions are very complex human systems that sit interlinked with each other. Our attempt to divide them is based on existent theory which has only scratched the surface of of these complex mechanisms. It is likely that cues identified based on these theories do not portray the full picture in terms of actual reasoning. As a result, each decision can draw inspiration from multiple heuristics but the extracted cue only identifies one.

4. Findings & Analysis

Please refer to Appendix: 7.4 Results Table & 7.5 Answer Statistics for figures

4.1 Entry Scenario

In this scenario, the participants were asked to decide on their target customer, as well as their target market for the imaginary product - a simulation environment for entrepreneurship. The information states it can be an instructional technology or a simulation game. They were given some numerical data and were also provided with a graph about historical trends for these markets.

Novices:

The answers from the *novices* were mixed with cues showing both analytic and non-analytic behaviour, although leaning more towards *AN*.

The least used strategies in the entry scenario by the *novices* were all *NA*: representativeness heuristics, emotional choice, ignoring the fluff and storytelling. One *novice*, Karl, reflected this latter type of behaviour with the statement *"If my main focus is to be put towards adults, I would also have to figure out the meaning of what educators to address, which would take up a lot of time, and I really don't know anyone for that".* There were emotionally dependent behaviours with references to *'gut feeling'* and benevolence related discussion. An instance where a participant drew from emotion is shown below.

"I think you learn better when being instructed, so I would want my software in the hands of educators..I want people to like this program... and if it is effective then at least I would be more inclined to like it"

Other *NA* behaviour displayed with greater frequency were simple subjective preferences (affect heuristics) and other heuristics.

The *novices* did not hesitate to engage in analytic behaviour either, with high instances recorded for focus on data and formal systematic methods. As *Novices* kept a close eye on the data, high numbers were recorded for logical deductions. This can be seen with statements such as:

"Choosing to target educators is difficult, because then you are dependent on what type of students they are involved with...so then I could just save myself the trouble and target end customers straight away because then I only have to figure out the requirements of one target group"

Novices were also quick to point out that the information provided was insufficient signalling *AN* behaviour. This scenario also provided the participants with a diagram designed with the intention to provide redundant information. The objective of this graph was to measure adherence and engagement with this information and the findings showed that all but one *novice* did so.

Experts:

The responses from the *experts* were mixed with both types of decision strategies visible, although *NA* reasoning was used to a much higher degree. Interestingly, the most used analytic choice here was pointing to insufficient data: *"Without knowing more details, I could not say anything else"*.

The category of rules of thumb lead the way in this scenario for *NA* behaviour. *Experts* showed this type of reasoning in five instances. For example, Miro shows some form of underlying cognitive framework or script when deciding on which customer group to target.

"You don't have to always pick the bigger one but one that will make the most impact"

Another *expert*, Harald used similar rules to guide judgement when assessing the market. He was apprehensive of the enormous size of the education industry and made the following statement, *"There's this risk when you go into a huge market like that"*. Other codes that made appearances were representativeness and narration in the form of providing creative solutions. For example, Fiona

did not want to pick either options provided in the data set and instead decided on her own solution.

> *"I would not only promote this as a game, but also as an instructional product. It should be both, otherwise it will lose the younger audience. But I would include the right tools into the game and then it can be placed in both"*

All four *experts* spent limited time in engaging or analysing the supplemented graph and thus appeared to 'ignore the fluff'. Harald even stated it to be *"useless"*.

Entry Scenario Analysis:

While *novices* adhered to the numbers with focus on data and logical deductions among the top categories, their use of heuristics were also apparent with affect heuristic being a top category and other heuristics as well. A discussion by Anderson (1988) regarding information processing in professionals and non-professionals addresses part of this behaviour. *Novices* are suggested to follow the cues at hand, often in the same order they are provided, which lends itself as a credible proposition given that our results show *novices* focusing on data and addressing it in a logically deductive manner. This behaviour is *AN* by nature, as discussed in literature. The *novices'* use of affect heuristics implies that when these *novices* deliberate on uncertain tasks, they do not generate inclinations based on cognitive frameworks or predefined notions but rather follow general feeling towards an option. This behaviour differed from the behaviour of the *experts*, which showed a systematic understanding of the problem through working with rules of thumb. Andersson (2004) provides insights which this behaviour falls in line with. The behaviour of the *novices* showed the formation of opinions, with the intent of finding data to support these claims. The result in our study showed however, that they did not find the affirmation and the decisions reflected rather opinionated answers with little factual support. Andersson further discusses the expert behaviour of following a mental checklist, which can ba argued to be apparent through their use of rules of thumb. Here the *experts* used general understanding of a certain topic, to more closely explain their opinions. What our results do not reflect is whether or not the *experts* were trying to find data to contradict their beliefs, which

according to Anderson (1988) is proposed to be the case. The general understanding we get from this is, that *expert* and *novice* use of heuristics differed.

An apparent occurrence was that *novices* engaged far more with the particular problem set, compared to the *experts*. This showed in their tendency to follow the given information, rather than addressing the question from a more broad perspective. This is evidently different from how the *experts* acted, as seen in their aforementioned use of rules of thumb and comparably high count of representative heuristics. What furthermore emphasises this realisation is that *novices* indicated very little transferred knowledge from their previous experiences. Inversely the *experts* indicated drawing from previous learnings. These results fall in line with Cohen and Levinthal's (1990) statements that experts make more use of previously gained knowledge, and apply this in new situations. Our results further indicate this, when considering that the largest difference between strategies used in this scenario was rules of thumb, where *experts* indicated the use five times and *novices* none. *Novices* were focused on the data five times compared to the *experts* who only did so once. This is taken as a clear indication for *AN* behaviour. Gustafsson's (2004) findings, which argue that *novices* are more analytic in the opportunity-recognition phase, seem to hold true for this first scenario of our study. *Experts* have repeat experience in performing this task and have thus formed ideas and beliefs of what works and what does not, through years of deliberate practice.Through this they were able to create a much more detailed understanding of the problem statement, without adhering to analysis of the information.

The ability to ignore irrelevant information was seen in how the participants made use of the graph. As proposed by Shanteau (1992) experts show better ability in identifying relevant information, and therefore may require less of it. Through this, the *experts* focused less on the data.

4.2 Pricing Scenario

In this scenario the participants were asked to make a decision about their pricing strategy, given two sets of data reflecting customers' willingness to pay. Additionally, the scenario asked the participants if they changed their mind on their target customer upon reviewing information in this scenario. This scenario was designed to be the most analytic-inducing of all due to a high degree of objective measurability in the data provided (Hammond et al., 1987).

Novices:

Without surprise, the most used strategies by *novices* in this scenario were *AN*. A high focus on data was present with statements like *"these numbers coincide"* and *"judging from these number". Novices* pointed out insufficient data in five occasions. For example, Karl added,*"This information does not really provide and add much for me...I would instead need…". Novices* also utilised the data provided to make logical deductions a top strategy.

"Price it too high and they won't want it. And price it too low, then you basically say that you aren't worth much"

Two *novices* changed their mind on their answer from the first scenario after analyzing this scenario displaying *AN* behaviour. *"Given this, I am inclined to change my response…"* and *"I am unsure, I might change my mind"*

Novices also engaged in several *NA* strategies in this scenario. The use of various heuristic strategies were visible with representativeness, other heuristics and rules of thumb each recorded a total of four times.

Experts:

This scenario recorded the highest instances of analytic behaviour among *experts* compared to other scenarios. However, they still preferred *NA* strategies in total. Two of the most used

strategies were *NA* while one was *AN*. Many creative solutions were visible, Fiona mentioned that given the results of the survey she was inclined to make a *"lighter version (of the app)"* and go to market early. However, before doing so, she indicated using a formal method of trial and error to test the pricing. She mentions:

"First, I will price it at this range, see what happens and then create the lighter version based on those results"

Harald was not very confident with the options provided stating the need for more data. He backed that feeling by performing some quick calculations, which we coded as a formal systematic method, saying *"There's no way to get the return on investment".* Another *expert* showed a different analytic approach to tackling pricing. Finn, uses a ballparking strategy , *"I would first pick an option from the lower category first" and then after careful analysis, "something in the upper end… okay I will price at 700".*

Pricing Scenario Analysis:

The *novices* continue to remain predominantly *AN*, and interestingly this scenario marks the most *AN* behaviour for the *experts.* As discussed in the methodology, this scenario is deemed the most analysis inducing (Hammond et al., 1987). What we see is the *experts* signalling adapting to this particular condition, portraying a flexibility in their decision-making. These results support the findings by Gustafsson (2004), who states that *experts* are more adaptive with their decision behaviour. Our findings extend beyond just this scenario, but in fact to all the scenarios. Looking at all the scenarios of this study, the *experts* display a much larger variation in their usage of *AN* and *NA* strategies from scenario to scenario. The *novices'* percentages stay far more constant. (See Appendix 7.5) This occurrence falls in line with Shanteau (1992) stating that novices seek out much more information, when compared to experienced individuals.. *Novices* portrayed behaviour fitting by Gustafsson (2004) who asserts that novices adhere to analysis regardless of the task in the opportunity-recognition phase. Our findings suggest that this claim can be extended to this pricing scenario. As the scenarios progress, *novices* who have been in business for less than a year, will more and more be lacking experience in the particular stage of business.

One would expect more and more dependency on the information provided, while the *experts* continue to be able to draw from experience, enabling them to diverge from analytic behaviour. Our results contradict statements by Einhorn (1974), who claims that expert behaviour leads to similar judgement and consensus regarding tasks. Their findings suggest that expertise causes decisions to align. The noticeable difference in the min:max usage of both *NA* and *AN* of the *expert*s suggests a lack of consensus in this scenario. This may reflect the openness of the problem, which can be argued through statements of the *novices*, which frequently point to insufficient data.

Novices claimed insufficient data five times, while *experts* took to *NA* strategies and portrayed seven instances of making creative solutions. This comparison highlights certain competencies that the *experts* reflected, being able to provide novel solutions in uncertain conditions. This, in conjunction with the prevalence of heuristics and usage of rules of thumb by the experts, reflects findings that fall in line with statements from Cohen and Levinthal (1990) regarding experts' superior ability to transfer knowledge from experience onto new problems.

In our findings, it is worth highlighting perhaps the most notable difference between the experts and the novices. The novices, who are at the beginning of their career and development, may not have reached the stage of possessing, or displaying, this type of entrepreneurial behaviour. Upon comparing the findings it can be stated, that the experts act in accordance with what is deemed to be entrepreneurial, whereas the novices did not. The underlying result of the pricing scenario continues to be that *experts* make more use of *NA* decision strategies. The strong adherence to *AN* behaviour by the *novices* is further reflected in the fact that the top three strategies were analytic and focused on the data, both by stating insufficient data but also repeatedly using the data as guidance throughout the verbalisation. This continuous following of data, or cues, falls very much in line with statements by Anderson (1988), who state that novices will actively seek out information and even follow the specific order in which these cues are presented. This displays strict *AN* behaviour. Andersson's findings seem to hold true for our findings in this scenario. What further supports this, is that three out of the four *novices* made changes to their

previous decision, based on new information being made available. None of the *experts* altered their original responses. Epstein et al. (1996) make the case that, upon reception of new information, analytic behaviour is more likely to create deviation from an original decision. This suggests that the novices acted in a more *AN* fashion. This behaviour is clearly prevalent for the *novices* in this scenario, and acts as support for claims by Gustafsson (2004) that novices show more analytical behaviour. While her results focused on the opportunity-recognition phase, our results suggest these claims can be extended further, to this pricing scenario.

4.3 Marketing Scenario

In this third scenario we asked participants to pick a market strategy given some price estimations. The entrepreneurs were also asked if they had other preferred solutions which they would rather choose, and why.

Novices:

In total, *AN* strategies took an upper hand again with *NA* instances being the lowest of all scenarios. *Novices* maintained a focus on data and utilised them to aid in decision-making. Statements like *"interested because..this option is relatively cheap in comparison to that one"* recorded instances of focus on data, and the following statement from Anabel corresponds to a formal systematic method

"I would like to do a SWOT analysis..based on the information and some assumptions"

As for *NA* decisions, *novices* displayed the highest usage of rules of thumb, followed by other heuristics. A prime example of a rule was recorded as follows:

"...been told that I want to spend something like 20% of revenue on marketing"

Other common cues that also signalled rules of thumb include *"start small and think big"* and *"sell as much as possible and keep costs down"*

Experts:

NA reasoning was heavily preferred by the *experts* especially with the use of heuristics. Going through the case, Miro put a lot of thought into picking his marketing channel and settled on internet as his choice. He based his decision on generalities and knowledge acquired, which we categorised as other heuristics. Eg: *"I've read a lot you know about companies that have been very successful in doing internet marketing and if you do it right, it's a lot cheaper"*. Another form of heuristics detected was representativeness which we coded for instances showing tendencies of generalisations. For example, Miro likens the internet to a *"water drop effect"*. He concluded by providing a novel solution that was not part of the problem set.

> *"Why just go to schools, we could do direct selling to stores and online stores and stuff. You know go to Amazon, get this software in there"*

Other participants used more of *AN* approach to tackle this question. For example, Finn used logical deductions to justify his decision of picking the direct selling option. *"I can approach them and tell them with entrepreneurship you have an alternative form of employment"*. Another *expert,* Fiona*,* was quick to use a systemic approach of divide & conquer to eliminate an option.

> *"I don't want to go through the route of training people, so I will eliminate this immediately"*

Marketing Scenario Analysis:

Novices showed strong *AN* decision-making in this scenario once again. This follows suggestions by Cooper et al. (1995) that novices will follow information more vigorously under uncertain circumstances, compared to experienced entrepreneurs. As the scenarios progress further to tasks that are new to the *novices*, we expect this to be more noticeable. What is seen in our results is that *experts* maintained a very *NA* approach relative to the *novices*. The mean responses from the two groups of entrepreneurs furthermore indicate their tendencies regarding the use of *NA* and

AN decision-making under the conditions of this scenario. The *novice* results once again fall in line with Gustafsson's (2004) findings that novices remain analytic in various tasks throughout the opportunity-recognition phase. Our results indicate that these claims can be extended. As Baron and Ensley (2006) remark, the difference in life experiences impacts the use of heuristics, as can be interpreted from the *NA* tendencies of the *experts*, who have had far more years of learning in the field. Marketing is an important concern and the *experts* have inevitably worked with this aspect multiple times before, making it possible to take a more *NA* approach in this scenario. What ought to be highlighted here, is the min:max usage of *AN* and *NA* strategies of the *experts*. It can be interpreted that scenario three shows consensus among the participants, which Einhorn (1974) proposes to be the case. Interestingly, it will be shown that only in scenario one and three this is reflected in our data. The cause for this, as previously mentioned, could be the openness of our problem statements, despite both groups not mentioning a lack of data. One may infer that it could come as a result of this scenario being heavily dependent on personal feelings and convictions. The high *NA* count for the *experts* reflects behaviour researched by Cooper et al. (1995), stating that experience leads to less focus on finding information.

This scenario also saw high usage of representativeness heuristic from *experts* in the form of generalisations and associations. Results from Busenitz & Barney (1997) showed entrepreneurs' tendency to use representativeness to a much larger degree compared to managers in large organisations. The *experts* in this study appeared to behave in a similar fashion as suggested in this scenario.

4.4 Termination Scenario

In this fourth scenario a long time employee is going through personal issues which has decreased the person's productivity levels over the last half of the year. Participants were asked to choose between letting the person go or keeping the employee as part of the workforce.

Novices:

Despite the dilemmatic nature of this scenario, *novices* kept a keen eye on the data provided but also took inspiration from outside sources. Instances of recorded *NA* behaviour tended to originate in the form of emotions or feelings. These were recorded as emotional choice, affect infusion and affect heuristics. Appeal to a higher order of emotions and the role of affect was clear with such statements coded as emotional choice:

"We support each other in hard times, because the mentality of everyone is crucial"

Novices also recorded a number decisions based on inclinations without real deliberation. Statements such as *"I find these situations.."* and *"I don't want to"*, were recorded as affect heuristics in the relevant cases. Another *novice* references mood and highlights the weight it carries in such situations which we marked as affect infusion.*"...sometimes it can really depend on how I'm feeling you know. If I had an accident in the morning and somebody poured coffee on me, firing him will be a lot easier.."*

In terms of *AN* behaviour, *novices* reasoned using available information. Focussing on the data present with statements such as *"ultimately if the performance is not right..cannot be having that"* and *"it is not about being nice or mean, we need to run a business"*. This led to logical deductions like *"There is a problem..I try to help it, and it does not work.....so the solution is to fire"*. Other instances demonstrated that *novices* had an understanding of formal systematic methods that can be utilised in such scenarios. Anabel made that clear with the following statement:

"A company has many options to affect people in these situation. Implement a monitoring system, improve communications channels, schemas and rotas"

Experts:

Experts were again high in *NA* usage, with emotions playing a crucial role in their decisions. However, that is not to say the focus on data was withdrawn which could be seen with statements such as *"I don't want to let him go, but it seems I have tried to boost his productivity levels"*. To others,

it was a matter of empathy and so the data itself played a limited role in convincing otherwise. Eg: *"I have seen this myself with friends and so I will have some patience"*

Some instances showed *experts* not satisfied with the information provided thereby taking alternate paths recorded as creative solutions : *"..maybe help him get another job and not leave him on the street, since he was loyal from the beginning"*. Another *expert*, Finn, displayed elements of regret from a similar situation in the past which was coded as counterfactual thinking.

"In another company I was involved in, we had the wrong person running the company. It ended up costing the company lots and lots of money. Looking back, the person had psychopathic tendencies and we should have seen that"

He concluded by saying, *"it's* not always easy, especially here in Sweden but if you are logical you have to let him go and have him com*e back later maybe"*. Although, *AN* reasoning was not very popular in this scenario, one *expert* took to the use of logical deductions to make this decision. "*Underperforming..let him go, to gain happiness. Come back and things would be back to normal"*

Termination Scenario Analysis:

This scenario contained the least amount of objective measures and due to the openness of the question, and limit of information, was expected to induce *NA* reasoning from the participants. In this scenario *experts* demonstrated the second largest use of *NA* usage among all their scenarios at 71% while the *novices* showed a slight increase in *NA* usage from the previous scenario. In general, *novices* did not have a significantly higher proportion of *NA* reasoning in this scenario compared to others. The *novices* show a predominant use of *AN* strategies, continuing this rather constant adherence throughout all the scenarios. The event of firing people may be very unfamiliar territory, and could lead to less understanding of the picture as a whole. This could be the reason for these results, with *novices* showing much more exploring of the available information to arrive at a decision. Through this they display the analytic behaviour which Gustafsson (2004) describes regarding the opportunity-recognition phase. A further statement derived from her work is that *experts* indicate more heuristics in the opportunity-recognition

phase. This certainly holds true even in this termination scenario, as well as throughout the entirety of our results. Our findings show various heuristics that were used, as well as instances of counterfactual thinking. These together allow for some speculation regarding how these *experts* can deviate from the data at hand. Gavetti and Levinthal (2000) find that experts are able to envisage outcomes more clearly, due to experience, and our results seem to fall in line with this argument. The use of heuristics, and frequent discussion of the past, was indicated by the *experts* as being central to answering this question.

This scenario once again did not show the expected consensus among the *experts'* answers, as proposed by Einhorn (1974). Our results suggest that the usage of *NA* differed rather drastically (seen in the min:max value for *NA)*, between just this small sample of entrepreneurs. This scenario cannot be stated to display decision-making behaviour that is measurably similar between the sample of *experts*. What this however does, is highlight the strength of the cognitive approach to studying entrepreneurial decision-making. As addressed by Mitchell et al. (2007), a strength of a cognitive approach to studying decision-making exists due of the heterogeneity of entrepreneurs, rendering the more traditional trait approach less suited for this cause. Our results from the *experts* support the assumption of this heterogeneity, given that in our small set of expert entrepreneurs a rather strong difference in approaches is noticeable.

With regards to specific differences in strategies used, logical deductions appeared seven times for *novices* and only once for *experts*. Likewise, other heuristics was counted five times for *experts* and none for *novices*. This could suggest that *experts* are hesitant to rely on the data in such situations and instead draw from personal experiences. *Novices* however continue with adhering to the data provided, displaying *AN* behaviour. The cause may be the lack of available information, and a lack of experience in this environment for the *novices*. Nevertheless, the *experts* divergence from data can be argued to show better ability to determine relevancy of information, as stated by authors such as Shanteau (1992). Another interesting result is the appearance of emotional reasoning in this scenario. *Experts* and *novices* recorded very high instances of emotional choice and affect infusion. This finding is in line with Brundin &

Gustafsson's (2013) agreement on the role of emotion in entrepreneurial decision-making, but specific to the termination scenario. Looking further into the decisions themselves, the results showed *experts* to be much more reluctant to fire the employee despite the data provided. Wong et al., (2013) infer that entrepreneurs look to avoid negative emotions and the *experts* can be argued to confirm to this behaviour.

A noticeable difference between the *experts* and the *novices* is the use of *AN* strategies in this scenario. *Experts* indicate little importance to *AN* strategies and this difference is made more significant by a comparison to the pricing scenario, the most analytic-inducing scenario in this study. *Experts* display much stronger abandonment of *AN* behaviour than *novices*, in a scenario that leaves more room for subjective and emotional reasoning. As Gustafsson (2004) states, experts show better ability of adapting their decision-making styles.

4.5 Exit Scenario

In this scenario the participants were asked to decide on a future course for their company. Participants could decide between going public, selling the company and continue without any outside influence. The question provided some numbers and information regarding each option.

Novices*:*

Novices responses were mixed in this scenario but again *AN* reasoning played a bigger role than external influences (*NA*). *Novices* analysed the data intently and made conclusions from them. Responses that showed this behaviour include simple statements such as *"the information here to me says to pick.." and "...big topic..need to look at these [options] a bit"* to more complex statements such as the following deduction.

> *"..I sell my company to Disney, this means I will be out of a job, I don't know how much money I will actually get, and someone else will do things to what I created"*

Another *AN* category with many recorded instances was pointing to insufficient data suggesting a difficult question for the *novices*. An example being, Anabel's statement: *"I would need more [information] to make a decision that I'd call my right decision"*.

Still, some *novices* showed previous learnings and utilised *NA* reasoning citing regret and emotions. Counterfactual thinking was recorded in three separate occasions. Enrico made the connection of past anguish to avoid making a future mistake.

"[reached what was] ultimately a disadvantage, by getting out of a stable job in favour of something new...cost me many things and I wished I had done the exact opposite of my planning procedure"

The personal nature of the question was also apparent with participants dwelling on wants, likes and dislikes. An example being, the following statement which was recorded as affect heuristic. *"After I have worked on something for 10 years, I want new things, and I want this boring thing to stop"*

Experts:

This scenario saw the largest use of *NA* reasoning from *experts* across all scenarios. Categories appearing most frequently were affect heuristics, counterfactual thinking, emotional choice and rules of thumb.

An example showing affect heuristic was Fiona pointing to her preferred style of work.*"I like collaborations that opens new presence for changing what i'm doing"*. Another *expert* Miro, having sold four companies in the past had much to add in this scenario. He used an *AN* strategy of divide and conquer to break down the options into pros and cons and eliminated one option citing a rule of thumb: *"IPO is always the last option because all of a sudden you lose control and you go step into a totally different arena"*. He then used various heuristic measures to support this rule, with the following statement adjudged as representativeness.

"You know when Tetra Pak went into Russia they lost money for how many years. Ikea same thing, when they do their expansion and they were in the stock market, it would be quite tough I think"

Ultimately, counterfactual thinking and emotional choice were conflicting drivers when making the decision. His past experience highlighted the need to *"secure a baseline"* but "*When you are building a company and put so much energy into it, you have this emotional attachment to it and really want to see it grow".* Thus, his final decision took on a middle ground:

"If this was my first company, I would sell. If this was my second or third I would keep going"

Overall, *AN* reasoning in this scenario was quite limited with Harald being the only *expert* not interested in selling the company. He focussed on the data provided to form logical deductions from the available options:*"It says, I'm in the tenth year of growing and since i'm profitable I go with direction 3 (continue with the company)"*

Exit Scenario Analysis:

The split in responses by the *novices* in this exit scenario shows predominantly *AN* strategies, with 61% of the cues being categorised as such. The figures for the mean responses show that as a group, the tendency for *novices* to primarily rely on analysis is consistent and strong. Gustafsson's (2004) results, which focus on the opportunity-recognition phase, can be seen to hold true for a firm exit phase in our data. This reflects an extension of existent literature regarding this analytic behaviour of *novices*. What can be understood from the *novices* behaviour in this scenario, as well as the opportunity-recognition phase discussed by Gustafsson, is that the uncertainty of the problem promotes *AN* behaviour among *novices*. These findings seem to correspond to the findings by Cooper et al. (1995) which show that in uncertainty *novices* seek out more information, compared to experienced entrepreneurs. The specific uncertainty from this exit scenario may originate from the newness of the problem, given that the *novices* had been in business less than one year, and therefore had no experience with this phase of a business. *Experts* show a considerable increase in *NA* usage in this scenario, given that it left much room for personal input. The increase from the previous scenario, in the mean *NA* value, can be argued to reflect that *experts* are more ready to change their particular decision-making style. What can be seen is that the *experts* did not reflect consensus, when comparing the individual with the least

NA and the individual with the most *NA* usage. This does not correspond to the propositions by Einhorn (1974), which argue that *expertise* would lead to similar decisions. The min:max usage of *AN* and *NA* strategies showed a strong difference between what type of behaviour the *experts* displayed. In comparison, the min:max value shows a much more consistent *AN* approach of the *novices*. Once again the openness of the question may be the reason for this, leaving much freedom to address this question outside of our intended scope. For the *experts* this allowed for a more heuristic and *NA* approach, as can be seen in their top used strategies for this scenario.

A striking difference between the choices of strategies is the use of affect heuristics. Inevitably *experts* will have more experience with the exit process of an entrepreneur and have had the chance to develop thoughts and opinion. Many responses came in the form of opinions without much reasoning about these, which leads to questioning how in this scenario the *experts* reasoned internally. This final scenario appears to be the one with the most affect heuristics used, despite no apparent reason for this. The *experts'* experience with exits may be the reason for this, given that it is an infrequent event. This allows questioning whether under certain circumstances, *experts* will draw from reasoning which is very little motivated, leaving perhaps much room for error. While in other scenarios, it can be stated that *experts* draw from personal experience and thus display certain heuristics, the use of affect heuristics did not occur as strongly as in this final scenario. Studying this decision behaviour on a cognitive level may be a strong tool for understanding phenomenons such as in this scenario. *Novices*, the more *analytic* group, displayed affect heuristics only two times which strengthens the statement that *novices* will look for more information, especially under uncertain circumstances (Cooper et al. 1995). The *novices'* adherence to data in this scenario is rather clear and typical compared to the other scenario, which furthermore raises the question of what about this scenario has lead to the *experts'* use of affect heuristics.

4.6 Discussion

Do heuristics presuppose experience in a task?

The theme of heuristics is a central component throughout this paper, due to its prevalence in the data and importance to the category of non-analytic behaviour. The responses from both the *experts* and the *novices* indicate its presence like literature suggests. A noticeable difference became apparent throughout this study, especially when moving from scenarios that could be familiar to a young startup to ones where a young entrepreneur most likely had no experience.

Experts were consistently far more heuristic, portraying much more *NA* behaviour, corresponding to findings by Gustafsson (2004), which primarily focused on the opportunity-recognition phase. A striking difference was seen in *how* heuristics were utilised. Despite the limited scope of *how* these two groups differed in the usage of heuristics, some conjecture can be made around this general *NA* behaviour. The openness of many scenarios enabled participants to address the problems with much freedom. This freedom seems to have been exploited to a greater extent by the *experts*. This realisation does not come from the instances where *experts* used their specific knowledge of having dealt with a specific problem before, but much more from the instances where experts drew from a wide background of material in order to aid in one specific component of the problem. *Novices* appeared to address only the surface of problems, which is stated to be a significant difference to expert behaviour (Mitchell & Chesteen, 1995). Despite *experts* showing that they draw from problem related experiences through relevant cognitive frameworks or expert scripts (Baron, 2006; Mitchell & Chesteen 1995), much of the *NA* behaviour came from experience outside the field of entrepreneurship. The essence of this comparison revolves around the fact that heuristics can draw from a wide area of experience, and in this context, allows the statement to be made that entrepreneurs do not solely rely on their entrepreneurial experience. This however, can not be interpreted into our data of the *novices*. Considering that entrepreneurs act in an unusually uncertain environment, and heuristics are a crucial tool for navigating this landscape (Ucbasaran et al., 2015), it appears the *novices*' avoidance of *NA* behaviour could be seen as a disadvantage.

One apparent reason for classifying *experts* to be more *NA* comes due to their use of experience from a broad and holistic context, not just the entrepreneurial one.

Are novices 'entrepreneurial' ?

The *novices* in our study were required to hold less than one-year of business experience to create the largest difference in expertise among the two groups. The findings showed these entrepreneurs to be significantly less *NA* inclined, either by choice or limited experience. Consequently, this translated to lower usage of most heuristics measures. One particular strategy that *novices* utilised in much smaller proportion to *experts* is representativeness heuristic. Busenitz & Barney (1997) demonstrated entrepreneurs' overwhelming usage of representativeness, or the propensity to generalise compared to middle-managers in large business organisations. An interesting question can thus be posed against the entrepreneurs in our study with less than one year of business experience. Have they really attained an entrepreneurial mindset? Is there a transition from a student mindset to one of an entrepreneur after a few years of experience in the field? One can argue that school work does not necessarily facilitate the use of heuristics and the real world is very different scenario for which one-year is not a sufficient transition period.

5. Conclusions

We intended to answer our research question with respect to the usage of analytic and non-analytic decision-making among expert entrepreneurs and novice entrepreneurs across various entrepreneurial scenarios. Gustafsson (2004) took a similar approach in the opportunity-recognition phase and found novices to be analytically inclined irrespective of the demands of the task and experts much more flexible in their reasoning. Our findings corroborate her results to a large extent. From our small sample of participants, across all five scenarios, the *novices* were overwhelmingly in favour of *AN* reasoning and conversely, *experts* tended to use *NA* reasoning. However, the *experts* showed much more variability in their approach; the pricing scenario being an example where they displayed much higher *AN* reasoning in relation to other scenarios. Thus, in a broader sense, it can be argued that *novices* and *experts* use different decision-making scripts not just in recognising opportunity but also at different stages of the entrepreneurial journey.

Examining the particular strategies used by both subgroups of entrepreneurs also yielded interesting outcomes. While both *novices* and *experts* appeared to show varied decision-making, with respect to *AN* and *NA* behaviour, it was fascinating to see how different they were with regards to the particular strategies used. *Novices* for example when using *AN* reasoning, preferred to focus on the data presented to make logical deductions. However, the *experts* when being analytic, still maintained a focus on data, but tended to seek formal systematic methods to analyse this data. These were seen in the form of computations, ROI calculations, SWOT analysis, decision-tree analysis etc. The *novices* were also vigorous to seek out information when progressing through scenarios, possibly highlighting their unfamiliarity with later stage entrepreneurial tasks due to limited business experience (Cooper et al., 1995).

In the realm of non-analytic decisions as well there were considerable differences particularly in the specific usage of various heuristic strategies. *Novices* had a tendency to use affect heuristics

moreseo than other means. These correspond to decisions that were made with a feeling of 'like' or 'dislike' and little deliberate reasoning (Kahneman, 2011). Conversely, when *experts* made use of external influences for their decisions, it materialised in the form of rules of thumb and representativeness heuristic. Rules of thumb can be understood as a set of predefined rules that these entrepreneurs use to make sense of their environment (Simon & Houghton, 2002) and representativeness as making generalisations and associations based on just a few details (Busenitz, 1999). *Experts* were also much more likely to make use of narratives as a heuristic means to give novel, creative solutions. This is in agreement with suggested characteristics of expert decision-makers (Shanteau, 1988). Furthermore, *experts* and *novices* also differ in information extraction as our small sample showed all *experts* 'ignoring the fluff' compared to just one *novice*, supporting the idea that expert entrepreneurs are able to identify relevant information quickly (Mitchell & Chesteen, 1995).

With regards to the use of emotions, both groups of entrepreneurs showed elements of emotional decision-making, particularly in the termination and exit scenario. *Experts* however, showed their likeliness to pursue counterfactual thinking which is learning from regret or 'what if' scenarios to address a future situation. Nonetheless, both groups of entrepreneurs showed their affinity to be swayed by the role of affect/feelings further cementing the idea that entrepreneurs are not 'rational computers' (Brundin & Gustafsson, 2013).

Our findings show one discrepancy with regards to previous literature which discusses that expertise leads to consensus in decisions (Einhorn, 1974). This proposition does not hold true, as in various scenarios the *experts* showed distinctly different approaches to tackling the problem. In most of our scenarios, an apparent difference can be seen in the amount of *AN* and *NA* usage of the individual *experts*. What is concluded from this realisation is that there seems to be an apparent heterogeneity among even the small sample size of *experts*, which we take to argue that the 'trait' approach does not capture the complexities of entrepreneurs appropriately. Subsequently we find this to support statements that the cognitive approach may be an applicable mode of exploring decision-making (Mitchell et al., 2007; Ucbasaran et al., 2015). As

highlighted in the later scenarios, we find no apparent explanation for the *experts'* behaviour, which we conclude is best addressed in further cognitive research into decision-making.

5.1 Implications for Research and Practice

In breaking down analytic and non-analytic decisions, we have attempted to provide further insight into entrepreneurial cognition and also address a need outlined by Shepherd et al. (2015) which is the detailing of various types of heuristics used by entrepreneurs. Gustafsson (2004) also highlight the need for novice entrepreneurs to learn heuristics and how to use them. This paper has taken baby steps in that path detailing various strategies, heuristics and others. Using our findings, novice entrepreneurs can gain a better understanding of how they are different from expert entrepreneurs. This knowledge can be a valuable tool for the novices as Mitchell & Chesteen (1995) mentions interacting with experts or expert scripts creates ideal circumstances to gain expertise.

It is important to keep in mind the small sample size of this research paper and thus forming definite conclusion would require a study addressing a much larger sample in a similar fashion. The results from this study can be viewed as a promising start providing descriptive value of the various cognitive strategies employed by entrepreneurs. Future studies can join this type of research with a normative approach to create best-practice guidelines. As Gustafsson (2004) pointed out, this should emerge from evaluating success of these strategies. Undoubtedly, it would provide *novices* with stronger support in understanding how to approach entrepreneurial tasks.

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7. Appendix

7.1 Case

Intro:

For this experiment, imagine you are an entrepreneur who has built an imaginary product. Although the product is imaginary, it is technically feasible and financially viable. You are trying to build a company and take this product to the market using little money of your own and whatever experience you have till date. Please answer the following questions relating to different scenarios of the company's life-cycle. The case data has been obtained through realistic market research - the kind of research used in developing a real world business plan.

The Product

The product is a game that consists of a simulated environment for starting and running a company. The game has a sophisticated multi-media interface — for example, a 3D office where phones ring with messages from the market, a TV that will provide macroeconomic information etc.. During the game, the player has to make production decisions such as how much to produce, whether to build new warehouses or negotiate with trucking companies, etc. Based on these decisions, the player receives feedback on their performance.

ANSWERING STYLE

The style of this experiment is not conversational, instead you are meant to think aloud the thoughts you are having (you can ignore we are sitting here). Ideally, we would like you to verbalise all your thoughts including what you have read. **PLEASE EXPAND** on your decisions and reasoning as much as possible. Moreover, try to explain what sources of information you draw from in order to give your answers. Much of the questions are given limited information and intentionally left vague because the decisions themselves are not as interesting as the process of arriving at those decisions.

PRACTICE EXAMPLES

1) Complete this simple math task: 64 + 26 =

2) Today is Wednesday and you need to buy a birthday present for your friend's birthday that takes place on Friday. When will you go buy the present?

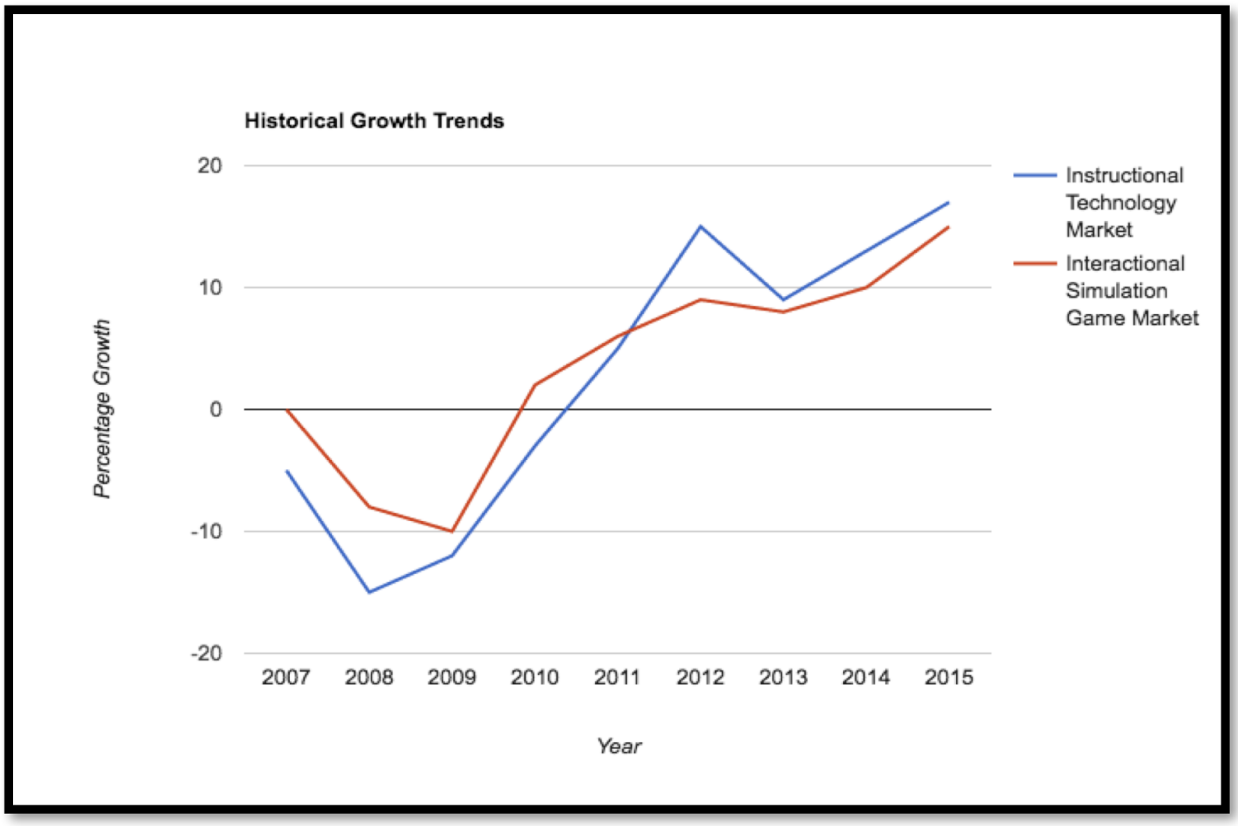
1) ENTRY SCENARIO

Look at the available information, and make a decision about the following:

Segment	Estimated total size
Young adults between 15-25 years old	20 million
Adults over 25 years old who are curious about entrepreneurship	30 million
Educators	200.000 institutions

- The estimated value of the instructional technology market is SEK 17 billion
- The estimated value of the interactive simulation game market is SEK 8 billion

- Both are expected to grow at a minimum rate of 20% p.a. For the next 5 years.



A) Which customer segment will you target and why?

B) What market will you target with your product and why?

2) PRICING SCENARIO

You do customer research through online questionnaires and also in person at 2 bookstores.

Based on your findings, answer the questions below:

Internet Research:

Willing to pay (SEK)	Young adults (%)	Adults (%)	Educators (%)
350-700	45	26	52
700-1000	32	38	30
1000-1300	15	22	16
1300-1600	8	9	2
1600-2000	0	5	0
Total	100	100	100

In-person Research at Bookstores

Willing to pay (SEK)	Young adults (%)	Adults (%)	Educators (%)
350-700	51	21	65
700-1000	42	49	18
1000-1300	7	19	10
1300-1600	0	8	7
1600-2000	0	3	0
Total	100	100	100

A) How will you price your product, and why?

B) Who is the primary target of your product now, and why?

3) MARKETING SCENARIO

Based on your market research, you arrive at the following cost estimates for marketing your product.

Internet	SEK 200 000 up front + SEK 5000 per month thereafter
Retailers	SEK 5 million to SEK 10 million up front and support services and follow-up thereafter
Mail Order Catalogs	Relatively Cheap - but ads and demos could cost SEK 500 000 up front
Direct Selling to Schools	Involves recruiting and training sales representatives

A) What option do you chose, and why?

B) Are there other options you would prefer, and why?

4) TERMINATION SCENARIO

One of your highest paid employees who has been at the company from it's early days just got divorced. In the last 6 months this person's productivity levels have dropped significantly and a lot of key activities are not being performed. Your attempts to help recover and boost productivity have been futile. You deliberate firing this person because of the effect on co-workers and product quality. However, this person has served the firm since the beginning

and this slump could be a temporary phenomenon but there is no way to tell. Would you let go of this employee? Motivate your decision.

5) EXIT SCENARIO

The company is now in its 10th year growing and people are starting to take notice. You have acquired three other profitable product lines. You're doing SEK 700 million in sales and project you will reach SEK 1 billion within a year. At this point, you have three possible directions.

Direction 1:

Your accountants and bankers think this is a good time for you to take the company public. The IPO market is booming and the industry you're in is seeing upward trend. They estimate you should make an IPO of 2 million shares at SEK 300 per share. The company has a total of 12 million shares outstanding.

Direction 2

At this point in time, *Disney* approaches you and makes an offer for your company - it seems they have decided to get in on the booming educational software market and have decided to enter the arena through acquisitions -They see you as a perfect fit for their strategy and offer you SEK 4.2 billion.

Direction 3

You want to maintain majority of the control within your firm and think you can take this company forward without giving up equity. You decide to reject both offers for now.

A) Which of these directions do you choose and why?

7.2 Coding Scheme

- Age
- Years working as an entrepreneur
- Country of operation
- How many ventures started, as a main decision-maker
- Number and type of industry
- Level of education

Question 1: Entry Scenario

A) Which customer segment will you target and why? *Check for adherence to the numbers.*

Code: Reference to outside information in order to arrive at an answer

1) Number, and type, of references to non-analytic motivators in this scenario
2) Number, and type, of references to analytic motivators in this scenario

B) What market will you target with your product and why?

Code:

1) Did the subject state the diagram was unnecessary? Yes or No
2) Time spent discussing the diagram:
3) Words used to describe the diagram:
4) Number, and type, of references to non-analytic motivators in this scenario
5) Number, and type, of references to analytic motivators in this scenario

2) Pricing Scenario

A) How will you price your product, and why?

B) Who is the primary target of your product now, and why?

1) Number, and type, of references to outside information
2) Number, and type, of references to provided information from problem

3) Number of outcomes imagined per potential decision:

4) Did the participant change their mind given the new information? Yes or No

3) MARKETING SCENARIO

A) What option do you chose, and why?

1) Is an option from the available choices chosen?

2) Is the answer dependent on the numbers?

3) Number, and type, of references to non-analytic motivators in this scenario

4) Number, and type, of references to analytic motivators in this scenario

B) Are there other options you would prefer, and why?

1) Number of outside options proposed as alternative instead of options in the question:
2) Origins of proposed options:

4) TERMINATION SCENARIO

1) Number, and type, of references to non-analytic motivators in this scenario:

2) Number, and type, of references to analytic motivators in this scenario:

5) EXIT SCENARIO

1) Number, and type, of references to non-analytic motivators in this scenario:

2) Number, and type, of references to analytic motivators in this scenario:

7.3 Table of Codes

	Non-Analytic Codes	
Concept	(Origin) Description	Quote Examples
Affect Infusion	(Baron, 1998) References to the role of affect in the decision making process	*...sometimes it can really depend on how I'm feeling you know. If I had an accident in the morning and somebody poured coffee on me, firing him will be a lot easier..* *"I don't make a decision in one day. My mood will change, then I will look at it again"*
Other Heuristics	(Fong et al., 1989) Abstract inferential rules that guide thought process. Includes references to personal experiences and heuristics that could not be categorised under other proposed heuristics categories	*..when you go public, you can't take decisions like yeah okay let's try this...because your net profit would drop.* *"I've read a lot you know about companies that have been very successful in doing internet marketing and if you do it right, it's a lot cheaper"*
Representativeness Heuristics	(Busenitz, 1997) Making generalisations on individuals or topics based on only a few details about them	*"..because this game is not something like sonic or candy crush.."* *"Younger adults..have more energy and a better chance of starting a business because no commitments like family and debts"*

Affect heuristic	(Kahneman, 2011) Making judgements directly by feelings of liking and disliking, with little deliberation or reasoning.	*"..I like these types of games and I think I would have used it when I was that age"* *"I have a good feeling about this one"* *"After I have worked on something for 10 years, I want new things, and I want this boring thing to stop"*
Counterfactual Thinking	(Baron, 2004;) Using past regret or 'if only', 'what if' scenarios as a baseline to make a future decision	*"Looking back, I would not have sold my first company so I don't think I will sell this one"*
Emotional Choice	Cardon et al. (2012) Decisions influenced by the role of affect, emotions or feelings	*"I would try to be patient with him"* *"[These actions] set the base for the working environment and the ethics of how you are as a company"*
Rule of Thumb	(Simon & Houghton, 2002) Pre-defined set of rules used to understand their environment.	*"...been told that I want to spend something like 20% of revenue on marketing."* *"One thing you shouldn't have is the special connection, like it's your baby or something"* *People are more important, especially if she*

		was here since the beginning
Ignore The Fluff	Shanteau (1988) Being able to see information that is relevant and ignore those that are irrelevant.	*"This information is more or less useless"*
Story Telling	Hutton & Klein (1999) Mental simulation providing narration to explain past experiences	*"If my main focus is to be put towards adults, I would also have to figure out the meaning of what educators to address, which would take up a lot of time, and I really don't know anyone for that"*
Creative Solutions	Hutton & Klein (1999) Shanteau(1988) Creative thought or narratives leading to novel outcomes	*"I would not only promote this as a game, but also as an instructional product. It should be both, otherwise it will lose the younger audience. But I would include the right tools into the game and then it can be placed in both"* *"Why just go to schools, we could do direct selling to stores and online stores and stuff. You know go to Amazon, get this software in there"*

	Analytic Codes	
Concept	(Origin) Description	Quotes and Examples
Insufficient Data	(Gustafsson, 2004) Stating a lack of information or a need for more information	*"Need more information"* *"More information would allow me to.."*
Focus on Data	Scepticism about Data, close adherence/ dependence on data Decision is based on the numbers/information provided	*"This information does not really provide and add much for me...I would instead need..."* *"Interested because..this option is relatively cheap in comparison to that one"* *"Ultimately if the performance is not right, then I cannot be having that in my firm..so I would let him go"*
Formal Systematic Methods	(Hammond et al., 1987) Use of formalised mechanisms/tools/system to address a problem, for example mathematical, financial or strategic analysis	*"Considering half the population for this segment, you can quickly calculate a ROI"* *"First, I will price it at this range, see what happens and then create the lighter version based on those results"* *"I would like to do a SWOT analysis..based on the information and some assumptions"*
Changing mind	(Epstein et al., 1996)	*"Given this, I am inclined*

	Analytic behaviour more likely to change answer upon addition of new information	*to change my response to the previous question"*
Logical Deductions	(Gustafson, 2004) (Chaiken, 1980) Logically derived, or step-by-step decision from information available in the problem set	*"Being logical, you have to go with the numbers"* *"Underperforming..let him go, to gain happiness. Come back and things would be back to normal"* *"If I chose this option, I will not be able to spend time on retailers, who could be a second great source for this. But money is limited, so I would start with the strategy I find to be most lucrative, and then move to the second most lucrative one"* *"They know what to do, then I can move to another task and we end up being more efficient and therefore save money"* *"There is a problem..I try to help it, and it does not work.....so the solution is to fire"*
Ballpark Estimation	Shanteau (1988) Create a rough ballpark estimate first and then conduct a more careful analysis.	*"I would first pick an option from the lower category first"* *[... after careful analysis] "something in the upper end... okay I will price at 700"*

Divide & Conquer	Shanteau (1988) Break down problem into smaller more manageable components before attempting to solve them	*"I don't want to go through the route of training people, so I will eliminate this immediately"*

7.4 Result Tables

Entry Scenario:

Novice Top Strategies 1. Entry Scenario Analytic (AN), Non-Analytic (NA)	
Affect Heuristics (NA)	6
Logical Deductions (AN)	6
Formal Systematic Methods (AN)	6
Focus on Data (AN)	5
Other Heuristics (NA)	4
Insufficient Data (AN)	3
Representativeness Heuristics (NA)	2
Emotional Choice (NA)	1
Storytelling (NA)	1
Ignore The Fluff (NA)	1

Expert Top Strategies 1. Entry Scenario Analytic (AN), Non-Analytic (NA)	
Rules of Thumb (NA)	5
Insufficient Data (AN)	4
Ignore The Fluff (NA)	4
Representativeness Heuristics (NA)	4
Logical Deductions (AN)	3
Affect Heuristics (NA)	2
Creative Solutions (NA)	2
Other Heuristics (NA)	2
Storytelling (NA)	2
Counterfactual Thinking (NA)	1
Divide & Conquer (AN)	1
Focus on Data (AN)	1

Pricing Scenario:

Novice Top Strategies 2. Pricing Scenario Analytic (AN), Non-Analytic (NA)	
Focus on Data (AN)	6
Insufficient Data (AN)	5
Logical Deductions (AN)	5
Other Heuristics (NA)	4
Rules of Thumb (NA)	4
Changing Mind (AN)	2
Representativeness Heuristics (NA)	4
Affect Heuristics (NA)	1
Creative Solutions (NA)	1
Emotional Choice (NA)	1
Formal Systematic Methods (AN)	1

Expert Top Strategies 2. Pricing Scenario Analytic (AN), Non-Analytic (NA)	
Creative Solutions (NA)	7
Rules of Thumb (NA)	6
Formal Systematic Methods (AN)	6
Other Heuristics (NA)	3
Ballpark Estimation (AN)	2
Focus on Data (AN)	2
Insufficient Data (AN)	2
Logical Deductions (AN)	2
Representativeness Heuristics (NA)	2
Storytelling (NA)	2
Counterfactual Thinking (NA)	1
Emotional Choice (NA)	1
Questioning Data (AN)	1

Marketing Scenario:

Novice Top Strategies 3. Marketing Scenario Analytic (AN), Non-Analytic (NA)	
Focus on Data (AN)	5
Logical Deductions (AN)	5
Formal Systematic Methods (AN)	5
Rules of Thumb (NA)	4
Questioning Data (AN)	3
Other Heuristics (NA)	3
Ballpark Estimation (AN)	2
Creative Solutions (NA)	2
Affect Heuristics (NA)	1
Insufficient Data (AN)	1

Expert Top Strategies 3. Marketing Scenario Analytic (AN), Non-Analytic (NA)	
Representativeness Heuristics (NA)	7
Other Heuristics (NA)	5
Creative Solutions (NA)	4
Focus on Data (AN)	3
Formal Systematic Methods (AN)	3
Rules of Thumb (NA)	3
Divide & Conquer (AN)	2
Logical Deductions (AN)	2
Counterfactual Thinking (NA)	1
Emotional Choice (NA)	1
Questioning Data (AN)	1

Termination Scenario:

Novice Top Strategies 4. Termination Scenario Analytic (AN), Non-Analytic (NA)	
Logical Deductions (AN)	7
Focus on Data (AN)	6
Emotional Choice (NA)	5
Affect Heuristics (NA)	2
Affect Infusion (NA)	2
Formal Systematic Methods (AN)	2
Counterfactual Thinking (NA)	1
Divide & Conquer (AN)	1
Insufficient Data (AN)	1
Representativeness Heuristics (NA)	1
Storytelling (NA)	1

Expert Top Strategies 4. Termination Scenario Analytic (AN), Non-Analytic (NA)	
Emotional Choice (NA)	7
Other Heuristics (NA)	5
Counterfactual Thinking (NA)	3
Focus on Data (AN)	3
Formal Systematic Methods (AN)	3
Affect Heuristics (NA)	2
Creative Solutions (NA)	2
Divide & Conquer (AN)	2
Rules of Thumb (NA)	2
Affect Infusion (NA)	1
Insufficient Data (AN)	1
Logical Deductions (AN)	1
Representativeness Heuristics (NA)	1
Storytelling (NA)	1

Exit Scenario:

Novice Top Strategies 5. Exit Scenario Analytic (AN), Non-Analytic (NA)	
Focus on Data (AN)	5
Logical Deductions (AN)	5
Formal Systematic Methods (AN)	4
Counterfactual Thinking (NA)	3
Emotional Choice (NA)	3
Insufficient Data (AN)	3
Affect Heuristics (NA)	2
Rules of Thumb (NA)	2
Affect Infusion (NA)	1
Ballpark Estimation (AN)	1
Divide & Conquer (AN)	1
Representativeness Heuristics (NA)	1

Expert Top Strategies 5. Exit Scenario Analytic (AN), Non-Analytic (NA)	
Affect Heuristics (NA)	7
Counterfactual Thinking (NA)	6
Emotional Choice (NA)	5
Rules of Thumb (NA)	5
Creative Solutions (NA)	4
Formal Systematic Methods (AN)	3
Focus on Data (AN)	2
Logical Deductions (AN)	2
Representativeness Heuristics (NA)	2
Affect Infusion (NA)	1
Ballpark Estimation (AN)	1
Divide & Conquer (AN)	1
Other Heuristics (NA)	1

7.5 Answer Statistics

	Number of Non-Analytic Cues	Number of Analytic Cues	Non-Analytic Min:Max	Analytic Min:Max	Non-Analytic Mean	Analytic Mean	Non-Analytic %	Analytic %
1. Entry Scenario								
Novice Entrepreneurs	15	20	2:6	3:7	3.75	5	43	57
Expert Entrepreneurs	22	9	4:7	1:3	5.5	2.25	71	29
2. Pricing Scenario								
Novice Entrepreneurs	15	19	3:5	2:7	3.75	4.75	44	56
Expert Entrepreneurs	22	15	3:9	1:7	5.5	3.75	59	41
3. Marketing Scenario								
Novice Entrepreneurs	10	21	1:4	5:6	2.5	5.25	32	68
Expert Entrepreneurs	21	11	4:7	2:4	5.25	2.75	66	34
4. Termination Scenario								
Novice Entrepreneurs	12	17	2:5	3:6	3	4.25	41	59
Expert Entrepreneurs	24	10	3:8	1:3	6	2.5	71	29
5. Exit Scenario								
Novice Entrepreneurs	12	19	2:4	4:6	3	4.75	39	61
Expert Entrepreneurs	31	9	5:9	1:5	7.75	2.25	78	23